

ANNUAL REPORT

2017



JPMORGAN CHASE & CO.

Financial Highlights

As of or for the year ended December 31,

(in millions, except per share, ratio data and headcount)

	2017	2016	2015
Reported basis^(a)			
Total net revenue	\$ 99,624	\$ 95,668	\$ 93,543
Total noninterest expense	58,434	55,771	59,014
Pre-provision profit	41,190	39,897	34,529
Provision for credit losses	5,290	5,361	3,827
Net income	\$ 24,441	\$ 24,733	\$ 24,442
Per common share data			
Net income per share:			
Basic	\$ 6.35	\$ 6.24	\$ 6.05
Diluted	6.31	6.19	6.00
Cash dividends declared	2.12	1.88	1.72
Book value	67.04	64.06	60.46
Tangible book value (TBVPS) ^(b)	53.56	51.44	48.13
Selected ratios			
Return on common equity	10%	10%	11%
Return on tangible common equity (ROTCE) ^(b)	12	13	13
Common equity Tier 1 capital ratio ^(c)	12.1	12.2	11.6
Tier 1 capital ratio ^(c)	13.8	13.9 ^(d)	13.3
Total capital ratio ^(c)	15.7	15.2	14.7
Selected balance sheet data (period-end)			
Loans	\$ 930,697	\$ 894,765	\$ 837,299
Total assets	2,533,600	2,490,972	2,351,698
Deposits	1,443,982	1,375,176	1,279,715
Common stockholders' equity	229,625	228,122	221,505
Total stockholders' equity	255,693	254,190	247,573
Market data			
Closing share price	\$ 106.94	\$ 86.29	\$ 66.03
Market capitalization	366,301	307,295	241,899
Common shares at period-end	3,425.3	3,561.2	3,663.5
Headcount	252,539	243,355	234,598

(a) Results are presented in accordance with accounting principles generally accepted in the United States of America, except where otherwise noted.

(b) TBVPS and ROTCE are each non-GAAP financial measures. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Financial Performance Measures on pages 52-54.

(c) The ratios presented are calculated under the Basel III Advanced Fully Phased-In Approach, and they are key regulatory capital measures. For further discussion, see "Capital Risk Management" on pages 82-91.

(d) The prior period ratio has been revised to conform with the current period presentation.

JPMorgan Chase & Co. (NYSE: JPM) is a leading global financial services firm with assets of \$2.5 trillion and operations worldwide. The firm is a leader in investment banking, financial services for consumers and small businesses, commercial banking, financial transaction processing, and asset management. A component of the Dow Jones Industrial Average, JPMorgan Chase & Co. serves millions of customers in the United States and many of the world's most prominent corporate, institutional and government clients under its J.P. Morgan and Chase brands.

Information about J.P. Morgan's capabilities can be found at jpmorgan.com and about Chase's capabilities at chase.com. Information about JPMorgan Chase & Co. is available at jpmorganchase.com.

46.7

MILLION DIGITAL CUSTOMERS

46.7 million digital customers make us the #1 most visited bank website with the most mobile banking customers

\$900+

BILLION

\$900+ billion in debit and credit card sales volume

\$1.75

BILLION

\$1.75 billion in philanthropic investments over the next five years

\$200

BILLION

\$200 billion in clean energy financing by 2025

TOP
EMPLOYER

Named a top company by LinkedIn for where people want to work

#1

#1 on *Fortune's* Change the World list

400

Opening 400 new branches in 15-20 markets over the next five years

100%

Renewable energy for 100% of the firm's global power by 2020

\$5

TRILLION

\$5 trillion daily value of wholesale payments across 120 currencies

\$1.3

TRILLION

\$1.3 trillion in assets under management shifted to J.P. Morgan by BlackRock as part of the largest custody mandate in history

TOP 50

Top 50 metro areas covered by Commercial Banking following expansion into new locations

86%

86% of long-term mutual fund assets under management ranked in top two quartiles over 10-year period

Dear Fellow Shareholders,



Jamie Dimon,
Chairman and
Chief Executive Officer

Once again, I begin this letter with a sense of pride about JPMorgan Chase. As I look back on last year – in fact, the last decade – it is remarkable how well our company has performed. And I’m not only talking about our strong financial performance – but also about how much we have accomplished to help our clients, customers and communities all around the world. Ours is an exceptional company with an extraordinary heritage and a promising future.

We continue to make excellent progress around technology, risk and controls, innovation, diversity and reduced bureaucracy. We’ve helped communities large and small – by doing what we do best (lending, investing and serving our clients); by creatively expanding certain flagship Corporate Responsibility programs, including the Entrepreneurs of Color Fund, The Fellowship Initiative and our Service Corps; and by applying our successful Detroit investment model to neighborhood revitalization efforts in the Bronx in New York City, Chicago and Washington, D.C.

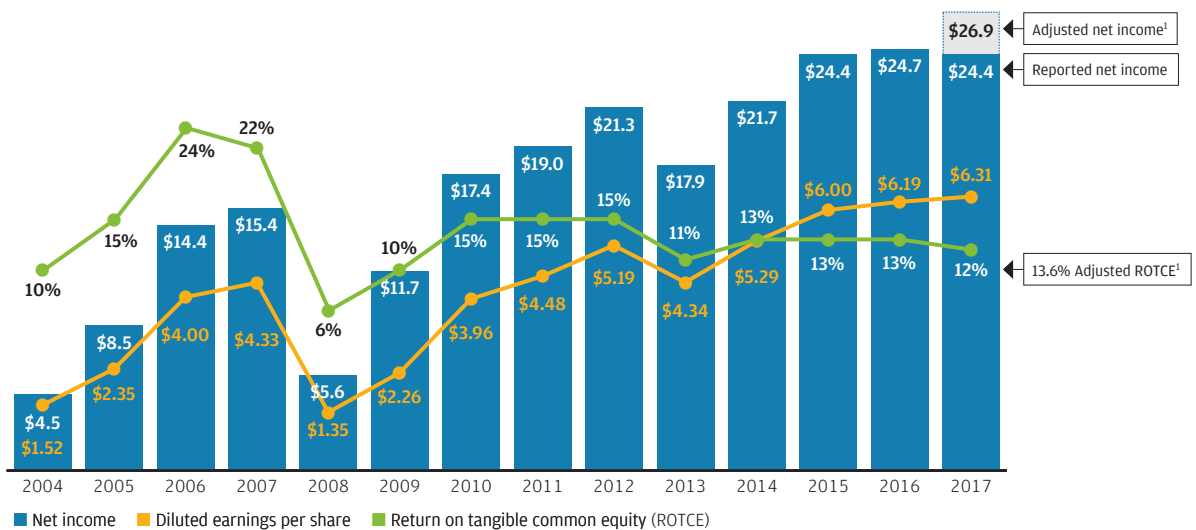
Throughout a period of profound political and economic change around the world, our company has been steadfast in our dedication to the clients, communities and countries we serve while earning a fair return for our shareholders.

2017 was another record year across many measures for our company as we added clients and customers and delivered record earnings per share. We earned \$24.4 billion in net income on revenue¹ of \$103.6 billion (if we exclude the tax charge at year-end, 2017 net income would have been a record \$26.9 billion), reflecting strong underlying performance across our businesses. We now have delivered record results in seven of the last eight years, and we have confidence that we will continue to deliver in the future.

¹ Represents managed revenue

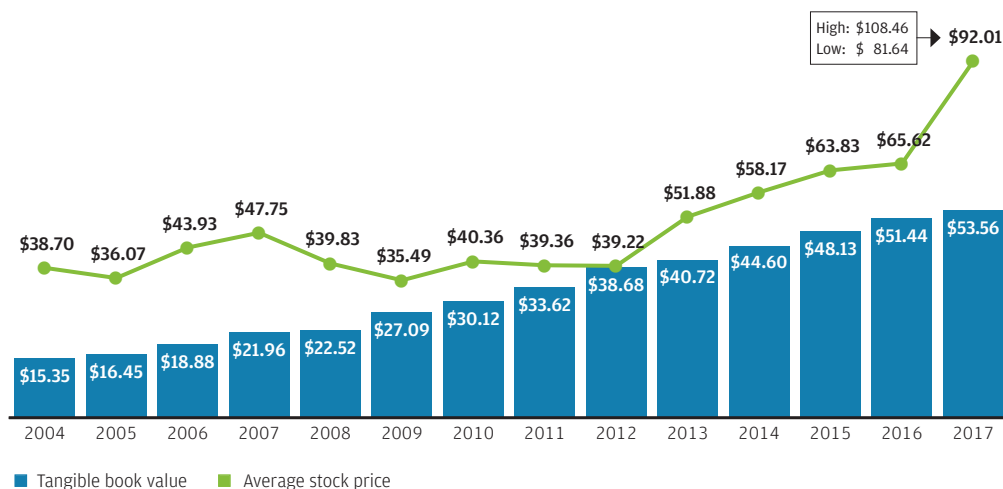
Earnings, Diluted Earnings per Share and Return on Tangible Common Equity 2004-2017

(\$ in billions, except per share and ratio data)



¹ Adjusted results exclude a \$2.4 billion decrease to net income as a result of the enactment of the Tax Cuts and Jobs Act (TCJA)

Tangible Book Value and Average Stock Price per Share 2004-2017



As you know, we believe tangible book value per share is a good measure of the value we have created for our shareholders. If our asset and liability values are appropriate – and we believe they are – and if we can continue to deploy this capital profitably, we now think that it can earn approximately 17% return on tangible equity for the foreseeable future. Then, in our view, our company should ultimately be worth considerably more than tangible book value. The chart on the bottom of page 3 shows that tangible book value “anchors” the stock price.

Bank One/JPMorgan Chase & Co. tangible book value per share performance vs. S&P 500			
	Bank One (A)	S&P 500 (B)	Relative Results (A) – (B)
Performance since becoming CEO of Bank One (3/27/2000–12/31/2017)¹			
Compounded annual gain	11.8%	5.2%	6.6%
Overall gain	566.3%	147.3%	419.0%
	JPMorgan Chase & Co. (A)	S&P 500 (B)	Relative Results (A) – (B)
Performance since the Bank One and JPMorgan Chase & Co. merger (7/1/2004–12/31/2017)			
Compounded annual gain	12.7%	8.8%	3.9%
Overall gain	403.5%	210.4%	193.1%
Tangible book value over time captures the company's use of capital, balance sheet and profitability. In this chart, we are looking at heritage Bank One shareholders and JPMorgan Chase & Co. shareholders. The chart shows the increase in tangible book value per share; it is an after-tax number assuming all dividends were retained vs. the Standard & Poor's 500 Index (S&P 500), which is a pre-tax number with dividends reinvested.			
¹ On March 27, 2000, Jamie Dimon was hired as CEO of Bank One.			

In the last five years, we have bought back nearly \$40 billion in stock. In prior years, I explained why buying back our stock at tangible book value per share was a no-brainer. Six years ago, we offered an example of this, with earnings per share and tangible book value per share being substantially higher than they otherwise would have been just four years later. While we prefer buying back our stock at tangible book value, we think it makes sense to do so even at or above two times tangible book value for reasons similar to those we've expressed in the past. If we buy back a big block of stock this year, we would expect (using analyst earnings estimates for the next five years) earnings per share in five years to be 2%–3% higher and tangible book value to be virtually unchanged.

We want to remind our shareholders that we *much* prefer to use our capital to grow than to buy back stock. Buying back stock should only be considered when we either cannot invest (sometimes that's a function of regulatory policies) or when we are generating excess, unusable capital. We currently have excess capital, but due to recent tax reform and a more constructive regulatory environment, we hope, in the future, to use more of our excess capital to grow our businesses, expand into new markets and support our employees.

Stock total return analysis			
	Bank One	S&P 500	S&P Financials Index
Performance since becoming CEO of Bank One (3/27/2000–12/31/2017)¹			
Compounded annual gain	12.4%	5.2%	4.1%
Overall gain	691.5%	147.3%	102.8%
	JPMorgan Chase & Co.	S&P 500	S&P Financials Index
Performance since the Bank One and JPMorgan Chase & Co. merger (7/1/2004–12/31/2017)			
Compounded annual gain	10.7%	8.8%	3.6%
Overall gain	294.2%	210.4%	61.6%
Performance for the period ended December 31, 2017			
Compounded annual gain			
One year	26.7%	21.8%	22.1%
Five years	22.7%	15.8%	18.2%
Ten years	12.0%	8.5%	3.7%
These charts show actual returns of the stock, with dividends reinvested, for heritage shareholders of Bank One and JPMorgan Chase & Co. vs. the Standard & Poor's 500 Index (S&P 500) and the Standard & Poor's Financials Index (S&P Financials Index).			
¹ On March 27, 2000, Jamie Dimon was hired as CEO of Bank One.			

Our stock price is a measure of the progress we have made over the years. This progress is a function of continually making important investments, in good times and not-so-good times, to build our capabilities – people, systems and products. These investments drive the future prospects of our company and position it to grow and prosper for decades. Whether looking back over five years, 10 years or since the Bank One/JPMorgan Chase merger (approximately 13 years ago), our stock has significantly outperformed the Standard & Poor's 500 Index (S&P 500) and the S&P Financials Index. And this growth came during a time of unprecedented challenges for banks – both the Great Recession and the

extraordinarily difficult legal, regulatory and political environment that followed. We have long contended that these factors explained why bank stock price/earnings ratios were appropriately depressed. And we believe the anticipated reversal of many negatives and an increasingly more favorable business environment, coupled with our sustained, strong business results, are among the reasons our stock price has done so well this past year.

We do not worry about the stock price in the short run, and we do not worry about quarterly earnings. Our mindset is that we consistently build the company – if you do the right things, the stock price will take care of itself. In the next section, I discuss in more detail how we think about building shareholder value for the long run while also taking care of customers, employees and communities.

JPMorgan Chase stock is owned by large institutions, pension plans, mutual funds and directly by individual investors. However, it is important to remember that in almost all cases, the ultimate owner is an individual. Well over 100 million people in the United States own stocks, and a large percentage of them, in one way or another, own JPMorgan Chase stock. Many of these people are veterans, teachers, police officers, firefighters, retirees, or those saving for a home, school or retirement. Your management team goes to work every day recognizing the enormous responsibility that we have to perform for our shareholders.

In this letter, I discuss the issues highlighted below – which describe many of our successes and opportunities, as well as our challenges and responses.

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I. JPMORGAN CHASE BUSINESS STRATEGIES

Since our business leaders describe their businesses later in this report, I am not going to be repetitive within this section. I encourage you to read their letters following this Letter to Shareholders. Instead, in this section, I deal with some critical themes around how we run this company – in good times and in bad times – and how we are continuing to build for what we think will be a bright future.

1. How has the company grown?

Below is a powerful representation of how we have grown and built client franchises over time.

You can see from the numbers circled within the chart below that we have grown our market share fairly substantially in most of our businesses. In some cases, these market

Client Franchises Built Over the Long Term

	2006	2016	2017		
Consumer & Community Banking	Deposits market share ¹	3.6%	8.3%	8.7%	■ Relationships with ~50% of U.S. households ■ Industry-leading deposit growth¹² ■ #1 U.S. credit card issuer¹³ ■ #1 U.S. co-brand credit card issuer¹⁴ ■ #1 U.S. credit and debit payments volume¹⁵ ■ #2 merchant acquirer¹⁶
	# of top 50 Chase markets where we are #1 (top 3)	11 (25)	14 (38)	16 (40)	
	Average deposits growth rate	8%	10%	9%	
	Active mobile customers growth rate	NM	16%	13%	
	Credit card sales market share ²	15.9%	21.5%	22.4%	
	Merchant processing volume ³ (\$B)	\$661	\$1,063	\$1,192	
	# of branches	3,079	5,258	5,130	
	Client investment assets (\$B)	~\$80	\$235	\$273	
	Business Banking primary market share ²⁴	5.1%	8.5%	8.7%	
Corporate & Investment Bank	Global Investment Banking fees ⁴	#2	#1	#1	■ >80% of Fortune 500 companies do business with us ■ #1 in both N.A. and EMEA Investment Banking fees¹⁷ ■ #1 in Global Long-Term Debt and Loan Syndications¹⁷ ■ #1 in FICC productivity¹⁸ ■ Top 3 Custodian globally with AUC of \$23.5T¹⁹ ■ #1 in USD payment volumes with 20% share in 2017²⁰ ■ In Total Markets, J.P. Morgan has ranked #1 in each year since 2012²⁵ ■ Equities and Prime are now ranked co-#1²⁵ ■ J.P. Morgan Research ranked as the #1 Global Research Firm²⁶
	Market share ⁴	8.7%	7.9%	8.1%	
	Total Markets revenue ⁵	#8	#1	#1	
	Market share ⁵	6.3%	11.2%	11.0%	
	FICC ⁵	#7	#1	#1	
	Market share ⁵	7.0%	11.7%	11.4%	
	Equities ⁵	#8	#2	co-#1	
	Market share ⁵	5.0%	10.1%	10.3%	
	Assets under custody (AUC)(\$T)	\$13.9	\$20.5	\$23.5	
Commercial Banking	# of top 50 MSAs with dedicated teams	26	47	50	■ Top 3 in overall Middle Market, large Middle Market and Asset Based Lending Bookrunner²¹ ■ Industry-leading credit performance – 6th straight year of net recoveries or single digit NCO rate
	Bankers	1,203	1,642	1,766	
	New relationships (gross)	NA	911	1,062	
	Gross Investment Banking revenue (\$B)	\$0.7	\$2.3	\$2.3	
	Average loans (\$B)	\$53.6	\$179.4	\$198.1	
	Average deposits (\$B)	\$73.6	\$174.4	\$177.0	
Asset & Wealth Management	Multifamily lending ⁷	#28	#1	#1	■ 86% of 10-year long-term mutual fund assets under management (AUM) in top 2 quartiles²² ■ #2 in 5-year cumulative long-term client asset flows among publicly traded peers ■ #1 Private Bank in N.A. and LatAm²³ ■ Revenue and long-term AUM growth >90% since 2006
	Mutual funds with a 4/5 star rating ⁸	119	220	235	
	Ranking of long-term client asset flows ⁹	NA	#2	#2	
	Active AUM market share ¹⁰	1.8%	2.5%	2.4%	
	North America Private Bank (<i>Euromoney</i>)	#1	#1	#1	
	Client assets (\$T)	\$1.3	\$2.5	\$2.8	
	Client assets market share ¹¹	3%	4%	4%	
	Average loans (\$B)	\$26.5	\$112.9	\$123.5	
# of Wealth Management client advisors	1,506	2,504	2,605		

For information on footnotes 1-23, refer to slides 105-106 in the 2018 JPMorgan Chase Strategic Update presentation, which is available on JPMorgan Chase & Co.'s website (https://www.jpmorganchase.com/corporate/investor-relations/document/3cea4108_strategic_update.pdf), under the heading Investor Relations, Events & Presentations, JPMorgan Chase 2018 Investor Day, and on Form 8-K as furnished to the U.S. Securities and Exchange Commission (SEC) on February 27, 2018, which is available on the SEC's website (www.sec.gov).

²⁴Source: Barlow Research Associates, Primary Bank Market Share Database as of 4Q17. Rolling eight quarter average of small businesses with revenues of \$100,000 - <\$25 million

²⁵Source: Preliminary Coalition Global Industry Revenue Pool based on internal business structure, 2017

²⁶Source: *Institutional Investor* magazine survey of large investors, 2017

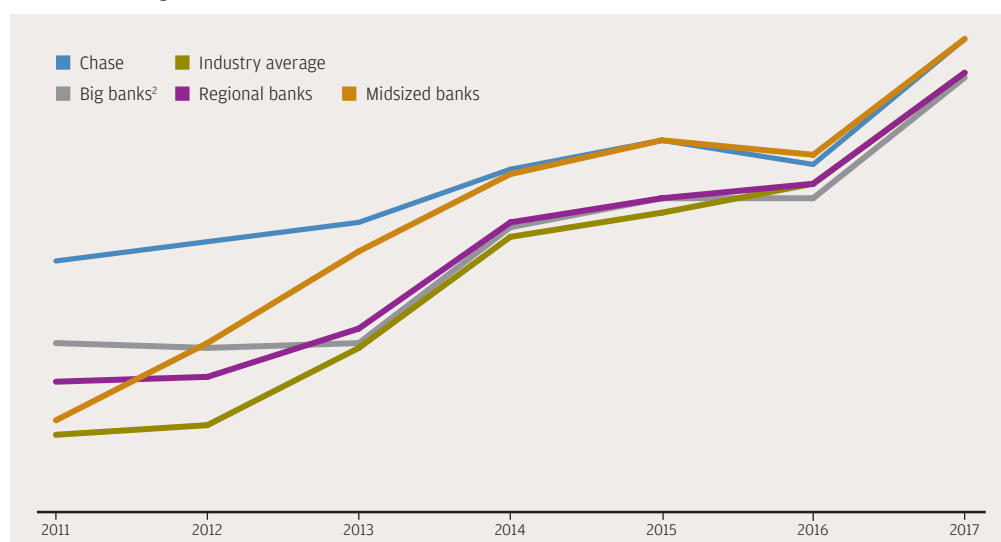
NM = Not meaningful
NA = Not available
FICC = Fixed Income, Currencies and Commodities
N.A. = North America
EMEA = Europe/Middle East/Africa
MSAs = Metropolitan Statistical Areas
LatAm = Latin America/Caribbean
B = Billions
T = Trillions

share increases were due to our acquisitions of Bear Stearns and Washington Mutual. But in all cases, this growth is driven by consistent and disciplined investment in our businesses. The chart below shows how we try to measure customer satisfaction in multiple

ways. For the most part, we have seen a rise in these scores as well. It is a given that you will not grow your share – unless you are satisfying your customers – and we know they can always walk across the street to be served by another bank.

Increasing Customer Satisfaction

U.S. retail banking satisfaction¹



¹ Source: J.D. Power U.S. Retail Banking Satisfaction Study, 2017

² Big banks defined as top six U.S. banks

Other important metrics

Increasing market share is a sign of increasing customer satisfaction

Consumer & Community Banking

- Chase continues to lead the big banks and the industry average in U.S. Consumer Bank Customer Satisfaction studies including being ranked #1 in retail banking advice in the U.S. and ranked #2 in the first ever National Bank study¹
- Customer satisfaction, measured by Net Promoter Scores ("NPS"), has continued to increase across most of our businesses since we brought CCB together five years ago. NPS increased year over year in Merchant Services, Business Banking, Home Lending, and Auto
- Digitally-engaged customers who bank with Chase are more satisfied than all other households, with higher NPS (+19%), higher retention rates (+10 percentage points), and higher card spend (+118%)
- Digitally-engaged established customers who use Chase as their primary bank also have 40% more deposits and investments with us

Corporate & Investment Bank

- Highest ever client satisfaction and retention levels for Custody & Fund Services

Commercial Banking

- NPS for Commercial Banking Middle Market clients increased from 35 to 45 from 2011 to 2017²
- #1 in overall satisfaction, perceived satisfaction, customer relationships and transactions/payments processing³

Asset & Wealth Management

- J.P. Morgan has ranked as the #1 private bank in the U.S. for nine consecutive years and #1 in Latin America for five consecutive years⁴
- J.P. Morgan has ranked as the Leading Pan-European Fund Management Firm for eight consecutive years⁵

¹ Source: J.D. Power 2018 U.S. Retail Banking Advice Study & 2017 National Bank Satisfaction Study

² Source: Greenwich Associates Commercial Banking Study, 2017

³ Source: CFO magazine's Commercial Banking Survey, 2017

⁴ Source: Euromoney, 2018

⁵ Source: Thomson Reuters, 2017

2. How will the company continue to grow? What are the organic growth opportunities?

We have good market share in most businesses, but we see organic growth opportunities almost everywhere – some large and some small. Following are a few examples:

Consumer & Community Banking

- We recently announced that we will start to expand the consumer branch business into cities like Boston, Philadelphia and Washington, D.C. Over the next five years, we hope to expand to another 15-20 new markets. We know the competition is tough, but we have much to offer. When JPMorgan Chase comes to town, we come not just with our consumer branches but also with mortgages, investments, credit cards, private banking, small and mid-sized business banking, government business and corporate responsibility initiatives to support our communities.
- In addition, this year we are rolling out many new exciting products and have made several improvements around the customer's experience, including a fully mobile bank pilot (Finn), digital account openings, facial recognition in our app, the Amazon Prime Rewards Visa card and a simpler online application for Business Banking customers.
- We also are adding many tools that will help our customers manage their financial affairs. For example, in the credit card business, we will be allowing our customers to review and decide how and where they want their cards and credit lines to be used. In Consumer Banking, we are adding financial planning tools and insights that help customers make the most of their money – and there's more coming.

Corporate & Investment Bank

- We see growth opportunities even in Fixed Income, Currencies and Commodities, where we already have the #1 market share at 11.4%. There may be some underlying growth as the capital markets of the world grow, even though this is partially offset by declining margins like we have experienced over the last 30 years. However, we see opportunities to gain share in various products and in certain regions where we have low share.
- This opportunity would be true for Investment Banking, too. Country by country and industry by industry, there are still plenty of opportunities to increase our low market share. For example, we have 10% share in the United States but less than 5% share in Asia.
- In Treasury Services and Custody, where our market shares are 4.7% and 8.0%, respectively, we believe we can grow significantly by adding bankers, building better technology, entering new countries, building better products and continuing to do a great job for clients. In this business, while you make large initial investments in order to grow, when you gain clients, they usually stick with you for a long time.
- Over time, we do expect to expand our Corporate & Investment Bank into new countries, which will benefit all the businesses within this franchise.

Commercial Banking

- This past year, Commercial Banking has completed its expansion into the top 50 markets in the United States – this will drive growth for decades. And remember, when Commercial Banking opens its doors, it also helps drive the growth of our Private Bank and the Corporate & Investment Bank businesses.
- Commercial Banking has added many specialized industry bankers to better serve those specific segments.

Asset & Wealth Management

- In the United States, our share of the ultra-high-net-worth market (\$10 million or greater) is 8%. We believe we have a superior business and that we can grow our share by essentially adding bankers, branches and better products.
- In the high-net-worth business (\$3 million to \$10 million) and the Chase affluent business (\$500,000 to \$5 million), our market shares are only 1% and 4%, respectively. We have no doubt that we can grow by adding bankers and locations, particularly because we have some exciting new products coming soon. There is no reason we can't more than double our share over the next 10 years.
- We are also adding new products, like index funds and exchange-traded funds (ETF), that we believe will help drive growth.

Across the company

In addition, we are undertaking many initiatives across the company that will help grow our businesses and better serve our customers.

- On the payments front, we have developed multiple products to make wholesale payments better, easier and faster. We are rolling out these products across our platforms, and they should help us solidify and grow our position.
- On the consumer side, we have introduced Chase Pay, the digital equivalent to using a debit or credit card, which allows customers to pay online or in-store with their mobile phone. We also introduced Zelle, a real-time consumer-to-consumer payments system, which allows customers to easily, safely and immediately send money to their friends and family. We expect these products to drive lots of customer interactions and make our payments offerings compelling, even as some very smart fintech competitors emerge.
- Across the company – not just in technology – we have thousands of employees who are data scientists or have advanced degrees in science, technology, engineering and math. Of the nearly 50,000 people in technology at the company, more than 31,000 are in development and engineering jobs, and more than 2,500 are in digital technology. Think of these talented individuals as driving change across the company.
- Artificial intelligence, big data and machine learning are helping us reduce risk and fraud, upgrade service, improve underwriting and enhance marketing across the firm. And this is just the beginning.
- Our shared technology infrastructure – our networks, data centers, and the public and private cloud – decreases costs, enhances efficiency and makes all our businesses more productive. In addition, this allows us to embrace the fact that every business and merchant has its own software and also wants easy, integrated access to our products and services. We are delivering on that through the creation of a common JPMorgan Chase API (application programming interface) store that allows customers to add simple, secure payments to their software. And we are building everything digital – both for individual customers and large corporations – from onboarding to idea generation.
- Increasingly, the management teams of Consumer & Community Banking, Corporate & Investment Bank, Commercial Banking and Asset & Wealth Management share ideas, share platforms and serve each other's customers. The success of any one business almost always helps the other three.

- **Privacy and safety – we spend an enormous amount of resources to protect all of our clients and customers from fraud, cybersecurity risk and invasion of their privacy.** These capabilities are extraordinary, and we will continue to relentlessly build them. As part of this, we have consistently warned our customers about privacy issues, which will become increasingly critical for all industries as consumers realize the severity of the problem. Last year, we wrote about a new arrangement with Intuit that bears repeating – it briefly described the problem and presented a solution, which we hope might set a standard for protecting customers while giving them control of their data.

For years, we have been describing the risks – to banks and customers – that arise when customers freely give away their bank passcodes to third-party services, allowing virtually unlimited access to their data. Customers often do not know the liability this may create for them if their passcode is misused, and, in many cases, they do not realize how their data are being used. For example, access to

the data may continue for years after customers have stopped using the third-party services.

We recently completed a new arrangement with Intuit, which we think represents an important step forward. In addition to protecting the bank, the customers and even the third party (in this case, Intuit), it allows customers to share data – how and when they want. Under this arrangement, customers can choose whatever they would like to share and opt to turn these selections on or off as they see fit. The data will be “pushed” to Intuit, eliminating the need for sharing bank passcodes, which protects the bank and our customers and reduces potential liabilities on Intuit’s part as well. We are hoping this sets a new standard for data-sharing relationships.

Events from the past year underscore the importance of efforts like this. As questions are raised about how consumers’ information is shared and protected, I strongly believe that data privacy and security should be a way in which we and other businesses compete to serve customers.

3. Why is organic growth a better way to grow – and why is it sometimes difficult?

Organic growth is all about hiring and training bankers, opening branches, improving or innovating new products and building new technology. It is **hard** work. In fact, institutionally, there is often a lot of resistance to it. It’s easier **not** to add expenses, even when they are good for the business. And growing any sales force is usually met by some opposition from – guess who? – the existing sales force. Sometimes people are afraid the change will take away from their compensation pool or their client base. And it’s hard work to properly recruit and train salespeople. Building new products and services is sometimes in conflict with existing products and services. All of these

efforts require huge team coordination. So it’s no surprise that it’s sometimes easier not to push organic growth. However, if you build the right culture, where management teams are intensely analytical and critical of their own business’ strengths, weaknesses and opportunities, you can create great clarity about what those opportunities are. If you have strong leaders, they have the discipline and fortitude to develop and execute a forward-looking growth plan.

4. Is there a conflict between building shareholder value vs. serving customers, taking care of employees and lifting up communities?

Keeping JPMorgan Chase a healthy and vibrant company is the *best* thing we can do for our shareholders, our customers, our employees and our communities. Building shareholder value is the *primary* goal of a business, but it is simply not possible to do well if a company is not properly treating and serving its customers, training and motivating its employees, and being a good citizen in the community. If they are all done well, it enhances shareholder value. Let me explain.

We cannot be a healthy and vibrant company if we are not both delivering financial success and investing for the future.

Show me a company that is not financially successful (in the long run), and I will show you an unsuccessful company. This is particularly true for a bank, where confidence in its stability is critical. I should caution, however, that financial success is a little more complex than short-term profits – and many investors are completely aware of this.

Do not confuse financial success with profits in a quarter or even in a year. All businesses have a different customer and investment life cycle, which can be anywhere from one year to 30 years – think of building new restaurants to developing new airplanes or building electrical grids. Generally, anything our business does to grow will cost money in the short term (whether it's opening branches or conducting research and development (R&D) or launching products), but it does not mean that it is not the right financial decision. A company could be losing money on its way to bankruptcy *or* on its way to a very high return on invested

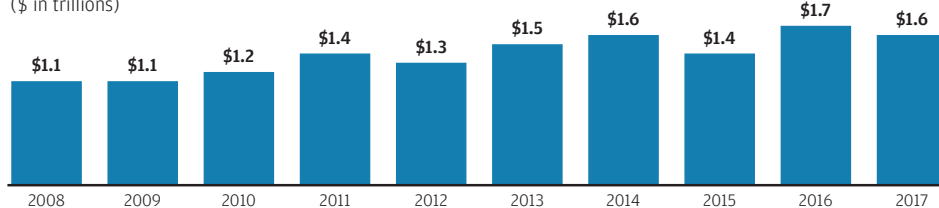
capital. Diligent management teams understand the difference between the two scenarios and invest in a way that will make the company financially successful over time. You need to invest continually for better products and services so you can serve your customers in the future.

A bank cannot simply stop serving its clients or halt investing because of quarterly or annual earnings pressures. It does not work when long-term investing is changed because of short-term pressures – you cannot stop-start training programs and the development of new products, among other investments. You need to serve your clients and make investments while explaining to shareholders why certain decisions are appropriate at that time. Earnings results for any one quarter or even the next few years are fundamentally the result of decisions that were made years and even decades earlier.

New and Renewed Credit and Capital for Our Clients at December 31,

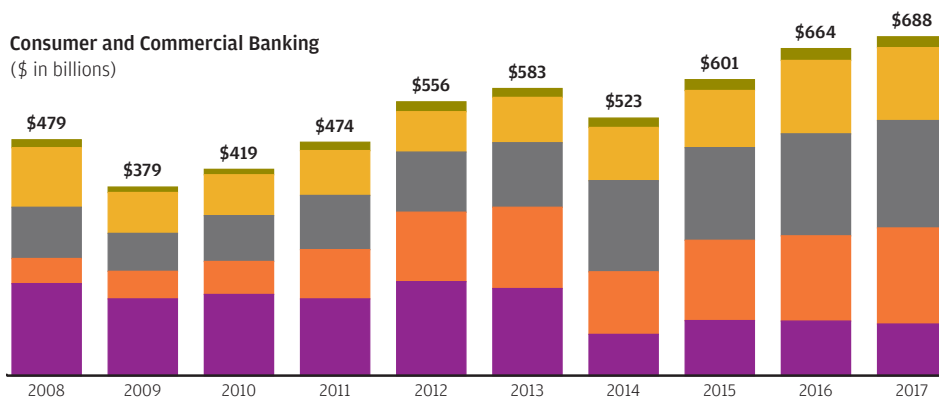
Corporate clients

(\$ in trillions)



Consumer and Commercial Banking

(\$ in billions)

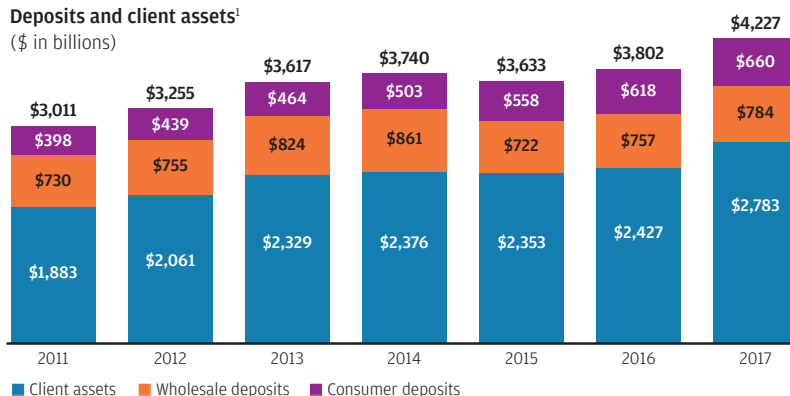


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Small business	\$ 16	\$ 7	\$ 11	\$ 17	\$ 20	\$ 18	\$ 19	\$ 22	\$ 24	\$ 22
Card & Auto	121	83	83	91	82	92	108	116	149	148
Commercial/Middle market	104	77	93	110	122	131	185	188	207	218
Asset & Wealth management	51	56	67	100	141	165	127	163	173	195
Mortgage/Home equity	187	156	165	156	191	177	84	112	111	105

Assets Entrusted to Us by Our Clients at December 31,

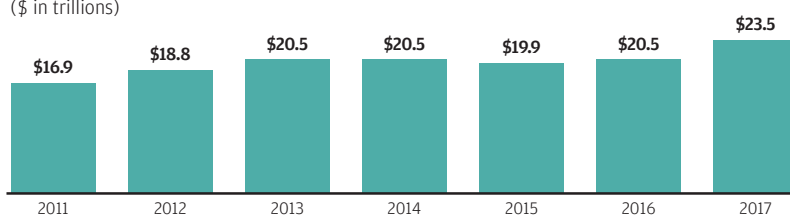
Deposits and client assets¹

(\$ in billions)



Assets under custody²

(\$ in trillions)



¹ Represents assets under management, as well as custody, brokerage, administration and deposit accounts

² Represents activities associated with the safekeeping and servicing of assets

We have to be there for our clients in good times and bad. And we have to continuously improve the products and services we provide to them.

If you are a bank, your clients rely on you to always be there, regardless of the environment – banks are the lender of last resort. Contrary to public opinion, most banks consistently extended credit to their clients (without dramatically raising lending rates) throughout the Great Recession. The charts on page 14 show how we have consistently been there for our clients and that they trust us to hold their assets.

We simply cannot deliver to our shareholders what they deserve if we do not have high-quality, motivated, committed employees.

Talented, diverse employees deliver lifelong – and satisfied – customers. They also deliver innovative products, excellent training and outstanding ideas. Basically, everything we do emanates from our employees. And all of this creates shareholder value. We do not try to get the last dollar of profit off of our employees' or customers' backs. We want long-tenured employees and satisfied customers who stay with us year after year. We would rather earn a fair return and grow our businesses long term than try to maximize our profit over any one time period.

Great employees are the result of a healthy, open and respectful environment and continual investment in training. And great employees are the result of management teams that are humble enough to recognize that they don't know everything their employees do and, therefore, are always seeking out constructive feedback.

While keeping JPMorgan Chase a healthy and vibrant company is the best thing we can do for our communities, there's a lot more we can do.

It is important to explain both what we do and why it is so important for our communities.

As the primary engine of economic growth, the private sector has an important role to play in making sure the benefits are widely shared. The future of business and the health

of our communities are *inextricably linked*. We believe that making the economy work for more people is not simply a moral obligation – it's a business imperative.

Using our unique capabilities, we can do even more for our communities to help lift them up. We have broad and unique knowledge around how communities can develop, how work skills can be successfully implemented, how businesses can be started, how inequality can be addressed, how financial health can be secured, and how more families can find jobs and affordable housing.

We continue to step up our efforts to help communities. In 2017, we were honored to be ranked by *Fortune* magazine as the #1 company changing the world in recognition of our work in Detroit and other communities.

We do extensive investing to help our communities, such as providing affordable housing, lending to lower income households and helping advise governments in economic development. Our philanthropic efforts are only a part of what we do – but a very important part. This year, we announced we will increase our philanthropic investments by 40%. Over the next five years, we will spend \$1.75 billion to help drive inclusive growth in communities around the world. Our head of Corporate Responsibility talks about our significant progress and specific measures in more detail in his letter, but I would like to highlight a few initiatives:

- **We are helping communities realize their potential as engines of growth and shared prosperity.** In 2014, we launched our most comprehensive corporate responsibility initiative to date to try to help Detroit, an iconic city that was long engulfed in economic turmoil and then bankruptcy. We view our initiative in Detroit as validation of our firm's model for driving inclusive growth. Three years in, we exceeded our initial \$100 million commitment, and we now expect to invest \$150 million in the city by 2019. We see the results on the ground – people are moving back into the city, small businesses are being created and

expanded, and for the first time in 17 years, property values are on the rise. Our work in Detroit has taught us many important lessons, and this past year, we extended our model for impact to communities in need in Chicago and Washington, D.C.

- **Helping people develop the skills they need to compete for today's jobs can transform lives and strengthen economies.** JPMorgan Chase is investing more than \$350 million to support demand-driven skills training around the world. Through New Skills for Youth, we launched additional innovation sites to expand high-quality, career-focused education programs in cities across the United States and around the world.
- **The path to opportunity begins at an early age, but too many young people, particularly from disadvantaged backgrounds, do not get a fair shot at economic opportunity.** High school graduation rates for young men of color are dangerously low, and many who do graduate lack the skills they need to be successful in college or their careers. Through programs like The Fellowship Initiative (TFI), we are working to address barriers to opportunity. TFI engages young men of color in a comprehensive program that includes academic support, leadership development and mentoring during their critical high school years. This past year, we expanded this program to Dallas and recruited new classes of Fellows in Chicago, Los Angeles and New York. One hundred percent of these students are graduating from high school, and, combined, they have been accepted into more than 200 colleges and universities across the country.
- **Supporting re-entry programs is an important part of our effort to create opportunity that strengthens communities and results in a stronger economy.** The overwhelming majority of Americans who are incarcerated return to their communities after they are released. Reducing recidivism is not only important to returning citizens and their families – it can also have profound implications for public safety. New research from The Brookings Institution shows that, not surprisingly, joblessness and incarceration are related. Barriers to hiring returning citizens come in different forms, and some are imposed from the outside. This year, we welcomed the Federal Deposit Insurance Corporation's proposed changes to allow banks more flexibility in hiring returning citizens. Our responsibility to recruit, hire, retain and train talented workers extends to this population. Earlier this year, I visited one of our partnering organizations, the North Lawndale Employment Network in Chicago, which gives formerly incarcerated Americans a path to well-paying jobs. The network also builds a pipeline of trained mechanics for Chicago's growing transportation sector. This is a win-win for workers, employers and the economy as a whole.
- **We are expanding innovative models that enable more people to share in the rewards of a growing economy.** Small businesses are growing fastest among people of color, yet, despite their critical role in boosting economic growth, these businesses receive only a fraction of traditional loans compared with non-minority entrepreneurs. In Detroit, a city with the fourth-largest number of minority-owned small businesses, we quickly saw the need to address the challenges facing minority entrepreneurs. Therefore, in 2015, we helped launch the *Entrepreneurs of Color Fund in Detroit* to provide underserved entrepreneurs with greater access to the capital and assistance they needed. Seeing the tremendous success this program has had in Detroit, we decided to scale this model to the South Bronx in New York City, as well as San Francisco – cities that are experiencing similar challenges.

Our Diverse Workforce

I believe the door to diversity opens when you run a great company where everyone feels they are treated fairly and with respect – this is what we strive to create at JPMorgan Chase. We are devoted to diversity for three reasons, and each reason stands on its own – combined, they are powerful. First, it is the right thing to do from a moral perspective. Second, it is better for business to include a group of people who represent the various communities where we operate. And third, if I can pick my team from among all diverse people, I will have the best team.

We have more than 252,000 employees globally, with over 170,000 in the United States. Women represent 50% of our employees. Recently, Oliver Wyman, a leading global management consulting firm, issued a report stating that it would be 30 years before women reach 30% executive committee representation within global financial services companies. So you might be surprised to learn that, today, 50% of the Operating Committee members reporting to me are women as are approximately 30% of our firm's senior leader-

ship globally. They run major businesses – several units on their own would be among Fortune 1000 companies. In addition to having five women on our Operating Committee – who run Asset & Wealth Management, Finance, Global Technology, Legal and Human Resources – some of our other businesses and functions headed by women include Consumer Banking, Credit Card, U.S. Private Bank, U.S. Mergers & Acquisitions, Global Equity Capital Markets, Global Research, Global Custody, Regulatory Affairs, Global Philanthropy, our U.S. branch network, our Controller and firmwide Marketing. I believe we have some of the best women leaders in the corporate world globally. In addition to gender diversity, 48% of our firm's population is ethnically diverse in the United States.

We are proud of JPMorgan Chase's industry recognition for its diversity and inclusion efforts. In 2017, we received more than 50 awards that recognize the firm and represent the diversity of our employees.

Advancing Black Leaders

In 2016, we introduced Advancing Black Leaders (ABL), an expanded diversity strategy focused on increased hiring, retention and development of talent from within the black community. This specifically recognized that – with this population – we should and could do more. We set up a separate group whose sole purpose is to help do this better. From training to retention to recruiting and hiring new employees, our intensified efforts are starting to pay off.

Two years into this initiative, we are seeing encouraging results. At executive levels, we closed 2017 with a noticeable increase in headcount (97 black managing directors globally, up from 83 a year earlier), driven by recruiting new talent and promoting existing talent. In addition, we are seeing positive headcount gains in our pipeline

for mid-level managers over the last two years, with executive director representation up 30%, emerging talent with vice president representation up 17% and student talent up 7%. To encourage dialogue and engage our people, more than 85,000 employees were invited to participate in ABL Dialogues – a series of interactive panel discussions facilitated by local leaders in 10 U.S. strategic hubs.

We recently developed a few additional plans and goals for this effort, which we believe will improve these results dramatically.

5. Transparency, financial discipline and a fortress balance sheet. Why is this discipline so important?

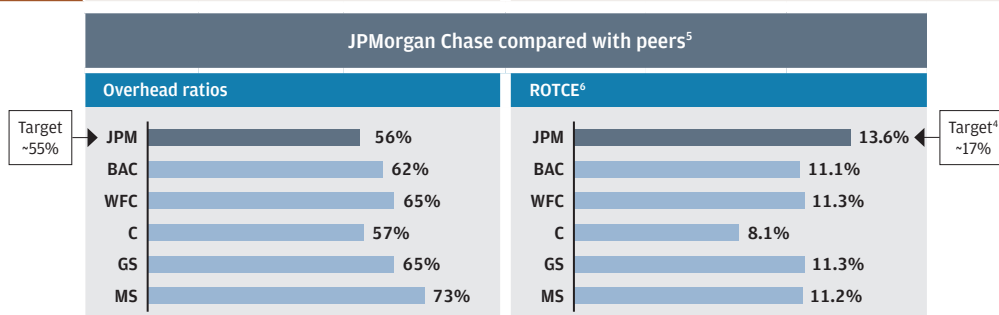
Our bank operates in a complex and sometimes volatile world. We must maintain a fortress balance sheet if we want to continually invest and support our clients through thick and thin. A fortress balance sheet also means clear, comprehensive, accurate financial and operational reporting so we can properly manage the company, particularly through difficult times.

We are fanatical about measuring our results – financial and operational. We set targets for ourselves, and we always compare ourselves with our competitors.

These targets are what we hope to achieve over the medium term and after making proper investments for the future, such as adding bankers and enhancing technology. The chart below shows that we generally compare well with our best-in-class peers (we never expect to be best-in-class every year

JPMorgan Chase Is in Line with Best-in-Class Peers in Both Efficiency and Returns

	Efficiency			Returns			
	JPM 2017 overhead ratios	Best-in-class peer overhead ratios ¹	JPM medium-term target overhead ratio	JPM 2017 ROTCE	Best-in-class peer ROTCE ^{2,3}	JPM medium-term target ROTCE Year-ago	Current ⁴
Consumer & Community Banking	56%	52% BAC-CB	50%+/-	17%	22% BAC-CB	20%+/-	25%+
Corporate & Investment Bank	56%	53% BAC-GB & GM	54%+/-	14%	14% BAC-GB & GM	14%+/-	~17%
Commercial Banking	39%	42% PNC	35%+/-	17%	16% FITB	15%+/-	~18%
Asset & Wealth Management	72%	63% CS-PB & TROW	70%+/-	25%	24% BAC-GWIM & TROW	25%+/-	~35%



¹ Best-in-class overhead ratio represents comparable JPMorgan Chase (JPM) peer business segments: Bank of America Consumer Banking (BAC-CB), Bank of America Global Banking and Global Markets (BAC-GB & GM), PNC Corporate and Institutional Banking (PNC), Credit Suisse Private Banking (CS-PB) and T. Rowe Price (TROW)

² Best-in-class ROTCE represents implied net income minus preferred stock dividends of comparable JPM peers and peer business segments when available: BAC-CB, BAC-GB & GM, Fifth Third Bank (FITB), Bank of America Global Wealth and Investment Management (BAC-GWIM), and TROW

³ Given comparisons are at the business segment level, where available, allocation methodologies across peers may be inconsistent with JPM's

⁴ Each of our businesses has revised its medium-term return targets up, reflecting the benefit of tax reform and growth. We also increased our Firmwide ROTCE target to 17%, up from 15% last year. While competitive dynamics will impact our ultimate results, we believe this target is achievable in the medium-term, reflecting higher revenue in a normalized rate environment and our disciplined investment agenda

⁵ Bank of America Corporation (BAC), Wells Fargo & Company (WFC), Citigroup Inc. (C), Goldman Sachs Group, Inc. (GS), Morgan Stanley (MS)

⁶ ROTCE is a non-GAAP financial measure and has been adjusted for the impact of the enactment of the TCJA

in every business). You should assume we do this internally at a far more detailed level than what is presented here.

We need a fortress balance sheet so we can continue to do our job – regardless of the environment.

The chart below and the one on page 20 show the extraordinary strength of our balance sheet. We have always believed that maintaining a strong balance sheet (including liquidity and conservative accounting) is an absolute necessity.

We have said this before, and it remains true: JPMorgan Chase has to be prepared to handle multiple, complex, global and interrelated types of risk. We do this in many ways – let me share a few:

The Federal Reserve's Comprehensive Capital Analysis and Review (CCAR) stress test estimated what our losses would be through a severely adverse event lasting over nine quarters – an event that is worse than what actually happened during the Great Recession; e.g., high unemployment and

Our Fortress Balance Sheet

at December 31,

	2008		2017	
CET1	7.0% ³	+570 bps	12.7% ⁴	17.5% excluding operational risk RWA
TCE/ Total assets ¹	4.0%	+340 bps	7.4%	
Tangible common equity	\$84B	+\$99B	\$183B	
Total assets	\$2.2T	+\$300B	\$2.5T	
RWA	\$1.2T ³	+\$200B	\$1.4T ⁴	
Operational risk RWA	\$0	+\$400B	\$400B ⁵	
Liquidity	~\$300B	+~\$256B	\$556B ⁶	
Fed funds purchased and securities loaned or sold under repurchase agreements	\$193B	-\$34B	\$159B	
Long-term debt and preferred stock ²	\$303B	+\$7B	\$310B	\$186B eligible for TLAC

¹ Excludes goodwill and intangible assets.

² Includes trust preferred securities.

³ Reflects Basel I measure; CET1 reflects Tier 1 common.

⁴ Reflects Basel III Advanced Fully Phased-in measure.

⁵ Operational risk RWA is a component of RWA.

⁶ Represents the amount of high quality liquid assets (HQLA) included in the liquidity coverage ratio. For additional information, see LCR and HQLA on page 93.

B = Billions
T = Trillions
bps = basis points

CET1 = Common equity Tier 1 ratio

TCE = Tangible common equity

RWA = Risk-weighted assets

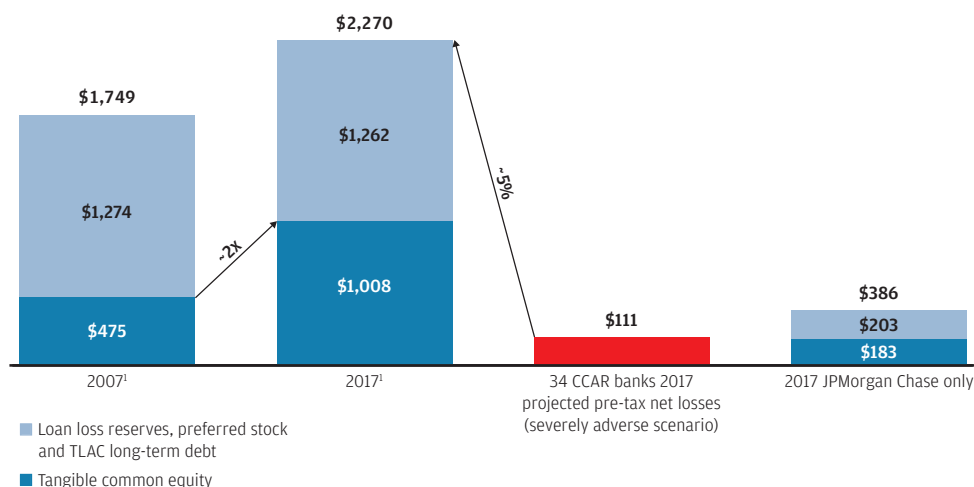
HQLA = High quality liquid assets predominantly includes cash on deposit at central banks, U.S. agency mortgage-backed securities, U.S. Treasuries and sovereign bonds

Liquidity = HQLA plus unencumbered marketable securities, which includes excess liquidity at JPMorgan Chase Bank, N.A.

TLAC = Total loss absorbing capacity

Loss Absorbing Resources of U.S. SIFI Banks Combined

(\$ in billions)



¹ Includes only the 18 banks participating in CCAR in 2013, as well as Bear Stearns,

Countrywide, Merrill Lynch, National City, Wachovia and Washington Mutual

Source: SNL Financial; Federal Reserve Bank, February 2018

SIFI = Systemically important financial institution

CCAR = Comprehensive Capital Analysis and Review

TLAC = Total loss absorbing capacity

counterparty failures. The Fed estimated that in such a scenario, we would lose \$18 billion over the ensuing nine quarters, which is easily manageable by JPMorgan Chase's capital base. My view is that we would make money in almost every quarter in that scenario, and this is supported by our having earned approximately \$30 billion pre-tax over the course of the nine quarters during the *actual* financial crisis of 2009.

We are believers in the CCAR stress testing process, although our view is that it could be simplified and improved. Our shareholders should know that the CCAR stress test is only an annual test. To explain how serious we are about stress testing, you should know that we run several hundred tests a week – including a number of complicated, potentially disastrous scenarios – to prepare our company for almost every type of event. While we never know exactly how and when the next major crisis will unfold, these rigorous exercises keep us constantly prepared.

The chart above shows just how much capital is retained by the CCAR banks. To remind you, CCAR forecasts the losses of each bank over the next nine quarters as if all of them went through a crisis worse than the crisis in 2009 and that each bank performed as poorly as the worst bank throughout that crisis. The chart above also shows that even in the extremely unlikely event that it could happen this way (i.e., that each bank is the worst bank), there is plenty of capital in the system to absorb these events. This does not include the fact that the new regulatory requirements would appropriately force any bank to take corrective action long before it gets into serious trouble.

6. What risks worry us the most? And what could go wrong?

The global economy across Asia and Japan, Latin America and Europe, and the United States has been doing well – better than most would have expected a year ago. The United States in particular may be strengthening as we speak. The competitive tax system, a more constructive regulatory environment, and very high consumer and business confidence are increasing indications that the economy will likely expand. Unemployment may very well drop to 3.5% this year, and there are more and more signals that business will improve capital expenditures and raise payrolls. Credit is readily available (though still not enough in some mortgage markets). Wages, jobs and household formation are increasing. Housing is in short supply. Underlying consumer and corporate credit have been relatively strong. All these signs lead to a positive outlook for the economy for the next year or so.

I will not spend time dwelling on geopolitics here, which can – but rarely does – upset the global economy. In the next section, I talk about serious policy issues that could harm economic growth, including America's relationship with China and potential disruptions to global trade. In this section, I focus on some of the risks in the financial system and how we go about managing them.

We will be prepared for Brexit.

So far, it has turned out pretty much like we expected: It's complex and hard to figure out, and the long-term impact to the United Kingdom is still uncertain. Last year, we spoke about whether Brexit would cause the European Union to unravel or pull together – and it appears, particularly with the new leadership in France and the steady hand in Germany, that the countries might pull together. As for JPMorgan Chase, fortunately, we have the resources to be prepared for a hard Brexit, as we must be. It essentially means moving 300-400 jobs around Europe in the short term and modifying some of our legal entities to be able to conduct business the day after Brexit. What we do not know – and will not know until the negotiations

are complete – is what the end state will look like. Although unlikely, there is the possibility that we could stay exactly as we are today. Unfortunately, the worst outcome would be much of London's financial center moving to the Continent over time. We hope for all involved that this outcome will not be the case.

We cannot do enough as a country when it comes to cybersecurity.

I cannot overemphasize the importance of cybersecurity in America. This is a critical issue, not just for financial companies but also for utilities, technology companies, electrical grids and others. It is an arms race, and we need to do whatever we can to protect the United States of America.

Our bank is extremely good at cybersecurity and client protection. However, cyber law in the United States is inadequate regarding banks and government entities. We need to be allowed to work even closer with our government in real time to properly protect the financial system. In addition, we need to have better international cyber laws (and include them in trade agreements) like we do in maritime and aviation laws. Countries should know what they are responsible for – and what redress companies or countries have – when either a bad state actor or criminals in a state cause extreme problems.

In the financial markets, we must be prepared for the full range of possibilities and probabilities.

We strive to try to understand the *possibilities and probabilities* of potential outcomes so as to be prepared for any outcome. We analyze multiple scenarios (in addition to the stress testing I wrote about earlier in this section). So regardless of what you think about the probabilities, we need to be prepared for the possibilities, including the worst case. In essence, we try to manage the company such that all possibilities, including the “fat tails” (the worst-case scenarios), cannot hurt the company.

We try to intelligently, thoughtfully and analytically make decisions and manage risk (and not overly rely on models).

When I hear people talk about banks taking risks, it often sounds as if we are taking big bets like you would at a casino or a racetrack. This is the complete opposite of reality. Every loan we extend is a proprietary risk. Every new facility we build is a risk. Whether we are adding branches or bankers – or making markets or expanding operations – we perform extensive analytics and stress testing to challenge our assumptions. In short, we look at the best- and worst-case scenarios before we “take risk.” Much of what we do as a bank is to mitigate or manage the risk being taken. I think you would be impressed by the thoroughness and risk-mitigating approach demonstrated at our risk committee meetings. At these meetings, we have lawyers, compliance, risk management, bankers and technologists – folks with decades of experience who challenge each other and ensure we have thought about every possible angle. And since we know we will be wrong sometimes, we almost always look at the worst possible case – to ensure JPMorgan Chase can survive any situation. This is not risk taking on the order of taking a guess – it is intelligent, thoughtful, analytical decision making.

We rely heavily on detailed and constantly improving models as a foundational element of that analysis. But we are cognizant of the fact that models by their nature are backward looking and have a difficult time adjusting to material items, including the following:

- The character and integrity of those with whom you are doing business
- Changing technology as it impacts industries (including the banking industry)
- Future changes in the law or even how the law might be interpreted differently 10 years from now
- Deteriorating international competitiveness (as what happened to our tax code)

- Emerging competitive threats
- Changes in industrial structure; e.g., new sources of competition
- Political influence and unexpected litigation
- Public sector fiscal challenges, demographic changes and challenges managing the nation’s healthcare resources

There are other items – but you get the point. Judgment (which will never be perfect all of the time) cannot be removed from the process.

Volatility and rapidly moving markets should surprise no one.

We are always prepared for volatility and rapidly moving markets – they should surprise no one. I am a little perplexed when people are surprised by large market moves. Oftentimes, it takes only an unexpected supply/demand imbalance of a few percent and changing sentiment to dramatically move markets. We have seen that condition occur recently in oil, but I have also seen it multiple times in my career in cotton, corn, aluminum, soybeans, chicken, beef, copper, iron – you get the point. Each industry or commodity has continually changing supply and demand, different investment horizons to add or subtract supply, varying marginal and fixed costs, and different inventory and supply lines. In all cases, extreme volatility can be created by slightly changing factors.

It is fundamentally the same for stocks, bonds, and interest rates and currencies. Changing expectations, whether around inflation, growth or recession (yes, there will be another recession – we just don’t know when), supply and demand, sentiment and other factors, can cause drastic volatility.

One scenario that we must be prepared for is the possibility that the reversal of quantitative easing (QE) by the world’s central banks – in a new regulatory environment – will be different from what people expect.

The United States has had subpar economic growth over the last eight years (I believe this is due to a lot of poor policy decisions that I discuss in the next section), as well as new

demographic realities. Our growth cumulatively in this expansion has been about 20%, while a more normal recovery would have seen growth of over 40% by now. However, with recent reforms, the situation may be improving. As inflation, wages and growth seem to be modestly increasing, the Federal Reserve has started to raise interest rates and reverse QE. **Importantly**, as long as rates are rising *because* the economy is strengthening and inflation is contained, it is reasonable to expect that the reversal of QE will not be painful. The benefits of a strong economy are more important than the negative impact from modest increases in interest rates.

Since QE has *never been done* on this scale and we don't completely know the myriad effects it has had on asset prices, confidence, capital expenditures and other factors, we cannot possibly know all of the effects of its reversal. We have to deal with the *possibility* that at one point, the Federal Reserve and other central banks may have to take more drastic action than they currently anticipate – reacting to the markets, not guiding the markets. A simple scenario under which this could happen is if inflation and wages grow more than people expect. I believe that many people underestimate the possibility of higher inflation and wages, which means they might be underestimating the chance that the Federal Reserve may have to raise rates faster than we all think. While in the past, interest rates have been lower and for longer than people expected, they may go higher and faster than people expect. If this happens, it is useful to look at how the table is set – what are all the things that are different or better or worse than during prior crises, particularly the last one – and try to think through the possible effects.

There are many pluses (things that are better than during the last crisis in 2009):

- Far more capital and less leverage in the banking system
- Far more liquidity in the banking system
- More collateral in the markets
- Less total short-term secured financing, which is also more properly collateralized
- Less leveraged lending
- Money market funds that are far safer due to regulatory requirements around credit standards and liquidation
- Healthier consumers in terms of both employment and disposable income (and their debt burden is still modest relative to their disposable income, while debt service burdens are historically low)
- The absence of massive losses in the mortgage markets. Mortgage underwriting since 2009 has been rather pristine. And while losses will go up in a recession, it will be nothing like what happened in the Great Recession. In the 2009 crisis, losses totaled more than \$1 trillion. The marketplace realization that financial institutions and investors were going to experience massive losses is a primary reason why there was a devastating loss of confidence in the financial system.

And there are some modest negatives or potentially important differences (than during the last crisis):

- Far more money than before (about \$9 trillion of assets, which represents about 30% of total mutual fund long-term assets) is managed passively in index funds or ETFs (both of which are very easy to get out of). Some of these funds provide far more liquidity to the customer than the underlying assets in the fund, and it is reasonable to worry about what would happen if these funds went into large liquidation.

- Even more procyclicality has been built into the system. Risk-weighted assets will go up as will collateral requirements – and this is on top of the procyclicality of loan loss reserving.
- Market making is dramatically smaller than in the past (e.g., aggregate primary dealer positions of bonds – including Treasury and agency securities, mortgage-backed securities and corporates – averaged \$530 billion in 2007 vs. an average of \$179 billion today). While in the past that total may have been too high, virtually every asset manager says today it is much harder to buy and sell securities, particularly the less liquid securities.
- Liquidity requirements, while much higher, now have an element of rigidity built in that did not exist before. Banks will be unable to use that liquidity when they most need to do so – to make loans or intermediate markets. They have a “red line” they cannot cross (they are required to maintain hard and fast liquidity requirements). As clients demand more liquidity from their banks, the banks essentially will be unable to provide it.
- There has been an excessive reliance on models (which I spoke about earlier in this section).
- The continuous politicization of complex policy is an issue. No one can believe that very detailed and complex global liquidity or capital requirements should be set by politicians.
- No banks to the rescue this time – banks got punished for helping in the last go-round.

It would be a *reasonable* expectation that with normal growth and inflation approaching 2%, the 10-year bond could or should be trading at around 4%. And the short end should be trading at around 2½% (these would be fairly normal historical experiences). And this is still a little lower than the Fed is forecasting under these conditions. It is also a reasonable explanation (and one that many economists believe) that today’s rates of the 10-year bond trading below 3% are due to the large purchases of U.S. debt by the Federal Reserve (and others).

This situation is completely reversing. Sometime in the next year or so, many of the major buyers of U.S. debt, including the Federal Reserve, will either stop their buying or reverse their purchases (think foreign exchange managers or central banks in Japan or China and Europe). So far, only one central bank, the Federal Reserve, has started to reverse QE – and even that in a minor way. However, by the end of this year, the Fed has indicated it might reduce its holding of Treasuries by up to \$150 billion a quarter. And finally, the U.S. government will need to sell more than \$250 billion a quarter to fund its deficit.

There are two offsetting factors to the large sales of Treasuries. One is that as the Federal Reserve sells, it reduces excess reserves, which requires banks to buy Treasuries to meet liquidity requirements. But we do not fully know the extent of this scenario, and it certainly won’t be dollar for dollar. The second factor, as some argue, is that the U.S. trade deficit effectively forces foreign countries to use their dollars to buy Treasuries, although this is not completely true – they can buy other U.S. securities or assets or sell their dollars.

So we could be going into a situation where the Fed will have to raise rates faster and/or sell more securities, which certainly could lead to more uncertainty and market volatility. Whether this would lead to a recession or not, we don’t know – but even that

is not the worst case. If growth in America is accelerating, which it seems to be, and any remaining slack in the labor markets is disappearing – and wages start going up, as do commodity prices – then it is not an unreasonable *possibility* that inflation could go higher than people might expect. As a result, the Federal Reserve will also need to raise rates faster and higher than people might expect. In this case, markets will get more volatile as all asset prices adjust to a new and maybe not-so-positive environment. Remember that former Chairman of the Federal Reserve Paul Volcker increased the discount rate by 100 basis points on a Saturday night back in 1979 in response to a serious double-digit inflation problem. And when markets opened the next business day, the Fed funds rate went up by over 200 basis points. Also remember that the Federal Reserve is operating with extremely different monetary transmission mechanisms than in the past. The old “money multiplier” has been superseded by the new capital and liquidity requirements. Today’s “excess reserves” (reserves once considered in excess of what banks were required to post in cash at the Federal Reserve – fundamentally reserves that could be lent out) are not lendable, although we still don’t completely understand the effect of this.

There is a risk that volatile and declining markets can lead to market panic.

Financial markets have a life of their own and are sometimes barely connected to the real economy (most people don’t pay much attention to the financial markets nor do the markets affect them very much). Volatile markets and/or declining markets generally have been a reaction to the economic environment. Most of the major downturns in the market since the Great Depression reflect negative future expectations due to a potential or real recession. In almost all of these cases, stock markets fell, credit losses increased and credit spreads rose, among other disruptions. The biggest negative effect of volatile markets is that it *can* create market panic, which could start to slow the growth of the *real* economy. The years 1929

and 2009 are the only real examples in the United States in the past 100 years when panic in the markets caused large reductions in investments and hiring. I wouldn’t give this scenario very high odds – in fact, I would give it low odds. Most people think of those events as one-in-a-thousand-year floods. But because the experience of 2009 is so recent, there is always a chance that people may overreact.

If truly negative events started to unfold, we could expect the Federal Reserve, with its enormous authority and power, to take strong action, including changing regulations, if the Fed thought it necessary. In any event, our shareholders should rest assured that we will weather it all. There are a couple of things we all could do to be more prepared for this situation and other disruptions, which I will discuss in the next few paragraphs.

Banks and regulators need to be more forward looking and less backward looking – particularly when examining risks across the system.

One day there will be another crisis, and financial institutions and central banks will need to respond. The financial system is far more safe and sound than in the past. But in spite of all the regulations put in place, I worry about whether we have properly prepared for the next crisis. The Financial Stability Oversight Council was created to oversee the whole system (as appropriate), but we have not yet really worked collaboratively to prepare tabletop exercises about what would happen *across* the system under difficult situations.

When the next crisis begins, regardless of where or how it starts, multiple actors in the system will take actions – either out of necessity (i.e., they need cash) or sentiment (i.e., they want to reduce risk). This will happen across passive, index and ETF funds, insurance companies, banks and nonbanks. As individual actors stop providing credit and liquidity in the marketplace, we need to do a better job of understanding how this might unfold. And all this will be happening under a different regulatory regime from before.

We also need to be more forward looking in many other areas. Doing so will create a better and stronger system – not doing so will actually create additional risk. Following are a few examples:

Almost all risk and control functions (think Anti-Money Laundering, Know Your Customer (KYC) and Compliance) could be better performed if we worked with the regulators to streamline what we do and use advanced techniques, like artificial intelligence and machine learning, to improve the outcomes. The same is true for fraud prevention and customer service. We must also be far more aggressive in protecting ourselves from cybersecurity risks, both within the banking system and across the financial system (think of nonbanks, money managers, clearinghouses, exchanges, etc.)

Modest regulatory reform can strengthen the financial system, improve the functioning of our markets and enhance economic growth for all Americans.

While the regulatory environment is appropriately much stricter than it once was, we can simplify it and even strengthen it by ensuring that it is globally fair and transparent and includes continuous, regular review and appropriate modification.

Regulators now have begun to simplify, coordinate and reduce overlapping regulations. I won't repeat the details that I've discussed in prior letters – many of them were also discussed in Treasury reports issued by the government. But suffice it to say, modest regulatory reform could allow banks to expand carefully, improve access to credit (e.g., mortgages and small business loans) and improve market making and the functioning of the money markets.

7. How is the company dealing with bureaucracy and complacency that often infect large companies?

I was recently at a senior leadership offsite meeting talking about bureaucracy. We heard bureaucracy described as “a necessary outcome of complex businesses operating in complex international and regulatory environments.” This is hogwash. Bureaucracy is a disease. Bureaucracy drives out good people, slows down decision making, kills innovation and is often the petri dish of bad politics. Large organizations, in fact all organizations, should be thought of as always slowing down and getting more bureaucratic. Therefore, leaders must continually drive for speed and accuracy to eliminate waste and kill bureaucracy. When you get in great shape, you don't stop exercising.

After years of increasing regulations, there has been a temptation to blame some of our bureaucracy and ridiculous processes on regulations. That, too, is (mostly) hogwash. It is easy to find excuses not to attempt to reimagine how things could be done better and more efficiently.

Below are five examples of how we've set out to combat this condition:

Meetings. Internal meetings can be a giant waste of time and money. I am a vocal proponent of having fewer of them. If a meeting is absolutely necessary, the organizer needs to have a well-planned, focused agenda with pre-read materials sent in advance. The right people have to be in the room, and follow-up actions must be well-documented. Just as important, each meeting should only run for as long as it needs to and lead

to real decisions. In addition, there should be clarity around who chairs the meeting. The chair is responsible for making sure all issues are properly raised, facilitating effective and productive discussions and driving to decisions.

War rooms. Just as important, we need to simplify our processes while accelerating the pace of change and driving new innovations. Last year, the Operating Committee created a number of “war rooms” – spanning lines of business, geographies, functions and levels – to make our firm more agile and to put a laser focus on several hot-button issues, like client onboarding and vendor and third-party management. Each war room is staffed with a dedicated group of employees tasked with solving specific problems within a set number of weeks or months. You would be amazed at how quickly our employees can come up with new solutions when they are galvanized around solving a problem in a concentrated time period. These teams have been so successful in driving bureaucracy out of the decision-making process that we plan to deploy more war rooms when critical needs arise. These war rooms are very similar to how we operated when we made complex acquisitions. Essentially, they cause better and faster dissemination of information to those who need to know – and faster and more productive decision making because everyone involved is in the room.

Reimagining. You can take any part of your business and reimagine it. You can get all the right people in the room to think about a certain process and reimagine how it could be done from the ground up. Our Know Your Customer problem-solving team is a good example of the results our reimagining and war rooms can drive. Comprising all lines of business, the group was given eight weeks to reimagine our KYC processes to improve the customer experience without sacrificing controls. By applying a sharp, firmwide focus to the KYC protocols, the

team identified several KYC questions and protocols that had become outdated or been made redundant by recent controls. One customer could be subjected to multiple KYC processes depending on the line of business and channel used. As a result, the team streamlined KYC questions substantially and identified a number of processes that could be eliminated, which will allow for a better customer experience while still maintaining a strong control environment. This war room team’s results not only helped disparate lines of business identify duplicative processes but also enabled the team to update the firm’s priorities.

Fighting complacency by being self-critical.

Complacency is another disease. It is usually borne out of arrogance or success, but it is a guarantee of future failure. Our competitors are not resting on their laurels – nor can we. The only way to fight complacency is to always analyze our own actions and point out our own weaknesses. It’s great to openly celebrate our successes, but when the door is closed, management should emphasize the negatives.

Using agile management to create speed.

Agile technology generally means using new forms of technology – think cloud computing, for example – to enable small teams of programmers to build and properly execute new programs and products rapidly and effectively. The concept of *agile management* goes hand in hand with this approach. Small teams of people responsible for products and services work with technologists to improve the customer experience. To do this, they must be given the necessary authority and resources. It is also important they understand that they can make mistakes without punishment.

8. What are the firm's views on succession?

Having a first-rate management team in place is probably the Board's highest priority. Therefore, management succession planning is a key focus of our Board. The Board knows the firm's senior leaders well, through unfettered access and significant interaction.

While the Board and I have agreed that I will continue in my current role for approximately five more years, we both believe that, under all timing scenarios, the firm has in place several highly capable successors.

Early in the year, we announced that Daniel Pinto, CEO of our Corporate & Investment Bank, and Gordon Smith, CEO of Consumer & Community Banking, have been appointed Co-Presidents and Chief Operating Officers of the company. In addition to their current

roles, Daniel and Gordon will work closely with me to help drive critical firmwide functions. Our other outstanding CEOs, Mary Erdoes, Asset & Wealth Management, and Doug Petno, Commercial Banking, along with our CFO, Marianne Lake, took on expanded responsibilities last year and have played progressively more significant roles partnering across the firm in helping to manage the company. I also want to say how grateful I am to our Operating Committee and to all of the leaders of our organization for the extraordinary job they do.

II. PUBLIC POLICY

The following messages are worth repeating from last year's letter: The United States needs to ensure that we maintain a healthy and vibrant economy. This is what fuels job creation, raises the standard of living and creates opportunity for those who are hurting, while positioning us to invest in education, technology and infrastructure – in a programmatic and sustainable way – to build a better and safer future for our country and its people. And in a world with so many security threats and challenges, we need to maintain the best military. America's military will be the best in the world only as long as we have the best economy in the world.

Business plays a critical role as an engine of economic growth – particularly our largest, globally competitive American businesses. As an example, the 1,000 largest companies in America (out of approximately 29 million) employ nearly 30 million people in the United States, and nearly all of their full-time employees receive full medical and retirement benefits, as well as extensive training. In addition, these companies account for more than 30% of the roughly \$2.3 trillion spent annually on capital expenditures. These expenditures and research and development spending drive productivity and innovation, which, ultimately, drive job creation across the entire economy.

Of the approximately 150 million people who work in the United States, 130 million work in private enterprise. We hold in high regard the 20 million people employed by the government or in the public sector – teachers, police officers, firefighters and others. But we could not pay for those jobs if the other 130 million workers were not actively producing America's gross domestic product (GDP).

Small businesses are a critical engine of economic growth. Small and large businesses are symbiotic – they are each other's customers, and they help drive each other's growth. They are integral to our large business ecosystem. At JPMorgan Chase, for example, we support more than 4 million small business clients, including hundreds of small banks, 15,000 middle market companies, and approximately 7,000 corporations and investor clients. Additionally, we rely on services from nearly 30,000 vendors, many of which are small and mid-sized companies.

Business, taken as a whole, is the source of almost all job creation. And we need to maintain trust and confidence in our businesses as in all of our institutions. Confidence is a "secret sauce" that costs nothing, but it helps the economy grow. A strong and vibrant private sector (including big companies) is good for the average American. Entrepreneurship and free enterprise, with strong ethics and high standards, are something to root for – not attack.

To support this, we need a pro-growth policy environment from the government that provides a degree of certainty around long-standing issues that have proved frustratingly elusive to solve. The most pressing areas where government, business and other stakeholders can find common ground should include tax reform, infrastructure investment, education reform, more favorable trade agreements and a sensible immigration policy.

Let's take another look at what is holding us back and some solutions that could make life better for all Americans.

1. What has gone wrong in public policy?

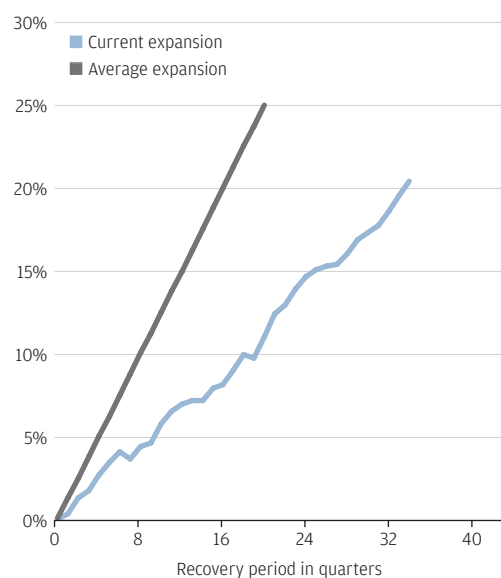
In the last several years, I have spent a good amount of time – in both these letters and elsewhere – talking about public policy. Some of the policies directly relate to JPMorgan Chase, while others are more indirect but have a large effect on the future of the United States of America, on the global economy and, therefore, on our company. With all of America's exceptional strengths, it seems clear to me that something is holding us back. As we have already pointed out, our economic growth has been anemic. Our economy has grown approximately 20% in the last eight years, but this stands in contrast with prior average recoveries where growth would have been more than 40% over an eight-year period. The chart below on the left shows this.

Last year, I laid out in detail an extensive list of things I thought were holding us back, and it bears repeating here because, just as it took many years for these obstacles to develop, it is going to take sustained effort over many years to right the course. When you look at this list in totality, it is significant and fairly shocking. Most of these areas have become consistently worse over the last 10 to 20 years, and it is hard to argue that they did not meaningfully damage the country's economic growth. It is also important to point out that I have never seen an economic model that accounts for the extremely damaging aspects of these items. (These items don't include the trillions of dollars we have spent on war-related expenditures. And whether you were for or against these wars, they certainly did not add to American productivity.) This is not secular stagnation – this represents senseless and misguided policies.

GDP¹ Growth

The present expansion relative to average

Cumulative growth since prior trough, percent



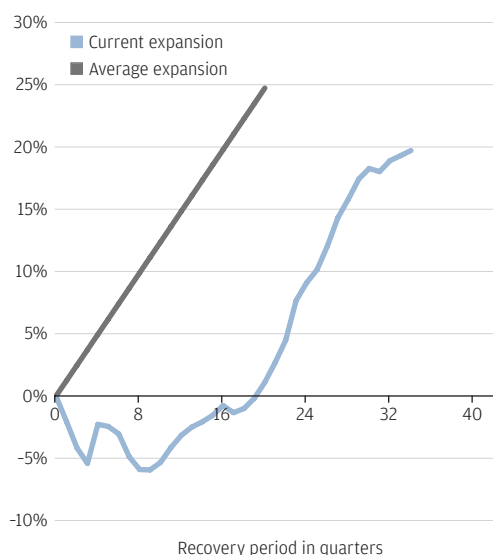
¹ Adjusted for inflation

Source: Bureau of Economic Analysis (BEA); National Bureau of Economic Research (NBER), March 2018

Bank Credit¹ Growth

The present expansion relative to average

Cumulative growth since prior trough, percent



¹ Adjusted for inflation

Source: Haver; Federal Reserve Board, March 2018

- We had a hugely and increasingly uncompetitive tax system driving companies' capital and brainpower overseas.
- Excessive regulations for both large and small companies reduced growth and business formation. The ease of starting a business in the United States worsened, with small business formation dropping to the lowest rate in 30 years.
- The chart on the bottom right of page 30 shows how tepid bank credit growth was in general during this recovery. Remember, bank credit growth directly relates to economic growth, although it's often difficult to figure out the cause and effect. But there is no question that the things that reduce credit availability, in turn, reduce growth. One area where we know this happened was in the mortgage market. Household formation has been slow because many young adults have had a difficult time finding work and, with the help of their families, have gone back for more schooling. That is slowly reversing. But the inability to reform mortgage markets has dramatically reduced mortgage availability. In fact, our analysis shows that, conservatively, more than \$1 trillion in mortgage loans might have been made over a five-year period.
- Labor force participation – particularly among men aged 25-54 – dropped dramatically. An estimated 2 million Americans are currently addicted to opioids (in 2016, a staggering 42,000 Americans died because of opioid overdoses), and some studies show this is one of the major reasons why men aged 25-54 are permanently out of work. Even worse, 70% of today's youth (ages 17-24) are not eligible for military service, essentially due to a lack of proper education (basic reading and writing skills) or health issues (often obesity or diabetes).
- Our schools are leaving too many behind. In some inner city schools, fewer than 60% of students graduate, and of those who do, a significant number are not prepared for employment. Additionally, many of our high schools, vocational schools and community colleges do not properly prepare today's younger generation for the available professional-level jobs, many of which pay a multiple of the minimum wage.
- Infrastructure is a disaster. It took eight years to get a man to the moon (from idea inception to completion), yet it now can sometimes take a decade to simply get the permits to build a bridge or a new solar field. The country that used to have the best infrastructure on the planet by most measures is now not even ranked among the top 20 developed nations according to the Basic Requirement Index.
- Our immigration policies fail us in numerous ways. Forty percent of foreign students who receive advanced degrees in science, technology and math (300,000 students annually) have no legal way of staying here, although many would choose to do so. Most students from countries outside the United States pay full freight to attend our universities but many are forced to take the training back home. From my vantage point, that means one of our largest exports is brainpower.
- Our nation's healthcare costs are twice the amount per person compared with most developed nations.
- Our litigation system is increasingly arbitrary, capricious, wasteful and slow.

Economic analysis provides a sense of the costs associated with misguided policies. The Congressional Budget Office estimates the cost of failing to pass immigration reform earlier this decade at 0.3% of GDP a year. An International Monetary Fund study suggests that a 1% of GDP rise in infrastructure investment in 2013 would have delivered a similar boost to advanced economy GDP over the subsequent decade. J.P. Morgan analysis indicates that the cost of not reforming the mortgage markets could be as high as 0.2% of GDP a year. Taken together with the costs of excessive regulation and a depressed prime age labor participation rate, it is easy to conclude that corrections in policy could add more than 1% of GDP annually. And this does not account for many of the items I mentioned in the prior list.

The end result is that our economy is still leaving many behind. Much of this is probably self-inflicted. While a job used to provide a ticket to the middle class, today more people are getting stuck in low-wage work. Historically, we've thought of these jobs as providing the first rung on a career

ladder – a chance for workers to prove themselves and develop skills before moving on to other, better paying jobs. But a growing number of Americans are left hanging on this first rung: During the mid-1990s, only one in five minimum-wage workers was still at minimum wage a year later. Today, that number is nearly one in three.

So while the economy has not performed badly and has done amazingly well for a handful – low-skilled and even middle-skilled wages have gone down, leaving large swaths of Americans behind.

It is surprising that many younger people in the United States, who are effectively going to inherit the wealthiest nation on the planet, seem to be pessimistic about our future and capitalism. But falling expectations, the failure of our economy to lift up everyone, and the continual deprecation of society and its leaders have led to huge amounts of discontent and unrest.

All these issues are fixable, but we should ask ourselves how we got it wrong in the first place.

2. Poor public policy – how has this happened?

America has been an amazingly resilient country. And we hope it will reset and get back on track. But it is hard to look at the last 20 years and not think that it has been getting increasingly worse (and we should not assume that it will get better on its own). Before we try to address what we can do to fix it, it is important to look at why it has gotten worse. Here are my theories:

- The world is getting faster and more complex, making speed and analytics all the more important. But the structure of our political parties and institutions has barely changed in 100 years. They may not be set up for success – organized in a way to enable them to deal with today's challenges.
- Critical thinking, analysis of facts and proper policy formation have become extremely difficult in a politicized and media-saturated environment. Often, politics misuses facts to justify a position.
- We are effectively crippled when it comes to fixing our problems *even when they are totally predictable*. Puerto Rico's bankruptcy, Detroit's bankruptcy, unfunded pension plans, the job skills gap, and crumbling bridges and tunnels are prime examples.
- We focus too much on the short term. For example, President Bill Clinton (and I don't mean to pick him out specifically) usually gets credit for driving a strong economy. But the excessive mortgage lending, incited and promulgated by the federal government (I am in no way saying that banks and investors didn't play a part, too), is part of the reason the economy at that time did well. It blew up

late in President George W. Bush's term. There are many examples of presidents getting credit or blame for scenarios that had nothing to do with their governing. We simply learned the wrong lessons. And in the short run, we tend to simplistically look for scapegoats instead of solutions.

- Rogoff and Reinhart wrote in their book, *This Time Is Different*, that it takes a long time to recover from a financial crisis. But this was often due to poor policy or over-reaction to the financial crisis, and while history teaches us that maybe we should expect this reaction in the next crisis, it does not have to be true over and over. We have a difficult time learning from the past.
- A famous politician once said, "Don't let a good crisis go to waste." I think he really meant, "Let's use the crisis to get some good, important things done." It appears

that politicians sometimes use a crisis to justify implementing their own agenda.

- Here's another example: We all know that the U.S. healthcare system needs to be reformed. Many have advocated getting on the path to universal healthcare for all Americans. The creation of Obamacare, while a step in the right moral direction, was not well done. America has 290 million people who have insurance – 180 million through private enterprise and 110 million through Medicare and Medicaid. Obamacare slightly expanded both and created exchanges that insure 10 million people. But it did very little to fix our broken healthcare system and has, in fact, torn up the body politic over 10 years – and this tumult may go on for another 10 years.

3. We can fix this problem through intelligent, thoughtful, analytical and comprehensive policy.

First off, we should find it rather easy to recognize that bad thinking often leads to bad policymaking. Let me list a few of the culprits:

- Binary arguments. When people argue as if there are binary solutions, the argument is almost always wrong. When people say you should not do something because it is like going down a "slippery slope," it generally is not a good argument. In the modern world, there are reasons to calibrate various parts of policy instead of just denying the argument altogether.
- "They complain too much" arguments. When a point has been made and someone calls it a complaint, the point is diminished right away. When someone complains about something, a better response is to think about where or how the person might be right or partially right.
- Not listening to one another. I tell my liberal friends to read columnists like Arthur Brooks and George Will. And I tell my conservative friends to read writers like Tom Friedman.

- Not asking what outcomes you really want to achieve.
- Not working with experts who know the most about a subject.
- Trying to create too many zero-tolerance environments when they are often not merited. Examples include situations where people need to be able to communicate with each other and work through miscommunications and mistakes of judgment rather than criminal and unethical behavior, where a zero-tolerance standard should be applied equally to all.
- This way of thinking also applies to institutions. We should not destroy the credibility or the effectiveness of institutions – public or private – for the mistakes or misdeeds of a few. This may feel good in the short term but will not serve us well over the long term.

We all generally know what a good decision-making process looks like – and we applaud it – whether in business or in Congress.

4. The need for solutions through collaborative, competent government.

People don't think about the challenges in their everyday lives as being Democratic or Republican issues – and our political leaders need to stop thinking that way. We need a well-performing, competent government to thrive as a nation. Clearly, there are things that only the government can do – and must do well – such as having a strong military and ensuring an efficient and properly functioning justice system. The federal government maintains most of our nation's transportation systems, and we need state and local governments to do a good job in terms of education, policing and other important functions. Some argue that the government should be doing more. But when many Americans think of the government delivering services, they think of the endless bureaucracy and paperwork associated with the Internal Revenue Service, the U.S. Postal Service and the Department of Veterans Affairs – none of which would consistently get high marks.

We all can agree that the lack of true collaboration and an unwillingness to address our most pressing policy issues have contributed to the divisive and polarized environment we have today. Certainly there is plenty of blame to go around on this front. However, rather than looking back, it now is more important than ever for the business community and government to come together to find meaningful solutions. This cannot be done by government or business alone.

By collaborating and applying some good old American can-do ingenuity, there is nothing we can't accomplish. By working together, business, government and the nonprofit sector can ensure and maintain a healthy and vibrant economy into the future – creating jobs, fostering economic mobility and maintaining sustainable economic growth. Ultimately, this translates to an improved quality of life and greater financial security for those in the United States struggling to make ends meet. It also represents a significant step in

restoring public faith in two of our greatest democratic institutions in the United States: business and government. Working together will allow us to move toward a prosperous future for all Americans.

Many examples of business and government working together already have produced positive outcomes. Businesses have played a large role in trying to help Detroit recover. Businesses started the Veteran Jobs Mission. With a goal of 1 million jobs, the coalition of businesses has already helped 400,000 U.S. veterans get work, and the number is still growing. Many businesses have worked closely with the education system (mostly locally) to support charter schools, vocational schools and community colleges to provide skills training that prepares students for productive employment. We believe that collaboration can create even better outcomes in education, healthcare and job creation while shoring up pension plans and rebuilding our cities and communities across the nation.

Our Founding Fathers studied and worked hard to design a strong and permanent democracy. They perfected a Constitution to protect our basic liberties, building in protections to temper some of our worst attributes and incent our best ones. If they were here with us today, I believe they would recognize that our government institutions are stuck in the mud – too slow and inadequate for the job at hand. Therefore, they would study and work hard within the Constitution to redesign and reformulate how government should function so that it works properly. We will eventually need to do the same.

5. A competitive business tax system is a key pillar of a growth strategy.

It isn't easy to stay competitive in an increasingly global marketplace, and national tax policy was one critical area where we were falling behind. Over the last 20 years, as the world reduced its tax rates, America did not. Our previous tax code was increasingly uncompetitive, overly complex, and loaded with special interest provisions that created winners and losers. This was driving down capital investment, reducing productivity and causing wages to remain stagnant. The good news is that the recent changes in the U.S. tax system have many of the key ingredients to fuel economic expansion: a business tax rate that will make the U.S. competitive around the world; provisions to free U.S. companies to bring back profits earned overseas; and, importantly, tax relief for the middle class.

The passage of tax reform is critical because strong businesses create jobs and higher wages. Before tax reform was passed, 76% of the CEOs of leading U.S. companies said they would increase hiring if tax reform were enacted, and 82% would increase capital spending – and we already are seeing these effects. Hundreds of companies like ours are stepping up by investing in their employees and in initiatives to address challenges facing communities.

I must confess I don't understand how anyone could believe an uncompetitive tax system would be good for the United States – whether the current economic environment was good or bad. The damage has been cumulative. Here is one example: A recent study by the accounting firm Ernst & Young found that under a 20% corporate income tax rate, U.S. companies would

have acquired \$1.2 trillion in cross-border assets during 2004-2016 instead of losing \$510 billion in such assets to foreign buyers. Simply put, this means the United States would have kept 4,700 companies under U.S. ownership during the past 13 years if they had paid taxes at a rate competitive with other countries that have modernized their corporate tax codes. Today's competitive U.S. corporate tax rate will reduce incentives for U.S. companies to relocate abroad or be purchased by foreign companies.

There is a reason why it has taken 30 years for comprehensive tax reform to take place in this country: It is complicated work, and navigating competing interests is hard. I am pleased that we did the right thing – not the easy thing. Congress took a historic step in 2017 to reform America's broken and outdated tax code. Coming together to get that work done shows that we can take on tough issues that have been holding us back.

I believe tax reform will have both short- and long-term benefits. In the short term, we already are seeing some companies increasing capital expenditures, hiring and raising wages. Of course, that will not be enough to offset all the immediate benefits associated with tax reform. Some argue that the added cash flow going to dividends and buybacks is a negative – it is not. It simply represents capital finding a higher and better use than the current owner has with it. And that higher and better use will be reinvestment in companies, innovation, R&D or consumption. Thinking this is a bad thing is just wrong. Tax reform's real benefit will be the *long-term cumulative* effect of retained and reinvested capital in the United States, which means more companies, innovation and employment will stay in this country. The United States should always aim to have a competitive business tax system. It should not be traded off against other objectives.

Here is some news we announced on how JPMorgan Chase is immediately putting some of the benefits of tax reform to good work.

Along with a more constructive regulatory and business environment and our strong business performance, this reform has led our company to recently announce a \$20 billion, five-year comprehensive investment to help its employees while supporting job and local economic growth in the United States.

JPMorgan Chase plans to build up to 400 Chase branches in 15-20 new markets and hire up to 4,000 additional employees over the next five years. These employees will support our branch growth and more lending to small businesses and homeowners. Today, Chase has roughly 5,100 branches across 23 U.S. states, and, for a long time, we have wanted to expand beyond our current footprint. The heart of our company is our branches. We serve 61 million U.S. households – one out of every two U.S. families is a Chase customer. Nearly every line of business operates out of our branches in some way. We are not in some major markets, including Boston, Philadelphia and Washington, D.C., but Consumer Banking has started the formal application process for national expansion.

As I previously said, when Chase enters a community, it enters with the full force of JPMorgan Chase behind it. We hire people. We lend to and support local businesses. We help customers with banking, lending and saving. And our philanthropic programs help make these communities stronger.

Our company has made a significant economic impact in all the communities in which we operate, and we're excited to become an even more relevant part of many others.

We're also investing in our employees. We want to have the best people, period. We know happy customers start with happy employees, and we want to be the best place to work *everywhere* we do business. For the second time in two years, we're raising wages for 22,000 employees. For employees making between \$12 and \$16.50 an hour, we will raise hourly wages to between \$15 and \$18, depending on the local cost of living.

This is the right thing to do, and we believe it puts us well above the average hourly wage for most markets. These increases are on top of the value of the firm's full benefits package, which averages \$12,000 for employees in this pay range. But the improvements won't stop there. We're reducing medical plan deductibles by \$750 per year for employees making less than \$60,000 – this essentially makes the deductible \$0 for those employees who take care of themselves by meeting minimal wellness and preventative program requirements.

Credit is essential to a healthy economy and growth, and our new investments include sizable increases in lending to small businesses and homeowners. Through Commercial Banking and Business Banking, we will hire 500 new bankers and help expand small business lending by 20% – or \$4 billion – over three years while entering new markets. We're also doubling the investment in our Small Business Forward initiative to \$150 million over five years to help provide small businesses run by women, minorities and veterans get both the capital and technical assistance they need to grow.

We will also help more families live their dream of owning a home by increasing home lending in low- and moderate-income communities by 25% – to \$50 billion – over the next five years. To do so, we will hire up to 500 new Home Lending advisors across our current markets and in some new ones. In addition, we will increase lending to finance affordable rental housing to \$7 billion over five years.

Today, our company is strong and growing, and when we grow, so do the communities where we do business. We're excited to welcome new employees, new customers and new communities to JPMorgan Chase and to look forward to a bright future.

The need for rational, thoughtful, consistent tax policy.

The best long-term tax policy should have the following attributes:

- The business tax system should be competitive – always – and not be traded off against anything else. I would consider this table stakes for having a healthy economy in the long run.
- We should build the infrastructure we need. (We should consider this table stakes, too.) There are many reports that highlight how less expensive it is in the long run to have better infrastructure. In fact, some studies show it is even more expensive to have bad infrastructure.
- We should have a progressive tax system (helping people on the lower end) that progressively taxes higher incomes, like mine. And, of course, no one wants to

think about their money being misspent. Therefore, it is critical for Washington to show the American public that their money will be used wisely – and that includes canceling or modifying programs that don't work and not using money to pay off special interest groups. If we need to raise taxes on the more well-off, I would hope the more affluent would recognize that they will do better if the country does better.

- The tax policy should be consistent in the long term for businesses to maximize their productivity and growth.

This is the best way to permanently drive growth and become a far wealthier and fairer society. There are two things I would do immediately to improve income inequality and create a much healthier society as explained below.

6. We should reform and expand the Earned Income Tax Credit and invest in the workforce of the future.

The Earned Income Tax Credit (EITC) supplements low- to moderate-income working individuals and couples, particularly with children. For example, a single mother with two children earning \$9 an hour (approximately \$20,000 a year) could get a tax credit of more than \$5,000 at year's end. A single male without children (also making approximately \$20,000 a year) does not get any money for a tax credit under this program. Last year, the EITC program cost the United States about \$65 billion, and 27 million individuals received the credit. This program has lifted an estimated 9 million people above the poverty line. (The federal poverty guideline is determined by household size. For a four-person household, the poverty level is \$25,100 or approximately \$11 an hour.)

There are some problems with the EITC. Paid as a tax credit at the end of the year, 21% of the people who are entitled to it don't file for it – mostly because they don't know about it. Additionally, there is some fraud involved.

We should convert the EITC into more of a negative income payroll tax, which would spread the benefit, reduce fraud and get it into more people's hands. (Both Democrats and Republicans favor a move like this.)

We should also dramatically expand the tax credit and even make it more available to workers without children.

Of the 150 million Americans working today, approximately 21 million earn between \$7.25 an hour (the prevailing federal minimum wage) and \$10.10 an hour. Approximately 42% of American workers make less than \$15 an hour. It is hard to argue that you can live on \$7-\$10 an hour, particularly for families (even if two are working in that household). Decades ago, workers with very limited skills could earn a living wage to support themselves and their family. In this new highly technical world – where work skills are so greatly valued – the “natural” wage for unskilled workers may no longer lead to a living wage. This is an area that deserves more study.

Jobs are a wonderful thing. Jobs bring dignity. That first job is often the first rung on the ladder. People like working, and studies show that once people start working, they continue working. Jobs and living wages lead to better social outcomes – more household formation, more marriages and children, and less crime, as well as better health and overall well-being. As society creates an enormous amount of wealth, expanding the EITC would be a very productive way to share it. If a large portion of the American population cannot earn a living wage, then we will create a situation of permanent social turmoil.

We need to improve work skills and training that lead to better jobs – this will help both low- and middle-income workers. It is also the cure for rapid technological change.

Many high schools and vocational schools do not provide the education our students need – the ability to graduate and get a decent job. We should be ringing the alarm bell, signaling that inner city schools are failing our children – often minorities and mostly lower income students. In many inner city schools, fewer than 60% of students graduate, and many of those who do are not prepared for employment. We are creating generations of citizens who never had a chance in this land of dreams and equal opportunity. Unfortunately, it's self-perpetuating.

And we all pay the price. According to an assessment of math and science scores that the Organisation for Economic Co-operation and Development (OECD) conducted in 35 advanced industrialized countries, the United States ranks, on average, #24. Making the investment to improve our performance to the level of the OECD average would increase the U.S. gross domestic product by 1.7% over the next 35 years.

America used to be one of the best at training our workforce for good jobs. *We know what to do* to regain that mantle. We need to ensure that our high schools, vocational schools, technical schools and community colleges work together with local businesses to properly train these students so they can get well-paying jobs upon graduation; then we need

to make sure proper apprenticeships and certifications (including college credits) are widely available. These students can continue to work or have the opportunity to go back to college, if they so choose. Doing this well will help the lower skilled and middle-income workers in the new world. The best way to offset any negatives associated with trade or technology is through continued education and training so that well-paying jobs are replaced with other well-paying jobs.

We know that technological advancements are displacing certain industries. Driverless cars, for example, are getting closer to mainstream use every day. Technology will bring innovation, but it will also change the employment opportunities available to hundreds of thousands – perhaps even millions – of people. We have the opportunity, now, to start preparing for and addressing potential future job losses. Anticipating problems that may arise from new technologies – and developing plans to responsibly minimize them – should be considered the final phase of our R&D process.

We, as a country, must also change the way we think about education. In less mutable times, a degree meant that formal learning was complete. You had acquired what you needed for a successful career in your field. A degree in today's world cannot mean the end of your studies. New discoveries, new advancements, new technologies and new terminology all mean that a degree will not carry you as far into the future as it once did. We must place a higher premium on lifelong learning. Corporations can do a lot to encourage and foster such a shift.

We should celebrate the benefits of technology, and we should also prepare for its challenges.

Overall, technology is the greatest thing that has ever happened to mankind. It is the reason why we enjoy our high living standard. It is staggering how our lives have changed when compared with 100 years ago. We live longer and work less; we are healthier and safer; and during that time period, billions of people have been pulled out of poverty. People legitimately worry that technology will eliminate jobs as artificial intelligence replaces drivers, call center

operators, etc. And this is no doubt true. But this has actually been happening for a long time. For instance, back in 1900, 41% of the U.S. workforce made their living in agriculture. Today, it is under 2%. This is only one example, but our vibrant economy has always found a way to adjust to job loss by creating new jobs and sometimes changing the way we work by reducing work days and work hours.

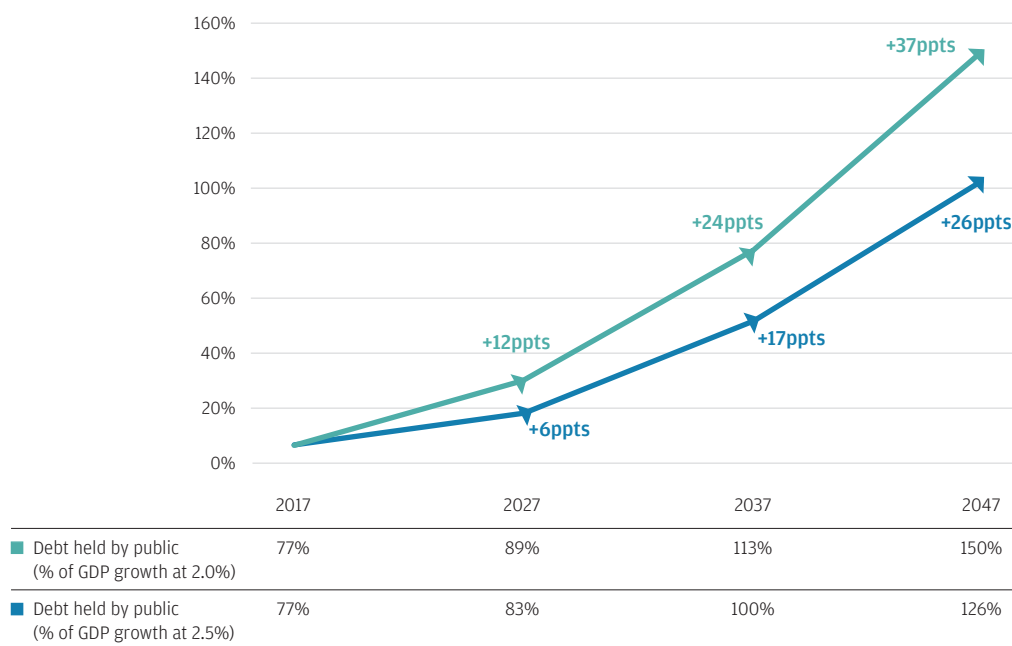
We know technology has been a great force, and for the benefit of mankind, that force should be left unleashed. In the event that it creates change faster in the future than it has in the past – and the economy is unable to adjust jobs fast enough – the best protection is continual workforce training, education and re-education, supplemented by income assistance and relocation.

7. America's growing fiscal deficit and fixing our entitlement programs.

America's net debt currently stands at 77% of GDP (this is already historically high but not unprecedented). You can see in the chart below that the debt level continues to get worse, but at an accelerated pace over the ensuing decades. We have time to fix it, so I am not immediately concerned. But this problem will not age well, and the sooner we start to fix it, the better. If we don't fix the growing deficit situation, it will adjust itself and in a way we won't like.

The chart below also shows the Congressional Budget Office's estimate of the total U.S. debt to GDP, assuming a 2% real GDP growth rate. Hopefully, with the right policies we can grow faster than 2%. We estimate if we got the growth rate even a little bit higher (i.e., 2½%), then the debt burden gets a little lighter but does not disappear.

U.S. Government Public¹ Debt as a Percentage of GDP



¹ Debt issued in the financial markets, but not held by any U.S. government agency or fund
 Source: Congressional Budget Office, March 2017
 pts = percentage points

The real problem with our deficit is the uncontrolled growth of our entitlement programs.

We cannot fix problems if we don't acknowledge them. The extraordinary growth of Medicare, Medicaid and Social Security is jeopardizing our fiscal situation. We have to attack these issues. I am not going to spend a lot of time talking about Social Security. I think fixing it is within our grasp – for example, by changing the qualification age and means testing, among other things. When President Franklin Delano Roosevelt astutely put Social Security in place in 1935, American citizens would work and pay into Social Security until they were 65 years old. At that time, when someone retired at age 65, the average life span after retirement was 13 years. Today, the average person retires at age 62, and the average life span after retiring is just under 25 years.

The core issue underpinning the entitlements problem is healthcare in the United States. Here are just a few places where we know we can do better:

- The United States has some of the best healthcare in the world, including our doctors, nurses, hospitals and clinical research. However, we also have some of the worst – in terms of some outcomes and costs.
- Administrative and fraud costs are estimated to be 25% to 40% of total healthcare spend.
- Chronic disease accounts for 75% of spend concentrated on six conditions, which, in many cases, are preventable or reversible.

While we don't know the exact fix to this problem, we do know the process that will help us fix it. We need to form a bipartisan group of experts whose direct charge is to fix our healthcare system. I am convinced that this can be done, and if done properly, it will actually improve the outcomes and satisfaction of all American citizens.

JPMorgan Chase, along with our partners Amazon and Berkshire Hathaway, recently formed a joint venture that we hope will help improve the satisfaction of our healthcare services for our employees (that could be in terms of costs and outcomes) and possibly help inform public policy for the country. The effort will start very small, but there is much to do, and we are optimistic. We will be hiring a strong management team to start working on some of these critical problems and issues:

- Aligning incentives systemwide – the United States has the highest costs associated with the worst outcomes because we're getting what we incentivize.
- Studying the extraordinary amount of money spent on waste, administration and fraud costs.
- Empowering employees to make better choices and have the best options available by owning their own healthcare data with access to excellent telemedicine options, where more consumer-driven health initiatives can help.
- Developing better wellness programs, particularly around obesity and smoking – they account for approximately 25% of chronic diseases (e.g., cancer, stroke, heart disease and depression).
- Determining why costly and specialized medicine and pharmaceuticals are frequently over- and under-utilized.
- Examining the extraordinary amount of money spent on end-of-life care, often unwanted.

To attack these issues, we will be using top management, big data, virtual technology, better customer engagement and the improved creation of customer choice (high deductibles have barely worked). This effort is just beginning, and we intend to start small. We will report on our progress in the coming years.

8. Why is smart regulation vs. just more regulation so important?

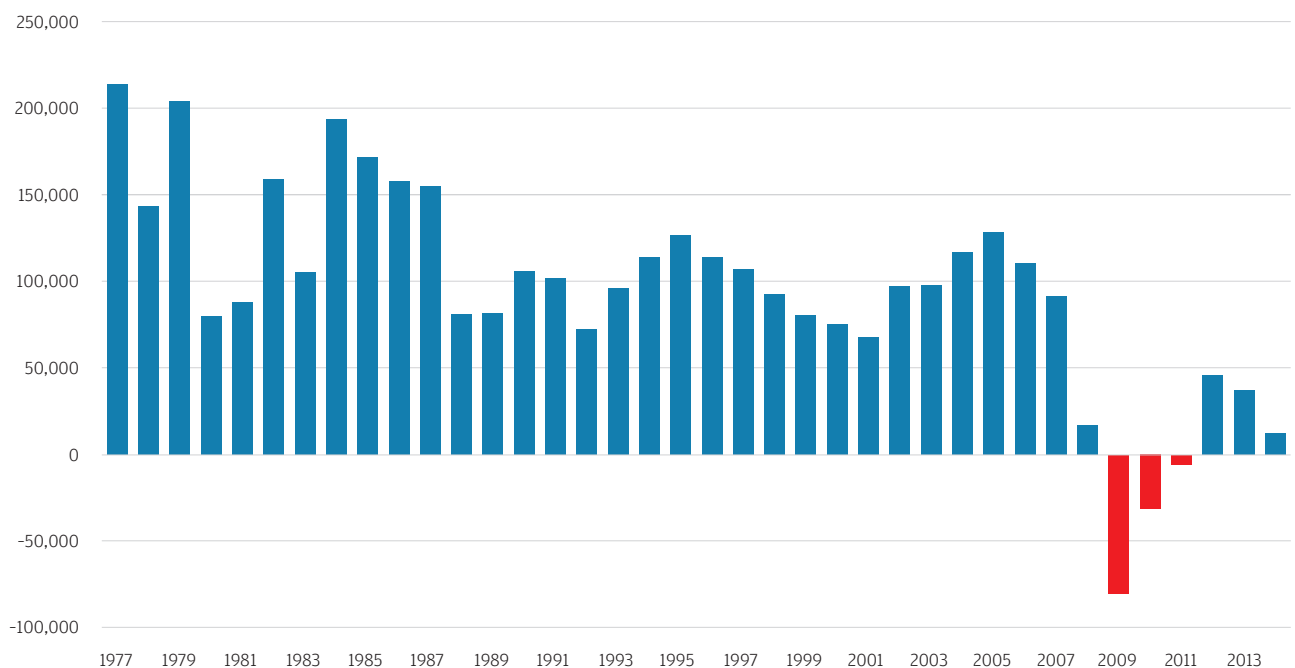
It is absolutely necessary to have proper regulation. Often, though, we confuse *more* regulation with *good* regulation. What is really needed is *smart* regulation. If you speak with businesses, large or small, they will give a long list of the time, effort and documentation it takes to run their business. They will show you books of red tape, inefficient, outdated systems and extraordinary delays. To start a small business today, you need multiple licenses. We have given an example of this with infrastructure in terms of needing up to 10 years to get a permit to build a bridge. Please read the article on page 42 written by a very liberal Democratic former U.S. senator and presidential candidate about what it was like to run a small business. The article provides excellent advice for all of our legislators and regulators. Unfortunately, he learned these lessons only after leaving his career in government.

The current administration is taking steps to reduce unnecessary regulation by insisting that congressional rules around cost-benefit analysis be properly applied. It is also actively trying to put regulators in the right roles with the proper authority to use commonsense principles to make appropriate changes.

By some estimates, approximately \$2 trillion is spent on regulations annually, which is about \$15,000 per household. While we believe much of this money is well spent (leading to cleaner water and air, and safer highways and hospitals, for example), it is hard to imagine that all of it is well spent. Decades of continuously expanding and overlapping regulation certainly can be streamlined and improved. There is little doubt that excessive regulation has adversely impacted innovation, growth and the formation of small businesses. The chart below shows the dramatic reduction in the net formation of small businesses. It is hard to know exactly

Annual Net Small Business Formations

Number of businesses



Source: U.S. Census Bureau, Business Dynamic Statistics, March 2018

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Manager's Journal:

A Politician's Dream Is a Businessman's Nightmare

By George McGovern

Wisdom too often never comes, and so one ought not to reject it merely because it comes late.

-- Justice Felix Frankfurter

It's been 11 years since I left the U.S. Senate, after serving 24 years in high public office. After leaving a career in politics, I devoted much of my time to public lectures that took me into every state in the union and much of Europe, Asia, the Middle East and Latin America.

In 1988, I invested most of the earnings from this lecture circuit acquiring the leasehold on Connecticut's Stratford Inn. Hotels, inns and restaurants have always held a special fascination for me. The Stratford Inn promised the realization of a longtime dream to own a combination hotel, restaurant and public conference facility -- complete with an experienced manager and staff.

In retrospect, I wish I had known more about the hazards and difficulties of such a business, especially during a recession of the kind that hit New England just as I was acquiring the inn's 43-year leasehold. I also wish that during the years I was in public office, I had had this firsthand experience about the difficulties business people face every day. That knowledge would have made me a better U.S. senator and a more understanding presidential contender.

Today we are much closer to a general acknowledgment that government must encourage business to expand and grow. Bill Clinton, Paul Tsongas, Bob Kerrey and others have, I believe, changed the debate of our party. We intuitively know that to create job opportunities we need entrepreneurs who will risk their capital against an expected payoff. Too often, however, public policy does not consider whether we are choking off those opportunities.

My own business perspective has

been limited to that small hotel and restaurant in Stratford, Conn., with an especially difficult lease and a severe recession. But my business associates and I also lived with federal, state and local rules that were all passed with the objective of helping employees, protecting the environment, raising tax dollars for schools, protecting our customers from fire hazards, etc. While I never have doubted the worthiness of any of these goals, the concept that most often eludes legislators is: "Can we make consumers pay the higher prices for the increased operating costs that accompany public regulation and government reporting requirements with reams of red tape." It is a simple concern that is nonetheless often ignored by legislators.

For example, the papers today are filled with stories about businesses dropping health coverage for employees. We provided a substantial package for our staff at the Stratford Inn. However, were we operating today, those costs would exceed \$150,000 a year for health care on top of salaries and other benefits. There would have been no reasonable way for us to absorb or pass on these costs.

Some of the escalation in the cost of health care is attributed to patients suing doctors. While one cannot assess the merit of all these claims, I've also witnessed firsthand the explosion in blame-shifting and scapegoating for every negative experience in life.

Today, despite bankruptcy, we are still dealing with litigation from individuals who fell in or near our restaurant. Despite these injuries, not every misstep is the fault of someone else. Not every such incident should be viewed as a lawsuit instead of an unfortunate accident. And while the business owner may prevail in the end, the endless exposure to frivolous claims and high legal fees is frightening.

Our Connecticut hotel, along with many others, went bankrupt for a variety of reasons, the general economy in the Northeast being a significant

cause. But that reason masks the variety of other challenges we faced that drive operating costs and financing charges beyond what a small business can handle.

It is clear that some businesses have products that can be priced at almost any level. The price of raw materials (e.g., steel and glass) and life-saving drugs and medical care are not easily substituted by consumers. It is only competition or antitrust that tempers price increases. Consumers may delay purchases, but they have little choice when faced with higher prices.

In services, however, consumers do have a choice when faced with higher prices. You may have to stay in a hotel while on vacation, but you can stay fewer days. You can eat in restaurants fewer times per month, or forgo a number of services from car washes to shoeshines. Every such decision eventually results in job losses for someone. And often these are the people without the skills to help themselves -- the people I've spent a lifetime trying to help.

In short, "one-size-fits-all" rules for business ignore the reality of the marketplace. And setting thresholds for regulatory guidelines at artificial levels -- e.g., 50 employees or more, \$500,000 in sales -- takes no account of other realities, such as profit margins, labor intensive vs. capital intensive businesses, and local market economics.

The problem we face as legislators is: Where do we set the bar so that it is not too high to clear? I don't have the answer. I do know that we need to start raising these questions more often.

Mr. McGovern, the 1972 Democratic presidential candidate, is president of the Middle-Eastern Policy Council in Washington.

(See related letters: "Letters to the Editor: A Politician's Dream Is a Businessman's Nightmare" -- WSJ July 2, 1992)

why this is happening, but the main culprits are probably the cost and difficulties that unnecessary regulations cause, coupled with the lack of access to credit for *new* businesses.

Another study examines the effect poor infrastructure has on efficiency (for example, poorly constructed highways, congested

airports with antiquated air traffic control systems, aging electrical grids and old water pipes). This could all be costing us more than \$200 billion a year. Philip Howard, who does some of the best academic work on America's infrastructure, estimates it would cost \$4 trillion to fix our aging infrastructure – and this is *less* than it would cost *not* to fix it.

9. Public company corporate governance – how would you change it? And the case against earnings guidance.

Last year, I wrote about the decline in the number of public companies in the United States. Unfortunately, that trend has continued unabated. Indeed, if anything, it's accelerated. According to one study, the number of U.S. public companies has fallen by approximately 50% over two decades (from 8,090 in 1996 to 4,331 in 2016). And that decline, it pains me to say, is a uniquely American phenomenon. Public company listings in other developed markets have increased over the same period.

Fortunately, policymakers are sitting up and taking notice. In a report issued in October 2017, the U.S. Treasury Department decried the decline in the number of U.S. public companies and recommended several measures to stem the tide. Eliminating duplicative regulations, liberalizing restrictions on pre-initial public offering communications and removing non-material disclosure requirements were some of these measures. Jay Clayton, Chairman of the U.S. Securities and Exchange Commission, also has been quite vocal about the decline: He says it potentially deprives “Mr. and Ms. 401(k)” of the opportunity to participate in much of our country's wealthy creation. I share Chairman Clayton's concern.

Too many private company owners look at the burdens tied to public company status – among them, frivolous shareholder litigation, burdensome disclosures that don't get to the core of investor concerns, an unhealthy focus on short-term results and shareholder meetings that often focus on the trivial. Because of such factors, many private companies make a rational decision to stay private,

particularly given rules that increasingly allow individuals to invest in private companies. Ultimately, that's not good for America because public companies are a powerful economic engine for job and wealth creation. They are also responsible for one-third of all private sector employment, with millions of American families depending on public companies for retirement, savings for college and home purchases, and investment.

So what can public companies do about these issues? For one, they can continue to engage policymakers. Second, they can continue to resist pressures to focus on the short term at the expense of long-term strategy, growth and sustainable performance. *And in my mind, quarterly and annual earnings per share guidance is a major contributor to that short-term focus. It can cause companies to hold back on technology spending, marketing expenditures and other investments in their future in order to meet a prognostication affected by factors outside the company's control, such as fluctuations in commodity prices, stock market volatility and even the weather.*

That's why during my time as JPMorgan Chase's CEO we've never provided quarterly or annual net earnings guidance and why we would support any company that considers dropping such guidance in the future. We totally support being open and transparent about our financial and operational numbers with our shareholders – this includes providing guidance or expectations around number of branches, likely expense levels, “what ifs” and other specific items.

With their own sizable investment portfolios, most public companies could use their power as shareholders to urge public companies and asset managers to take a relentlessly long-term focus.

Of course, shareholders of all stripes – and particularly institutional shareholders (asset managers, as well as asset owners) – have a critical role to play in public company corporate governance. Among other things, they should exercise their proxy voting rights thoughtfully, using independent

judgment even where they use proxy advisors to inform their judgment. They should actively engage with company boards and management, as appropriate, to understand the company's point of view and to convey their own. And they should evaluate and compensate their portfolio managers in a manner that reflects the investment time horizon applicable to the portfolio they are managing. That may mean using performance benchmarks over three-, five- and even 10-year periods, in addition to shorter period benchmarks.

10. Global engagement, trade and immigration – America's role in the world is critical.

Today's world is as complex and dynamic as ever. Things like trade, immigration, technology and social media, as well as our ability to move capital and purchase goods with the click of a button, all are changing how we live and how we do business. A natural reaction to this disruption might be to turn inward, to build walls. Such an impulse reflects real and justifiable concerns about whether our rush to change has outpaced our ability to successfully adapt. At this moment of uncertainty, however, U.S. global engagement is needed more than ever.

Following the devastation brought on by two world wars, the United States and other like-minded nations resolved to shape a new international order that would ensure a future unlike the past. In the succeeding years, America led the creation of a system defined by the rule of law and supported international institutions like the United Nations, the World Health Organization and the World Trade Organization (WTO). These institutions offered states a way to work out their differences around a conference table and address pressing economic and social challenges. Organizations like the North Atlantic Treaty Organization (NATO) were formed to enable collective action, promote peace and deter aggression. Treaties and coalitions were forged to limit the spread of nuclear weapons and to address threats such as terrorism, disease and climate change. America undertook efforts to promote and spread democratic

values such as free speech and equality while standing firm against dictators and strongmen who would otherwise insist that "might makes right." There should be no doubt that these efforts have made us all more prosperous, secure and free.

The world has made incredible strides since most of us were born. We have overcome challenges once thought insurmountable. More than a billion people have been lifted out of extreme poverty in the last two decades. Food security is dramatically improving – a major driver of improving human health – and the number of undernourished people around the world is continuing to fall. Vaccines have almost entirely eliminated most infectious diseases around the globe – polio, smallpox, measles, mumps, diphtheria, rubella. Malaria has been eradicated in many parts of the world, and deaths have declined significantly in Africa and Southeast Asia over the last decade. These achievements and numerous others reinforce the overall positive trend line of human history.

Reversing the interconnectedness built by our post-World War II institutions is neither desirable nor feasible. As a nation, we cannot isolate ourselves any more than we can stem the ocean's tide. The international system provides agreed-upon rules of the road – and mechanisms for enforcing them. It serves as the basis upon which we can insist on fairer trade practices from competitors and adequate burden-sharing from allies. It is the

means by which we can continue to improve people's lives and livelihoods. The system, built at great sacrifice, continues to serve our interests. It should be preserved and defended – ideally under strong U.S. leadership.

Any system created by humans, however, is ultimately fallible. Sustaining the current order and ensuring its longevity mean acknowledging its flaws. We must have an honest conversation about its strengths and, more important, its weaknesses. Global GDP has more than doubled since 2000, yet too many people are being left behind – shut out of a growing economy's rewards. Nations with a proud history of welcoming immigrants – including the United States, a nation of immigrants – are engaged in hotly contested debates over whether immigration is good for one's country or not. Recognizing our extraordinary accomplishments is one thing, but we should acknowledge what has gotten worse. NATO has become less effective, serious issues surround trade and the WTO is unprepared to deal with today's issues – and too bureaucratic and slow to fix them. The associated loss of faith in governments and institutions has manifested itself in a wave of political disruptions, none more surprising than in the United States itself. We are increasingly divided and unable to work out our disagreements.

Retreating from the world is not the solution, nor is burning down the current system and starting anew. At the same time, we cannot and should not turn a blind eye to the real pressures millions of families face at the hands of globalization, technological advances and other factors. Ultimately, governments are charged with addressing the types of issues and popular grievances that led us to this moment of division and distrust. But increasingly, the private sector must also play a role.

Business in total has a huge amount of capabilities and knowledge. Business needs to work with the government to drive good, long-term solutions. But if it is to play a helpful role, business must be less parochial about what is good for one's particular company and more helpful about what is good for the people of our countries.

Proper resolution of serious trade issues is good for the United States and for the rest of the world.

We have entered a time of uncertainty over global trade. President Trump has rejected the Trans-Pacific Partnership (TPP) as not being in the best interests of the United States and is renegotiating the North American Free Trade Agreement (NAFTA). He has begun to demand material changes in our trade agreements with many nations and has begun to demand that nations reduce their trade surpluses with the United States, probably most importantly between the United States and China, the world's two largest economies.

We should acknowledge many of the legitimate complaints around trade. Tariffs and non-tariff barriers to trade are often not fair; intellectual property is frequently stolen; and the rights to invest in and own companies in some countries, in many cases, are not equal. Countries commonly subsidize state-owned enterprises. When the U.S. administration talks about "free" and "fair," it essentially means the same on all counts. This is not what has existed. It is not unreasonable for the United States to press ahead for more equivalency.

In last year's letter, I spoke about NAFTA and said that while there are some clear problems, an updated agreement should be worked out in a way that is fair and beneficial for all parties. The logic to do so is completely compelling.

China is far more complex – and the complaints are more legitimate. China has realized significant economic and employment gains since joining the WTO in 2001. China was expected to continue on an aggressive path of opening up its economy, but this has happened at a much slower pace than most nations expected. Now, more than 16 years later, it has the second-largest economy in the world and is home to 20% of the Fortune 500 companies, yet it still considers itself a "developing" nation that should not be subject to the same WTO standards as the United States and other "developed" countries. The Chinese government is competent and capable, and it has done an extraordinarily good job of managing its emergence as the world's second-largest economy. I believe

that China understands most of these issues and wants to properly resolve them. Recently, the United States threatened unilateral action against China. Of course, anything that starts to resemble a trade war creates risk and uncertainty to the global economic system. One of the administration's best arguments is that negotiation alone has not worked. But regardless of the process, here is my view on what the best outcomes would look like:

- The United States should define very clearly, and in detail, what it wants from China.
- The United States should lay out a distinct timeline – and determine what the reaction would be if it is not met.
- The United States should listen closely to China about any legitimate complaints it may have.
- This should be done in partnership with our largest allies, particularly Japan and Europe.
- The United States should revisit the Trans-Pacific Partnership and fix the parts considered unfair. The TPP could be an excellent economic and strategic agreement between America and its allies, particularly Asia. This is not against China: The country could at some point be offered the opportunity to enter the TPP if it demonstrates a willingness to meet its standards, which would improve upon the rules-based global trading system under American leadership.
- We need to have – and *believe* that we have – proper border control. American citizens have the right to complain that we have not successfully protected our borders since the last immigration reform in 1986. In the 1986 amnesty, 3 million undocumented immigrants came forward, and now we estimate there are another 11 million undocumented people domiciled in our country. If the American public does not believe we have proper border control, nothing else can be accomplished.
- The “Dreamers” who came to America as undocumented children (there are approximately 2 million of them) should get a path to legal status and citizenship.
- We need improved merit-based immigration. Those who get an advanced degree in the United States should receive a green card along with their diploma. We need these skilled individuals in America. We could also improve on other merit-based immigration practices.
- Law-abiding, hardworking undocumented immigrants should have a path to legal status or citizenship. The American public should know this is no easy path. Back taxes should be paid, and citizenship could take up to 15 years.
- Finally, it is unlikely the American public will feel comfortable with immigration if we don't revert to some core principles. Immigrants should be coming here because they want to be part of our country and who we are as a people. America was an idea borne of freedom, with freedom of speech, freedom of religion, freedom of enterprise, and equality and opportunity. People immigrating to this country should be taught American history, our language and our principles. The American public will not be pro-immigration if we don't address these issues.

While the chance of having an improved trade deal with both Mexico and Canada, as well as a more mutually beneficial relationship with China, is possible and preferable, there is always a chance that miscalculations on the part of the various actors could lead to negative outcomes. This obviously creates higher risk and more uncertainty until resolved.

We need to resolve immigration – it is tearing apart our body politic and damaging our economy.

Immigration reform is important both morally and economically. Immigration has been a critical part of America's economic and cultural vitality. And there are some basic and key principles that most Americans seem to agree with:

Closing policy thoughts.

It is an absolute necessity that America maintain a world-class economy, with world-class companies and a world-class military. We need to do a significantly better job of managing our economy if we want it to be world class.

And, finally, ceding America's leadership role on the world stage is a bad idea for everyone – inside and outside our great land. We must all collaborate and respect each other to make the world a better place.

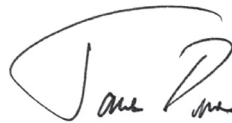
IN CLOSING

We are devoted to earning the trust and respect of our shareholders, customers, employees and the communities we serve every single day.

We will never lose sight of this.

And we have an outstanding management team leading this mission – a group of dedicated executives with exceptional capabilities, character, experience and wisdom.

I am humbled and honored to work at this company and with its great people. It is an extraordinary privilege and responsibility. On behalf of JPMorgan Chase and our management team, I want to express my deepest gratitude to all of our people – I am proud to be their partner.



Jamie Dimon
Chairman and Chief Executive Officer

April 5, 2018

Consumer & Community Banking

2017 financial results

JPMorgan Chase had a strong year in 2017. For Consumer & Community Banking (CCB), we delivered 17% return on equity (ROE) on net income of \$9.4 billion and \$46.5 billion in revenue. We grew our customer base to 61 million U.S. households – nearly half of all U.S. households do business with Chase – including 4 million small businesses. Our customers have 97 million debit and credit card accounts and spent over \$900 billion on their cards in 2017. Our active digital customers grew to 47 million, and 30 million of them are active on mobile, the largest in our industry.

We've made progress since we brought the Chase businesses together five years ago, and we have seen remarkable growth in our business drivers over that time. In Consumer and Business Banking, our average deposits of \$626 billion are up 60%, and our client investment assets are up 72%, hitting a record \$273 billion. Annual credit card sales rose to \$622 billion in 2017, up 63% since five years ago. Merchant processing volume reached \$1.2 trillion, up 82%. Home Lending average loans have grown 16%, and our Auto loans and leases have grown 53%.

We delivered these results with a steady focus on the same four areas: customers, profitability, controls and people. There is no substitute for a consistent strategy well-executed.

Here are some of the highlights from 2017 for each.

Customers

Customer satisfaction is at record highs across most of our businesses. We will always have plenty of work to do, but we are extremely pleased with how far we've come.

2017 Performance Highlights

Key business drivers				
(\$ in billions, except ratios and where otherwise noted)		2017	2012	%Δ
Consumer & Community Banking	Households (millions) ¹	61.0	55.9	9%
	Active digital customers (millions) ²	46.7	31.1	50%
	Active mobile customers (millions) ³	30.1	12.4	143%
Consumer and Business Banking	Average deposits	\$626	\$392	60%
	Client investment assets (end of period)	\$273	\$159	72%
	Average Business Banking loans	\$23	\$18	28%
	Business Banking net charge-off rate	0.57%	1.65%	(108) bps
Home Lending	Total mortgage origination volume	\$98	\$181	(46)%
	Foreclosure units (thousands, end of period)	35	312	(89)%
	Average loans	\$237	\$205	16%
	Net charge-off rate ⁴	0.02%	2.37%	(235) bps
Credit Card	New accounts opened (millions) ⁵	8.4	6.7	25%
	Sales volume ⁵	\$622	\$381	63%
	Average loans	\$140	\$125	12%
	Net charge-off rate	2.95%	3.95%	(100) bps
Merchant Services	Merchant processing volume	\$1,192	\$655	82%
Auto	Loan and lease originations	\$33	\$23	43%
	Average loan and leased assets	\$81	\$53	53%
	Net charge-off rate	0.51%	0.39%	12 bps

¹ Reflects data as of November 2017

bps = basis points

² Users of all web and/or mobile platforms who have logged in within the past 90 days

³ Users of all mobile platforms who have logged in within the past 90 days

⁴ Excludes the impact of purchased credit-impaired loans

⁵ Excludes Commercial Card

The bar for what customers expect in every industry has grown much higher. We live in an on-demand world. Customers can get the service, content or experience they want when they want it on nearly any device. They expect speed and simplicity.

Customer service in banking and payments has improved greatly in recent years but lags compared with certain other industries such as travel or segments of retail. We are seeing fintechs have success simply by removing customer pain points that banks haven't. Customers are showing us where we need to get better, and we are paying attention. Getting this right is important because we are a part of our customers' everyday lives. On average, our digitally active customers log in more than 15 times a month. Our active debit card customers average 32 purchases a

month, and those who use our ATMs have an average of five monthly ATM transactions. Our active credit card customers average 21 transactions each month.

In 2017, we made several improvements around the customer experience, including facial recognition in our app, a fully mobile bank pilot (Finn), real-time payments using Chase QuickPaySM with Zelle and a simpler online application for Business Banking customers. For those who need our business products – deposits, credit cards and merchant processing – we collapsed the three applications into one so customers provide their information once instead of multiple times. We didn't change the products – we just made it easier for customers to get the ones they want. The simpler application reduces the time it takes to apply

for all three products by 45 minutes, and we saw engagement with new Business Banking households with both deposit and credit card accounts increase 25% with this change.

We also reached many new customers through important partnerships. In the Card business, many consumers want rewards for items they buy. In 2017, we completed co-brand renewals for partner cards with Disney, Hyatt and Marriott. We also launched the popular Amazon Prime Rewards Visa card and helped drive double-digit year-over-year sales growth for the Amazon portfolio. In addition to signing new, strategic Chase Pay® partnerships with PayPal and The Kroger Co., we launched acceptance of Chase Pay® across merchants such as Cinemark, Wakefern Food Corporation and Walmart. And in Auto, we renewed our contract with Subaru of America, extending our partnership.

Profitability

We always have said short-term growth is not our goal, but profitable growth over the long term is. We never make decisions to drive short-term earnings and always focus on investing for long-term results. We are proud of the work we have done to bring down our structural expense, allowing us to invest more in our core businesses. The CCB overhead ratio has gone from 61% in 2011 to 56% in 2017, with a medium-term target of 50%+/- . Delivering on that will allow us to further increase our investments in technology and digital, as well as to move with greater speed to market. These investments matter: Digital is a more efficient way to serve our customers, and our digitally engaged customers are happier with us and are more likely to stay with Chase. Our goal is to be the easiest bank for customers to do business with.

Controls

Controls are the checks, balances and safeguards we rely on to do our work effectively. Controls help us avoid errors and adhere to all requirements and regulations. Controls are an ongoing discipline for us, but we believe the worst is behind us. In 2017, three of our consent orders were lifted. Early in 2018, the Federal Reserve lifted our Home Lending consent order, recognizing the improvements we have made since the financial crisis; the Office of the Comptroller of the Currency lifted its own foreclosure consent order in 2016.

People

We think we have the greatest team on the field with our 134,000 Chase employees. Our steady focus on creating a great employee experience and investing in our people has made us a stronger business. We promoted more than 15,000 people in 2017 and filled over 16,000 roles with internal candidates. During the year, the firm invested in excess of \$300 million on employee training to keep everyone's skills current in a changing economy. Our team reflects the customer base we serve: More than 58% of our employees are female, and over 53% are minorities. Although we are proud of our progress in increasing diversity among our senior leadership, we still have work to do.

We have also made several changes to help support our people. For the second time in two years, we raised wages for 22,000 employees to \$15 to \$18 an hour, depending on the local cost of living. These increases are on top of our full benefits package, which averages \$12,000 for employees in this pay range and a lower medical deductible to protect families from sudden medical expense.

Perhaps the proudest moment of 2017 came when this firm and our

people stepped up to help communities in need, as hurricanes, fires and mudslides devastated several communities in the U.S.

This is when our company is at its best. We made more loans, extended loan payments, waived late fees and made investments to support the long-term recovery in these communities. We also reached out to help the hundreds of our employees who were affected directly. Our employee-to-employee giving fund showed the tremendous generosity of employees looking out for each other in times of need. And from Houston to South Florida to the Bay Area, you could see the blue shirts of our Good Works volunteers helping out distributing food and water, clearing debris and helping however they could. Business has a broader social role to play, particularly now, and it's possible that no company can do as much as ours.

Looking ahead

If this organization has proved one thing, it's that we can move and adapt quickly for a company of our size. We are experiencing another period of extraordinary change. The pace of technology is accelerating faster than most businesses can absorb. Industry after industry is being disrupted as emerging players develop better customer experiences, faster than incumbents can innovate. API-based platforms allow software developers to build onto experiences, and we see services converging.

We know we have an extraordinary leadership position, and we do not take it for granted for a second. Across industries, the mighty have fallen – and we do not think we are immune. The key for us now is to invest, innovate and speed up to serve customers. As we look ahead, we will be laser focused on

“
Intelligence is the ability to adapt to change.

— STEPHEN HAWKING

”

becoming the easiest bank to do business with. We will do that by being excellent in six core areas we deliver for customers: becoming a customer, paying with Chase, owning a home, owning a car, growing wealth and growing businesses.

Becoming a customer – No matter how customers find us – in a branch, on our app, on chase.com or through a friend – we want to make it easy for them to become a customer and stay with us throughout their lives. We will continue to invest in having a simple, fast way to develop this relationship across Chase. Early in 2018, we started using a simpler digital application for our Consumer checking and savings products. Similar to the Business Banking application I mentioned earlier, we just streamlined the process to make it fast and easy. Early results have been beyond our expectations, requiring only a few minutes for existing customers to add checking or savings accounts and only a few minutes longer for customers who are new to Chase to join us. During one day in February, we opened two accounts every minute.

Paying with Chase – Helping our customers pay for things is at the center of everything we do. Whether a customer pays an individual, purchases a product or settles a bill, it should be simple, quick and safe. Forty percent of Chase customers already move money with us. We have 48 million active credit and debit card customers, and more than 70% of our active credit card customers use those cards in mobile wallets or for recurring bills and merchant payments. Zelle has been adding nearly 100,000 users every day, and

Chase QuickPaySM makes up more than 50% of Zelle's volume. We want our customers to decide who to pay and when, and we make sure it's simple, safe and seamless.

Owning a home – Buying a home is one of the most emotional purchases a family ever makes. But the process of buying one is anything but joyful. We want to help the hundreds of thousands of customers who will buy a home with Chase in 2018 to do so with ease and speed. Our partnership with Roostify has made our digital mortgage process simpler and has reduced the time it takes to refinance by 15%.

Owning a car – Over 1 million customers will buy or lease a car with Chase in 2018, yet many people still don't think to call us first if they're buying one. Like getting a home loan, the experience of buying a car can be long and daunting. We think we can reinvent it – making it easier, less expensive and a pleasant experience. Chase Auto Direct, in partnership with TrueCar, is a step in the right direction.

Growing wealth – Our brand promise is to help customers make the most of their money. Our team of bankers and wealth advisors has worked with customers for decades. In 2018, we will introduce new digital tools to help customers invest and trade from their phones, as well as connect them with an advisor when they need one. Unlike other investment apps, ours will have the team of J.P. Morgan advisors and bankers behind it.

Growing businesses – Few banks can help businesses as much as JPMorgan Chase can, from startups

to multinationals. From the beginning, we can offer banking, credit and merchant services along with a business banker. We have developed new products and services that make it easier for our customers to manage and grow their business. Chase Business Quick Capital[®], powered by our partnership with OnDeck, is a great example, offering same-day access to short-term loans. The next step is to expand into new markets and use the power of Chase to help our business customers grow and thrive.

Looking ahead at our ambitions for the year, we are grateful for our leadership position and are ready to do more. As large as we are and as much as we have grown, we know the best days are still to come. We raised our medium-term ROE target to 25%+ from 20%+/-, in part due to the impact of tax reform. With the strength of our products, distribution and brand, we know we can get there.

The first step will be expanding our already sizable technology investment. As a firm, we invest in excess of \$10 billion annually in technology. We have more than 31,000 technologists at the firm in development and engineering jobs; that number has grown over time, and we expect to hire more people in 2018. We have moved a number of our technology teams to an agile structure, allowing them to be closer to the product owners and speeding up time to market. This change has enabled our teams to be 100% focused on their products and on delivering for our customers.

To maintain speed and adaptability, we have to fight the institutional drag that slows big companies down. Bureaucracy is like a virus. As soon

as one strain is inoculated, another appears. In most cases, bureaucracy is driven by good people thinking they're doing the right thing. But when we try to torture a product to perfection, we sacrifice time to market and risk losing customers to someone who can do it better. Jamie has asked Daniel and me to take this on, and we have accepted with pleasure. We are working at cutting unnecessary committees, making meetings more efficient and putting accountability on business owners.

And last, we will expand our retail branches into new communities. This is perhaps the most exciting development for 2018. The heart of our company is our retail branches – more than 1 million customers visit our branches each day. For years, we have been constrained to our current 23-state footprint and unable to expand into major markets such as Washington, D.C., Boston, Philadelphia, Baltimore and the Carolinas. In January 2018, we announced that we plan to open up to 400 branches in

15-20 new markets over the next five years. These markets represent a \$1 trillion deposit opportunity. Our new branches in these markets will lead to nearly 3,000 new jobs and drive economic opportunity for small businesses in those communities.

When we enter these markets, we will do so with the full force of JPMorgan Chase. We will hire. We will lend. And we will help customers achieve milestones, like buying a home or sending a child to college. Our JPMorgan Chase Foundation will support the nonprofits within that area to drive economic growth. We have seen the significant impact we have made in the communities we are in, and we're excited to become an even more relevant part of many more.

I'm always an optimist, but I can honestly say I've never been more optimistic to be a part of this company. We are the largest bank in America, and I don't think we've ever been stronger, more disciplined and more

focused on how we can serve our customers. Thank you for your support of this great company, and I look forward to our best days ahead.



Gordon Smith
Co-President and Chief Operating Officer,
JPMorgan Chase & Co., and
CEO, Consumer & Community Banking

2017 HIGHLIGHTS AND ACCOMPLISHMENTS

- Consumer relationships with nearly half of U.S. households
- #1 most visited banking portal in the U.S. – chase.com
- #1 U.S. co-brand credit card issuer
- #2 jumbo mortgage originator
- #1 in primary bank relationships within our Chase footprint
- #1 in Retail Banking for five years in a row (Kantar TNS)
- #1 in total U.S. credit and debit payments volume
- #3 bank auto lender
- Consumer deposit volume has grown at a rate more than twice the industry average since 2012
- #1 ATM network in the U.S.
- #1 wholly-owned merchant acquirer
- 2017 Bank Brand of the Year (The Harris Poll)



Helping Customers in Times of Need

After Hurricane Harvey in Houston, a city where we have served people and businesses for 151 years, we provided more than \$30 million in immediate relief, worked with customers on over \$1.2 billion in loans and mortgages, and waived certain fees. After the storm, we hosted 1,400 Houston area neighbors at community branch events where our employees helped our customers and members of the community.

Corporate & Investment Bank

During 2017, the Corporate & Investment Bank (CIB) maintained its position as the most successful and profitable institution of its kind.

But the seeds of our current strength were planted years ago. As other banks retrenched, cutting back on products and geographies, we chose a different path. We believed that growth would come from being global, having scale and maintaining a complete product offering for clients. Those elements anchored the profitability that enabled us to invest consistently and to sustain our growth, all while improving the client experience.

Staying true to our character and reputation, we also knew we had to be open for business under all market conditions, not just when markets were strong. Whether in Europe, Latin America, Asia or North America, our teams have worked hard, built trust and gained share in recent years.

In 2017, the CIB generated earnings of \$10.8 billion on \$34.5 billion of revenue, resulting in a return on equity (ROE) of 14% that allowed us to continue our pace of investment in our people and technology.

Our CIB franchise also benefits from being part of JPMorgan Chase and collaborating with our firmwide partners: Commercial Banking (CB), Asset & Wealth Management (AWM) and Consumer & Community Banking (CCB).

To cite some examples, CB's universe of more than 20,000 clients has access to the CIB's treasury services and foreign exchange products as a result of the close working relationship they share. On the strength of that relationship, nearly 40% of North America Investment Banking fees were derived from CB clients – a record. Family office clients served by AWM are often interested in investing in the types of transactions the CIB brings to market, and the CCB's relationships with major merchants and businesses generate opportunities as these businesses need to raise capital, seek advisory expertise or require payments services.

Maintaining share, and even growing it, in recent years hasn't been easy. Having scale and expertise across a set of businesses enabled us to sustain profitability under various market conditions. And while we take pride in our standings, we aren't compla-

cent about them. Each day, our employees know that J.P. Morgan has to earn client business with innovative solutions that tap the appropriate mix of our products. More than ever, that means delivering best-in-class ideas and service through cutting-edge technology.

Providing easy-to-use technology in order to deliver a great client experience will continue to be a major differentiator in the coming years. That's why we are always exploring ways to offer our clients faster, better and simpler ways to do business with us. The banks that don't invest will lose ground and will have a long, difficult catchup process.

Looking ahead, we are implementing a set of simultaneous priorities – a blueprint for investing that runs in parallel tracks across three time horizons. In the immediate period, we are focused on maintaining day-to-day discipline to support organic growth while holding firm on costs and integrating efficiencies.

At the same time, we are planning and preparing for the changing industry conditions that will affect the business over the medium term,

Sustaining Our Lead Across Three Horizons

Maintaining
day-to-day discipline

Running a best-in-class
business across all
dimensions

Optimizing our
current model

Improving the way
we serve our clients

Transforming for
the future

Investing in next-
generation capabilities
and expanding
our global footprint

a period defined as the next two to three years, and the longer term, extending 10 years out. The medium-term investments we're making are already enhancing our ability to serve clients and hold the promise of transforming our business.

Looking five to 10 years out, the pace of technological innovation will only quicken as artificial intelligence, robotics, machine learning, distributed ledgers and big data will all shape our future.

We will continue the prudent expansion of our global footprint. J.P. Morgan has been doing business in China, India, Brazil and countries in Africa for decades. And as global economies grow, we are making judicious decisions that will reaffirm our unique position as the leading global financial institution.

Our efforts to expand our coverage of global clients over the last eight years are paying dividends today. Now, with economic growth taking hold across the globe, these clients have turned to us for services, such as cash management, electronic payments and fraud detection.

On the following pages, I will discuss the CIB's 2017 performance in greater detail, outlining how we intend to prepare for the industry changes that are certain to affect our business over the foreseeable future.

By the numbers: Working for clients

The CIB's revenue was more than \$6 billion higher than its closest competitor, according to industry data provider Coalition.

That financial success is directly tied to how well the CIB delivers for our clients across our businesses. Their success is our success. With the

increasingly competitive environment we inhabit today, we take pride in every client assignment and the number of times they choose us for repeat business.

We kicked off 2017 announcing that J.P. Morgan's Custody & Fund Services business won the largest custody mandate in history. BlackRock is in the process of shifting \$1.3 trillion in assets under management over to our platform, validating the investments we've made and the resources we've added to that business. As the only global custodian with a top Markets franchise, we're confident that scale, technology and seamless execution will continue to draw clients.

Custody & Fund Services built on its momentum, as evidenced by the \$3.9 billion revenue in Securities Services, which was up 9% for the year. Our business has record assets under custody of \$23.5 trillion, which increased by 14% compared with 2016.

Treasury Services, a business that supports clients in their cash management needs and is rolling out its real-time payments capability, also continued to perform well through the year, with revenue rising to \$4.2 billion, an increase of 15% over 2016. As it serves the needs of increasingly global commerce, Treasury Services' state-of-the-art technology is reducing to seconds what once took days.

Turning to investment banking, J.P. Morgan set a record in global Investment Banking fees, \$7.2 billion, including debt underwriting of \$3.6 billion. Measured by market share, in Mergers & Acquisitions (M&A), Equity Capital Markets (ECM) and Debt Capital Markets (DCM), the firm has scored gains since 2015: M&A share rose to 8.6% from 8.4%; ECM was up to 7.1% from 6.9%; and DCM moved to 8.3% from 7.9%.

Our debt underwriting team closed on the largest number of deals in its history, up about 16% over last year. While we witnessed an overall decline in the number of deals over \$1 billion, J.P. Morgan still played a key role in the year's biggest transactions. We served as joint active bookrunner on AT&T's \$22.5 billion bond offering, the third largest of all time, and also served as joint active bookrunner on Amazon's \$16 billion offering to support its acquisition of Whole Foods Market.

J.P. Morgan was also #1 in U.S. initial public offering (IPO) volume and managed the largest number of deals during 2017. Our equity team served as global coordinator or helped to lead more than 40% of the IPOs over \$1 billion in size, including Pirelli at \$2.8 billion, Altice at \$2.1 billion and Netmarble at \$2.3 billion.

Our Global M&A team completed the most M&A deals during the year, 354, and had record post-crisis fees for its advisory work. The firm advised on six of the top M&A announced transactions in North America. One of our more visible roles is our work serving as advisor to The Walt Disney Company on its acquisition of portions of 21st Century Fox, including its film and television studio.

Looking at the Markets business, after an exceptionally strong 2016, J.P. Morgan's 2017 share in Fixed Income, Currencies and Commodities (FICC) decreased marginally to 11.4% from 11.7%. However, offsetting that slight drop, the market share in Equities and Prime rose to 10.3% from the previous year's 10.1% and shared the top ranking for the category.

We are particularly proud of progress in Prime Services. We have a competitive and complete platform,

and we grew global prime balances by 28% last year while increasing market share to 13.8% from 11.3% since 2015.

The CIB's Global Research team also continued to rank #1 worldwide and across a broad range of equity and debt market categories, providing clients with actionable insights on the markets. The regularity with which our analysts top the rankings is a remarkable achievement. As Markets in Financial Instruments Directive regulations take on a greater impact, quality research will continue to set us apart.

Our fintech future

The CIB is an investment bank, but financial technology forms the bank's backbone. As part of JPMorgan Chase, the CIB benefits from being part of a firm that draws on the expertise of nearly 50,000 technologists and a 2017 technology budget that amounted to \$9.5 billion. But to underscore the firm's overall commitment, this year's technology budget totals \$10.8 billion, with more than \$5 billion earmarked for new investments.

Over the last several years, I have mentioned in my annual letter J.P. Morgan's commitment to embracing technology. Being creative requires a willingness to take risks. As part of our technology culture, experimentation and failure are okay – it is encouraged, in fact, in order to achieve breakthroughs.

It was only a few years ago that programmers and technology graduates seemed reluctant to build their careers in banks; that's not the case at J.P. Morgan. Nearly 30% of our recent senior hires in technology came from non-financial services firms, and they're working on find-

ing solutions to some of the most complex issues in the field.

The divide between the front office and the back office is no more. Our technologists and our product people work side by side, in the same rooms and at the same tables. They're fully assimilated. That way, the teams are able to work in tandem to build the next-generation systems best targeted to meet the needs of our clients and the business.

In the age of smartphones, when people only need an app in order to trade, our mission is to make it possible for clients to trade and interact with us easily and in whatever way they choose. If they want to access our top-rated research or conduct business with us, we want them to have the freedom to choose the option they prefer – whether it's in person or by telephone, website, mobile app, online trading platform or third party.

On the strength of its scale and technology, J.P. Morgan processes \$5 trillion in payments and trades billions of dollars electronically every day. In equities, nearly 100% of the tickets are handled electronically, representing 89% of notional volume. The macro desk, primarily foreign exchange, handles 97% of its tickets electronically, corresponding to 46% of its volume.

We have assembled talented teams to drive innovation in artificial intelligence, blockchain technology, big data, machine learning and bots, with the objectives of improving our efficiency and enabling us to serve more clients with greater effectiveness, depth and sophistication. As a result, many of our initiatives are already showing promise in terms of charting their future expansion and application.

We're piloting several ventures to test the viability of technology in real-world situations. Late in 2017, J.P. Morgan's Treasury Services and its Blockchain Center of Excellence launched a payment network powered by distributed ledger technology in partnership with the Royal Bank of Canada and the Australia and New Zealand Banking Group. Called the Interbank Information Network, the pilot's objective is to use blockchain technology to process bank-to-bank transactions faster, alleviating situations where payments get held up due to mismatched information.

Because our people are our greatest strength, we value technology as a tool to enhance their ability to provide the best-in-class ideas and solutions that our clients expect from us.

Sustainability

Before I close, I want to highlight what the CIB, along with the overall JPMorgan Chase organization, is doing to further a sustainable environment. On behalf of the entire organization, I have been asked to champion our sustainability efforts. It's an issue that is important to me and is one that our employees care about deeply as well. Employees want to work for an organization they can be proud of and that shares their values. Through our sustainability initiatives, the firm is demonstrating its commitment to those shared concerns and is taking action.

In 2017, the Operating Committee ramped up our firmwide sustainability efforts in a big way. Over the next three years, JPMorgan Chase intends to become 100% reliant on renewable power. In our own workspace, we are executing several strategies to increase our energy efficiency. We are installing building management

systems and are in the process of retrofitting 4,500 Chase branches with LED lighting as part of the world's largest LED lighting installation. We will also produce power for some of our own buildings by developing on-site solar power generation. We expect that these measures will reduce total power consumption by 15%.

Using the firm's expertise in the renewable power sector also enables us to support the development of renewable projects – and advances our goal of 100% reliance on renewable power – in other substantive ways. One example is the Buckthorn wind farm, a 100-megawatt project in Texas that came online last December. More than half of the wind farm's output will be purchased by our Global Real Estate team and the remainder by our Commodities team. This is good for the environment and good for business.

In our effort to finance green initiatives, we've raised the stakes, committing \$200 billion for such projects by 2025. From 2016 to year-end 2017, we reached \$60.6 billion cumulatively toward that goal. The company plans to increase its recycling efforts and to pioneer the use of greener materials in its products and processes.

We've also continued our leading role as an underwriter of green bonds. In 2017, Apple Inc. raised \$1 billion using green bonds – the second green bond Apple has issued with J.P. Morgan as an active bookrunner.

In addition, J.P. Morgan led some of the largest clean energy transactions, such as serving as financial advisor to Enbridge on its C\$2.1 billion partnership with EnBW on the Hohe See and Albatros offshore wind farms in the North Sea. J.P. Morgan also was a bookrunner for energy company Iberdrola's first issue of green hybrid bonds on the euromarket, valued at €1 billion. The proceeds will be used to refinance investments in various renewable projects in the United Kingdom.

Closing

The CIB has had another successful year, gaining share and generating healthy profits by remaining intently focused on serving our clients and benefiting from our scale, breadth and global reach.

J.P. Morgan is known for being a place where people want to work, where we can attract and retain the best talent, where their work is recognized and where the culture is collaborative. That is critical to our

ongoing success. I, along with the entire CIB management team, appreciate the dedication, enthusiasm and intelligence our employees bring with them every day.

Finally, on a personal note, I'd like to express my gratitude to my partners on the Operating Committee. The collaboration that exists throughout the firm is the foundation that supports our strength year after year.



Daniel Pinto

Co-President and Chief Operating Officer, JPMorgan Chase & Co., and CEO, Corporate & Investment Bank

2017 HIGHLIGHTS AND ACCOMPLISHMENTS

- The CIB had earnings of \$10.8 billion on \$34.5 billion of revenue, producing a best-in-class ROE of 14%.
- We retained our #1 ranking in global Investment Banking fees with an 8.1% market share, according to Dealogic.
- Debt Capital Markets was #1 in closing deals, setting a record for the highest number of deals book-run in the firm's history.
- Equity Capital Markets was #1 in U.S. IPO volume and in the number of deals.
- M&A was #1 in the number of deals completed: 354.
- The CIB continued investing in technology to offer clients a broader array of trading platforms while making it easier and faster to trade with us.
- *Institutional Investor* magazine's survey of large investors ranked J.P. Morgan as the #1 Global Research Firm. Across individual categories, J.P. Morgan ranked #1 in All-America Fixed Income Research and All-Europe Fixed Income Research. It also ranked #1 in All-America Equity Research and ranked #2 in Emerging Markets.
- Treasury Services revenue rose to \$4.2 billion, an increase of 15% over 2016, and continued momentum in Custody & Fund Services drove 9% growth in Securities Services revenue for the year.
- Custody & Fund Services had a record \$23.5 trillion in assets under custody while also achieving the highest ever client satisfaction and retention levels.

Commercial Banking

Commercial Banking (CB) is the nexus of everything we do at JPMorgan Chase. The hard work of our dedicated team, along with the unmatched capabilities across our firm, allows us to build deep, lasting relationships with so many great companies. We are incredibly proud of the role we play in the success of our clients, and we are grateful every day for the confidence they place in us.

One such success story is siggi's yogurt (siggi's), celebrated as the fastest-growing national yogurt brand in 2017. What started as selling his unique recipe out of coolers at local outdoor markets in New York, founder Siggi Hilmarsson quickly turned his humble operation into a thriving business. Up until 2016, Siggi and his team had fully funded the company on their own, but when their growth accelerated, we worked with them to deliver their first bank credit facility. As Siggi shaped the company's plans for the future, we provided differentiated industry advice, and in 2017, we were selected to advise siggi's on the sale of the company – the capstone transaction for an incredible brand and business. At every step, we were delighted to support Siggi's passion to share his native Icelandic recipe with households around the country.

Our dedication to clients, like siggi's, continues to drive our strategy and how we do business in CB. I'm excited to share highlights of our 2017 performance, the investments we are making to deliver more value to our clients and the steps we are taking to reach our full potential.

2017 performance

With strong momentum across all of our businesses and continued focus on executing our strategic priorities,

CB delivered record financial results for 2017, earning \$3.5 billion of net income on revenue of \$8.6 billion. We achieved a notable return on equity of 17% and an industry-leading overhead ratio of 39%, even while making significant investments across the business.

Higher interest rates, disciplined loan growth and outstanding credit quality all contributed to our record performance. We ended the year with record loan balances across our Commercial & Industrial and Commercial Real Estate (CRE) businesses, up \$15 billion or 8% from the prior year. Staying true to our proven underwriting standards, we have remained highly selective in growing our loan portfolio – 2017 marked the sixth straight year of net charge-offs of less than 10 basis points. This ongoing discipline is especially important given the late stages of the current economic cycle and competitive pressures in the market.

These record results reflect our sustained investment, the incredible effort of the CB team and their continued focus on our clients. We are committed to building upon these great milestones and see tremendous potential across our franchise.

Executing our long-term, organic growth strategy

Our strategy to grow CB remains consistent year after year: Add great clients and work hard to deepen those relationships over time by delivering valuable solutions to help them succeed. We have been steadily investing in the business, taking a long-term disciplined approach. Since 2010, we have expanded into 33 new cities and added more than 800 bankers, helping us achieve sustained organic growth across our business.

Expanding into new markets

Being able to deliver the broad-based capabilities of JPMorgan Chase at a very local level is a key competitive advantage. In 2017, we added client coverage in six new high-potential markets and now have dedicated teams in all of the top 50 metropolitan statistical areas. We look forward to growing our business in these terrific locations and expanding into additional communities in the future.

Investing in our team

Our success depends 100% on our people. As such, we are making significant investments in our training and development capabilities, all focused on providing our bankers with the deep expertise they need to best serve our clients. In 2017, we hired more than 100 bankers to support the growth and expansion of our business, and we expect to add more great bankers in the coming year.

Delivering value to our clients

Expansion is only one part of our growth strategy – deepening our relationships with our clients is equally important. Given the breadth of our capabilities, we can support the needs of businesses of all sizes – fast-growing companies, like siggi's, as well as large, multinational corporations.

With the quality of our team, differentiated advice, and ability to deliver a full range of solutions locally, not many other banks can serve clients the way we can. In 2017, our clients had more than \$135 billion in assets managed by our leading Asset & Wealth Management business, generated nearly 40% of all North America Investment Banking (IB) fees for the Corporate & Investment Bank (CIB), and made over 13 million transactions in our branches.

Smart growth in our CRE business

We have been building a CRE business that will stand the test of time. Although we are in the late stages of the real estate cycle, market conditions for our targeted asset classes remain strong, and we were able to grow our CRE loan portfolio by \$12 billion in 2017. Importantly, maintaining our strict underwriting standards and conservative approach, we are focusing only on the loans and markets we know best. If we can stay true to these fundamentals, we believe we can continue to selectively grow our real estate loan balances.

Innovating across CB

Complementing our investments to drive growth in our business, we are working to bring new technologies and innovation to transform how we interact with our clients. Our approach to innovation is anchored on having a full understanding of the identified, as well as unidentified, needs of our clients. Over 99% of companies in the U.S. are small to mid-sized businesses. We know they

have unique behaviors and concerns. They tell us they don't feel in control. Small business owners and their teams can be stretched, and they struggle with forecasting, collecting receivables and managing vendors. To help, this past year we increased our payments, technology and digital investments and put more capital and resources into delivering real solutions to these challenges.

Digital

In 2017, we partnered with Consumer & Community Banking to launch a new digital platform, Chase Connect, that is tailored to meet the needs of small and mid-sized companies. This platform provides our clients with a simple and convenient experience, integrating account information, payables and receivables. Chase Connect allows clients to see all of their accounts in one place, stay organized when paying bills, view payment history, approve transactions quickly and easily from one location, and receive customized account alerts. We are focused on having the best

integrated, digital capabilities for clients and will continue to invest in enhancing the functionality of this robust platform.

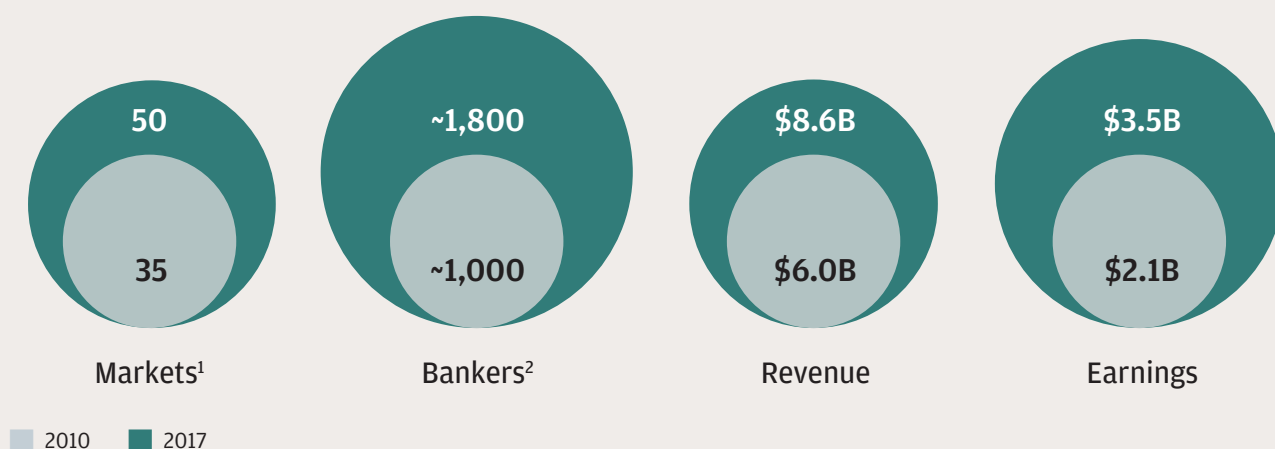
Payments

Recognizing that managing payments is a major pain point for our clients, we completed a comprehensive analysis to determine a digital solution. In 2017, we announced our investment in and partnership with Bill.com, the largest digital business-to-business payments network in the U.S. Seamlessly integrated into Chase Connect, this new automated payments capability will enable our clients to easily send and receive electronic invoices and payments, saving them substantial time and effort. We are very excited about this innovative solution and look forward to bringing this functionality to our clients in 2018.

Client experience

In addition to offering new capabilities, we are making great progress in re-engineering our core processes to

Sustained Growth Across Commercial Banking



¹ Number of Metropolitan Statistical Areas (MSAs) with Middle Market Banking presence out of top 50 MSAs

² Based on total count of client-facing employees

B = Billion

make it easier for clients to do business with us. For example, we are working to streamline and digitize the onboarding process to ensure that our clients' first experience with JPMorgan Chase is simple and transparent. Through these efforts, clients will be able to provide information electronically, e-sign and upload documents digitally, and receive real-time support via online chat capabilities. Clients are at the center of everything we do, and our work to deliver more value and an exceptional experience has no finish line.

Looking forward

While we celebrate CB's record 2017, we do not take our performance for

granted. We understand that complacency and standing still in any way will threaten the future success of our business. As such, we remain focused on building upon our franchise to provide even more support to our clients. By combining the core strength of our business with new technologies and innovation, we believe we can further extend our competitive advantages.

I want to thank all of our great clients, like siggi's, for the trust and confidence they place in JPMorgan Chase. I also want to thank the entire CB team for their continued dedication to our clients and their communities. I am excited about the direction of the business for 2018 and beyond.



Douglas Petno
CEO, Commercial Banking

2017 HIGHLIGHTS AND ACCOMPLISHMENTS

Performance highlights

- Delivered record revenue of \$8.6 billion
- Grew end-of-period loans 8%; 30 consecutive quarters of loan growth
- Generated return on equity of 17% on \$20 billion of allocated capital
- Continued superior credit quality – net charge-off ratio of 0.02%

Leadership positions

- #1 U.S. multifamily lender¹
- #1 in overall satisfaction, perceived satisfaction, customer relationships and transactions/payments processing – *CFO* magazine's Commercial Banking Survey, 2017
- Top 3 in Overall Middle Market, Large Middle Market and Asset Based Lending Bookrunner²

- Winner of 2017 Greenwich Best Brand Awards in Middle Market Banking – overall, loans/lines of credit, cash management, international products/services and investment banking
- Winner of 2017 Greenwich Excellence Awards in Middle Market Banking: international capabilities, cash management online banking functionality, cash management mobile banking functionality

Business segment highlights

- Middle Market Banking – Record gross Investment Banking revenue³; added eight new offices
- Corporate Client Banking – Record revenue, with average loans up 10% from prior year
- Commercial Term Lending – Record average loans; completed rollout of Commercial Real Estate Origination System for MFL business

- Real Estate Banking – Record revenue, with average loans up 27% from the prior year
- Community Development Banking – Record New Market Tax Credit equity investment production of \$1.2 billion – Financed more than 9,000 units of affordable housing in 70+ cities through construction lending commitments of over \$1 billion

Firmwide contribution

- Commercial Banking clients accounted for 38% of total North America Investment Banking fees⁴
- Over \$135 billion in assets under management from Commercial Banking clients, generating more than \$475 million in investment management revenue
- \$479 million in Card Services revenue⁵
- \$3.4 billion in Treasury Services revenue

Progress in key growth areas

- Middle Market expansion – Record revenue of \$519 million; 18% CAGR since 2012
- Investment Banking – Record gross revenue of \$2.3 billion³; 8% CAGR since 2012
- International Banking – Revenue⁵ of \$323 million; 8% CAGR since 2012

¹ Rank based on S&P Global Market Intelligence as of 12/31/17

² Thomson Reuters LPC, FY17

³ Investment Banking and Card Services revenue represents gross revenue generated by CB clients

⁴ Represents the percentage of CIB's North America IB fees generated by CB clients, excluding fees from fixed income and equity markets, which is included in CB gross IB revenue

⁵ Non-U.S. revenue from U.S. multinational clients

CAGR = Compound annual growth rate
MFL = Multifamily lending

Asset & Wealth Management

J.P. Morgan Asset & Wealth Management (AWM) has been a fiduciary of client assets for nearly two centuries, with our roots dating back to the earliest cross-border fund managers in the industry. Over these many decades, we have managed the assets of institutions, central banks, sovereign wealth funds and individuals, helping them navigate their assets from the beginning stages of cash management all the way through complex multi-generational portfolios.

Our breadth of experience, through economic and geopolitical cycles, gives us the insights to help clients make smart, long-term investment decisions. It also gives our portfolio managers and advisors the perspective and fortitude to remain disciplined risk managers and opportunistic risk takers in today's ever-evolving market environment.

Today, while the fundamentals of managing money still require having the best investment minds, they must be coupled with major investments in technology. This enables more comprehensive analysis of enormous data sets, faster and more optimal execution in portfolios, and seamless delivery of all that we do in both human and digital form. The global size and scale of AWM, as well as its connectivity with JPMorgan Chase's broader technology expertise, continue to be competitive advantages for our teams, our clients and our shareholders.

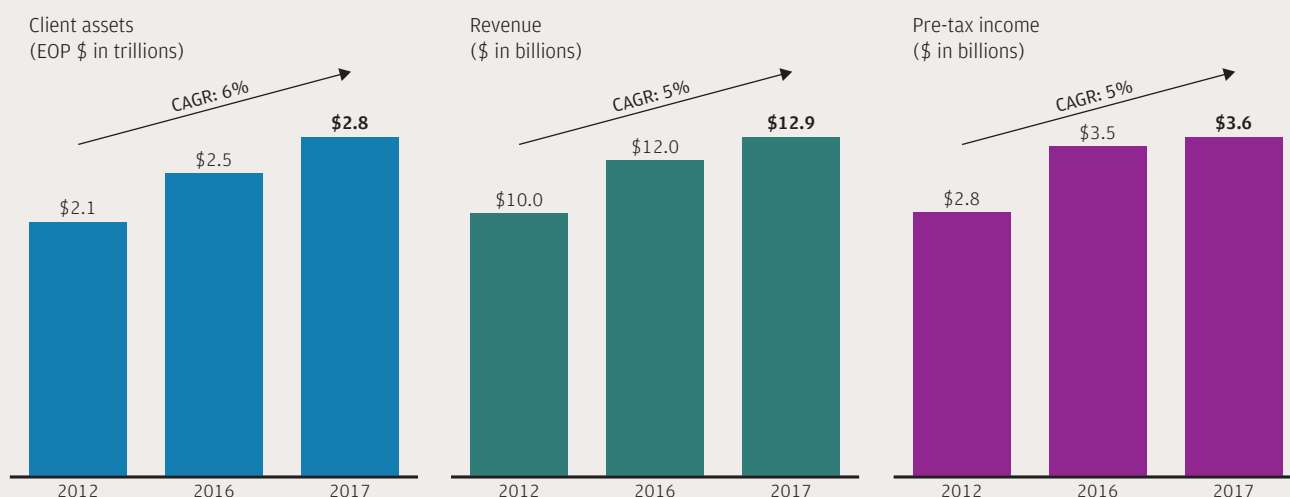
A record year for AWM

For investors in JPMorgan Chase, AWM continues to be a consistent revenue and earnings growth contributor to the company, with a very strong return on shareholder capital.

AWM's total client assets in 2017 grew to a record \$2.8 trillion, with revenue of \$12.9 billion and pre-tax income of \$3.6 billion also hitting their highest levels ever. However, the consistent growth trajectory those numbers represent is just as important. From 2012 to 2017, we achieved a 6% compound annual growth rate (CAGR) for client assets and a 5% CAGR for both revenue and pre-tax income.

Rising client assets is a critical indicator because it tells us that clients continue to entrust even more of their capital with us every year. In 2017, clients entrusted us with an additional \$84 billion of long-term assets – or \$1 billion to \$2 billion of incoming money every week. We have increased net new assets every year since 2004, with \$388 billion coming over the past five years.

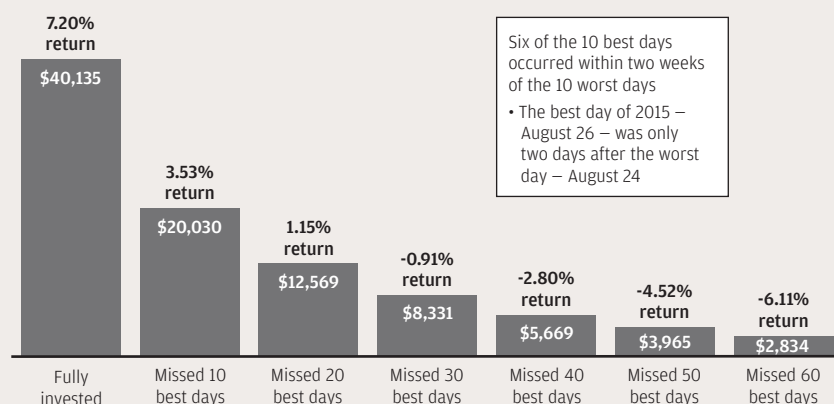
Continued Strong Financial Performance in 2017



CAGR = Compound annual growth rate
EOP = End of period

Returns of S&P 500

Performance of a \$10,000 investment between January 2, 1998 and December 29, 2017



Source: Prepared by J.P. Morgan Asset Management using data from Bloomberg. Returns based on the S&P 500 Total Return Index. For illustrative purposes only. Past performance is not indicative of future returns

The primary reason clients turn to J.P. Morgan to manage their assets is because of our strong and consistent investment performance. In 2017, 86% of our long-term mutual fund assets under management outperformed the peer median in the 10-year period, including 87% for equity, 81% for fixed income, and 90% for multi-asset solutions and alternatives.

Covering the full spectrum of clients

AWM delivers investment advisory expertise to clients across the firm, ranging from Chase customers investing their first \$100 to the world's wealthiest individuals and families. We also manage the portfolios of many of the largest sovereign wealth funds, pension funds and central banks in the world.

Across the Wealth Management business, in addition to investments, we help clients with their banking needs. This ranges from cash deposits to loans across many areas from real estate to investment capital for a new business. The deposit base of these private clients has grown consistently over the past five years, achieving a 10%

CAGR and reaching nearly \$300 billion. On the lending side, year-end spot balances of \$134 billion represent a 9% CAGR over the past five years. This was accomplished with a well-managed risk profile, resulting in strong and consistent credit performance, and low charge-offs of less than 10 basis points over a cycle.

In addition to traditional investing and banking, AWM has developed a full suite of solutions to meet the complexity of our clients' needs – from alternative investments to trust and estate planning to philanthropic advice. Our platform is among the most comprehensive in the industry, enabling us to serve clients across both sides of their balance sheet and to offer insights and expertise into virtually every area of their financial life.

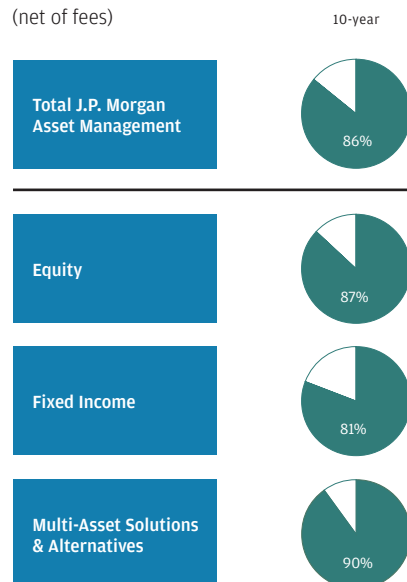
As wealth grows around the world, we continue to hire advisors to deliver J.P. Morgan's capabilities to more clients. We expect to hire in excess of 1,000 advisors over the coming years to expand in both new and existing markets. Our extensive experience in hiring and training has led our advisor productivity to rank among the top in the industry.

An increasingly digital world

Our clients' needs and behaviors are changing – and we are changing along with them.

% of J.P. Morgan Asset Management Long-Term Mutual Fund AUM Over the Peer Median¹

(net of fees)



¹ For footnoted information, refer to slide 98 in the 2018 JPMorgan Chase Strategic Update presentation, which is available on JPMorgan Chase & Co.'s website (https://www.jpmorganchase.com/corporate/investor-relations/document/3cea4108_strategic_update.pdf), under the heading Investor Relations, Events & Presentations, JPMorgan Chase 2018 Investor Day, and on Form 8-K as furnished to the SEC on February 27, 2018, which is available on the SEC's website (www.sec.gov)

Last year, we formed a new business, Intelligent Digital Solutions (IDS), to help drive our efforts around digital transformation and big data. This group is unifying and optimizing our use of data analytics to transform how we apply these added insights efficiently and effectively in managing portfolios. IDS also is helping us digitize everything we do to make it easier for clients to gain 24/7 access to our investment ideas, insights and execution.

Additionally, we are building a digital wealth offering that provides clients access to proprietary tools that can complement their personal relationship with an advisor or be used when they want to interact with us entirely online. Ultimately, we want to be at the intersection of human and digitally enhanced advice.

Simplify for growth

Our goal is not to be the biggest asset manager but rather to be the best at what we do. Knowing that what has made us successful in the past will not necessarily be sustainable or sufficient

for the future, we relentlessly challenge ourselves to focus on the products and services that are most important to clients and in which we have a competitive advantage.

We bring equal parts innovation and introspection in evaluating where to place our extra investment dollars and resources to ensure we have a differentiated offering. Last year, we launched more than 70 new fund strategies to our platform, a third of which are in our Beta Strategies lineup.

At the same time, if we aren't convinced we have a long-lasting advantage, we realign those resources to areas in which we do. In 2017, we liquidated or merged more than 70 funds and implemented significant fee reductions on 58 different funds across 235 share classes.

Above all, first-class business in a first-class way

I am proud of what we have delivered for our shareholders and clients and am even more excited about the investments we are

making to position ourselves for the future. We have been working for two centuries as stewards of our clients' wealth to continuously refine what we do and how we do it. We remain committed to delivering first-class business and that in a first-class way.



Mary Callahan Erdoes
CEO, Asset & Wealth Management

2017 HIGHLIGHTS AND ACCOMPLISHMENTS

Business highlights

- Fiduciary mindset ingrained since mid-1800s
- Positive client asset flows every year since 2004
- Record revenue of \$12.9 billion
- Record pre-tax income of \$3.6 billion
- Record \$2.8 trillion in client assets

- Record average loan balances of \$123 billion
- Record average mortgage balances of \$37 billion
- Retention rate of 98% for top senior portfolio management talent

Leadership positions

- #1 Private Bank Overall in North America (*Euromoney*, February 2018)

- #1 Private Bank Overall in Latin America (*Euromoney*, February 2018)
- Best Private Bank in Asia for Ultra-High-Net-Worth (*The Asset*, July 2017)
- Best Asset Management Company in Asia (*The Asset*, May 2017)
- Top Pan-European Fund Management Firm (Thomson Reuters Eintel, June 2017)

- Best New Alternatives ETF and Best New Active ETF (ETF.com, March 2017)
- IT Team of the Year (*Banking Technology* magazine, December 2017)
- Social Media Leader of the Year (Fund Intelligence, March 2017)

Corporate Responsibility

One reason for JPMorgan Chase's enduring success is that we have always recognized that businesses operate within the context of their communities – and when our communities thrive, our business thrives.

Despite so much progress and so many economic gains, we know that many are still struggling. Millions in our communities and throughout the world live daily with economic uncertainty, just one unexpected expense from the financial edge.

sector must step up and do more to ensure that everyone shares in the rewards of a growing economy.

That is precisely what JPMorgan Chase is doing. Through our model for driving inclusive growth, we are undertaking significant, long-term initiatives and are making strategic investments focused in areas where we can draw on our firm's resources and capabilities to have the greatest impact: building skills for today's high-quality jobs, expanding small

underserved neighborhoods. Our commitments to these cities are based on the successful approach we developed and refined through our firm's \$150 million investment in Detroit's economic recovery, which *Fortune* magazine cited in naming us #1 on its list of companies that are changing the world.

At JPMorgan Chase, we view it as a firmwide objective to be a positive force in society and to help solve today's biggest challenges. We are deeply proud of the ways we are making a real difference in people's lives through our strategic philanthropic investments, but this is just one example of how we are stepping up. Across our firm, we are leveraging our resources, capabilities and core business to, in short, invest in opportunity – something we know will pay dividends not only for our communities but for our firm as well.

“
At JPMorgan Chase, we view it as a firmwide objective to be a positive force in society and to help solve today's biggest challenges.
”

Young people entering the labor market are finding themselves stuck in low-skill, low-wage jobs or worse, entirely disconnected from employment, education or training. When so many are left behind, we all feel the consequences: It sows division, erodes trust in our institutions and undermines confidence in our systems. We all have a stake in creating more widely shared prosperity.

Economic growth fuels economic opportunity, so the momentum we are seeing in economies around the world should be unequivocally heralded as good news. Yet it is not preordained that an expanding economy automatically translates into greater opportunity for all. Rather, it requires deliberate action and meaningful collaboration. Government and the nonprofit sector will continue to play vital roles, but the private

businesses, revitalizing neighborhoods and promoting financial health.

Our firm's model is yielding real results – so we are scaling it with a 40% increase in our annual community investments. Whether times are good or tough, our firm has always supported our communities, but the strong and sustained performance of our company, recent changes to the U.S. corporate tax system, and a more constructive regulatory and business environment are enabling us to do even more. The net result is that JPMorgan Chase will invest a total of \$1.75 billion over the next five years to help drive inclusive economic growth in local communities.

In 2017, for example, we announced comprehensive, multi-year initiatives to expand opportunity for the residents of Chicago's South and West sides and Washington, D.C.'s



A stylized, handwritten signature in dark ink, appearing to read 'P. Scher'.

Peter L. Scher

Head of Corporate Responsibility and
Chairman of the Mid-Atlantic Region

Investing in opportunity

JPMorgan Chase believes there is a pressing need to expand access to opportunity and help more people move up the economic ladder. Through our proven model for driving inclusive growth, we are taking a strategic, data-driven approach to doing just that.

Our efforts are focused on what our experience has shown are universal pillars of opportunity, and we are undertaking significant, long-term global initiatives that directly leverage our firm's worldwide presence, expertise and resources.

Extending our model for impact

We refined this model through our work in Detroit, where, in 2014, we launched our most comprehensive initiative to date. Combining philanthropic investments and our core business expertise, we have been working to address some of Detroit's biggest economic challenges, from catalyzing commercial development and boosting small business growth to revitalizing neighborhoods and equipping Detroiters with the skills to secure well-paying jobs.

Meaningful collaboration among the city's leaders, business community and nonprofit sector has been the fundamental driver of the progress we are seeing to date and has allowed us to accelerate our initial investment. In just three years, and two years ahead of schedule, we exceeded our initial \$100 million commitment and now expect to invest \$150 million in the city by 2019.

Our comprehensive efforts in Detroit have yielded important insights, which we are turning into action in other communities that are facing similar challenges. In 2017, we extended our model for impact to Chicago and Washington, D.C. Our comprehensive, multimillion-dollar commitment to each city will focus on driving inclusive growth in underserved neighborhoods, where economic opportunity is increasingly out of reach.



Advancing sustainability for our clients and within our operations

As a company with clients and operations around the world, JPMorgan Chase is in a unique position to leverage our expertise to promote sustainable business practices and help clients capitalize on opportunities arising from the transition to a more sustainable global economy.

While JPMorgan Chase has a long-standing commitment to protect the environment and advance sustainability for our clients and within our own operations, we recognize that today's challenges call for an even greater commitment.



In 2017, we pledged to source renewable energy for 100% of our global power needs by 2020. JPMorgan Chase has offices and operations in over 60 countries across more than 5,500 properties, covering nearly 75 million square feet. To increase energy efficiency, we are retrofitting our branches with the world's largest LED lighting installation – a total of 1.4 million new lightbulbs. This move is likely to cut our lighting energy consumption in half, which is the equivalent of taking 27,000 cars off the road.

We are also developing an on-site solar installation at the firm's largest single-tenant office. This will comprise up to 20 megawatts of capacity, which is enough to power the equivalent of 3,280 homes. Additionally, we are supporting the development of new renewable assets by contracting for long-term power off-take from wind and solar projects on the grids from which JPMorgan Chase purchases power. As a first step, we are purchasing power from the Buckthorn wind farm, a 100-megawatt project in Erath County, Texas.

Finally, as one of the largest financiers of energy in the world, we pledged to facilitate \$200 billion in clean financing through 2025. Through this commitment, JPMorgan Chase

will help scale the impact of sustainability efforts among more than 20,000 corporate and investor clients in the U.S. and across the world.

The size, scope and global reach of our firm allow us to take on big challenges and to drive progress that few can match.

Harnessing the power of data

Delivering data and analyses is central to our model for impact. The JPMorgan Chase Institute is harnessing the scale and scope of one of the world's leading financial firms to better understand the economy. Its mission is to help policymakers, businesses and nonprofit leaders use better facts, timely data and thoughtful analysis to make smarter decisions to advance prosperity. Drawing on JPMorgan Chase's unique proprietary data, expertise and market access, the Institute frames and provides analysis of the most critical economic challenges of our time.

In 2017, the Institute shared important insights and thoughtful analyses on:

- U.S. household expense volatility, particularly in the wake of extraordinary medical payments;
- A first-of-its-kind look into out-of-pocket healthcare spending by U.S. consumers with a high frequency view at the state, metro and county level;
- The gender gap in financial outcomes and lasting impacts of major medical payments;
- The burden and dynamics of health insurance premium payments for small business owners;
- The challenges that U.S. small businesses face in managing payroll growth and volatility;
- Resident access to everyday goods and services in Detroit and New York City;
- A full year of the Local Consumer Commerce Index, measuring consumer spending growth within and across 14 U.S. cities each month;
- How an anticipated drop in mortgage payments, resulting from lower interest rates, impacted household consumption; and
- The impact of payment and principal reduction on default and consumption provided by mortgage modifications.

2017 HIGHLIGHTS AND ACCOMPLISHMENTS

FORTUNE RANKS JPMORGAN CHASE #1 ON “CHANGE THE WORLD” LIST

“Thanks to Detroit, the bank is confident that this full-court-press approach is a blueprint that could work across the country – and in the next few months, they’ll be taking components of the Motown model nationwide.”

Excerpted from “How JPMorgan Chase Is Fueling Detroit’s Revival,” *Fortune* (September 15, 2017)



- JPMorgan Chase’s investment in Detroit is yielding real results. To date, we have deployed \$117 million in loans and grants to accelerate the city’s economic recovery. This investment is allowing more than 15,000 adults and young people to receive skills training for in-demand jobs; supporting development projects that have created or preserved over 900 jobs, more than 1,300 housing units and over 177,000 square feet of commercial space; and providing more than 2,200 entrepreneurs with technical assistance and access to capital, creating or maintaining more than 1,100 jobs.
- Scaling innovative, high-impact models to create opportunity for more people:
 - Expanded the Entrepreneurs of Color (EOC) Fund to the South Bronx in New York City and San Francisco. We first launched the EOC Fund in Detroit in 2015 to provide underserved entrepreneurs with greater access to capital and assistance needed to grow and thrive. To date, the fund has lent or approved nearly \$4.7 million to more than 45 minority-owned small businesses, resulting in over 600 new or preserved jobs.



- Expanded The Fellowship Initiative (TFI) to Dallas and recruited new classes of Fellows in Chicago, Los Angeles and New York City. This program seeks to address barriers to opportunity for young men of color and to position them for success by engaging them in comprehensive training that

includes academic support, mentoring and leadership development at a critical juncture in their lives. One hundred percent of TFI Fellows are graduating from high school, and, collectively, they have been accepted into more than 200 colleges and universities across the country.



- Expanded innovative apprenticeship models and career-focused programs that equip high school students with the skills and education they need to pursue well-paying, long-term careers through the launch of New Skills for Youth innovation sites in New York City’s South Bronx and across three provinces in South Africa and four provinces in China.
- In the United Kingdom, we received the Queen’s Award for Enterprise for Promoting Opportunity for the firm’s Aspiring Professionals Program, which exposes young people from low-income backgrounds in London to new career opportunities.
- Engaged more than 1,800 young people in summer jobs and other work-related experiences in 19 cities across the U.S.
- Invested more than \$43 million in 164 job training and career education initiatives in 35 countries around the world – including in Mexico, the Philippines and the United Kingdom – to prepare people with the skills they need to be successful in growing industries.
- Increased labor market transparency and efficiency through the development and

launch of innovative workforce and career pathway tools such as the Good Jobs Index, BankingOnMyCareer.com and Credential Engine.

- Underwrote \$13.5 billion in green bonds and bonds with a sustainable use of proceeds.
- In 2017, provided \$1.2 billion for wind and solar projects in the U.S. Since 2003, JPMorgan Chase has committed or arranged over \$18 billion in financing for wind, solar and geothermal energy projects in the U.S.
- Announced eight financial services innovators as winners of the third competition of the Financial Solutions Lab (FinLab), which is focused on improving the financial health of overlooked populations. To date, FinLab has supported 26 fintech companies offering innovative financial products to help more than 2.5 million Americans improve their financial health. Collectively, these companies have raised over \$250 million in capital since joining the program. More than 100 JPMorgan Chase employees have provided mentorship to the companies as part of the Lab.



- Engaging our employees:
 - We are putting the knowledge and expertise of our people to work for our communities. In 2017, 56,000 of our employees volunteered more than 383,000 hours of their time. And through the JPMorgan Chase Service Corps, a program that leverages the energy and skills of top talent to assist nonprofit partners, nearly 80 employee volunteers from offices in more than a dozen countries have contributed over 11,500 hours to help 20 organizations address critical needs.
 - We are committed to supporting the communities where we work and live in their time of greatest need. In 2017, in the wake of an unprecedented number of natural disasters, our firm and employees donated \$7.8 million to assist disaster relief efforts around the world.

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Note:

The following pages from JPMorgan Chase & Co.'s 2017 Form 10-K are not included herein: 1-36, 290-301

FIVE-YEAR SUMMARY OF CONSOLIDATED FINANCIAL HIGHLIGHTS

(unaudited) As of or for the year ended December 31, (in millions, except per share, ratio, headcount data and where otherwise noted)					
	2017	2016	2015	2014	2013
Selected income statement data					
Total net revenue	\$ 99,624	\$ 95,668	\$ 93,543	\$ 95,112	\$ 97,367
Total noninterest expense	58,434	55,771	59,014	61,274	70,467
Pre-provision profit	41,190	39,897	34,529	33,838	26,900
Provision for credit losses	5,290	5,361	3,827	3,139	225
Income before income tax expense	35,900	34,536	30,702	30,699	26,675
Income tax expense	11,459	9,803	6,260	8,954	8,789
Net income^(a)	\$ 24,441	\$ 24,733	\$ 24,442	\$ 21,745	\$ 17,886
Earnings per share data					
Net income: Basic	\$ 6.35	\$ 6.24	\$ 6.05	\$ 5.33	\$ 4.38
Diluted	6.31	6.19	6.00	5.29	4.34
Average shares: Basic	3,551.6	3,658.8	3,741.2	3,808.3	3,832.4
Diluted	3,576.8	3,690.0	3,773.6	3,842.3	3,864.9
Market and per common share data					
Market capitalization	\$ 366,301	\$ 307,295	\$ 241,899	\$ 232,472	\$ 219,657
Common shares at period-end	3,425.3	3,561.2	3,663.5	3,714.8	3,756.1
Share price:^(b)					
High	\$ 108.46	\$ 87.39	\$ 70.61	\$ 63.49	\$ 58.55
Low	81.64	52.50	50.07	52.97	44.20
Close	106.94	86.29	66.03	62.58	58.48
Book value per share	67.04	64.06	60.46	56.98	53.17
Tangible book value per share ("TBVPS") ^(c)	53.56	51.44	48.13	44.60	40.72
Cash dividends declared per share	2.12	1.88	1.72	1.58	1.44
Selected ratios and metrics					
Return on common equity ("ROE")	10%	10%	11%	10%	9%
Return on tangible common equity ("ROTCE") ^(c)	12	13	13	13	11
Return on assets ("ROA")	0.96	1.00	0.99	0.89	0.75
Overhead ratio	59	58	63	64	72
Loans-to-deposits ratio	64	65	65	56	57
High quality liquid assets ("HQLA") (in billions) ^(d)	\$ 556	\$ 524	\$ 496	\$ 600	\$ 522
Common equity tier 1 ("CET1") capital ratio ^(e)	12.2%	12.3% ⁽ⁱ⁾	11.8%	10.2%	10.7%
Tier 1 capital ratio ^(e)	13.9	14.0 ⁽ⁱ⁾	13.5	11.6	11.9
Total capital ratio ^(e)	15.9	15.5	15.1	13.1	14.3
Tier 1 leverage ratio ^(e)	8.3	8.4	8.5	7.6	7.1
Selected balance sheet data (period-end)					
Trading assets	\$ 381,844	\$ 372,130	\$ 343,839	\$ 398,988	\$ 374,664
Securities	249,958	289,059	290,827	348,004	354,003
Loans	930,697	894,765	837,299	757,336	738,418
Core Loans	863,683	806,152	732,093	628,785	583,751
Average core loans	829,558	769,385	670,757	596,823	563,809
Total assets	2,533,600	2,490,972	2,351,698	2,572,274	2,414,879
Deposits	1,443,982	1,375,179	1,279,715	1,363,427	1,287,765
Long-term debt ^(f)	284,080	295,245	288,651	276,379	267,446
Common stockholders' equity	229,625	228,122	221,505	211,664	199,699
Total stockholders' equity	255,693	254,190	247,573	231,727	210,857
Headcount	252,539	243,355	234,598	241,359	251,196
Credit quality metrics					
Allowance for credit losses	\$ 14,672	\$ 14,854	\$ 14,341	\$ 14,807	\$ 16,969
Allowance for loan losses to total retained loans	1.47%	1.55%	1.63%	1.90%	2.25%
Allowance for loan losses to retained loans excluding purchased credit-impaired loans ^(g)	1.27	1.34	1.37	1.55	1.80
Nonperforming assets	\$ 6,426	\$ 7,535	\$ 7,034	\$ 7,967	\$ 9,706
Net charge-offs ^(h)	5,387	4,692	4,086	4,759	5,802
Net charge-off rate ^(h)	0.60%	0.54%	0.52%	0.65%	0.81%

(a) On December 22, 2017, the Tax Cuts and Jobs Act ("TCJA") was signed into law. The Firm's results included a \$2.4 billion decrease to net income as a result of the enactment of the TCJA. For additional information related to the impact of the TCJA, see Note 24.

(b) Based on daily prices reported by the New York Stock Exchange.

(c) TBVPS and ROTCE are non-GAAP financial measures. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Financial Performance Measures on pages 52-54.

(d) HQLA represents the amount of assets that qualify for inclusion in the liquidity coverage ratio. For December 31, 2017, the balance represents the average of quarterly reported results per the U.S. LCR public disclosure requirements effective April 1, 2017. Prior periods represent period-end balances under the final U.S. rule ("U.S. LCR") for December 31, 2016 and 2015, and the Firm's estimated amount for December 31, 2014 prior to the effective date of the final rule, and under the Basel III liquidity coverage ratio ("Basel III LCR") for December 31, 2013. For additional information, see LCR and HQLA on page 93.

(e) Ratios presented are calculated under the Basel III Transitional rules, which became effective on January 1, 2014, and for the capital ratios, represent the Collins Floor. Prior to 2014, the ratios were calculated under the Basel I rules. See Capital Risk Management on pages 82-91 for additional information on Basel III.

(f) Included unsecured long-term debt of \$218.8 billion, \$212.6 billion, \$211.8 billion, \$207.0 billion and \$198.9 billion respectively, as of December 31, of each year presented.

(g) Excluded the impact of residential real estate purchased credit-impaired ("PCI") loans, a non-GAAP financial measure. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 52-54, and the Allowance for credit losses on pages 117-119.

(h) Excluding net charge-offs of \$467 million related to the student loan portfolio sale, the net charge-off rate for the year ended December 31, 2017 would have been 0.55%.

(i) The prior period ratios have been revised to conform with the current period presentation.

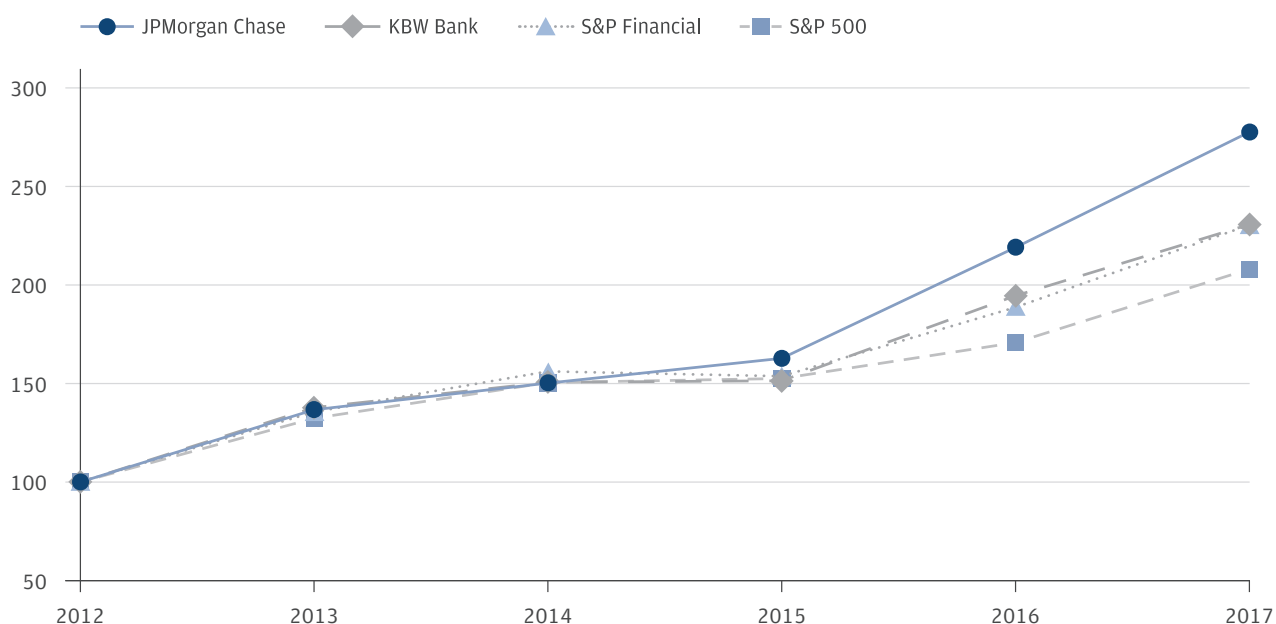
FIVE-YEAR STOCK PERFORMANCE

The following table and graph compare the five-year cumulative total return for JPMorgan Chase & Co. (“JPMorgan Chase” or the “Firm”) common stock with the cumulative return of the S&P 500 Index, the KBW Bank Index and the S&P Financial Index. The S&P 500 Index is a commonly referenced equity benchmark in the United States of America (“U.S.”), consisting of leading companies from different economic sectors. The KBW Bank Index seeks to reflect the performance of banks and thrifts that are publicly traded in the U.S. and is composed of leading national money center and regional banks and thrifts. The S&P Financial Index is an index of financial companies, all of which are components of the S&P 500. The Firm is a component of all three industry indices.

The following table and graph assume simultaneous investments of \$100 on December 31, 2012, in JPMorgan Chase common stock and in each of the above indices. The comparison assumes that all dividends are reinvested.

December 31, (in dollars)	2012	2013	2014	2015	2016	2017
JPMorgan Chase	\$ 100.00	\$ 136.71	\$ 150.22	\$ 162.79	\$ 219.06	\$ 277.62
KBW Bank Index	100.00	137.76	150.66	151.39	194.55	230.72
S&P Financial Index	100.00	135.59	156.17	153.72	188.69	230.47
S&P 500 Index	100.00	132.37	150.48	152.55	170.78	208.05

December 31,
(in dollars)



Management's discussion and analysis

This section of JPMorgan Chase's Annual Report for the year ended December 31, 2017 ("Annual Report"), provides Management's discussion and analysis of financial condition and results of operations ("MD&A") of JPMorgan Chase. See the Glossary of Terms and Acronyms on pages 283-289 for definitions of terms used throughout this Annual Report. The MD&A included in this Annual Report contains statements that are forward-looking within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements are based on the current beliefs and expectations of JPMorgan Chase's management and are subject to significant risks and uncertainties. These risks and uncertainties could cause the Firm's actual results to differ materially from those set forth in such forward-looking statements. Certain of such risks and uncertainties are described herein (see Forward-looking Statements on page 145) and in JPMorgan Chase's Annual Report on Form 10-K for the year ended December 31, 2017 ("2017 Form 10-K"), in Part I, Item 1A: Risk factors; reference is hereby made to both.

INTRODUCTION

JPMorgan Chase & Co., a financial holding company incorporated under Delaware law in 1968, is a leading global financial services firm and one of the largest banking institutions in the United States of America ("U.S."), with operations worldwide; the Firm had \$2.5 trillion in assets and \$255.7 billion in stockholders' equity as of December 31, 2017. The Firm is a leader in investment banking, financial services for consumers and small businesses, commercial banking, financial transaction processing and asset management. Under the J.P. Morgan and Chase brands, the Firm serves millions of customers in the U.S. and many of the world's most prominent corporate, institutional and government clients.

JPMorgan Chase's principal bank subsidiaries are JPMorgan Chase Bank, National Association ("JPMorgan Chase Bank, N.A."), a national banking association with U.S. branches in 23 states, and Chase Bank USA, National Association ("Chase Bank USA, N.A."), a national banking association that is the Firm's principal credit card-issuing bank. JPMorgan Chase's principal nonbank subsidiary is J.P. Morgan Securities LLC ("JPMorgan Securities"), a U.S. broker-dealer. The bank and non-bank subsidiaries of JPMorgan Chase operate nationally as well as through overseas branches and subsidiaries, representative offices and subsidiary foreign banks. The Firm's principal operating subsidiary in the U.K. is J.P. Morgan Securities plc, a subsidiary of JPMorgan Chase Bank, N.A.

For management reporting purposes, the Firm's activities are organized into four major reportable business segments, as well as a Corporate segment. The Firm's consumer business is the Consumer & Community Banking ("CCB") segment. The Firm's wholesale business segments are Corporate & Investment Bank ("CIB"), Commercial Banking ("CB"), and Asset & Wealth Management ("AWM"). For a description of the Firm's business segments, and the products and services they provide to their respective client bases, refer to Business Segment Results on pages 55-74, and Note 31.

EXECUTIVE OVERVIEW

This executive overview of the MD&A highlights selected information and may not contain all of the information that is important to readers of this Annual Report. For a complete description of the trends and uncertainties, as well as the risks and critical accounting estimates affecting the Firm and its various lines of business, this Annual Report should be read in its entirety.

Financial performance of JPMorgan Chase

Year ended December 31, (in millions, except per share data and ratios)	2017	2016	Change
Selected income statement data			
Total net revenue	\$ 99,624	\$ 95,668	4%
Total noninterest expense	58,434	55,771	5
Pre-provision profit	41,190	39,897	3
Provision for credit losses	5,290	5,361	(1)
Net income	24,441	24,733	(1)
Diluted earnings per share	6.31	6.19	2
Selected ratios and metrics			
Return on common equity	10%	10%	
Return on tangible common equity	12	13	
Book value per share	\$ 67.04	\$ 64.06	5
Tangible book value per share	53.56	51.44	4
Capital ratios^(a)			
CET1	12.2%	12.3% ^(b)	
Tier 1 capital	13.9	14.0 ^(b)	
Total capital	15.9	15.5	

(a) Ratios presented are calculated under the Basel III Transitional rules and represent the Collins Floor. See Capital Risk Management on pages 82-91 for additional information on Basel III.

(b) The prior period ratios have been revised to conform with the current period presentation.

Comparisons noted in the sections below are calculated for the full year of 2017 versus the full year of 2016, unless otherwise specified.

Summary of 2017 results

JPMorgan Chase reported strong results for full year 2017 with net income of \$24.4 billion, or \$6.31 per share, on net revenue of \$99.6 billion. The Firm reported ROE of 10% and ROTCE of 12%. The Firm's results included a \$2.4 billion decrease to net income as a result of the enactment of the Tax Cuts and Jobs Act ("TCJA"), driven by a deemed repatriation charge and adjustments to the value of the Firm's tax-oriented investments, partially offset by a benefit from the revaluation of the Firm's net deferred tax liability. For additional information related to the impact of the TCJA, refer to Note 24.

- Net income decreased 1% driven by higher noninterest expense and income tax expense, predominantly offset by higher net interest income.
- Total net revenue increased by 4% driven by higher net interest income and investment banking fees, partially

offset by lower Fixed Income Markets and Home Lending noninterest revenue.

- Noninterest expense was \$58.4 billion, up 5%, driven by higher compensation expense, auto lease depreciation expense and continued investments across the businesses.
- The provision for credit losses was \$5.3 billion, relatively flat compared with the prior year, reflecting a decrease in the wholesale provision driven by credit quality improvements in the Oil & Gas, Natural Gas Pipelines and Metals & Mining portfolios, offset by an increase in the consumer provision. The increase in the consumer provision was driven by higher net charge-offs and a higher addition to the allowance for loan losses in the credit card portfolio, and the impact of the sale of the student loan portfolio.
- The total allowance for credit losses was \$14.7 billion at December 31, 2017, and the Firm had a loan loss coverage ratio, excluding the PCI portfolio, of 1.27%, compared with 1.34% in the prior year. The Firm's nonperforming assets totaled \$6.4 billion, a decrease from the prior-year level of \$7.5 billion.
- Firmwide average core loans increased 8%.

Selected capital-related metrics

- The Firm's Basel III Fully Phased-In CET1 capital was \$183 billion, and the Standardized and Advanced CET1 ratios were 12.1% and 12.7%, respectively.
- The Firm's Fully Phased-In supplementary leverage ratio ("SLR") was 6.5%.
- The Firm continued to grow tangible book value per share ("TBVPS"), ending 2017 at \$53.56, up 4%.

ROTCE and TBVPS are non-GAAP financial measures. Core loans and each of the Fully Phased-In capital and leverage measures are considered key performance measures. For a further discussion of each of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 52-54, and Capital Risk Management on pages 82-91.

Management's discussion and analysis

Lines of business highlights

Selected business metrics for each of the Firm's four lines of business are presented below for the full year of 2017.

CCB ROE 17%	• Average core loans up 9%; average deposits of \$640 billion, up 9% • Client investment assets of \$273 billion, up 17% • Credit card sales volume up 14% and merchant processing volume up 12%
CIB ROE 14%	• Maintained #1 ranking for Global Investment Banking fees with 8.1% wallet share • Investment Banking revenue up 12%; Treasury Services revenue up 15%; and Securities Services revenue up 9%
CB ROE 17%	• Record revenue of \$8.6 billion, up 15%; record net income of \$3.5 billion, up 33% • Average loan balances of \$198 billion, up 10%
AWM ROE 25%	• Record revenue of \$12.9 billion, up 7%; record net income of \$2.3 billion, up 4% • Average loan balances of \$123 billion, up 9% • Record assets under management ("AUM") of \$2.0 trillion, up 15%

For a detailed discussion of results by line of business, refer to the Business Segment Results on pages 55-56.

Credit provided and capital raised

JPMorgan Chase continues to support consumers, businesses and communities around the globe. The Firm provided credit and raised capital of \$2.3 trillion for wholesale and consumer clients during 2017:

- \$258 billion of credit for consumers
- \$22 billion of credit for U.S. small businesses
- \$817 billion of credit for corporations
- \$1.1 trillion of capital raised for corporate clients and non-U.S. government entities
- \$92 billion of credit and capital raised for U.S. government and nonprofit entities, including states, municipalities, hospitals and universities.

Recent events

- On February 21, 2018, the Firm announced its intent to pursue building a new 2.5 million square foot headquarters at its 270 Park Avenue location in New York City. The project will be subject to various approvals, and the Firm will work closely with the New York City Council and State officials to complete the project in a manner that benefits all constituencies. Once the project's approvals are granted, redevelopment and construction are expected to begin in 2019 and take approximately five years to complete. The project is not expected to have a material impact on the company's financial results.
- On January 30, 2018, Amazon, Berkshire Hathaway, and JPMorgan Chase announced that they are partnering on ways to address healthcare for their U.S. employees, with the aim of improving employee satisfaction and reducing costs. Through a new independent company, the initial focus will be on technology solutions that will provide U.S. employees and their families with simplified, high-quality and transparent healthcare at a reasonable cost.
- On January 29, 2018, JPMorgan Chase announced that Daniel Pinto, Chief Executive Officer ("CEO") of CIB, and Gordon Smith, CEO of CCB, have been appointed Co-Presidents and Co-Chief Operating Officers ("COO") of the Firm, effective January 30, 2018, and will continue to report to Jamie Dimon, Chairman and CEO. In addition to their current roles, Mr. Pinto and Mr. Smith will work closely with Mr. Dimon to help drive critical Firmwide opportunities. Responsibilities for the rest of the Firm's Operating Committee will remain unchanged, with its members continuing to report to Mr. Dimon.
- On January 23, 2018, the Firm announced a \$20 billion, five-year comprehensive investment to help its employees and support job and economic growth in the U.S. Through these new investments, the Firm plans to develop hundreds of new branches in several new U.S. markets, increase wages and benefits for hourly U.S. employees, make increased small business and mortgage lending commitments, add approximately 4,000 jobs throughout the country, and increase philanthropic investments.
- On December 22, 2017, the TCJA was signed into law. The Firm's results included a \$2.4 billion decrease to net income as a result of the enactment of the TCJA. For additional information related to the impact of the TCJA, see Note 24.
- During the second half of 2017, natural disasters caused significant disruptions to individuals and businesses, and damage to homes and communities in several regions where the Firm conducts business. The Firm continues to provide assistance to customers, clients, communities and employees who have been affected by these disasters. These events did not have a material impact on the Firm's 2017 financial results.

2018 outlook

These current expectations are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Such forward-looking statements are based on the current beliefs and expectations of JPMorgan Chase's management and are subject to significant risks and uncertainties. These risks and uncertainties could cause the Firm's actual results to differ materially from those set forth in such forward-looking statements. See Forward-Looking Statements on page 145 and the Risk Factors section on pages 8-26. There is no assurance that actual results for the full year of 2018 will be in line with the outlook set forth below, and the Firm does not undertake to update any forward-looking statements.

JPMorgan Chase's outlook for 2018 should be viewed against the backdrop of the global and U.S. economies, financial markets activity, the geopolitical environment, the competitive environment, client and customer activity levels, and regulatory and legislative developments in the U.S. and other countries where the Firm does business. Each of these interrelated factors will affect the performance of the Firm and its lines of business. The Firm expects that it will continue to make appropriate adjustments to its businesses and operations in response to ongoing developments in the legal, regulatory, business and economic environments in which it operates.

Firmwide

- As a result of the change in tax rate due to the TCJA, management expects a reduction in tax-equivalent adjustments, decreasing both revenue and income tax expense, on a managed basis, by approximately \$1.2 billion on an annual run-rate basis.
- Management expects the new revenue recognition accounting standard to increase both noninterest revenue and expense for full-year 2018 by approximately \$1.2 billion, with most of the impact in the AWM business. For additional information on the new accounting standard, see Accounting and Reporting Developments on page 141.
- Management expects first-quarter 2018 net interest income, on a managed basis, to be down modestly compared with the fourth quarter of 2017, driven by the impact of the TCJA and a lower day count. For full-year 2018, management expects net interest income, on a managed basis, to be in the \$54 to \$55 billion range, market dependent, and assuming expected core loan growth. Management expects Firmwide average core loan growth to be in the 6% to 7% range in 2018, excluding CIB loans.
- Excluding the impact of the new revenue recognition accounting standard, management expects Firmwide noninterest revenue for full-year 2018, on a managed basis, to be up approximately 7%, depending on market conditions.

- The Firm continues to take a disciplined approach to managing its expenses, while investing for growth and innovation. As a result, management expects Firmwide adjusted expense for full-year 2018 to be less than \$62 billion, excluding the impact of the new revenue recognition accounting standard.
- Management estimates the full-year 2018 effective income tax rate to be in the 19% to 20% range, depending upon several factors, including the geographic mix of taxable income and refinements to estimates of the impacts of the TCJA.
- Management expects net charge-off rates to remain relatively flat across the wholesale and consumer portfolios, with the exception of Card.

CCB

- Management expects the full-year 2018 Card Services net revenue rate to be approximately 11.25%.
- In Card, management expects the net charge-off rate to increase to approximately 3.25% in 2018.

CIB

- Markets revenue in the first-quarter 2018 is expected to be up by mid to high single digit percentage points when compared with the prior-year quarter; actual Markets revenue results will continue to be affected by market conditions, which can be volatile.

CONSOLIDATED RESULTS OF OPERATIONS

This section provides a comparative discussion of JPMorgan Chase's Consolidated Results of Operations on a reported basis for the three-year period ended December 31, 2017, unless otherwise specified. Factors that relate primarily to a single business segment are discussed in more detail within that business segment. For a discussion of the Critical Accounting Estimates Used by the Firm that affect the Consolidated Results of Operations, see pages 138-140.

Revenue

Year ended December 31, (in millions)	2017	2016	2015
Investment banking fees	\$ 7,248	\$ 6,448	\$ 6,751
Principal transactions	11,347	11,566	10,408
Lending- and deposit-related fees	5,933	5,774	5,694
Asset management, administration and commissions	15,377	14,591	15,509
Securities gains/(losses)	(66)	141	202
Mortgage fees and related income	1,616	2,491	2,513
Card income	4,433	4,779	5,924
Other income ^(a)	3,639	3,795	3,032
Noninterest revenue	49,527	49,585	50,033
Net interest income	50,097	46,083	43,510
Total net revenue	\$ 99,624	\$ 95,668	\$ 93,543

(a) Included operating lease income of \$3.6 billion, \$2.7 billion and \$2.1 billion for the years ended December 31, 2017, 2016 and 2015, respectively.

2017 compared with 2016

Investment banking fees increased reflecting higher debt and equity underwriting fees in CIB. The increase in debt underwriting fees was driven by a higher share of fees and an overall increase in industry-wide fees; and the increase in equity underwriting fees was driven by growth in industry-wide issuance, including a strong initial public offering ("IPO") market. For additional information, see CIB segment results on pages 62-66 and Note 6.

Principal transactions revenue decreased compared with a strong prior year in CIB, primarily reflecting:

- lower Fixed Income-related revenue driven by sustained low volatility and tighter credit spreads

partially offset by

- higher Equity-related revenue primarily in Prime Services, and
- higher Lending-related revenue reflecting lower fair value losses on hedges of accrual loans.

For additional information, see CIB and Corporate segment results on pages 62-66 and pages 73-74, respectively, and Note 6.

Asset management, administration and commissions revenue increased as a result of higher asset management fees in AWM and CCB, and higher asset-based fees in CIB, both driven by higher market levels. For additional information, see AWM, CCB and CIB segment results on pages 70-72, pages 57-61 and pages 62-66, respectively, and Note 6.

For information on lending- and deposit-related fees, see the segment results for CCB on pages 57-61, CIB on pages 62-66, and CB on pages 67-69 and Note 6; on securities gains, see the Corporate segment discussion on pages 73-74.

Mortgage fees and related income decreased driven by lower MSR risk management results, lower net production revenue on lower margins and volumes, and lower servicing revenue on lower average third-party loans serviced. For further information, see CCB segment results on pages 57-61, Note 6 and 15.

Card income decreased predominantly driven by higher credit card new account origination costs, largely offset by higher card-related fees, primarily annual fees. For further information, see CCB segment results on pages 57-61.

Other income decreased primarily due to:

- lower other income in CIB largely driven by a \$520 million impact related to the enactment of the TCJA, which reduced the value of certain of CIB's tax-oriented investments, and
- the absence in the current year of gains from
 - the sale of Visa Europe interests in CCB,
 - the redemption of guaranteed capital debt securities ("trust preferred securities"), and
 - the disposal of an asset in AWM

partially offset by

- higher operating lease income reflecting growth in auto operating lease volume in CCB, and
- a legal benefit of \$645 million recorded in the second quarter of 2017 in Corporate related to a settlement with the FDIC receivership for Washington Mutual and with Deutsche Bank as trustee of certain Washington Mutual trusts.

For further information, see Note 6.

Net interest income increased primarily driven by the net impact of higher rates and loan growth across the businesses, partially offset by declines in Markets net interest income in CIB. The Firm's average interest-earning assets were \$2.2 trillion, up \$79 billion from the prior year, and the net interest yield on these assets, on a fully taxable equivalent ("FTE") basis, was 2.36%, an increase of 11 basis points from the prior year.

2016 compared with 2015

Investment banking fees decreased predominantly due to lower equity underwriting fees driven by declines in industry-wide fee levels.

Principal transactions revenue increased reflecting broad-based strength across products in CIB's Fixed Income Markets business. Rates performance was strong, with increased client activity driven by high issuance-based flows, global political developments, and central bank actions. Credit revenue improved driven by higher market-making revenue from the secondary market as clients' appetite for risk recovered.

Asset management, administration and commissions revenue decreased reflecting lower asset management fees in AWM driven by a reduction in revenue related to the disposal of assets at the beginning of 2016, the impact of lower average equity market levels and lower performance fees, as well as due to lower brokerage commissions and other fees in CIB and AWM.

Mortgage fees and related income were relatively flat, as lower mortgage servicing revenue related to lower average third-party loans serviced was predominantly offset by higher MSR risk management results.

Card income decreased predominantly driven by higher new account origination costs and the impact of renegotiated co-brand partnership agreements, partially offset by higher card sales volume and other card-related fees.

Other income increased primarily reflecting:

- higher operating lease income from growth in auto operating lease assets in CCB
- a gain on the sale of Visa Europe interests in CCB
- a gain related to the redemption of guaranteed capital debt securities
- the absence of losses recognized in 2015 related to the accelerated amortization of cash flow hedges associated with the exit of certain non-operating deposits
- a gain on disposal of an asset in AWM

partially offset by

- a \$514 million benefit recorded in the prior year from a legal settlement in Corporate.

Net interest income increased primarily driven by loan growth across the businesses and the net impact of higher rates, partially offset by lower investment securities balances and higher interest expense on long-term debt. The Firm's average interest-earning assets were \$2.1 trillion in 2016, up \$13 billion from the prior year, and the net interest yield on these assets, on a FTE basis, was 2.25%, an increase of 11 basis points from the prior year.

Provision for credit losses

Year ended December 31, (in millions)	2017	2016	2015
Consumer, excluding credit card	\$ 620	\$ 467	\$ (81)
Credit card	4,973	4,042	3,122
Total consumer	5,593	4,509	3,041
Wholesale	(303)	852	786
Total provision for credit losses	\$ 5,290	\$ 5,361	\$ 3,827

2017 compared with 2016

The **provision for credit losses** decreased as a result of:

- a net \$422 million reduction in the wholesale allowance for credit losses, reflecting credit quality improvements in the Oil & Gas, Natural Gas Pipelines, and Metals & Mining portfolios, compared with an addition of \$511 million in the prior year driven by downgrades in the same portfolios

predominantly offset by

- a higher consumer provision driven by
 - \$450 million of higher net charge-offs, primarily in the credit card portfolio due to growth in newer vintages which, as anticipated, have higher loss rates than the more seasoned portion of the portfolio, partially offset by a decrease in net charge-offs in the residential real estate portfolio reflecting continued improvement in home prices and delinquencies,
 - a \$416 million higher addition to the allowance for credit losses related to the credit card portfolio driven by higher loss rates and loan growth, and a lower reduction in the allowance for the residential real estate portfolio predominantly driven by continued improvement in home prices and delinquencies, and
 - a \$218 million impact in connection with the sale of the student loan portfolio.

For a more detailed discussion of the credit portfolio, the student loan sale and the allowance for credit losses, see the segment discussions of CCB on pages 57-61, CIB on pages 62-66, CB on pages 67-69, the Allowance for Credit Losses on pages 117-119 and Note 13.

2016 compared with 2015

The **provision for credit losses** reflected an increase in the consumer provision and, to a lesser extent, the wholesale provision. The increase in the consumer provision was predominantly driven by:

- a \$920 million increase related to the credit card portfolio, due to a \$600 million addition in the allowance for loan losses, as well as \$320 million of higher net charge-offs, driven by loan growth (including growth in newer vintages which, as anticipated, have higher loss rates compared to the overall portfolio), and

Management's discussion and analysis

- a \$470 million lower benefit related to the residential real estate portfolio, as the reduction in the allowance for loan losses in 2016 was lower than the prior year. The reduction in both periods reflected continued improvements in home prices and lower delinquencies.

The increase in the wholesale provision was largely driven by the impact of downgrades in the Oil & Gas and Natural Gas Pipelines portfolios.

Noninterest expense

Year ended December 31, (in millions)	2017	2016	2015
Compensation expense	\$31,009	\$29,979	\$29,750
Noncompensation expense:			
Occupancy	3,723	3,638	3,768
Technology, communications and equipment	7,706	6,846	6,193
Professional and outside services	6,840	6,655	7,002
Marketing	2,900	2,897	2,708
Other ^{(a)(b)}	6,256	5,756	9,593
Total noncompensation expense	27,425	25,792	29,264
Total noninterest expense	\$58,434	\$55,771	\$59,014

(a) Included Firmwide legal expense/(benefit) of \$(35) million, \$(317) million and \$3.0 billion for the years ended December 31, 2017, 2016 and 2015, respectively.

(b) Included FDIC-related expense of \$1.5 billion, \$1.3 billion and \$1.2 billion for the years ended December 31, 2017, 2016 and 2015, respectively.

2017 compared with 2016

Compensation expense increased predominantly driven by investments in headcount in most businesses, including bankers and business-related support staff, and higher performance-based compensation expense, predominantly in AWM.

Noncompensation expense increased as a result of:

- higher depreciation expense from growth in auto operating lease volume in CCB
- contributions to the Firm's Foundation
- a lower legal net benefit compared to the prior year
- higher FDIC-related expense, and
- an impairment in CB on certain leased equipment, the majority of which was sold subsequent to year-end

partially offset by

- the absence in the current year of two items totaling \$175 million in CCB related to liabilities from a merchant in bankruptcy and mortgage servicing reserves.

For a discussion of legal expense, see Note 29.

2016 compared with 2015

Compensation expense was relatively flat predominantly driven by higher performance-based compensation expense and investments in several businesses, offset by the impact of continued expense reduction initiatives, including lower headcount in certain businesses.

Noncompensation expense decreased as a result of lower legal expense (including lower legal professional services expense), the impact of efficiencies, and reduced non-U.S. tax surcharges. These factors were partially offset by higher depreciation expense from growth in auto operating lease assets and higher investments in marketing.

Income tax expense

Year ended December 31, (in millions, except rate)	2017	2016	2015
Income before income tax expense	\$35,900	\$34,536	\$30,702
Income tax expense	11,459	9,803	6,260
Effective tax rate	31.9%	28.4%	20.4%

2017 compared with 2016

The **effective tax rate** increased in 2017 driven by:

- a \$1.9 billion increase to income tax expense representing the impact of the enactment of the TCJA. The increase was driven by the deemed repatriation of the Firm's unremitted non-U.S. earnings and adjustments to the value of certain tax-oriented investments, partially offset by a benefit from the revaluation of the Firm's net deferred tax liability. The incremental expense resulted in a 5.4 percentage point increase to the Firm's effective tax rate

partially offset by

- benefits resulting from the vesting of employee share-based awards related to the appreciation of the Firm's stock price upon vesting above their original grant price, and the release of a valuation allowance.

For further information, see Note 24.

2016 compared with 2015

The **effective tax rate** in 2016 was affected by changes in the mix of income and expense subject to U.S. federal and state and local taxes, tax benefits related to the utilization of certain deferred tax assets, as well as the adoption of new accounting guidance related to employee share-based incentive payments. These tax benefits were partially offset by higher income tax expense from tax audits. The lower effective tax rate in 2015 was predominantly driven by \$2.9 billion of tax benefits, which reduced the Firm's effective tax rate by 9.4 percentage points. The recognition of tax benefits in 2015 resulted from the resolution of various tax audits, as well as the release of U.S. deferred taxes associated with the restructuring of certain non-U.S. entities.

CONSOLIDATED BALANCE SHEETS AND CASH FLOWS ANALYSIS

Consolidated Balance Sheets Analysis

The following is a discussion of the significant changes between December 31, 2017 and 2016.

Selected Consolidated balance sheets data

December 31, (in millions)	2017	2016	Change
Assets			
Cash and due from banks	\$ 25,827	\$ 23,873	8%
Deposits with banks	404,294	365,762	11
Federal funds sold and securities purchased under resale agreements	198,422	229,967	(14)
Securities borrowed	105,112	96,409	9
Trading assets:			
Debt and equity instruments	325,321	308,052	6
Derivative receivables	56,523	64,078	(12)
Securities	249,958	289,059	(14)
Loans	930,697	894,765	4
Allowance for loan losses	(13,604)	(13,776)	(1)
Loans, net of allowance for loan losses	917,093	880,989	4
Accrued interest and accounts receivable	67,729	52,330	29
Premises and equipment	14,159	14,131	—
Goodwill, MSRs and other intangible assets	54,392	54,246	—
Other assets	114,770	112,076	2
Total assets	\$ 2,533,600	\$ 2,490,972	2%

Cash and due from banks and deposits with banks

increased primarily driven by deposit growth and a shift in the deployment of excess cash from securities purchased under resale agreements and investment securities into deposits with banks. The Firm's excess cash is placed with various central banks, predominantly Federal Reserve Banks.

Federal funds sold and securities purchased under resale agreements decreased primarily due to the shift in the deployment of excess cash to deposits with banks and lower client activity in CIB. For additional information on the Firm's Liquidity Risk Management, see pages 92–97.

Securities borrowed increased driven by higher demand for securities to cover short positions related to client-driven market-making activities in CIB.

Trading assets—debt and equity instruments increased predominantly as a result of client-driven market-making activities in CIB, primarily in Fixed Income Markets and Prime Services, partially offset by lower equity instruments in Equity Markets. For additional information, refer to Note 2.

Trading assets and trading liabilities—derivative receivables and payables decreased predominantly as a result of client-driven market-making activities in CIB Markets, which reduced foreign exchange and interest rate derivative receivables and payables, and increased equity derivative receivables, driven by market movements. For additional information, refer to Derivative contracts on pages 114–115, and Notes 2 and 5.

Securities decreased primarily reflecting net sales, maturities and paydowns of U.S. Treasuries, non-U.S. government securities and collateralized loan obligations. For additional information, see Notes 2 and 10.

Loans increased reflecting:

- higher wholesale loans driven by new originations in CB and higher loans to Private Banking clients in AWM
- higher consumer loans driven by higher retention of originated high-quality prime mortgages in CCB and AWM, and higher credit card loans, largely offset by the sale of the student loan portfolio, lower home equity loans and the run-off of PCI loans.

The **allowance for loan losses** decreased driven by:

- a net reduction in the wholesale allowance, reflecting credit quality improvements in the Oil & Gas, Natural Gas Pipelines and Metals & Mining portfolios (compared with additions to the allowance in the prior year driven by downgrades in the same portfolios)

largely offset by

- a net increase in the consumer allowance, reflecting additions to the allowance for the credit card and business banking portfolios, driven by loan growth in both of these portfolios and higher loss rates in the credit card portfolio, largely offset by a reduction in the allowance for the residential real estate portfolio, predominantly driven by continued improvement in home prices and delinquencies, and the utilization of the allowance in connection with the sale of the student loan portfolio.

For a more detailed discussion of loans and the allowance for loan losses, refer to Credit and Investment Risk Management on pages 99–120, and Notes 2, 3, 12 and 13.

Management's discussion and analysis

Accrued interest and accounts receivable

increased primarily reflecting higher held-for-investment margin loans related to client-driven financing activities in Prime Services.

Other assets increased slightly as a result of higher auto operating lease assets from growth in business volume in CCB.

For information on Goodwill and MSRs, see Note 15.

Selected Consolidated balance sheets data

December 31, (in millions)	2017	2016	Change
Liabilities			
Deposits	\$ 1,443,982	\$ 1,375,179	5
Federal funds purchased and securities loaned or sold under repurchase agreements	158,916	165,666	(4)
Short-term borrowings	51,802	34,443	50
Trading liabilities:			
Debt and equity instruments	85,886	87,428	(2)
Derivative payables	37,777	49,231	(23)
Accounts payable and other liabilities	189,383	190,543	(1)
Beneficial interests issued by consolidated variable interest entities ("VIEs")	26,081	39,047	(33)
Long-term debt	284,080	295,245	(4)
Total liabilities	2,277,907	2,236,782	2
Stockholders' equity	255,693	254,190	1
Total liabilities and stockholders' equity	\$ 2,533,600	\$ 2,490,972	2%

Deposits increased due to:

- higher consumer deposits reflecting the continuation of strong growth from new and existing customers, and low attrition rates
- higher wholesale deposits largely driven by growth in client cash management activity in CIB's Securities Services business, partially offset by lower balances in AWM reflecting balance migration predominantly into the Firm's investment-related products.

For more information, refer to the Liquidity Risk Management discussion on pages 92-97; and Notes 2 and 17.

Short-term borrowings increased primarily due to higher issuance of commercial paper reflecting in part a change in the mix of funding from securities sold under repurchase agreements for CIB Markets activities. For additional information, see Liquidity Risk Management on pages 92-97.

Beneficial interests issued by consolidated VIEs

decreased due to net maturities of credit card securitizations and the deconsolidation of the student loan securitization entities in connection with the portfolio's sale. For further information on Firm-sponsored VIEs and loan securitization trusts, see Off-Balance Sheet Arrangements on pages 50-51 and Note 14 and 27; and for the sale of the student loan portfolio, see CCB segment results on pages 57-61.

Long-term debt decreased reflecting lower Federal Home Loan Bank ("FHLB") advances, partially offset by the net issuance of senior debt and the net issuance of structured notes in CIB driven by client demand. For additional information on the Firm's long-term debt activities, see Liquidity Risk Management on pages 92-97 and Note 19. For information on changes in stockholders' equity, see page 151, and on the Firm's capital actions, see Capital actions on pages 89-90.

Consolidated Cash Flows Analysis

(in millions)	Year ended December 31,		
	2017	2016	2015
Net cash provided by/(used in)			
Operating activities	\$ (2,501)	\$ 20,196	\$ 73,466
Investing activities	(10,283)	(114,949)	106,980
Financing activities	14,642	98,271	(187,511)
Effect of exchange rate changes on cash	96	(135)	(276)
Net increase/(decrease) in cash and due from banks	\$ 1,954	\$ 3,383	\$ (7,341)

Operating activities

JPMorgan Chase's operating assets and liabilities support the Firm's lending and capital markets activities. These assets and liabilities can vary significantly in the normal course of business due to the amount and timing of cash flows, which are affected by client-driven and risk management activities and market conditions. The Firm believes cash flows from operations, available cash and other liquidity sources, and its capacity to generate cash through secured and unsecured sources are sufficient to meet operating liquidity needs.

- In 2017, cash used reflected an increase in held-for-investment margin loans in accrued interest and accounts receivable and a decrease in trading liabilities.
- In 2016, cash provided reflected increases in accounts payable and trading liabilities, partially offset by cash used reflecting an increase in trading assets, an increase in accounts receivable from merchants and higher client receivables.
- In 2015, cash provided reflected decreases in trading assets and in accounts receivable, partially offset by cash used due to a decrease in accounts payable and other liabilities.

Investing activities

The Firm's investing activities predominantly include originating held-for-investment loans and investing in the securities portfolio and other short-term interest-earning assets.

- In 2017, cash used primarily reflected net originations of loans and a net increase in short-term interest-earning assets, partially offset by net proceeds from paydowns, maturities, sales and purchases of investment securities.
- In 2016, cash used reflected net originations of loans, an increase in short-term interest-earning assets, an increase in securities purchased under resale agreements, and the deployment of excess cash.
- In 2015, cash provided predominantly reflected lower short-term interest-earning assets, and net proceeds from lower investment securities, partially offset by cash used for net originations of loans.

Financing activities

The Firm's financing activities include acquiring customer deposits and issuing long-term debt, as well as preferred and common stock.

- In 2017, cash provided reflected higher deposits and short-term borrowings, partially offset by a decrease in long-term borrowings.
- In 2016, cash provided reflected higher deposits, and an increase in securities loaned or sold under repurchase agreements, and net proceeds from long term borrowings.
- In 2015, cash used reflected lower deposits and short-term borrowings, partially offset by net proceeds from long-term borrowings. Additionally, in 2015 cash outflows reflected a decrease in securities loaned or sold under repurchase agreements.
- For all periods, cash was used for repurchases of common stock and cash dividends on common and preferred stock.

* * *

For a further discussion of the activities affecting the Firm's cash flows, see Consolidated Balance Sheets Analysis on pages 47-48, Capital Risk Management on pages 82-91, and Liquidity Risk Management on pages 92-97.

Management's discussion and analysis

OFF-BALANCE SHEET ARRANGEMENTS AND CONTRACTUAL CASH OBLIGATIONS

In the normal course of business, the Firm enters into various contractual obligations that may require future cash payments. Certain obligations are recognized on-balance sheet, while others are off-balance sheet under accounting principles generally accepted in the U.S. ("U.S. GAAP").

The Firm is involved with several types of off-balance sheet arrangements, including through nonconsolidated SPEs, which are a type of VIE, and through lending-related financial instruments (e.g., commitments and guarantees).

The Firm holds capital, as deemed appropriate, against all SPE-related transactions and related exposures, such as

derivative transactions and lending-related commitments and guarantees.

The Firm has no commitments to issue its own stock to support any SPE transaction, and its policies require that transactions with SPEs be conducted at arm's length and reflect market pricing. Consistent with this policy, no JPMorgan Chase employee is permitted to invest in SPEs with which the Firm is involved where such investment would violate the Firm's Code of Conduct.

The table below provides an index of where in this Annual Report a discussion of the Firm's various off-balance sheet arrangements can be found. In addition, see Note 1 for information about the Firm's consolidation policies.

Type of off-balance sheet arrangement	Location of disclosure	Page references
Special-purpose entities: variable interests and other obligations, including contingent obligations, arising from variable interests in nonconsolidated VIEs	See Note 14	236-243
Off-balance sheet lending-related financial instruments, guarantees, and other commitments	See Note 27	261-266

Contractual cash obligations

The accompanying table summarizes, by remaining maturity, JPMorgan Chase's significant contractual cash obligations at December 31, 2017. The contractual cash obligations included in the table below reflect the minimum contractual obligation under legally enforceable contracts with terms that are both fixed and determinable. Excluded from the below table are certain liabilities with variable cash flows and/or no obligation to return a stated amount of principal at maturity.

The carrying amount of on-balance sheet obligations on the Consolidated balance sheets may differ from the minimum contractual amount of the obligations reported below. For a discussion of mortgage repurchase liabilities and other obligations, see Note 27.

Contractual cash obligations

By remaining maturity at December 31, (in millions)	2017					2016
	2018	2019-2020	2021-2022	After 2022	Total	Total
On-balance sheet obligations						
Deposits ^(a)	\$ 1,421,174	\$ 5,276	\$ 4,810	\$ 6,204	\$ 1,437,464	\$ 1,368,866
Federal funds purchased and securities loaned or sold under repurchase agreements	133,779	4,198	4,958	15,981	158,916	165,666
Short-term borrowings ^(a)	42,664	—	—	—	42,664	26,497
Beneficial interests issued by consolidated VIEs	13,636	9,542	2,544	314	26,036	38,927
Long-term debt ^(a)	37,211	63,685	43,180	116,819	260,895	288,315
Other ^(b)	4,726	2,146	2,080	4,573	13,525	8,980
Total on-balance sheet obligations	1,653,190	84,847	57,572	143,891	1,939,500	1,897,251
Off-balance sheet obligations						
Unsettled reverse repurchase and securities borrowing agreements ^(c)	76,859	—	—	—	76,859	50,722
Contractual interest payments ^(d)	9,248	11,046	7,471	26,338	54,103	48,862
Operating leases ^(e)	1,526	2,750	1,844	3,757	9,877	10,115
Equity investment commitments ^(f)	174	46	19	515	754	1,068
Contractual purchases and capital expenditures	1,923	937	439	204	3,503	2,566
Obligations under co-brand programs	249	500	478	207	1,434	868
Total off-balance sheet obligations	89,979	15,279	10,251	31,021	146,530	114,201
Total contractual cash obligations	\$ 1,743,169	\$ 100,126	\$ 67,823	\$ 174,912	\$ 2,086,030	\$ 2,011,452

(a) Excludes structured notes on which the Firm is not obligated to return a stated amount of principal at the maturity of the notes, but is obligated to return an amount based on the performance of the structured notes.

(b) Primarily includes dividends declared on preferred and common stock, deferred annuity contracts, pension and other postretirement employee benefit obligations, insurance liabilities and income taxes payable associated with the deemed repatriation under the TCJA.

(c) For further information, refer to unsettled reverse repurchase and securities borrowing agreements in Note 27.

(d) Includes accrued interest and future contractual interest obligations. Excludes interest related to structured notes for which the Firm's payment obligation is based on the performance of certain benchmarks.

(e) Includes noncancelable operating leases for premises and equipment used primarily for banking purposes. Excludes the benefit of noncancelable sublease rentals of \$1.0 billion and \$1.4 billion at December 31, 2017 and 2016, respectively. See Note 28 for more information on lease commitments.

(f) At December 31, 2017 and 2016, included unfunded commitments of \$40 million and \$48 million, respectively, to third-party private equity funds, and \$714 million and \$1.0 billion of unfunded commitments, respectively, to other equity investments.

EXPLANATION AND RECONCILIATION OF THE FIRM'S USE OF NON-GAAP FINANCIAL MEASURES AND KEY PERFORMANCE MEASURES

Non-GAAP financial measures

The Firm prepares its Consolidated Financial Statements using U.S. GAAP; these financial statements appear on pages 148-152. That presentation, which is referred to as "reported" basis, provides the reader with an understanding of the Firm's results that can be tracked consistently from year-to-year and enables a comparison of the Firm's performance with other companies' U.S. GAAP financial statements.

In addition to analyzing the Firm's results on a reported basis, management reviews Firmwide results, including the overhead ratio, on a "managed" basis; these Firmwide managed basis results are non-GAAP financial measures. The Firm also reviews the results of the lines of business on a managed basis. The Firm's definition of managed basis starts, in each case, with the reported U.S. GAAP results and includes certain reclassifications to present total net revenue for the Firm (and each of the reportable business segments) on a FTE basis. Accordingly, revenue from investments that receive tax credits and tax-exempt securities is presented in the managed results on a basis comparable to taxable investments and securities. These financial measures allow management to assess the comparability of revenue from year-to-year arising from both taxable and tax-exempt sources. The corresponding

income tax impact related to tax-exempt items is recorded within income tax expense. These adjustments have no impact on net income as reported by the Firm as a whole or by the lines of business.

Management also uses certain non-GAAP financial measures at the Firm and business-segment level, because these other non-GAAP financial measures provide information to investors about the underlying operational performance and trends of the Firm or of the particular business segment, as the case may be, and, therefore, facilitate a comparison of the Firm or the business segment with the performance of its relevant competitors. For additional information on these non-GAAP measures, see Business Segment Results on pages 55-74.

Additionally, certain credit metrics and ratios disclosed by the Firm exclude PCI loans, and are therefore non-GAAP measures. For additional information on these non-GAAP measures, see Credit and Investment Risk Management on pages 99-120.

Non-GAAP financial measures used by the Firm may not be comparable to similarly named non-GAAP financial measures used by other companies.

The following summary table provides a reconciliation from the Firm's reported U.S. GAAP results to managed basis.

Year ended December 31, (in millions, except ratios)	2017			2016			2015		
	Reported Results	Fully taxable-equivalent adjustments ^(a)	Managed basis	Reported Results	Fully taxable-equivalent adjustments ^(a)	Managed basis	Reported Results	Fully taxable-equivalent adjustments ^(a)	Managed basis
Other income	\$ 3,639	\$ 2,704 ^(b)	\$ 6,343	\$ 3,795	\$ 2,265	\$ 6,060	\$ 3,032	\$ 1,980	\$ 5,012
Total noninterest revenue	49,527	2,704	52,231	49,585	2,265	51,850	50,033	1,980	52,013
Net interest income	50,097	1,313	51,410	46,083	1,209	47,292	43,510	1,110	44,620
Total net revenue	99,624	4,017	103,641	95,668	3,474	99,142	93,543	3,090	96,633
Pre-provision profit	41,190	4,017	45,207	39,897	3,474	43,371	34,529	3,090	37,619
Income before income tax expense	35,900	4,017	39,917	34,536	3,474	38,010	30,702	3,090	33,792
Income tax expense	11,459	4,017 ^(b)	15,476	9,803	3,474	13,277	6,260	3,090	9,350
Overhead ratio	59%	NM	56%	58%	NM	56%	63%	NM	61%

(a) Predominantly recognized in CIB and CB business segments and Corporate.

(b) Included \$375 million related to tax-oriented investments as a result of the enactment of the TCJA.

Net interest income excluding CIB's Markets businesses

In addition to reviewing net interest income on a managed basis, management also reviews net interest income excluding net interest income arising from CIB's Markets businesses to assess the performance of the Firm's lending, investing (including asset-liability management) and deposit-raising activities. This net interest income is referred to as non-markets related net interest income. CIB's Markets businesses are Fixed Income Markets and Equity Markets. Management believes that disclosure of non-markets related net interest income provides investors and analysts with another measure by which to analyze the non-markets-related business trends of the Firm and provides a comparable measure to other financial institutions that are primarily focused on lending, investing and deposit-raising activities.

The data presented below are non-GAAP financial measures due to the exclusion of markets related net interest income arising from CIB.

Year ended December 31, (in millions, except rates)	2017	2016	2015
Net interest income – managed basis^{(a)(b)}	\$ 51,410	\$ 47,292	\$ 44,620
Less: CIB Markets net interest income ^(c)	4,630	6,334	5,298
Net interest income excluding CIB Markets^(a)	\$ 46,780	\$ 40,958	\$ 39,322
Average interest-earning assets	\$2,180,592	\$2,101,604	\$ 2,088,242
Less: Average CIB Markets interest-earning assets ^(c)	540,835	520,307	510,292
Average interest-earning assets excluding CIB Markets	\$1,639,757	\$1,581,297	\$ 1,577,950
Net interest yield on average interest-earning assets – managed basis	2.36%	2.25%	2.14%
Net interest yield on average CIB Markets interest-earning assets ^(c)	0.86	1.22	1.04
Net interest yield on average interest-earning assets excluding CIB Markets	2.85%	2.59%	2.49%

- (a) Interest includes the effect of related hedges. Taxable-equivalent amounts are used where applicable.
- (b) For a reconciliation of net interest income on a reported and managed basis, see reconciliation from the Firm's reported U.S. GAAP results to managed basis on page 52.
- (c) The amounts in this table differ from the prior-period presentation to align with CIB's Markets businesses. For further information on CIB's Markets businesses, see page 65.

Calculation of certain U.S. GAAP and non-GAAP financial measures

Certain U.S. GAAP and non-GAAP financial measures are calculated as follows:

Book value per share ("BVPS")

Common stockholders' equity at period-end /
Common shares at period-end

Overhead ratio

Total noninterest expense / Total net revenue

Return on assets ("ROA")

Reported net income / Total average assets

Return on common equity ("ROE")

Net income* / Average common stockholders' equity

Return on tangible common equity ("ROTCE")

Net income* / Average tangible common equity

Tangible book value per share ("TBVPS")

Tangible common equity at period-end / Common shares at period-end

* Represents net income applicable to common equity

Management's discussion and analysis

Tangible common equity, ROTCE and TBVPS

Tangible common equity ("TCE"), ROTCE and TBVPS are each non-GAAP financial measures. TCE represents the Firm's common stockholders' equity (i.e., total stockholders' equity less preferred stock) less goodwill and identifiable intangible assets (other than MSRs), net of related deferred tax liabilities. ROTCE measures the Firm's net income applicable to common equity as a percentage of average TCE. TBVPS represents the Firm's TCE at period-end divided by common shares at period-end. TCE, ROTCE and TBVPS are utilized by the Firm, as well as investors and analysts, in assessing the Firm's use of equity.

The following summary table provides a reconciliation from the Firm's common stockholders' equity to TCE.

(in millions, except per share and ratio data)	Period-end		Average		
	Dec 31, 2017	Dec 31, 2016	Year ended December 31,		
			2017	2016	2015
Common stockholders' equity	\$ 229,625	\$ 228,122	\$ 230,350	\$ 224,631	\$ 215,690
Less: Goodwill	47,507	47,288	47,317	47,310	47,445
Less: Other intangible assets	855	862	832	922	1,092
Add: Certain Deferred tax liabilities ^{(a)(b)}	2,204	3,230	3,116	3,212	2,964
Tangible common equity	\$ 183,467	\$ 183,202	\$ 185,317	\$ 179,611	\$ 170,117
Return on tangible common equity	NA	NA	12%	13%	13%
Tangible book value per share	\$ 53.56	\$ 51.44	NA	NA	NA

(a) Represents deferred tax liabilities related to tax-deductible goodwill and to identifiable intangibles created in nontaxable transactions, which are netted against goodwill and other intangibles when calculating TCE.

(b) Includes the effect from the revaluation of the Firm's net deferred tax liability as a result of the enactment of the TCJA.

Key performance measures

The Firm considers the following to be key regulatory capital measures:

- Capital, risk-weighted assets ("RWA"), and capital and leverage ratios presented under Basel III Standardized and Advanced Fully Phased-In rules, and
- SLR calculated under Basel III Advanced Fully Phased-In rules.

The Firm, as well as banking regulators, investors and analysts, use these measures to assess the Firm's regulatory capital position and to compare the Firm's regulatory capital to that of other financial services companies.

For additional information on these measures, see Capital Risk Management on pages 82-91.

Core loans are also considered a key performance measure. Core loans represent loans considered central to the Firm's ongoing businesses; and exclude loans classified as trading assets, runoff portfolios, discontinued portfolios and portfolios the Firm has an intent to exit. Core loans is a measure utilized by the Firm and its investors and analysts in assessing actual growth in the loan portfolio.

BUSINESS SEGMENT RESULTS

The Firm is managed on a line of business basis. There are four major reportable business segments – Consumer & Community Banking, Corporate & Investment Bank, Commercial Banking and Asset & Wealth Management. In addition, there is a Corporate segment.

The business segments are determined based on the products and services provided, or the type of customer served, and they reflect the manner in which financial information is currently evaluated by management. Results of these lines of business are presented on a managed basis. For a definition of managed basis, see Explanation and Reconciliation of the Firm's use of Non-GAAP Financial Measures, on pages 52–54.

JPMorgan Chase						
Consumer Businesses			Wholesale Businesses			
Consumer & Community Banking			Corporate & Investment Bank		Commercial Banking	Asset & Wealth Management
Consumer & Business Banking	Home Lending ^(a)	Card, Merchant Services & Auto ^(b)	Banking	Markets & Investor Services		
- Consumer Banking/Chase Wealth Management - Business Banking	- Home Lending Production - Home Lending Servicing - Real Estate Portfolios	- Card Services – Credit Card - Merchant Services - Auto	- Investment Banking - Treasury Services - Lending	- Fixed Income Markets - Equity Markets - Securities Services - Credit Adjustments & Other	- Middle Market Banking - Corporate Client Banking - Commercial Term Lending - Real Estate Banking	- Asset Management - Wealth Management

(a) Formerly Mortgage Banking

(b) Formerly Card, Commerce Solutions & Auto

Description of business segment reporting methodology

Results of the business segments are intended to reflect each segment as if it were essentially a stand-alone business. The management reporting process that derives business segment results includes the allocation of certain income and expense items described in more detail below. The Firm also assesses the level of capital required for each line of business on at least an annual basis.

The Firm periodically assesses the assumptions, methodologies and reporting classifications used for segment reporting, and further refinements may be implemented in future periods.

Revenue sharing

When business segments join efforts to sell products and services to the Firm's clients, the participating business segments agree to share revenue from those transactions. The segment results reflect these revenue-sharing agreements.

Funds transfer pricing

Funds transfer pricing is used to assign interest income and expense to each business segment and to transfer the primary interest rate risk and liquidity risk exposures to Treasury and CIO within Corporate. The funds transfer pricing process considers the interest rate risk, liquidity risk and regulatory requirements of a business segment as if it were operating independently. This process is overseen by senior management and reviewed by the Firm's Asset-Liability Committee ("ALCO").

Management's discussion and analysis

Debt expense and preferred stock dividend allocation

As part of the funds transfer pricing process, almost all of the cost of the credit spread component of outstanding unsecured long-term debt and preferred stock dividends is allocated to the reportable business segments, while the balance of the cost is retained in Corporate. The methodology to allocate the cost of unsecured long-term debt and preferred stock dividends to the business segments is aligned with the Firm's process to allocate capital. The allocated cost of unsecured long-term debt is included in a business segment's net interest income, and net income is reduced by preferred stock dividends to arrive at a business segment's net income applicable to common equity.

Business segment capital allocation

The amount of capital assigned to each business is referred to as equity. On at least an annual basis, the Firm assesses the level of capital required for each line of business as well as the assumptions and methodologies used to allocate

capital. For additional information on business segment capital allocation, see Line of business equity on page 89.

Expense allocation

Where business segments use services provided by corporate support units, or another business segment, the costs of those services are allocated to the respective business segments. The expense is generally allocated based on the actual cost and use of services provided. In contrast, certain other costs related to corporate support units, or to certain technology and operations, are not allocated to the business segments and are retained in Corporate. Expense retained in Corporate generally includes parent company costs that would not be incurred if the segments were stand-alone businesses; adjustments to align corporate support units; and other items not aligned with a particular business segment.

Segment Results – Managed Basis

The following tables summarize the business segment results for the periods indicated.

Year ended December 31, (in millions)	Total net revenue			Total noninterest expense			Pre-provision profit/(loss)		
	2017	2016	2015	2017	2016	2015	2017	2016	2015
Consumer & Community Banking	\$ 46,485	\$ 44,915	\$ 43,820	\$ 26,062	\$ 24,905	\$ 24,909	\$ 20,423	\$ 20,010	\$ 18,911
Corporate & Investment Bank	34,493	35,216	33,542	19,243	18,992	21,361	15,250	16,224	12,181
Commercial Banking	8,605	7,453	6,885	3,327	2,934	2,881	5,278	4,519	4,004
Asset & Wealth Management	12,918	12,045	12,119	9,301	8,478	8,886	3,617	3,567	3,233
Corporate	1,140	(487)	267	501	462	977	639	(949)	(710)
Total	\$103,641	\$ 99,142	\$ 96,633	\$ 58,434	\$ 55,771	\$ 59,014	\$ 45,207	\$ 43,371	\$ 37,619

Year ended December 31, (in millions, except ratios)	Provision for credit losses			Net income/(loss)			Return on equity		
	2017	2016	2015	2017	2016	2015	2017	2016	2015
Consumer & Community Banking	\$ 5,572	\$ 4,494	\$ 3,059	\$ 9,395	\$ 9,714	\$ 9,789	17%	18%	18%
Corporate & Investment Bank	(45)	563	332	10,813	10,815	8,090	14	16	12
Commercial Banking	(276)	282	442	3,539	2,657	2,191	17	16	15
Asset & Wealth Management	39	26	4	2,337	2,251	1,935	25	24	21
Corporate	—	(4)	(10)	(1,643)	(704)	2,437	NM	NM	NM
Total	\$ 5,290	\$ 5,361	\$ 3,827	\$ 24,441	\$ 24,733	\$ 24,442	10%	10%	11%

The following sections provide a comparative discussion of business segment results as of or for the years ended December 31, 2017, 2016 and 2015.

Consumer & Community Banking offers services to consumers and businesses through bank branches, ATMs, online, mobile and telephone banking. CCB is organized into Consumer & Business Banking (including Consumer Banking/Chase Wealth Management and Business Banking), Home Lending (including Home Lending Production, Home Lending Servicing and Real Estate Portfolios) and Card, Merchant Services & Auto. Consumer & Business Banking offers deposit and investment products and services to consumers, and lending, deposit, and cash management and payment solutions to small businesses. Home Lending includes mortgage origination and servicing activities, as well as portfolios consisting of residential mortgages and home equity loans. Card, Merchant Services & Auto issues credit cards to consumers and small businesses, offers payment processing services to merchants, and originates and services auto loans and leases.

Selected income statement data

Year ended December 31, (in millions, except ratios)	2017	2016	2015
Revenue			
Lending- and deposit-related fees	\$ 3,431	\$ 3,231	\$ 3,137
Asset management, administration and commissions	2,212	2,093	2,172
Mortgage fees and related income	1,613	2,490	2,511
Card income	4,024	4,364	5,491
All other income	3,430	3,077	2,281
Noninterest revenue	14,710	15,255	15,592
Net interest income	31,775	29,660	28,228
Total net revenue	46,485	44,915	43,820
Provision for credit losses	5,572	4,494	3,059
Noninterest expense			
Compensation expense	10,159	9,723	9,770
Noncompensation expense ^(a)	15,903	15,182	15,139
Total noninterest expense	26,062	24,905	24,909
Income before income tax expense	14,851	15,516	15,852
Income tax expense	5,456	5,802	6,063
Net income	\$ 9,395	\$ 9,714	\$ 9,789
Revenue by line of business			
Consumer & Business Banking	\$ 21,104	\$ 18,659	\$ 17,983
Home Lending	5,955	7,361	6,817
Card, Merchant Services & Auto	19,426	18,895	19,020
Mortgage fees and related income details:			
Net production revenue	636	853	769
Net mortgage servicing revenue ^(b)	977	1,637	1,742
Mortgage fees and related income	\$ 1,613	\$ 2,490	\$ 2,511
Financial ratios			
Return on equity	17%	18%	18%
Overhead ratio	56	55	57

Note: In the discussion and the tables which follow, CCB presents certain financial measures which exclude the impact of PCI loans; these are non-GAAP financial measures.

- (a) Included operating lease depreciation expense of \$2.7 billion, \$1.9 billion and \$1.4 billion for the years ended December 31, 2017, 2016 and 2015, respectively.
- (b) Included MSR risk management results of \$(242) million, \$217 million and \$(117) million for the years ended December 31, 2017, 2016 and 2015, respectively.

Management's discussion and analysis

2017 compared with 2016

Net income was \$9.4 billion, a decrease of 3%, driven by higher noninterest expense and provision for credit losses, largely offset by higher net revenue.

Net revenue was \$46.5 billion, an increase of 3%.

Net interest income was \$31.8 billion, up 7%, driven by higher deposit balances, deposit margin expansion, and higher loan balances in Card, partially offset by loan spread compression from higher rates, including the impact of higher funding costs in Home Lending and Auto and the impact of the sale of the student loan portfolio.

Noninterest revenue was \$14.7 billion, down 4%, driven by:

- higher new account origination costs in Card,
- lower MSR risk management results,
- the absence in the current year of a gain on the sale of Visa Europe interests,
- lower net production revenue reflecting lower mortgage production margins and volumes, and
- lower mortgage servicing revenue as a result of a lower level of third-party loans serviced

largely offset by

- higher auto lease volume and
- higher card- and deposit-related fees.

See Note 15 for further information regarding changes in value of the MSR asset and related hedges, and mortgage fees and related income.

Noninterest expense was \$26.1 billion, an increase of 5%, driven by:

- higher auto lease depreciation, and
- continued business growth

partially offset by

- two items totaling \$175 million included in the prior year related to liabilities from a merchant bankruptcy and mortgage servicing reserves.

The provision for credit losses was \$5.6 billion, an increase of 24%, reflecting:

- \$445 million of higher net charge-offs, primarily in the credit card portfolio due to growth in newer vintages which, as anticipated, have higher loss rates than the more seasoned portion of the portfolio, partially offset by a decrease in net charge-offs in the residential real estate portfolio reflecting continued improvement in home prices and delinquencies,
- a \$415 million higher addition to the allowance for credit losses related to the credit card portfolio driven by higher loss rates and loan growth, and a lower reduction in the allowance for the residential real estate portfolio predominantly driven by continued improvement in home prices and delinquencies, and
- a \$218 million impact in connection with the sale of the student loan portfolio.

The sale of the student loan portfolio during 2017 did not have a material impact on the Firm's Consolidated Financial Statements.

2016 compared with 2015

Net income was \$9.7 billion, a decrease of 1%, driven by higher provision for credit losses, predominantly offset by higher net revenue.

Net revenue was \$44.9 billion, an increase of 2%.

Net interest income was \$29.7 billion, up 5%, driven by higher deposit balances and higher loan balances, partially offset by deposit spread compression and an increase in the reserve for uncollectible interest and fees in Card.

Noninterest revenue was \$15.3 billion, down 2%, driven by higher new account origination costs and the impact of renegotiated co-brand partnership agreements in Card and lower mortgage servicing revenue predominantly as a result of a lower level of third-party loans serviced; these factors were predominantly offset by higher auto lease and card sales volume, higher card- and deposit-related fees, higher MSR risk management results and a gain on the sale of Visa Europe interests. See Note 15 for further information regarding changes in value of the MSR asset and related hedges, and mortgage fees and related income.

Noninterest expense of \$24.9 billion was flat, driven by:

- lower legal expense and branch efficiencies

offset by

- higher auto lease depreciation, and
- higher investment in marketing.

The provision for credit losses was \$4.5 billion, an increase of 47%, reflecting:

- a \$920 million increase related to the credit card portfolio, due to a \$600 million addition in the allowance for loan losses, as well as \$320 million of higher net charge-offs, driven by loan growth, including growth in newer vintages which, as anticipated, have higher loss rates compared to the overall portfolio,
- a \$450 million lower benefit related to the residential real estate portfolio, as the current year reduction in the allowance for loan losses was lower than the prior year. The reduction in both periods reflected continued improvements in home prices and lower delinquencies, and
- a \$150 million increase related to the auto and business banking portfolio, due to additions to the allowance for loan losses and higher net charge-offs, reflecting loan growth in the portfolios.

Selected metrics

As of or for the year ended December 31,			
(in millions, except headcount)	2017	2016	2015
Selected balance sheet data (period-end)			
Total assets	\$552,601	\$535,310	\$502,652
Loans:			
Consumer & Business Banking	25,789	24,307	22,730
Home equity	42,751	50,296	58,734
Residential mortgage	197,339	181,196	164,500
Home Lending	240,090	231,492	223,234
Card	149,511	141,816	131,463
Auto	66,242	65,814	60,255
Student	—	7,057	8,176
Total loans	481,632	470,486	445,858
Core loans	415,167	382,608	341,881
Deposits	659,885	618,337	557,645
Equity	51,000	51,000	51,000
Selected balance sheet data (average)			
Total assets	\$532,756	\$516,354	\$472,972
Loans:			
Consumer & Business Banking	24,875	23,431	21,894
Home equity	46,398	54,545	63,261
Residential mortgage	190,242	177,010	140,294
Home Lending	236,640	231,555	203,555
Card	140,024	131,165	125,881
Auto	65,395	63,573	56,487
Student	2,880	7,623	8,763
Total loans	469,814	457,347	416,580
Core loans	393,598	361,316	301,700
Deposits	640,219	586,637	530,938
Equity	51,000	51,000	51,000
Headcount	134,117	132,802	127,094

Selected metrics

As of or for the year ended December 31,			
(in millions, except ratio data)	2017	2016	2015
Credit data and quality statistics			
Nonaccrual loans ^{(a)(b)}	\$ 4,084	\$ 4,708	\$ 5,313
Net charge-offs/(recoveries) ^(c)			
Consumer & Business Banking	257	257	253
Home equity	63	184	283
Residential mortgage	(16)	14	2
Home Lending	47	198	285
Card	4,123	3,442	3,122
Auto	331	285	214
Student	498	162	210
Total net charge-offs/ (recoveries)	\$ 5,256	\$ 4,344	\$ 4,084
Net charge-off/(recovery) rate ^(c)			
Consumer & Business Banking	1.03%	1.10%	1.16%
Home equity ^(d)	0.18	0.45	0.60
Residential mortgage ^(d)	(0.01)	0.01	—
Home Lending ^(d)	0.02	0.10	0.18
Card	2.95	2.63	2.51
Auto	0.51	0.45	0.38
Student	NM	2.13	2.40
Total net charge-offs/(recovery) rate^(d)	1.21	1.04	1.10
30+ day delinquency rate			
Home Lending ^{(e)(f)}	1.19%	1.23%	1.57%
Card	1.80	1.61	1.43
Auto	0.89	1.19	1.35
Student ^(g)	—	1.60	1.81
90+ day delinquency rate - Card	0.92	0.81	0.72
Allowance for loan losses			
Consumer & Business Banking	\$ 796	\$ 753	\$ 703
Home Lending, excluding PCI loans	1,003	1,328	1,588
Home Lending — PCI loans ^(c)	2,225	2,311	2,742
Card	4,884	4,034	3,434
Auto	464	474	399
Student	—	249	299
Total allowance for loan losses^(c)	\$ 9,372	\$ 9,149	\$ 9,165

- (a) Excludes PCI loans. The Firm is recognizing interest income on each pool of PCI loans as each of the pools is performing.
- (b) At December 31, 2017, 2016 and 2015, nonaccrual loans excluded loans 90 or more days past due as follows: (1) mortgage loans insured by U.S. government agencies of \$4.3 billion, \$5.0 billion and \$6.3 billion, respectively; and (2) student loans insured by U.S. government agencies under the Federal Family Education Loan Program ("FFELP") of zero, \$263 million and \$290 million, respectively. These amounts have been excluded based upon the government guarantee.
- (c) Net charge-offs and the net charge-off rates for the years ended December 31, 2017, 2016 and 2015, excluded \$86 million, \$156 million and \$208 million, respectively, of write-offs in the PCI portfolio. These write-offs decreased the allowance for loan losses for PCI loans. For further information on PCI write-offs, see summary of changes in the allowance on page 118.
- (d) Excludes the impact of PCI loans. For the years ended December 31, 2017, 2016 and 2015, the net charge-off rates including the impact of PCI loans were as follows: (1) home equity of 0.14%, 0.34% and 0.45%, respectively; (2) residential mortgage of (0.01)%, 0.01% and —%, respectively; (3) Home Lending of 0.02%, 0.09% and 0.14%, respectively; and (4) total CCB of 1.12%, 0.95% and 0.99%, respectively.

Management's discussion and analysis

- (e) At December 31, 2017, 2016 and 2015, excluded mortgage loans insured by U.S. government agencies of \$6.2 billion, \$7.0 billion and \$8.4 billion, respectively, that are 30 or more days past due. These amounts have been excluded based upon the government guarantee.
- (f) Excludes PCI loans. The 30+ day delinquency rate for PCI loans was 10.13%, 9.82% and 11.21% at December 31, 2017, 2016 and 2015, respectively.
- (g) Excluded student loans insured by U.S. government agencies under FFELP of \$468 million and \$526 million at December 31, 2016 and 2015, respectively, that are 30 or more days past due. These amounts have been excluded based upon the government guarantee.

Selected metrics

As of or for the year ended December 31, (in billions, except ratios and where otherwise noted)			
	2017	2016	2015
Business Metrics			
CBB households (in millions) ^(a)	61.0	60.4	58.1
Number of branches	5,130	5,258	5,413
Active digital customers (in thousands) ^(b)	46,694	43,836	39,242
Active mobile customers (in thousands) ^(c)	30,056	26,536	22,810
Debit and credit card sales volume ^(a)	\$ 916.9	\$ 821.6	\$ 754.1
Consumer & Business Banking			
Average deposits	\$ 625.6	\$ 570.8	\$ 515.2
Deposit margin	1.98%	1.81%	1.90%
Business banking origination volume	\$ 7.3	\$ 7.3	\$ 6.8
Client investment assets	273.3	234.5	218.6
Home Lending			
Mortgage origination volume by channel			
Retail	\$ 40.3	\$ 44.3	\$ 36.1
Correspondent	57.3	59.3	70.3
Total mortgage origination volume ^(d)	\$ 97.6	\$ 103.6	\$ 106.4
Total loans serviced (period-end)	\$ 816.1	\$ 846.6	\$ 910.1
Third-party mortgage loans serviced (period-end)	553.5	591.5	674.0
MSR carrying value (period-end)	6.0	6.1	6.6
Ratio of MSR carrying value (period-end) to third-party mortgage loans serviced (period-end)	1.08%	1.03%	0.98%
MSR revenue multiple ^(e)	3.09x	2.94x	2.80x
Card, excluding Commercial Card			
Credit card sales volume	\$ 622.2	\$ 545.4	\$ 495.9
New accounts opened (in millions)	8.4	10.4	8.7
Card Services			
Net revenue rate	10.57%	11.29%	12.33%
Merchant Services			
Merchant processing volume	\$1,191.7	\$1,063.4	\$ 949.3
Auto			
Loan and lease origination volume	\$ 33.3	\$ 35.4	\$ 32.4
Average Auto operating lease assets	15.2	11.0	7.8

- (a) The prior period amounts have been revised to conform with the current period presentation.
- (b) Users of all web and/or mobile platforms who have logged in within the past 90 days.
- (c) Users of all mobile platforms who have logged in within the past 90 days.
- (d) Firmwide mortgage origination volume was \$107.6 billion, \$117.4 billion and \$115.2 billion for the years ended December 31, 2017, 2016 and 2015, respectively.
- (e) Represents the ratio of MSR carrying value (period-end) to third-party mortgage loans serviced (period-end) divided by the ratio of loan servicing-related revenue to third-party mortgage loans serviced (average).

Mortgage servicing-related matters

The Firm has resolved the majority of the consent orders and settlements into which it entered with federal and state governmental agencies and private parties related to mortgage servicing, origination, and residential mortgage-backed securities activities. On January 12, 2018, the Board of Governors of the Federal Reserve System terminated its mortgage servicing-related Consent Order with the Firm, which had been outstanding since April 2011.

Some of the remaining obligations are overseen by an independent reviewer, who publishes periodic reports detailing the Firm's compliance with the obligations.

CORPORATE & INVESTMENT BANK

The Corporate & Investment Bank, which consists of Banking and Markets & Investor Services, offers a broad suite of investment banking, market-making, prime brokerage, and treasury and securities products and services to a global client base of corporations, investors, financial institutions, government and municipal entities. Banking offers a full range of investment banking products and services in all major capital markets, including advising on corporate strategy and structure, capital-raising in equity and debt markets, as well as loan origination and syndication. Banking also includes Treasury Services, which provides transaction services, consisting of cash management and liquidity solutions. Markets & Investor Services is a global market-maker in cash securities and derivative instruments, and also offers sophisticated risk management solutions, prime brokerage, and research. Markets & Investor Services also includes Securities Services, a leading global custodian which provides custody, fund accounting and administration, and securities lending products principally for asset managers, insurance companies and public and private investment funds.

Selected income statement data

Year ended December 31, (in millions, except ratios)	2017	2016	2015
Financial ratios			
Return on equity	14%	16%	12%
Overhead ratio	56	54	64
Compensation expense as percentage of total net revenue	28	27	30
Revenue by business			
Investment Banking	\$ 6,688	\$ 5,950	\$ 6,376
Treasury Services	4,172	3,643	3,631
Lending	1,429	1,208	1,461
Total Banking	12,289	10,801	11,468
Fixed Income Markets	12,812	15,259	12,592
Equity Markets	5,703	5,740	5,694
Securities Services	3,917	3,591	3,777
Credit Adjustments & Other ^(a)	(228)	(175)	11
Total Markets & Investor Services	22,204	24,415	22,074
Total net revenue	\$34,493	\$35,216	\$33,542

(a) Consists primarily of credit valuation adjustments ("CVA") managed centrally within CIB, funding valuation adjustments ("FVA") and debit valuation adjustments ("DVA") on derivatives. Results are primarily reported in principal transactions revenue. Results are presented net of associated hedging activities and net of CVA and FVA amounts allocated to Fixed Income Markets and Equity Markets. For additional information, see Accounting and Reporting Developments on pages 141-144 and Notes 2, 3 and 23.

2017 compared with 2016

Net income was \$10.8 billion, flat compared with the prior year, reflecting lower net revenue and higher noninterest expense, offset by a lower provision for credit losses, and a tax benefit resulting from the vesting of employee share-based awards. The current year included a \$141 million benefit to net income as a result of the enactment of the TCJA.

Net revenue was \$34.5 billion, down 2%.

Banking revenue was \$12.3 billion, up 14% compared with the prior year. Investment banking revenue was \$6.7 billion, up 12% from the prior year, driven by higher debt and equity underwriting fees. The Firm maintained its #1 ranking for Global Investment Banking fees, according to Dealogic. Debt underwriting fees were \$3.6 billion, up 16% driven by a higher share of fees and an overall increase in industry-wide fees; the Firm maintained its #1 ranking globally in fees across high-grade, high-yield, and loan products. Equity underwriting fees were \$1.4 billion, up 20% driven by growth in industry-wide issuance including a strong IPO market; the Firm ranked #2 in equity underwriting fees globally. Advisory fees were \$2.2 billion, up 2%; the Firm maintained its #2 ranking for M&A. Treasury Services revenue was \$4.2 billion, up 15%, driven by the impact of higher interest rates and growth in operating deposits. Lending revenue was \$1.4 billion, up

Selected income statement data

Year ended December 31, (in millions)	2017	2016	2015
Revenue			
Investment banking fees	\$ 7,192	\$ 6,424	\$ 6,736
Principal transactions	10,873	11,089	9,905
Lending- and deposit-related fees	1,531	1,581	1,573
Asset management, administration and commissions	4,207	4,062	4,467
All other income	572	1,169	1,012
Noninterest revenue	24,375	24,325	23,693
Net interest income	10,118	10,891	9,849
Total net revenue^{(a)(b)}	34,493	35,216	33,542
Provision for credit losses	(45)	563	332
Noninterest expense			
Compensation expense	9,535	9,546	9,973
Noncompensation expense	9,708	9,446	11,388
Total noninterest expense	19,243	18,992	21,361
Income before income tax expense	15,295	15,661	11,849
Income tax expense	4,482	4,846	3,759
Net income^(a)	\$ 10,813	\$ 10,815	\$ 8,090

(a) The full year 2017 results reflect the impact of the enactment of the TCJA including a decrease to net revenue of \$259 million and a benefit to net income of \$141 million. For additional information related to the impact of the TCJA, see Note 24.

(b) Included tax-equivalent adjustments, predominantly due to income tax credits related to alternative energy investments; income tax credits and amortization of the cost of investments in affordable housing projects; and tax-exempt income from municipal bonds of \$2.4 billion, \$2.0 billion and \$1.7 billion for the years ended December 31, 2017, 2016 and 2015, respectively.

18% from the prior year, reflecting lower fair value losses on hedges of accrual loans.

Markets & Investor Services revenue was \$22.2 billion, down 9% from the prior year. Fixed Income Markets revenue was \$12.8 billion, down 16%, as lower revenue across products was driven by sustained low volatility, tighter credit spreads, and the impact from the TCJA on tax-oriented investments of \$259 million, against a strong prior year. Equity Markets revenue was \$5.7 billion, down 1% from the prior year, and included a fair value loss of \$143 million on a margin loan to a single client. Excluding the fair value loss, Equity Markets revenue was higher driven by higher revenue in Prime Services and Cash Equities, partially offset by lower revenue in derivatives. Securities Services revenue was \$3.9 billion, up 9%, driven by the impact of higher interest rates and deposit growth, as well as higher asset-based fees driven by higher market levels. Credit Adjustments & Other was a loss of \$228 million, driven by valuation adjustments.

The provision for credit losses was a benefit of \$45 million, which included a net reduction in the allowance for credit losses driven by the Oil & Gas and Metals & Mining portfolios partially offset by a net increase in the allowance for credit losses for a single client. The prior year was an expense of \$563 million, which included an addition to the allowance for credit losses driven by the Oil & Gas and Metals & Mining portfolios.

Noninterest expense was \$19.2 billion, up 1% compared with the prior year.

2016 compared with 2015

Net income was \$10.8 billion, up 34% compared with the prior year, driven by lower noninterest expense and higher net revenue, partially offset by a higher provision for credit losses.

Banking revenue was \$10.8 billion, down 6% compared with the prior year. Investment banking revenue was \$6.0 billion, down 7% from the prior year, largely driven by lower equity underwriting fees. The Firm maintained its #1 ranking for Global Investment Banking fees, according to

Dealogic. Equity underwriting fees were \$1.2 billion, down 19% driven by lower industry-wide fee levels; however, the Firm improved its market share and maintained its #1 ranking in equity underwriting fees globally as well as in both North America and Europe and its #1 ranking by volumes across all products, according to Dealogic. Advisory fees were \$2.1 billion, down 1%; the Firm maintained its #2 ranking for M&A, according to Dealogic. Debt underwriting fees were \$3.2 billion; the Firm maintained its #1 ranking globally in fees across high grade, high yield, and loan products, according to Dealogic. Treasury Services revenue was \$3.6 billion. Lending revenue was \$1.2 billion, down 17% from the prior year, reflecting fair value losses on hedges of accrual loans.

Markets & Investor Services revenue was \$24.4 billion, up 11% from the prior year. Fixed Income Markets revenue was \$15.3 billion, up 21% from the prior year, driven by broad strength across products. Rates performance was strong, with increased client activity driven by high issuance-based flows, global political developments, and central bank actions. Credit and Securitized Products revenue improved driven by higher market-making revenue from the secondary market as clients' risk appetite recovered, and due to increased financing activity. Equity Markets revenue was \$5.7 billion, up 1%, compared to a strong prior-year. Securities Services revenue was \$3.6 billion, down 5% from the prior year, largely driven by lower fees and commissions. Credit Adjustments and Other was a loss of \$175 million driven by valuation adjustments, compared with an \$11 million gain in the prior-year, which included funding spread gains on fair value option elected liabilities.

The provision for credit losses was \$563 million, compared to \$332 million in the prior year, reflecting a higher allowance for credit losses, including the impact of select downgrades within the Oil & Gas portfolio.

Noninterest expense was \$19.0 billion, down 11% compared with the prior year, driven by lower legal and compensation expenses.

Management's discussion and analysis

Selected metrics

As of or for the year ended December 31, (in millions, except headcount)	2017	2016	2015
Selected balance sheet data (period-end)			
Assets	\$ 826,384	\$ 803,511	\$ 748,691
Loans:			
Loans retained ^(a)	108,765	111,872	106,908
Loans held-for-sale and loans at fair value	4,321	3,781	3,698
Total loans	113,086	115,653	110,606
Core loans	112,754	115,243	110,084
Equity	70,000	64,000	62,000
Selected balance sheet data (average)			
Assets	\$ 857,060	\$ 815,321	\$ 824,208
Trading assets-debt and equity instruments	342,124	300,606	302,514
Trading assets-derivative receivables	56,466	63,387	67,263
Loans:			
Loans retained ^(a)	108,368	111,082	98,331
Loans held-for-sale and loans at fair value	4,995	3,812	4,572
Total loans	113,363	114,894	102,903
Core loans	113,006	114,455	102,142
Equity	70,000	64,000	62,000
Headcount	51,181	48,748	49,067

(a) Loans retained includes credit portfolio loans, loans held by consolidated Firm-administered multi-seller conduits, trade finance loans, other held-for-investment loans and overdrafts.

Selected metrics

As of or for the year ended December 31, (in millions, except ratios)	2017	2016	2015
Credit data and quality statistics			
Net charge-offs/ (recoveries)	\$ 71	\$ 168	\$ (19)
Nonperforming assets:			
Nonaccrual loans:			
Nonaccrual loans retained ^(a)	812	467	428
Nonaccrual loans held- for-sale and loans at fair value	—	109	10
Total nonaccrual loans	812	576	438
Derivative receivables	130	223	204
Assets acquired in loan satisfactions	85	79	62
Total nonperforming assets	1,027	878	704
Allowance for credit losses:			
Allowance for loan losses	1,379	1,420	1,258
Allowance for lending- related commitments	727	801	569
Total allowance for credit losses	2,106	2,221	1,827
Net charge-off/(recovery) rate ^(b)	0.07%	0.15%	(0.02)%
Allowance for loan losses to period-end loans retained	1.27	1.27	1.18
Allowance for loan losses to period-end loans retained, excluding trade finance and conduits ^(c)	1.92	1.86	1.88
Allowance for loan losses to nonaccrual loans retained ^(a)	170	304	294
Nonaccrual loans to total period-end loans	0.72	0.50	0.40

(a) Allowance for loan losses of \$316 million, \$113 million and \$177 million were held against these nonaccrual loans at December 31, 2017, 2016 and 2015, respectively.

(b) Loans held-for-sale and loans at fair value were excluded when calculating the net charge-off/(recovery) rate.

(c) Management uses allowance for loan losses to period-end loans retained, excluding trade finance and conduits, a non-GAAP financial measure, to provide a more meaningful assessment of CIB's allowance coverage ratio.

Investment banking fees

(in millions)	Year ended December 31,		
	2017	2016	2015
Advisory	\$ 2,150	\$ 2,110	\$ 2,133
Equity underwriting	1,396	1,159	1,434
Debt underwriting ^(a)	3,646	3,155	3,169
Total investment banking fees	\$ 7,192	\$ 6,424	\$ 6,736

(a) Includes loans syndication.

League table results – wallet share

Year ended December 31,	2017		2016		2015	
	Rank	Share	Rank	Share	Rank	Share
<i>Based on fees^(a)</i>						
Debt, equity and equity-related						
Global	#1	7.4%	#1	7.0%	#1	7.6%
U.S.	1	11.2	1	11.9	1	11.5
Long-term debt^(b)						
Global	1	7.6	1	6.7	1	8.1
U.S.	2	10.9	2	11.1	1	11.7
Equity and equity-related						
Global ^(c)	2	7.1	1	7.4	2	6.9
U.S.	1	11.7	1	13.3	1	11.3
M&A^(d)						
Global	2	8.6	2	8.3	2	8.4
U.S.	2	9.2	2	9.8	2	9.9
Loan syndications						
Global	1	9.5	1	9.3	1	7.5
U.S.	1	11.3	2	11.9	2	10.8
Global investment banking fees ^(e)	#1	8.1%	#1	7.9%	#1	7.8%

(a) Source: Dealogic as of January 1, 2018. Reflects the ranking of revenue wallet and market share.

(b) Long-term debt rankings include investment-grade, high-yield, supranationals, sovereigns, agencies, covered bonds, asset-backed securities ("ABS") and mortgage-backed securities ("MBS"); and exclude money market, short-term debt, and U.S. municipal securities.

(c) Global equity and equity-related ranking includes rights offerings and Chinese A-Shares.

(d) Global M&A reflect the removal of any withdrawn transactions. U.S. M&A revenue wallet represents wallet from client parents based in the U.S.

(e) Global investment banking fees exclude money market, short-term debt and shelf deals.

Markets revenue

The following table summarizes select income statement data for the Markets businesses. Markets includes both Fixed Income Markets and Equity Markets. Markets revenue consists of principal transactions, fees, commissions and other income, as well as net interest income. The Firm assesses its Markets business performance on a total revenue basis, as offsets may occur across revenue line items. For example, securities that generate net interest income may be risk-managed by derivatives that are recorded in principal transactions. For a description of the composition of these income statement line items, see Notes 6 and 7.

Principal transactions reflects revenue on financial instruments and commodities transactions that arise from client-driven market making activity. Principal transactions revenue includes amounts recognized upon executing new transactions with market participants, as well as "inventory-related revenue", which is revenue recognized from gains and losses on derivatives and other instruments that the

Firm has been holding in anticipation of, or in response to, client demand, and changes in the fair value of instruments used by the Firm to actively manage the risk exposure arising from such inventory. Principal transactions revenue recognized upon executing new transactions with market participants is driven by many factors including the level of client activity, the bid-offer spread (which is the difference between the price at which a market participant is willing to sell an instrument to the Firm and the price at which another market participant is willing to buy it from the Firm, and vice versa), market liquidity and volatility. These factors are interrelated and sensitive to the same factors that drive inventory-related revenue, which include general market conditions, such as interest rates, foreign exchange rates, credit spreads, and equity and commodity prices, as well as other macroeconomic conditions.

For the periods presented below, the predominant source of principal transactions revenue was the amount recognized upon executing new transactions.

Year ended December 31, (in millions, except where otherwise noted)	2017			2016			2015		
	Fixed Income Markets	Equity Markets	Total Markets	Fixed Income Markets	Equity Markets	Total Markets	Fixed Income Markets	Equity Markets	Total Markets
Principal transactions	\$ 7,393	\$ 3,855	\$ 11,248	\$ 8,347	\$ 3,130	\$ 11,477	\$ 6,899	\$ 3,038	\$ 9,937
Lending- and deposit-related fees	191	6	197	220	2	222	194	–	194
Asset management, administration and commissions	390	1,635	2,025	388	1,551	1,939	383	1,704	2,087
All other income	436	(21)	415	1,014	13	1,027	854	(84)	770
Noninterest revenue	8,410	5,475	13,885	9,969	4,696	14,665	8,330	4,658	12,988
Net interest income ^(a)	4,402	228	4,630	5,290	1,044	6,334	4,262	1,036	5,298
Total net revenue	\$ 12,812	\$ 5,703	\$ 18,515	\$ 15,259	\$ 5,740	\$ 20,999	\$ 12,592	\$ 5,694	\$ 18,286
Loss days^(b)	4			0			2		

(a) Declines in Markets net interest income in 2017 were driven by higher funding costs.

(b) Loss days represent the number of days for which Markets posted losses. The loss days determined under this measure differ from the disclosure of daily market risk-related gains and losses for the Firm in the value-at-risk ("VaR") back-testing discussion on pages 123–125.

Management's discussion and analysis

Selected metrics

As of or for the year ended December 31, (in millions, except where otherwise noted)	2017	2016	2015
Assets under custody ("AUC") by asset class (period-end) (in billions):			
Fixed Income	\$ 13,043	\$ 12,166	\$ 12,042
Equity	7,863	6,428	6,194
Other ^(a)	2,563	1,926	1,707
Total AUC	\$ 23,469	\$ 20,520	\$ 19,943
Client deposits and other third party liabilities (average) ^(b)	\$ 408,911	\$ 376,287	\$ 395,297
Trade finance loans (period-end)	17,947	15,923	19,255

(a) Consists of mutual funds, unit investment trusts, currencies, annuities, insurance contracts, options and other contracts.

(b) Client deposits and other third party liabilities pertain to the Treasury Services and Securities Services businesses.

International metrics

Year ended December 31, (in millions, except where otherwise noted)	2017	2016	2015
Total net revenue^(a)			
Europe/Middle East/Africa	\$ 11,328	\$ 10,786	\$ 10,894
Asia/Pacific	4,525	4,915	4,901
Latin America/Caribbean	1,125	1,225	1,096
Total international net revenue	16,978	16,926	16,891
North America	17,515	18,290	16,651
Total net revenue	\$ 34,493	\$ 35,216	\$ 33,542
Loans retained (period-end)^(a)			
Europe/Middle East/Africa	\$ 25,931	\$ 26,696	\$ 24,622
Asia/Pacific	15,248	14,508	17,108
Latin America/Caribbean	6,546	7,607	8,609
Total international loans	47,725	48,811	50,339
North America	61,040	63,061	56,569
Total loans retained	\$ 108,765	\$ 111,872	\$ 106,908
Client deposits and other third-party liabilities (average)^{(a)(b)}			
Europe/Middle East/Africa	\$ 154,582	\$ 135,979	\$ 141,062
Asia/Pacific	76,744	68,110	67,111
Latin America/Caribbean	25,419	22,914	23,070
Total international	\$ 256,745	\$ 227,003	\$ 231,243
North America	152,166	149,284	164,054
Total client deposits and other third-party liabilities	\$ 408,911	\$ 376,287	\$ 395,297
AUC (period-end) (in billions)^(a)			
North America	\$ 13,971	\$ 12,290	\$ 12,034
All other regions	9,498	8,230	7,909
Total AUC	\$ 23,469	\$ 20,520	\$ 19,943

(a) Total net revenue is based predominantly on the domicile of the client or location of the trading desk, as applicable. Loans outstanding (excluding loans held-for-sale and loans at fair value), client deposits and other third-party liabilities, and AUC are based predominantly on the domicile of the client.

(b) Client deposits and other third party liabilities pertain to the Treasury Services and Securities Services businesses.

Commercial Banking delivers extensive industry knowledge, local expertise and dedicated service to U.S. and U.S. multinational clients, including corporations, municipalities, financial institutions and nonprofit entities with annual revenue generally ranging from \$20 million to \$2 billion. In addition, CB provides financing to real estate investors and owners. Partnering with the Firm's other businesses, CB provides comprehensive financial solutions, including lending, treasury services, investment banking and asset management to meet its clients' domestic and international financial needs.

Selected income statement data

Year ended December 31, (in millions)	2017	2016	2015
Revenue			
Lending- and deposit-related fees	\$ 919	\$ 917	\$ 944
Asset management, administration and commissions	68	69	88
All other income ^(a)	1,535	1,334	1,333
Noninterest revenue	2,522	2,320	2,365
Net interest income	6,083	5,133	4,520
Total net revenue^(b)	8,605	7,453	6,885
Provision for credit losses	(276)	282	442
Noninterest expense			
Compensation expense	1,470	1,332	1,238
Noncompensation expense	1,857	1,602	1,643
Total noninterest expense	3,327	2,934	2,881
Income before income tax expense	5,554	4,237	3,562
Income tax expense	2,015	1,580	1,371
Net income	\$ 3,539	\$ 2,657	\$ 2,191

(a) Includes revenue from investment banking products and commercial card transactions.

(b) Total net revenue included tax-equivalent adjustments from income tax credits related to equity investments in designated community development entities that provide loans to qualified businesses in low-income communities, as well as tax-exempt income related to municipal financing activities of \$699 million, \$505 million and \$493 million for the years ended December 31, 2017, 2016 and 2015, respectively. The 2017 results reflect the impact of the enactment of the TCJA including a benefit to all other income of \$115 million on certain investments in the Community Development Banking business. For additional information related to the impact of the TCJA, see Note 24.

2017 compared with 2016

Net income was \$3.5 billion, an increase of 33% compared with the prior year, driven by higher net revenue and a lower provision for credit losses, partially offset by higher noninterest expense.

Net revenue was \$8.6 billion, an increase of 15% compared with the prior year. Net interest income was \$6.1 billion, an increase of 19% compared with the prior year, driven by higher deposit spreads and loan growth. Noninterest revenue was \$2.5 billion, an increase of 9% compared with the prior year, predominantly driven by higher Community Development Banking revenue, including a \$115 million benefit for the impact of the TCJA on certain investments, and higher investment banking revenue.

Noninterest expense was \$3.3 billion, an increase of 13% driven by hiring of bankers and business-related support staff, investments in technology, and an impairment of approximately \$130 million on certain leased equipment, the majority of which was sold subsequent to year-end.

The provision for credit losses was a benefit of \$276 million, driven by net reductions in the allowance for credit losses, including in the Oil & Gas, Natural Gas Pipelines and Metals & Mining portfolios. The prior year provision for credit losses was \$282 million driven by downgrades in the Oil & Gas portfolio and select client downgrades in other industries.

2016 compared with 2015

Net income was \$2.7 billion, an increase of 21% compared with the prior year, driven by higher net revenue and a lower provision for credit losses, partially offset by higher noninterest expense.

Net revenue was \$7.5 billion, an increase of 8% compared with the prior year. Net interest income was \$5.1 billion, an increase of 14% compared with the prior year, driven by higher loan balances and deposit spreads. Noninterest revenue was \$2.3 billion, a decrease of 2% compared with the prior year, largely driven by lower lending-and-deposit-related fees and other revenue, partially offset by higher investment banking revenue.

Noninterest expense was \$2.9 billion, an increase of 2% compared with the prior year, reflecting increased hiring of bankers and business-related support staff and investments in technology.

The provision for credit losses was \$282 million and \$442 million for 2016 and 2015, respectively, with both periods driven by downgrades in the Oil & Gas portfolio and select client downgrades in other industries.

Management's discussion and analysis

CB product revenue consists of the following:

Lending includes a variety of financing alternatives, which are primarily provided on a secured basis; collateral includes receivables, inventory, equipment, real estate or other assets. Products include term loans, revolving lines of credit, bridge financing, asset-based structures, leases, and standby letters of credit.

Treasury services includes revenue from a broad range of products and services that enable CB clients to manage payments and receipts, as well as invest and manage funds.

Investment banking includes revenue from a range of products providing CB clients with sophisticated capital-raising alternatives, as well as balance sheet and risk management tools through advisory, equity underwriting, and loan syndications. Revenue from Fixed Income and Equity Markets products used by CB clients is also included.

Other product revenue primarily includes tax-equivalent adjustments generated from Community Development Banking activities and certain income derived from principal transactions.

CB is divided into four primary client segments: Middle Market Banking, Corporate Client Banking, Commercial Term Lending, and Real Estate Banking.

Middle Market Banking covers corporate, municipal and nonprofit clients, with annual revenue generally ranging between \$20 million and \$500 million.

Corporate Client Banking covers clients with annual revenue generally ranging between \$500 million and \$2 billion and focuses on clients that have broader investment banking needs.

Commercial Term Lending primarily provides term financing to real estate investors/owners for multifamily properties as well as office, retail and industrial properties.

Real Estate Banking provides full-service banking to investors and developers of institutional-grade real estate investment properties.

Other primarily includes lending and investment-related activities within the Community Development Banking business.

Selected income statement data (continued)

Year ended December 31, (in millions, except ratios)	2017	2016	2015
Revenue by product			
Lending	\$ 4,094	\$ 3,795	\$ 3,429
Treasury services	3,444	2,797	2,581
Investment banking ^(a)	805	785	730
Other ^(b)	262	76	145
Total Commercial Banking net revenue	\$ 8,605	\$ 7,453	\$ 6,885
Investment banking revenue, gross ^(c)	\$ 2,327	\$ 2,286	\$ 2,179
Revenue by client segment			
Middle Market Banking ^(d)	\$ 3,341	\$ 2,848	\$ 2,685
Corporate Client Banking ^(d)	2,727	2,429	2,205
Commercial Term Lending	1,454	1,408	1,275
Real Estate Banking	604	456	358
Other ^(b)	479	312	362
Total Commercial Banking net revenue	\$ 8,605	\$ 7,453	\$ 6,885
Financial ratios			
Return on equity	17%	16%	15%
Overhead ratio	39	39	42

- (a) Includes total Firm revenue from investment banking products sold to CB clients, net of revenue sharing with the CIB.
- (b) The 2017 results reflect the impact of the enactment of the TCJA including a benefit of \$115 million on certain investments in the Community Development Banking business. For additional information related to the impact of the TCJA, see Note 24.
- (c) Represents total Firm revenue from investment banking products sold to CB clients.
- (d) Certain clients were transferred from Middle Market Banking to Corporate Client Banking in the second quarter of 2017. The prior period amounts have been revised to conform with the current period presentation.

Selected metrics

As of or for the year ended December 31, (in millions, except headcount)	2017	2016	2015
Selected balance sheet data (period-end)			
Total assets	\$ 221,228	\$ 214,341	\$ 200,700
Loans:			
Loans retained	202,400	188,261	167,374
Loans held-for-sale and loans at fair value	1,286	734	267
Total loans	\$ 203,686	\$ 188,995	\$ 167,641
Core loans	203,469	188,673	166,939
Equity	20,000	16,000	14,000
Period-end loans by client segment			
Middle Market Banking ^(a)	\$ 56,965	\$ 53,929	\$ 50,501
Corporate Client Banking ^(a)	46,963	43,027	37,709
Commercial Term Lending	74,901	71,249	62,860
Real Estate Banking	17,796	14,722	11,234
Other	7,061	6,068	5,337
Total Commercial Banking loans	\$ 203,686	\$ 188,995	\$ 167,641
Selected balance sheet data (average)			
Total assets	\$ 217,047	\$ 207,532	\$ 198,076
Loans:			
Loans retained	197,203	178,670	157,389
Loans held-for-sale and loans at fair value	909	723	492
Total loans	\$ 198,112	\$ 179,393	\$ 157,881
Core loans	197,846	178,875	156,975
Client deposits and other third-party liabilities	177,018	174,396	191,529
Equity	20,000	16,000	14,000
Average loans by client segment			
Middle Market Banking ^(a)	\$ 55,474	\$ 52,242	\$ 50,334
Corporate Client Banking ^(a)	46,037	41,756	34,497
Commercial Term Lending	73,428	66,700	58,138
Real Estate Banking	16,525	13,063	9,917
Other	6,648	5,632	4,995
Total Commercial Banking loans	\$ 198,112	\$ 179,393	\$ 157,881
Headcount	9,005	8,365	7,845

(a) Certain clients were transferred from Middle Market Banking to Corporate Client Banking in the second quarter of 2017. The prior period amounts have been revised to conform with the current period presentation.

Selected metrics

As of or for the year ended December 31, (in millions, except ratios)	2017	2016	2015
Credit data and quality statistics			
Net charge-offs/(recoveries)	\$ 39	\$ 163	\$ 21
Nonperforming assets			
Nonaccrual loans:			
Nonaccrual loans retained ^(a)	617	1,149	375
Nonaccrual loans held-for-sale and loans at fair value	—	—	18
Total nonaccrual loans	617	1,149	393
Assets acquired in loan satisfactions	3	1	8
Total nonperforming assets	620	1,150	401
Allowance for credit losses:			
Allowance for loan losses	2,558	2,925	2,855
Allowance for lending-related commitments	300	248	198
Total allowance for credit losses	2,858	3,173	3,053
Net charge-off/(recovery) rate ^(b)	0.02%	0.09%	0.01%
Allowance for loan losses to period-end loans retained	1.26	1.55	1.71
Allowance for loan losses to nonaccrual loans retained ^(a)	415	255	761
Nonaccrual loans to period-end total loans	0.30	0.61	0.23

(a) Allowance for loan losses of \$92 million, \$155 million and \$64 million was held against nonaccrual loans retained at December 31, 2017, 2016 and 2015, respectively.

(b) Loans held-for-sale and loans at fair value were excluded when calculating the net charge-off/(recovery) rate.

ASSET & WEALTH MANAGEMENT

Asset & Wealth Management, with client assets of \$2.8 trillion, is a global leader in investment and wealth management. AWM clients include institutions, high-net-worth individuals and retail investors in many major markets throughout the world. AWM offers investment management across most major asset classes including equities, fixed income, alternatives and money market funds. AWM also offers multi-asset investment management, providing solutions for a broad range of clients' investment needs. For Wealth Management clients, AWM also provides retirement products and services, brokerage and banking services including trusts and estates, loans, mortgages and deposits. The majority of AWM's client assets are in actively managed portfolios.

Selected income statement data

Year ended December 31, (in millions, except ratios and headcount)	2017	2016	2015
Revenue			
Asset management, administration and commissions	\$ 8,946	\$ 8,414	\$ 9,175
All other income	593	598	388
Noninterest revenue	9,539	9,012	9,563
Net interest income	3,379	3,033	2,556
Total net revenue	12,918	12,045	12,119
Provision for credit losses	39	26	4
Noninterest expense			
Compensation expense	5,318	5,065	5,113
Noncompensation expense	3,983	3,413	3,773
Total noninterest expense	9,301	8,478	8,886
Income before income tax expense	3,578	3,541	3,229
Income tax expense	1,241	1,290	1,294
Net income	\$ 2,337	\$ 2,251	\$ 1,935
Revenue by line of business			
Asset Management	\$ 6,340	\$ 5,970	\$ 6,301
Wealth Management	6,578	6,075	5,818
Total net revenue	\$12,918	\$12,045	\$12,119
Financial ratios			
Return on common equity	25%	24%	21%
Overhead ratio	72	70	73
Pre-tax margin ratio:			
Asset Management	25	31	31
Wealth Management	30	28	22
Asset & Wealth Management	28	29	27
Headcount	22,975	21,082	20,975
Number of Wealth Management client advisors	2,605	2,504	2,778

2017 compared with 2016

Net income was \$2.3 billion, an increase of 4% compared with the prior year, reflecting higher revenue and a tax benefit resulting from the vesting of employee share-based awards, offset by higher noninterest expense.

Net revenue was \$12.9 billion, an increase of 7%. Net interest income was \$3.4 billion, up 11%, driven by higher deposit spreads. Noninterest revenue was \$9.5 billion, up 6%, driven by higher market levels, partially offset by the absence of a gain in the prior year on the disposal of an asset.

Revenue from Asset Management was \$6.3 billion, up 6% from the prior year, driven by higher market levels, partially offset by the absence of a gain in prior year on the disposal of an asset. Revenue from Wealth Management was \$6.6 billion, up 8% from the prior year, reflecting higher net interest income from higher deposit spreads.

Noninterest expense was \$9.3 billion, an increase of 10%, predominantly driven by higher legal expense and compensation expense on higher revenue and headcount.

2016 compared with 2015

Net income was \$2.3 billion, a decrease of 16% compared with the prior year, reflecting lower noninterest expense, predominantly offset by lower net revenue.

Net revenue was \$12.0 billion, a decrease of 1%. Net interest income was \$3.0 billion, up 19%, driven by higher loan balances and spreads. Noninterest revenue was \$9.0 billion, a decrease of 6%, reflecting the impact of lower average equity market levels, a reduction in revenue related to the disposal of assets at the beginning of 2016, and lower performance fees and placement fees.

Revenue from Asset Management was \$6.0 billion, down 5% from the prior year, driven by a reduction in revenue related to the disposal of assets at the beginning of 2016, the impact of lower average equity market levels and lower performance fees. Revenue from Wealth Management was \$6.1 billion, up 4% from the prior year, reflecting higher net interest income from higher deposit and loan spreads and continued loan growth, partially offset by the impact of lower average equity market levels and lower placement fees.

Noninterest expense was \$8.5 billion, a decrease of 5%, predominantly due to a reduction in expense related to the disposal of assets at the beginning of 2016 and lower legal expense.

AWM's lines of business consist of the following:

Asset Management provides comprehensive global investment services, including asset management, pension analytics, asset-liability management and active risk-budgeting strategies.

Wealth Management offers investment advice and wealth management, including investment management, capital markets and risk management, tax and estate planning, banking, lending and and specialty-wealth advisory services.

AWM's client segments consist of the following:

Private Banking clients include high- and ultra-high-net-worth individuals, families, money managers, business owners and small corporations worldwide.

Institutional clients include both corporate and public institutions, endowments, foundations, nonprofit organizations and governments worldwide.

Retail clients include financial intermediaries and individual investors.

Asset Management has two high-level measures of its overall fund performance.

• **Percentage of mutual fund assets under management in funds rated 4- or 5-star:** Mutual fund rating services rank funds based on their risk-adjusted performance over various periods. A 5-star rating is the best rating and represents the top 10% of industry-wide ranked funds. A 4-star rating represents the next 22.5% of industry-wide ranked funds. A 3-star rating represents the next 35% of industry-wide ranked funds. A 2-star rating represents the next 22.5% of industry-wide ranked funds. A 1-star rating is the worst rating and represents the bottom 10% of industry-wide ranked funds. The "overall Morningstar rating" is derived from a weighted average of the performance associated with a fund's three-, five- and ten-year (if applicable) Morningstar Rating metrics. For U.S. domiciled funds, separate star ratings are given at the individual share class level. The Nomura "star rating" is based on three-year risk-adjusted performance only. Funds with fewer than three years of history are not rated and hence excluded from this analysis. All ratings, the assigned peer categories and the asset values used to derive this analysis are sourced from these fund rating providers mentioned in footnote (a). The data providers re-denominate the asset values into U.S. dollars. This % of AUM is based on star ratings at the share class level for U.S. domiciled funds, and at a "primary share class" level to represent the star rating of all other funds except for Japan where Nomura provides ratings at the fund level. The "primary share class", as defined by Morningstar, denotes the share class recommended as being the best proxy for the portfolio and in most cases will be the most retail version (based upon annual management charge, minimum investment, currency and other factors). The performance data could have been different if all funds/accounts would have been included. Past performance is not indicative of future results.

• **Percentage of mutual fund assets under management in funds ranked in the 1st or 2nd quartile (one, three and five years):** All quartile rankings, the assigned peer categories and the asset values used to derive this analysis are sourced from the fund ranking providers mentioned in footnote (c). Quartile rankings are done on the net-of-fee absolute return of each fund. The data providers re-denominate the asset values into U.S. dollars. This % of AUM is based on fund performance and associated peer rankings at the share class level for U.S. domiciled funds, at a "primary share class" level to represent the quartile ranking of the U.K., Luxembourg and Hong Kong funds and at the fund level for all other funds. The "primary share class", as defined by Morningstar, denotes the share class recommended as being the best proxy for the portfolio and in most cases will be the most retail version (based upon annual management charge, minimum investment, currency and other factors). Where peer group rankings given for a fund are in more than one "primary share class" territory both rankings are included to reflect local market competitiveness (applies to "Offshore Territories" and "HK SFC Authorized" funds only). The performance data could have been different if all funds/accounts would have been included. Past performance is not indicative of future results.

Selected metrics

As of or for the year ended December 31, (in millions, except ranking data and ratios)	2017	2016	2015
% of JPM mutual fund assets rated as 4- or 5-star ^{(a)(b)}	60%	63%	52%
% of JPM mutual fund assets ranked in 1 st or 2 nd quartile: ^(c)			
1 year	64	54	62
3 years	75	72	78
5 years ^(b)	83	79	79

Selected balance sheet data (period-end)

Total assets	\$ 151,909	\$ 138,384	\$ 131,451
Loans	130,640	118,039	111,007
Core loans	130,640	118,039	111,007
Deposits	146,407	161,577	146,766
Equity	9,000	9,000	9,000

Selected balance sheet data (average)

Total assets	\$ 144,206	\$ 132,875	\$ 129,743
Loans	123,464	112,876	107,418
Core loans	123,464	112,876	107,418
Deposits	148,982	153,334	149,525
Equity	9,000	9,000	9,000

Credit data and quality statistics

Net charge-offs	\$ 14	\$ 16	\$ 12
Nonaccrual loans	375	390	218
Allowance for credit losses:			
Allowance for loan losses	290	274	266
Allowance for lending- related commitments	10	4	5
Total allowance for credit losses	300	278	271
Net charge-off rate	0.01%	0.01%	0.01%
Allowance for loan losses to period-end loans	0.22	0.23	0.24
Allowance for loan losses to nonaccrual loans	77	70	122
Nonaccrual loans to period- end loans	0.29	0.33	0.20

- (a) Represents the "overall star rating" derived from Morningstar for the U.S., the U.K., Luxembourg, Hong Kong and Taiwan domiciled funds; and Nomura "star rating" for Japan domiciled funds. Includes only Asset Management retail open-ended mutual funds that have a rating. Excludes money market funds, Undiscovered Managers Fund, and Brazil domiciled funds.
- (b) The prior period amounts have been revised to conform with the current period presentation.
- (c) Quartile ranking sourced from: Lipper for the U.S. and Taiwan domiciled funds; Morningstar for the U.K., Luxembourg and Hong Kong domiciled funds; Nomura for Japan domiciled funds and Fund Doctor for South Korea domiciled funds. Includes only Asset Management retail open-ended mutual funds that are ranked by the aforementioned sources. Excludes money market funds, Undiscovered Managers Fund, and Brazil domiciled funds.

Management's discussion and analysis

Client assets

2017 compared with 2016

Client assets were \$2.8 trillion, an increase of 14% compared with the prior year. Assets under management were \$2.0 trillion, an increase of 15% from the prior year reflecting higher market levels, and net inflows into long-term and liquidity products.

2016 compared with 2015

Client assets were \$2.5 trillion, an increase of 4% compared with the prior year. Assets under management were \$1.8 trillion, an increase of 3% from the prior year reflecting inflows into both liquidity and long-term products and the effect of higher market levels, partially offset by asset sales at the beginning of 2016.

Client assets

December 31, (in billions)	2017	2016	2015
Assets by asset class			
Liquidity ^(a)	\$ 459	\$ 436	\$ 430
Fixed income ^(a)	474	420	376
Equity	428	351	353
Multi-asset and alternatives	673	564	564
Total assets under management	2,034	1,771	1,723
Custody/brokerage/ administration/deposits	755	682	627
Total client assets	\$ 2,789	\$ 2,453	\$ 2,350

Memo:

Alternatives client assets^(b) \$ 166 \$ 154 \$ 172

Assets by client segment

Private Banking	\$ 526	\$ 435	\$ 437
Institutional	968	869	816
Retail	540	467	470
Total assets under management	\$ 2,034	\$ 1,771	\$ 1,723
Private Banking	\$ 1,256	\$ 1,098	\$ 1,050
Institutional	990	886	824
Retail	543	469	476
Total client assets	\$ 2,789	\$ 2,453	\$ 2,350

(a) The prior period amounts have been revised to conform with the current period presentation.

(b) Represents assets under management, as well as client balances in brokerage accounts.

Client assets (continued)

Year ended December 31, (in billions)	2017	2016	2015
Assets under management rollforward			
Beginning balance	\$ 1,771	\$ 1,723	\$ 1,744
Net asset flows:			
Liquidity	9	24	—
Fixed income	36	30	(8)
Equity	(11)	(29)	1
Multi-asset and alternatives	43	22	22
Market/performance/other impacts	186	1	(36)
Ending balance, December 31	\$ 2,034	\$ 1,771	\$ 1,723

Client assets rollforward

Beginning balance	\$ 2,453	\$ 2,350	\$ 2,387
Net asset flows	93	63	27
Market/performance/other impacts	243	40	(64)
Ending balance, December 31	\$ 2,789	\$ 2,453	\$ 2,350

International metrics

Year ended December 31, (in billions, except where otherwise noted)	2017	2016	2015
Total net revenue (in millions)^(a)			
Europe/Middle East/Africa	\$ 2,021	\$ 1,849	\$ 1,946
Asia/Pacific	1,162	1,077	1,130
Latin America/Caribbean	844	726	795
Total international net revenue	4,027	3,652	3,871
North America	8,891	8,393	8,248
Total net revenue	\$ 12,918	\$ 12,045	\$ 12,119
Assets under management			
Europe/Middle East/Africa	\$ 384	\$ 309	\$ 302
Asia/Pacific	160	123	123
Latin America/Caribbean	61	45	45
Total international assets under management	605	477	470
North America	1,429	1,294	1,253
Total assets under management	\$ 2,034	\$ 1,771	\$ 1,723

Client assets

Europe/Middle East/Africa	\$ 441	\$ 359	\$ 351
Asia/Pacific	225	177	173
Latin America/Caribbean	154	114	110
Total international client assets	820	650	634
North America	1,969	1,803	1,716
Total client assets	\$ 2,789	\$ 2,453	\$ 2,350

(a) Regional revenue is based on the domicile of the client.

The Corporate segment consists of Treasury and Chief Investment Office and Other Corporate, which includes corporate staff units and expense that is centrally managed. Treasury and CIO is predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding and structural interest rate and foreign exchange risks, as well as executing the Firm's capital plan. The major Other Corporate units include Real Estate, Enterprise Technology, Legal, Finance, Human Resources, Internal Audit, Risk Management, Compliance, Oversight & Controls, Corporate Responsibility and various Other Corporate groups.

Selected income statement data

Year ended December 31, (in millions, except headcount)	2017	2016	2015
Revenue			
Principal transactions	\$ 284	\$ 210	\$ 41
Securities gains/(losses)	(66)	140	190
All other income/(loss) ^(a)	867	588	569
Noninterest revenue	1,085	938	800
Net interest income	55	(1,425)	(533)
Total net revenue^(b)	1,140	(487)	267
Provision for credit losses	—	(4)	(10)
Noninterest expense^(c)	501	462	977
Income/(loss) before income tax benefit	639	(945)	(700)
Income tax expense/(benefit)	2,282	(241)	(3,137)
Net income/(loss)	\$ (1,643)	\$ (704)	\$ 2,437
Total net revenue			
Treasury and CIO	566	(787)	(493)
Other Corporate	574	300	760
Total net revenue	\$ 1,140	\$ (487)	\$ 267
Net income/(loss)			
Treasury and CIO	60	(715)	(235)
Other Corporate	(1,703)	11	2,672
Total net income/(loss)	\$ (1,643)	\$ (704)	\$ 2,437
Total assets (period-end)	\$ 781,478	\$ 799,426	\$ 768,204
Loans (period-end)	1,653	1,592	2,187
Core loans ^(d)	1,653	1,589	2,182
Headcount	35,261	32,358	29,617

(a) Included revenue related to a legal settlement of \$645 million for the year ended December 31, 2017.

(b) Included tax-equivalent adjustments, predominantly due to tax-exempt income from municipal bond investments of \$905 million, \$885 million and \$839 million for the years ended December 31, 2017, 2016 and 2015, respectively.

(c) Included legal expense/(benefit) of \$(593) million, \$(385) million and \$832 million for the years ended December 31, 2017, 2016 and 2015, respectively.

(d) Average core loans were \$1.6 billion, \$1.9 billion and \$2.5 billion for the years ended December 31, 2017, 2016 and 2015, respectively.

2017 compared with 2016

Net loss was \$1.6 billion, compared with a net loss of \$704 million in the prior year. The current year net loss included a \$2.7 billion increase to income tax expense related to the impact of the TCJA.

Net revenue was \$1.1 billion, compared with a loss of \$487 million in the prior year. The increase in current year net revenue was driven by a \$645 million benefit from a legal settlement with the FDIC receivership for Washington Mutual and with Deutsche Bank as trustee of certain Washington Mutual trusts and by the net impact of higher interest rates.

Net interest income was \$55 million, compared with a loss of \$1.4 billion in the prior year. The gain in the current year was primarily driven by higher interest income on deposits with banks due to higher interest rates and balances, partially offset by higher interest expense on long-term debt primarily driven by higher interest rates.

2016 compared with 2015

Net loss was \$704 million, compared with net income of \$2.4 billion in the prior year.

Net revenue was a loss of \$487 million, compared with a gain of \$267 million in the prior year. The prior year included a \$514 million benefit from a legal settlement.

Net interest income was a loss of \$1.4 billion, compared with a loss of \$533 million in the prior year. The loss in the current year was primarily driven by higher interest expense on long-term debt and lower investment securities balances during the year, partially offset by higher interest income on deposits with banks and securities purchased under resale agreements as a result of higher interest rates.

Noninterest expense was \$462 million, a decrease of \$515 million from the prior year driven by lower legal expense, partially offset by higher compensation expense.

The prior year reflected tax benefits of \$2.6 billion predominantly from the resolution of various tax audits.

Management's discussion and analysis

Treasury and CIO overview

Treasury and CIO is predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding and structural interest rate and foreign exchange risks, as well as executing the Firm's capital plan. The risks managed by Treasury and CIO arise from the activities undertaken by the Firm's four major reportable business segments to serve their respective client bases, which generate both on- and off-balance sheet assets and liabilities.

Treasury and CIO seek to achieve the Firm's asset-liability management objectives generally by investing in high-quality securities that are managed for the longer-term as part of the Firm's investment securities portfolio. Treasury and CIO also use derivatives to meet the Firm's asset-liability management objectives. For further information on derivatives, see Note 5. The investment securities portfolio primarily consists of agency and nonagency mortgage-backed securities, U.S. and non-U.S. government securities, obligations of U.S. states and municipalities, other ABS and corporate debt securities. At December 31, 2017, the investment securities portfolio was \$248.0 billion, and the average credit rating of the securities comprising the portfolio was AA+ (based upon external ratings where available and where not available, based primarily upon internal ratings that correspond to ratings as defined by S&P and Moody's). See Note 10 for further information on the details of the Firm's investment securities portfolio. For further information on liquidity and funding risk, see Liquidity Risk Management on pages 92-97. For information on interest rate, foreign exchange and other risks, see Market Risk Management on pages 121-128.

Selected income statement and balance sheet data

As of or for the year ended December 31, (in millions)	2017	2016	2015
Securities gains/(losses)	\$ (78)	\$ 132	\$ 190
AFS investment securities (average)	219,345	226,892	264,758
HTM investment securities (average)	47,927	51,358	50,044
Investment securities portfolio (average)	267,272	278,250	314,802
AFS investment securities (period-end)	200,247	236,670	238,704
HTM investment securities (period-end)	47,733	50,168	49,073
Investment securities portfolio (period-end)	247,980	286,838	287,777

ENTERPRISE-WIDE RISK MANAGEMENT

Risk is an inherent part of JPMorgan Chase's business activities. When the Firm extends a consumer or wholesale loan, advises customers on their investment decisions, makes markets in securities, or offers other products or services, the Firm takes on some degree of risk. The Firm's overall objective is to manage its businesses, and the associated risks, in a manner that balances serving the interests of its clients, customers and investors and protects the safety and soundness of the Firm.

The Firm believes that effective risk management requires:

- Acceptance of responsibility, including identification and escalation of risk issues, by all individuals within the Firm;
- Ownership of risk identification, assessment, data and management within each of the lines of business and corporate functions; and
- Firmwide structures for risk governance.

The Firm strives for continual improvement through efforts to enhance controls, ongoing employee training and development, talent retention, and other measures. The Firm follows a disciplined and balanced compensation framework with strong internal governance and independent Board oversight. The impact of risk and control issues are carefully considered in the Firm's performance evaluation and incentive compensation processes.

Firmwide Risk Management is overseen and managed on an enterprise-wide basis. The Firm's approach to risk management involves understanding drivers of risks, risk types, and impacts of risks.

Drivers of risk include, but are not limited to, the economic environment, regulatory or government policy, competitor or market evolution, business decisions, process or judgment error, deliberate wrongdoing, dysfunctional markets, and natural disasters.

The Firm's risks are generally categorized in the following four risk types:

- Strategic risk is the risk associated with the Firm's current and future business plans and objectives, including capital risk, liquidity risk, and the impact to the Firm's reputation.
- Credit and investment risk is the risk associated with the default or change in credit profile of a client, counterparty or customer; or loss of principal or a reduction in expected returns on investments, including consumer credit risk, wholesale credit risk, and investment portfolio risk.
- Market risk is the risk associated with the effect of changes in market factors, such as interest and foreign exchange rates, equity and commodity prices, credit spreads or implied volatilities, on the value of assets and liabilities held for both the short and long term.
- Operational risk is the risk associated with inadequate or failed internal processes, people and systems, or from external events and includes compliance risk, conduct risk, legal risk, and estimations and model risk.

There may be many consequences of risks manifesting, including quantitative impacts such as reduction in earnings and capital, liquidity outflows, and fines or penalties, or qualitative impacts, such as reputation damage, loss of clients, and regulatory and enforcement actions.

Management's discussion and analysis

The Firm has established Firmwide risk management functions to manage different risk types. The scope of a particular risk management function may include multiple risk types. For example, the Firm's Country Risk Management function oversees country risk which may be a driver of risk or an aggregation of exposures that could give rise to multiple risk types such as credit or market risk. The following sections discuss how the Firm manages the key risks that are inherent in its business activities.

Risk Oversight	Definition	Page references
Strategic risk	The risk associated with the Firm's current and future business plans and objectives.	81
Capital risk	The risk that the Firm has an insufficient level and composition of capital to support the Firm's business activities and associated risks during normal economic environments and under stressed conditions.	82-91
Liquidity risk	The risk that the Firm will be unable to meet its contractual and contingent financial obligations as they arise or that it does not have the appropriate amount, composition and tenor of funding and liquidity to support its assets and liabilities.	92-97
Reputation risk	The potential that an action, inaction, transaction, investment or event will reduce trust in the Firm's integrity or competence by its various constituents, including clients, counterparties, investors, regulators, employees and the broader public.	98
Consumer credit risk	The risk associated with the default or change in credit profile of a customer.	102-107
Wholesale credit risk	The risk associated with the default or change in credit profile of a client or counterparty.	108-116
Investment portfolio risk	The risk associated with the loss of principal or a reduction in expected returns on investments arising from the investment securities portfolio held by Treasury and CIO in connection with the Firm's balance sheet or asset-liability management objectives or from principal investments managed in various lines of business in predominantly privately-held financial assets and instruments.	120
Market risk	The risk associated with the effect of changes in market factors, such as interest and foreign exchange rates, equity and commodity prices, credit spreads or implied volatilities, on the value of assets and liabilities held for both the short and long term.	121-128
Country risk	The framework for monitoring and assessing how financial, economic, political or other significant developments adversely affect the value of the Firm's exposures related to a particular country or set of countries.	129-130
Operational risk	The risk associated with inadequate or failed internal processes, people and systems, or from external events.	131-133
Compliance risk	The risk of failure to comply with applicable laws, rules, and regulations.	134
Conduct risk	The risk that any action or inaction by an employee of the Firm could lead to unfair client/customer outcomes, compromise the Firm's reputation, impact the integrity of the markets in which the Firm operates, or reflect poorly on the Firm's culture.	135
Legal risk	The risk of loss primarily caused by the actual or alleged failure to meet legal obligations that arise from the rule of law in jurisdictions in which the Firm operates, agreements with clients and customers, and products and services offered by the Firm.	136
Estimations and Model risk	The risk of the potential for adverse consequences from decisions based on incorrect or misused estimation outputs.	137

Governance and oversight

The Firm's overall appetite for risk is governed by a "Risk Appetite" framework. The framework and the Firm's risk appetite are set and approved by the Firm's Chief Executive Officer ("CEO"), Chief Financial Officer ("CFO") and Chief Risk Officer ("CRO"). LOB-level risk appetite is set by the respective LOB CEO, CFO and CRO and is approved by the Firm's CEO, CFO and CRO. Quantitative parameters and qualitative factors are used to monitor and measure the Firm's capacity to take risk consistent with its stated risk appetite. Quantitative parameters have been established to assess select strategic risks, credit risks and market risks. Qualitative factors have been established for select operational risks, and for reputation risks. Risk Appetite results are reported quarterly to the Board of Directors' Risk Policy Committee ("DRPC").

The Firm has an Independent Risk Management ("IRM") function, which consists of the Risk Management and Compliance organizations. The CEO appoints, subject to DRPC approval, the Firm's CRO to lead the IRM organization and manage the risk governance framework of the Firm. The framework is subject to approval by the DRPC in the form of the primary risk management policies. The Chief Compliance Officer ("CCO"), who reports to the CRO, is also responsible for reporting to the Audit Committee for the Global Compliance Program. The Firm's Global Compliance Program focuses on overseeing compliance with laws, rules and regulations applicable to the Firm's products and services to clients and counterparties.

The Firm places reliance on each of its LOBs and other functional areas giving rise to risk. Each LOB and other functional area giving rise to risk is expected to operate within the parameters identified by the IRM function, and within its own management-identified risk and control standards. The LOBs, inclusive of LOB aligned Operations, Technology and Oversight & Controls, are the "first line of defense" in identifying and managing the risk in their activities, including but not limited to applicable laws, rules and regulations.

The IRM function is independent of the businesses and forms "the second line of defense". The IRM function sets and oversees various standards for the risk governance framework, including risk policy, identification, measurement, assessment, testing, limit setting, monitoring and reporting, and conducts independent challenge of adherence to such standards.

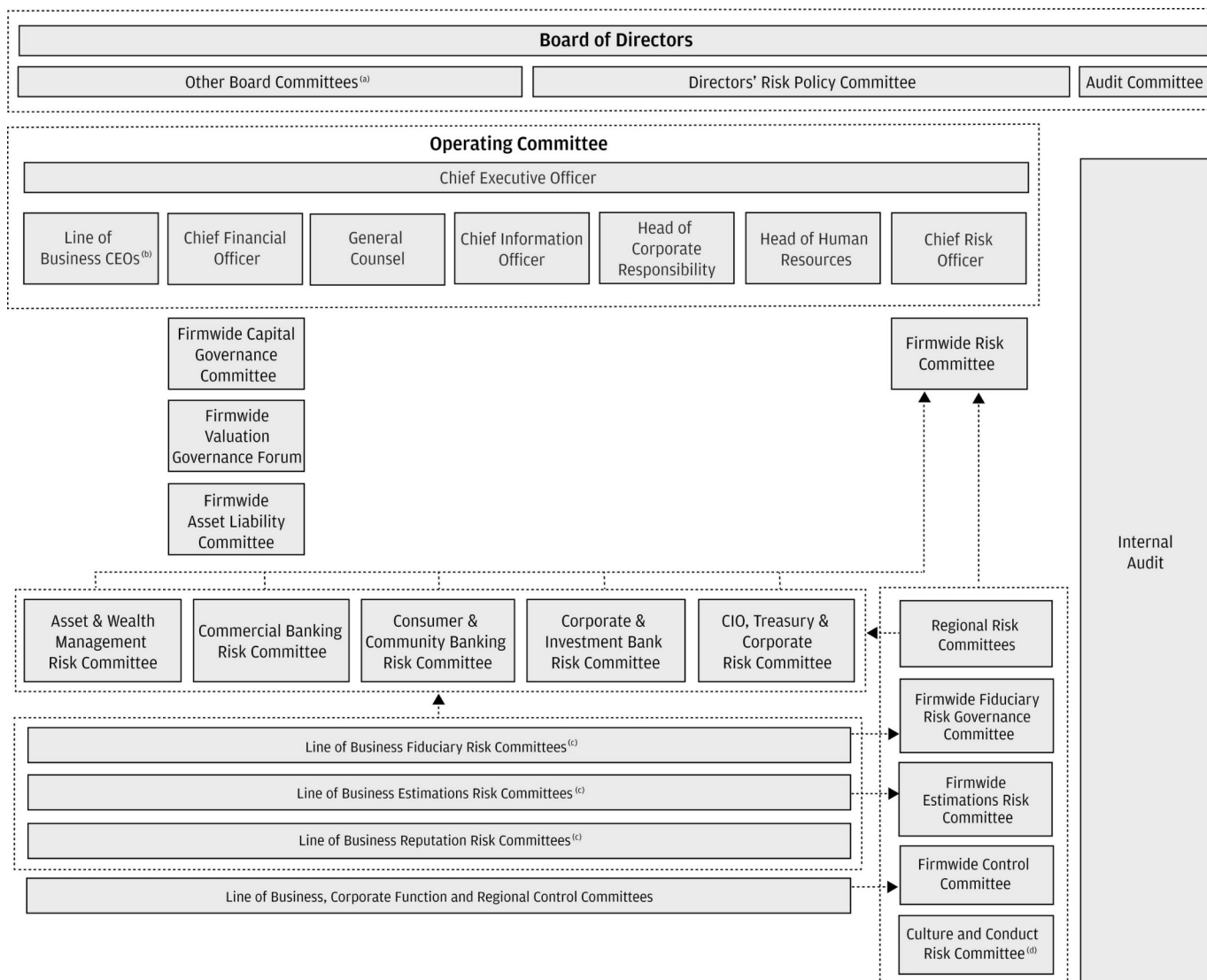
The Internal Audit function operates independently from other parts of the Firm and performs independent testing and evaluation of firmwide processes and controls across the entire enterprise as the Firm's "third line of defense" in managing risk. The Internal Audit Function is headed by the General Auditor, who reports to the Audit Committee.

In addition, there are other functions that contribute to the firmwide control environment including Finance, Human Resources, Legal, and Corporate Oversight & Control.

Management's discussion and analysis

The independent status of the IRM function is supported by a governance structure that provides for escalation of risk issues to senior management, the Firmwide Risk Committee, and the Board of Directors, as appropriate.

The chart below illustrates the Board of Directors and key senior management level committees in the Firm's risk governance structure. In addition, there are other committees, forums and paths of escalation that support the oversight of risk, not shown in the chart below.



(a) Other Board Committees include the Compensation & Management Development Committee, Corporate Governance & Nominating Committee and Public Responsibility Committee.

(b) The Line of Business CEOs for CIB and CCB are also the Firm's Co-Presidents and Co-Chief Operating Officers.

(c) As applicable.

(d) Each Board committee oversees conduct risk within the scope of its responsibilities.

The Firm's Operating Committee, which consists of the Firm's CEO, CRO, CFO and other senior executives, is the ultimate management escalation point in the Firm and may refer matters to the Firm's Board of Directors. The Operating Committee is accountable to the Firm's Board of Directors.

The Board of Directors provides oversight of risk principally through the DRPC, the Audit Committee and, with respect to compensation and other management-related matters, the Compensation & Management Development Committee. Each committee of the Board oversees reputation risk and conduct risk issues within its scope of responsibility.

The Directors' Risk Policy Committee of the Board oversees the Firm's global risk management framework and approves the primary risk management policies of the Firm. The Committee's responsibilities include oversight of management's exercise of its responsibility to assess and manage the Firm's risks, and its capital and liquidity planning and analysis. Breaches in risk appetite, liquidity issues that may have a material adverse impact on the Firm and other significant risk-related matters are escalated to the DRPC.

The Audit Committee of the Board assists the Board in its oversight of management's responsibilities to assure that there is an effective system of controls reasonably designed to safeguard the assets and income of the Firm, assure the integrity of the Firm's financial statements and maintain compliance with the Firm's ethical standards, policies, plans and procedures, and with laws and regulations. In addition, the Audit Committee assists the Board in its oversight of the Firm's independent registered public accounting firm's qualifications, independence and performance, and of the performance of the Firm's Internal Audit function.

The Compensation & Management Development Committee ("CMDC") assists the Board in its oversight of the Firm's compensation programs and reviews and approves the Firm's overall compensation philosophy, incentive compensation pools, and compensation practices consistent with key business objectives and safety and soundness. The CMDC reviews Operating Committee members' performance against their goals, and approves their compensation awards. The CMDC also periodically reviews the Firm's diversity programs and management development and succession planning, and provides oversight of the Firm's culture and conduct programs.

Among the Firm's senior management-level committees that are primarily responsible for key risk-related functions are:

The Firmwide Risk Committee ("FRC") is the Firm's highest management-level risk committee. It provides oversight of the risks inherent in the Firm's businesses. The FRC is co-chaired by the Firm's CEO and CRO. The FRC serves as an escalation point for risk topics and issues raised by its members, the Line of Business Risk Committees, Firmwide Control Committee, Firmwide Fiduciary Risk Governance Committee, Firmwide Estimations Risk Committee, Culture and Conduct Risk Committee and regional Risk Committees, as appropriate. The FRC escalates significant issues to the DRPC, as appropriate.

The Firmwide Control Committee ("FCC") provides a forum for senior management to review and discuss firmwide operational risks, including existing and emerging issues and operational risk metrics, and to review operational risk management execution in the context of the Operational Risk Management Framework ("ORMF"). The ORMF provides the framework for the governance, risk identification and assessment, measurement, monitoring and reporting of operational risk. The FCC is co-chaired by the Chief Control Officer and the Firmwide Risk Executive for Operational Risk Governance. The FCC relies on the prompt escalation of operational risk and control issues from businesses and functions as the primary owners of the operational risk. Operational risk and control issues may be escalated by business or function control committees to the FCC, which in turn, may escalate to the FRC, as appropriate.

The Firmwide Fiduciary Risk Governance Committee ("FFRGC") is a forum for risk matters related to the Firm's fiduciary activities. The FFRGC oversees the firmwide fiduciary risk governance framework, which supports the consistent identification and escalation of fiduciary risk issues by the relevant lines of business; approves risk or compliance policy exceptions requiring FFRGC approval; approves the scope and/or expansion of the Firm's fiduciary framework; and reviews metrics to track fiduciary activity and issue resolution Firmwide. The FFRGC is co-chaired by the Asset Management CEO and the Asset & Wealth Management CRO. The FFRGC escalates significant fiduciary issues to the FRC, the DRPC and the Audit Committee, as appropriate.

The Firmwide Estimations Risk Committee ("FERC") reviews and oversees governance and execution activities related to models and certain analytical and judgment based estimations, such as those used in risk management, budget forecasting and capital planning and analysis. The FERC is chaired by the Firmwide Risk Executive for Model Risk Governance and Review. The FERC serves as an escalation channel for relevant topics and issues raised by its members and the Line of Business Estimation Risk Committees. The FERC escalates significant issues to the FRC, as appropriate.

The Culture and Conduct Risk Committee ("CCRC") provides oversight of culture and conduct initiatives to develop a more holistic view of conduct risks and to connect key programs across the Firm to identify opportunities and emerging areas for focus. The CCRC is co-chaired by the Chief Culture & Conduct Officer and the Conduct Risk Compliance Executive. The CCRC escalates significant issues to the FRC, as appropriate.

Line of Business and Regional Risk Committees review the ways in which the particular line of business or the business operating in a particular region could be exposed to adverse outcomes with a focus on identifying, accepting, escalating and/or requiring remediation of matters brought to these committees. These committees may escalate to the FRC, as appropriate. LOB risk committees are co-chaired by the LOB CEO and the LOB CRO. Each LOB risk committee may create sub-committees with requirements for escalation. The regional committees are established similarly, as appropriate, for the region.

In addition, each line of business and function is required to have a Control Committee. These control committees oversee the control environment of their respective business or function. As part of that mandate, they are responsible for reviewing data which indicates the quality and stability of the processes in a business or function, reviewing key operational risk issues and focusing on processes with shortcomings and overseeing process remediation. These committees escalate issues to the FCC, as appropriate.

Management's discussion and analysis

The Firmwide Asset Liability Committee ("ALCO"), chaired by the Firm's Treasurer and Chief Investment Officer under the direction of the CFO, monitors the Firm's balance sheet, liquidity risk and structural interest rate risk. ALCO reviews the Firm's overall structural interest rate risk position, and the Firm's funding requirements and strategy. ALCO is responsible for reviewing and approving the Firm's Funds Transfer Pricing Policy (through which lines of business "transfer" interest rate risk and liquidity risk to Treasury and CIO), the Firm's Intercompany Funding and Liquidity Policy and the Firm's Contingency Funding Plan.

The Firmwide Capital Governance Committee, chaired by the Head of the Regulatory Capital Management Office, is responsible for reviewing the Firm's Capital Management Policy and the principles underlying capital issuance and distribution alternatives and decisions. The Committee oversees the capital adequacy assessment process, including the overall design, scenario development and macro assumptions, and ensures that capital stress test programs are designed to adequately capture the risks specific to the Firm's businesses.

The Firmwide Valuation Governance Forum ("VGF") is composed of senior finance and risk executives and is responsible for overseeing the management of risks arising from valuation activities conducted across the Firm. The VGF is chaired by the Firmwide head of the Valuation Control Group ("VCG") under the direction of the Firm's Controller, and includes sub-forums covering the Corporate & Investment Bank, Consumer & Community Banking, Commercial Banking, Asset & Wealth Management and certain corporate functions, including Treasury and CIO.

In addition, the JPMorgan Chase Bank, N.A. Board of Directors is responsible for the oversight of management of the Bank. The JPMorgan Chase Bank, N.A. Board accomplishes this function acting directly and through the principal standing committees of the Firm's Board of Directors. Risk and control oversight on behalf of JPMorgan Chase Bank N.A. is primarily the responsibility of the DRPC and the Audit Committee of the Firm's Board of Directors, respectively, and, with respect to compensation and other management-related matters, the Compensation & Management Development Committee of the Firm's Board of Directors.

Risk Identification

The Firm has a Risk Identification process in which the first line of defense identifies material risks inherent to the Firm, catalogs them in a central repository and reviews the most material risks on a regular basis. The second line of defense, at a firmwide level, establishes the risk identification framework, coordinates the process, maintains the central repository and reviews and challenges the first line's identification of risks.

STRATEGIC RISK MANAGEMENT

Strategic risk is the risk associated with the Firm's current and future business plans and objectives. Strategic risk includes the risk to current or anticipated earnings, capital, liquidity, enterprise value, or the Firm's reputation arising from adverse business decisions, poor implementation of business decisions, or lack of responsiveness to changes in the industry or external environment.

Overview

The Operating Committee and the senior leadership of each LOB are responsible for managing the Firm's most significant strategic risks. Strategic risks are overseen by IRM through participation in business reviews, LOB senior management committees, ongoing management of the Firm's risk appetite and limit framework, and other relevant governance forums. The Board of Directors oversees management's strategic decisions, and the DRPC oversees IRM and the Firm's risk management framework.

The Firm's strategic planning process, which includes the development and execution of strategic priorities and initiatives by the Operating Committee and the management teams of the lines of business, is an important process for managing the Firm's strategic risk. Guided by the Firm's How We Do Business ("HWDB") principles, the strategic priorities and initiatives are updated annually and include evaluating performance against prior year initiatives, assessment of the operating environment, refinement of existing strategies and development of new strategies.

These strategic priorities and initiatives are then incorporated in the Firm's budget, and are reviewed by the Board of Directors.

In the process of developing the strategic initiatives, line of business leadership identify the strategic risks associated with their strategic initiatives and those risks are incorporated into the Firmwide Risk Identification process and monitored and assessed as part of the Firmwide Risk Appetite framework. For further information on Risk Identification, see Enterprise-Wide Risk Management on page 75. For further information on the Risk Appetite framework see, Enterprise-Wide Risk Management on page 77.

The Firm's balance sheet strategy, which focuses on risk-adjusted returns, strong capital and robust liquidity, is key to management of strategic risk. For further information on capital risk, see Capital Risk Management on pages 82-91. For further information on liquidity risk see, Liquidity Risk Management on pages 92-97

For further information on reputation risk, see Reputation Risk Management on page 98.

Governance and oversight

The Firm's Operating Committee defines the most significant strategic priorities and initiatives, including those of the Firm, the LOBs and the Corporate functions, for the coming year and evaluates performance against the prior year. As part of the strategic planning process, IRM conducts a qualitative assessment of those significant initiatives to determine the impact on the risk profile of the Firm. The Firm's priorities, initiatives and IRM's assessment are provided to the Board for its review.

As part of its ongoing oversight and management of risk across the Firm, IRM is regularly engaged in significant discussions and decision-making across the Firm, including decisions to pursue new business opportunities or modify or exit existing businesses.

CAPITAL RISK MANAGEMENT

Capital risk is the risk the Firm has an insufficient level and composition of capital to support the Firm's business activities and associated risks during normal economic environments and under stressed conditions.

A strong capital position is essential to the Firm's business strategy and competitive position. Maintaining a strong balance sheet to manage through economic volatility is considered a strategic imperative of the Firm's Board of Directors, CEO and Operating Committee. The Firm's fortress balance sheet philosophy focuses on risk-adjusted returns, strong capital and robust liquidity. The Firm's capital risk management strategy focuses on maintaining long-term stability to enable it to build and invest in market-leading businesses, even in a highly stressed environment. Senior management considers the implications on the Firm's capital prior to making decisions that could impact future business activities. In addition to considering the Firm's earnings outlook, senior management evaluates all sources and uses of capital with a view to preserving the Firm's capital strength.

The Firm's capital risk management objectives are to hold capital sufficient to:

- Maintain "well-capitalized" status for the Firm and its insured depository institution ("IDI") subsidiaries;
- Support risks underlying business activities;
- Maintain sufficient capital in order to continue to build and invest in its businesses through the cycle and in stressed environments;
- Retain flexibility to take advantage of future investment opportunities;
- Serve as a source of strength to its subsidiaries;
- Meet capital distribution objectives; and
- Maintain sufficient capital resources to operate throughout a resolution period in accordance with the Firm's preferred resolution strategy.

These objectives are achieved through the establishment of minimum capital targets and a strong capital governance framework. Capital risk management is intended to be flexible in order to react to a range of potential events. The Firm's minimum capital targets are based on the most binding of three pillars: an internal assessment of the Firm's capital needs; an estimate of required capital under the CCAR and Dodd-Frank Act stress testing requirements; and Basel III Fully Phased-In regulatory minimums. Where necessary, each pillar may include a management-established buffer. The capital governance framework requires regular monitoring of the Firm's capital positions, stress testing and defining escalation protocols, both at the Firm and material legal entity levels.

The following tables present the Firm's Transitional and Fully Phased-In risk-based and leverage-based capital metrics under both the Basel III Standardized and Advanced Approaches. The Firm's Basel III ratios exceed both the Transitional and Fully Phased-In regulatory minimums as of December 31, 2017 and 2016. For further discussion of these capital metrics, including regulatory minimums, and the Standardized and Advanced Approaches, refer to Strategy and Governance on pages 84–88.

December 31, 2017 (in millions, except ratios)	Transitional			Fully Phased-In		
	Standardized	Advanced	Minimum capital ratios	Standardized	Advanced	Minimum capital ratios
Risk-based capital metrics:						
CET1 capital	\$ 183,300	\$ 183,300		\$ 183,244	\$ 183,244	
Tier 1 capital	208,644	208,644		208,564	208,564	
Total capital	238,395	227,933		237,960	227,498	
Risk-weighted assets	1,499,506	1,435,825		1,509,762	1,446,696	
CET1 capital ratio	12.2%	12.8%	7.5%	12.1%	12.7%	10.5%
Tier 1 capital ratio	13.9	14.5	9.0	13.8	14.4	12.0
Total capital ratio	15.9	15.9	11.0	15.8	15.7	14.0
Leverage-based capital metrics:						
Adjusted average assets ^(a)	\$ 2,514,270	\$ 2,514,270		\$ 2,514,822	\$ 2,514,822	
Tier 1 leverage ratio ^(b)	8.3%	8.3%	4.0%	8.3%	8.3%	4.0%
Total leverage exposure	NA	\$ 3,204,463		NA	\$ 3,205,015	
SLR ^(c)	NA	6.5%	NA	NA	6.5%	5.0% ^(e)

December 31, 2016 (in millions, except ratios)	Transitional			Fully Phased-In		
	Standardized	Advanced	Minimum capital ratios	Standardized	Advanced	Minimum capital ratios
Risk-based capital metrics:						
CET1 capital	\$ 182,967	\$ 182,967		\$ 181,734	\$ 181,734	
Tier 1 capital	208,112	208,112		207,474	207,474	
Total capital	239,553	228,592		237,487	226,526	
Risk-weighted assets	1,483,132 ^(d)	1,476,915		1,492,816 ^(d)	1,487,180	
CET1 capital ratio	12.3% ^(d)	12.4%	6.25%	12.2% ^(d)	12.2%	10.5%
Tier 1 capital ratio	14.0 ^(d)	14.1	7.75	13.9 ^(d)	14.0	12.0
Total capital ratio	16.2 ^(d)	15.5	9.75	15.9 ^(d)	15.2	14.0
Leverage-based capital metrics:						
Adjusted average assets ^(a)	\$ 2,484,631	\$ 2,484,631		\$ 2,485,480	\$ 2,485,480	
Tier 1 leverage ratio ^(b)	8.4%	8.4%	4.0%	8.3%	8.3%	4.0%
Total leverage exposure	NA	\$ 3,191,990		NA	\$ 3,192,839	
SLR ^(c)	NA	6.5%	NA	NA	6.5%	5.0% ^(e)

Note: As of December 31, 2017 and 2016, the lower of the Standardized or Advanced capital ratios under each of the Transitional and Fully Phased-In Approaches in the table above represents the Firm's Collins Floor, as discussed in Risk-based capital regulatory minimums on page 85.

- (a) Adjusted average assets, for purposes of calculating the Tier 1 leverage ratio, includes total quarterly average assets adjusted for unrealized gains/(losses) on available-for-sale ("AFS") securities, less deductions for goodwill and other intangible assets, defined benefit pension plan assets, and deferred tax assets related to tax attributes, including net operating losses ("NOLs").
- (b) The Tier 1 leverage ratio is calculated by dividing Tier 1 capital by adjusted total average assets.
- (c) The SLR leverage ratio is calculated by dividing Tier 1 capital by total leverage exposure. For additional information on total leverage exposure, see SLR on page 88.
- (d) The prior period amounts have been revised to conform with the current period presentation.
- (e) In the case of the SLR, the Fully Phased-In minimum ratio is effective January 1, 2018.

Management's discussion and analysis

Strategy and governance

The Firm's CEO, together with the Board of Directors and the Operating Committee, establishes principles and guidelines for capital planning, issuance, usage and distributions, and minimum capital targets for the level and composition of capital in business-as-usual and highly stressed environments. The DRPC reviews and approves the capital management and governance policy of the Firm. The Firm's Audit Committee is responsible for reviewing and approving the capital stress testing control framework.

The Capital Governance Committee and the Regulatory Capital Management Office ("RCMO") support the Firm's strategic capital decision-making. The Capital Governance Committee oversees the capital adequacy assessment process, including the overall design, scenario development and macro assumptions, and ensures that capital stress test programs are designed to adequately capture the risks specific to the Firm's businesses. RCMO, which reports to the Firm's CFO, is responsible for designing and monitoring the Firm's execution of its capital policies and strategies once approved by the Board, as well as reviewing and monitoring the execution of its capital adequacy assessment process. The Basel Independent Review function ("BIR"), which reports to the RCMO, conducts independent assessments of the Firm's regulatory capital framework to ensure compliance with the applicable U.S. Basel rules in support of senior management's responsibility for assessing and managing capital and for the DRPC's oversight of management in executing that responsibility. For additional discussion on the DRPC, see Enterprise-wide Risk Management on pages 75-137.

Monitoring and management of capital

In its monitoring and management of capital, the Firm takes into consideration an assessment of economic risk and all regulatory capital requirements to determine the level of capital needed to meet and maintain the objectives discussed above, as well as to support the framework for allocating capital to its business segments. While economic risk is considered prior to making decisions on future business activities, in most cases the Firm considers risk-based regulatory capital to be a proxy for economic risk capital.

Regulatory capital

The Federal Reserve establishes capital requirements, including well-capitalized standards, for the consolidated financial holding company. The OCC establishes similar minimum capital requirements for the Firm's national banks, including JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. The U.S. capital requirements generally follow the Capital Accord of the Basel Committee, as amended from time to time.

Basel III overview

Capital rules under Basel III establish minimum capital ratios and overall capital adequacy standards for large and internationally active U.S. bank holding companies ("BHC") and banks, including the Firm and its IDI subsidiaries. Basel III sets forth two comprehensive approaches for calculating RWA: a standardized approach ("Basel III Standardized"), and an advanced approach ("Basel III Advanced"). Certain of the requirements of Basel III are subject to phase-in periods that began on January 1, 2014 and continue through the end of 2018 ("transitional period").

Basel III establishes capital requirements for calculating credit risk RWA and market risk RWA, and in the case of Basel III Advanced, operational risk RWA. Key differences in the calculation of credit risk RWA between the Standardized and Advanced approaches are that for Basel III Advanced, credit risk RWA is based on risk-sensitive approaches which largely rely on the use of internal credit models and parameters, whereas for Basel III Standardized, credit risk RWA is generally based on supervisory risk-weightings which vary primarily by counterparty type and asset class. Market risk RWA is calculated on a generally consistent basis between Basel III Standardized and Basel III Advanced. In addition to the RWA calculated under these methodologies, the Firm may supplement such amounts to incorporate management judgment and feedback from its regulators.

Basel III also includes a requirement for Advanced Approach banking organizations, including the Firm, to calculate the SLR. For additional information on the SLR, see page 88.

On December 7, 2017, the Basel Committee issued the Basel III Reforms. Potential changes to the requirements for U.S. financial institutions are being considered by the U.S. banking regulators. For additional information on Basel III reforms, refer to Supervision & Regulation on pages 1-8.

Basel III Fully Phased-In

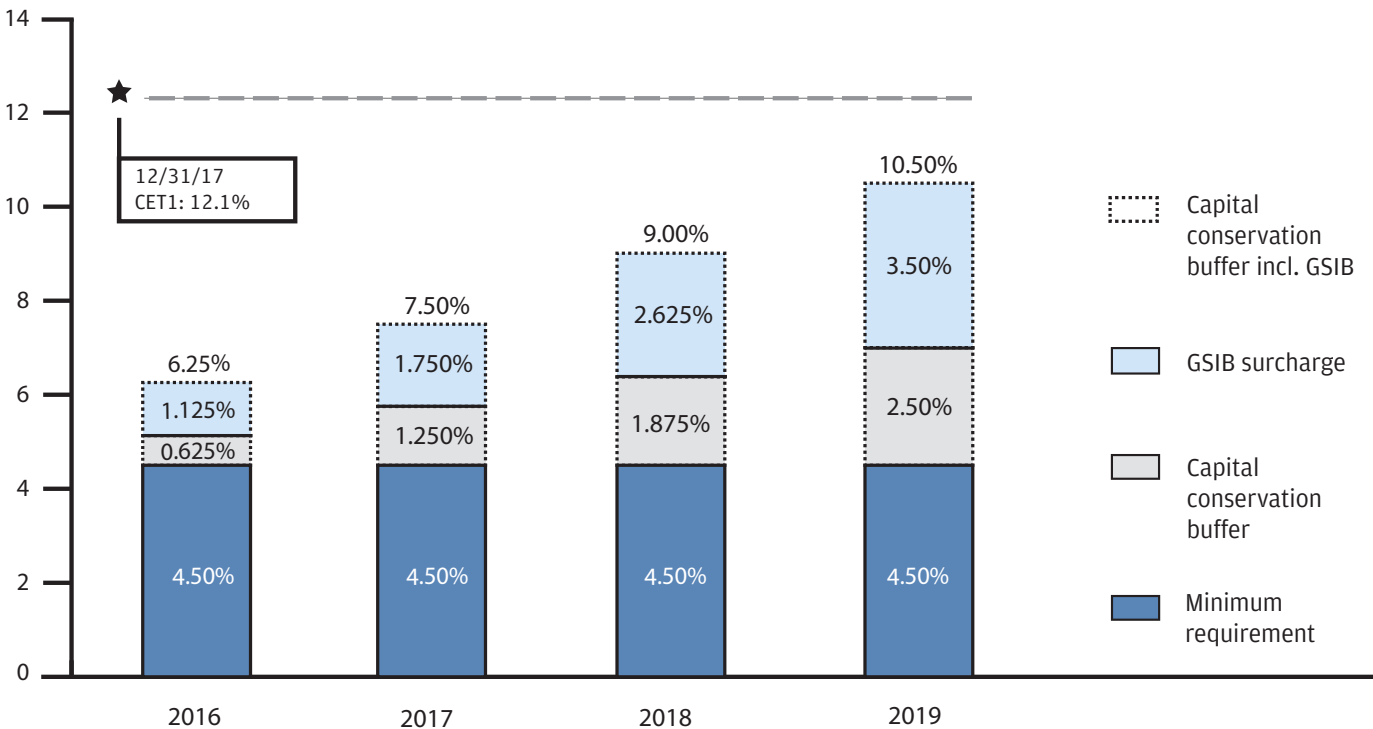
The Basel III transitional period will end on December 31, 2018, at which point the Firm will calculate its capital ratios under both the Basel III Standardized and Advanced Approaches on a Fully Phased-In basis. In the case of the SLR, the Fully Phased-In well-capitalized ratio is effective January 1, 2018. The Firm manages each of its lines of business, as well as the corporate functions, primarily on a Basel III Fully Phased-In basis.

For additional information on the Firm, JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A.'s capital, RWA and capital ratios under Basel III Standardized and Advanced Fully Phased-In rules and the SLR calculated under the Basel III Advanced Fully Phased-In rules, all of which are considered key regulatory capital measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 52-54.

The Basel III Standardized and Advanced Fully Phased-In capital, RWA and capital ratios, and SLRs for the Firm, JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. are based on the current published U.S. Basel III rules.

Risk-based capital regulatory minimums

The following chart presents the Basel III minimum CET1 capital ratio during the transitional periods and on a fully phased-in basis under the Basel III rules currently in effect.



The Basel III rules include minimum capital ratio requirements that are subject to phase-in periods through the end of 2018. The capital adequacy of the Firm and its IDI subsidiaries, both during the transitional period and upon full phase-in, is evaluated against the Basel III approach (Standardized or Advanced) which, for each quarter, results in the lower ratio as required by the Collins Amendment of the Dodd-Frank Act (the “Collins Floor”). The Basel III Standardized Fully Phased-In CET1 ratio is the Firm’s current binding constraint, and the Firm expects that this will remain its binding constraint for the foreseeable future.

Additional information regarding the Firm’s capital ratios, as well as the U.S. federal regulatory capital standards to which the Firm is subject, is presented in Note 26. For further information on the Firm’s Basel III measures, see the Firm’s Pillar 3 Regulatory Capital Disclosures reports, which are available on the Firm’s website (<http://investor.shareholder.com/jpmorganchase/basel.cfm>).

All banking institutions are currently required to have a minimum capital ratio of 4.5% of risk weighted assets. Certain banking organizations, including the Firm, are required to hold additional amounts of capital to serve as a “capital conservation buffer”. The capital conservation buffer is intended to be used to absorb potential losses in times of financial or economic stress. If not maintained, the Firm could be limited in the amount of capital that may be distributed, including dividends and common equity repurchases. The capital conservation buffer is subject to a

phase-in period that began January 1, 2016 and continues through the end of 2018.

As an expansion of the capital conservation buffer, the Firm is also required to hold additional levels of capital in the form of a GSIB surcharge and a countercyclical capital buffer.

Under the Federal Reserve’s final rule, the Firm is required to calculate its GSIB surcharge on an annual basis under two separately prescribed methods, and is subject to the higher of the two. The first (“Method 1”), reflects the GSIB surcharge as prescribed by the Basel Committee’s assessment methodology, and is calculated across five criteria: size, cross-jurisdictional activity, interconnectedness, complexity and substitutability. The second (“Method 2”), modifies the Method 1 requirements to include a measure of short-term wholesale funding in place of substitutability, and introduces a GSIB score “multiplication factor”. The following table represents the Firm’s GSIB surcharge.

	2017	2016
Fully Phased-In:		
Method 1	2.50%	2.50%
Method 2	3.50%	4.50%
Transitional ^(a)	1.75%	1.125%

(a) The GSIB surcharge is subject to transition provisions (in 25% increments) through the end of 2018.

Management's discussion and analysis

The Firm's effective GSIB surcharge for 2018 is anticipated to be 3.5%.

The countercyclical capital buffer takes into account the macro financial environment in which large, internationally active banks function. On September 8, 2016 the Federal Reserve published the framework that will apply to the setting of the countercyclical capital buffer. As of December 1, 2017, the Federal Reserve reaffirmed setting the U.S. countercyclical capital buffer at 0%, and stated that it will review the amount at least annually. The countercyclical capital buffer can be increased if the Federal Reserve, FDIC and OCC determine that credit growth in the economy has become excessive and can be set at up to an additional 2.5% of RWA subject to a 12-month implementation period.

The Firm believes that it will operate with a Basel III CET1 capital ratio between 11% and 12% over the medium term. It is the Firm's intention that its capital ratios will continue to meet regulatory minimums as they are fully phased in 2019 and thereafter.

In addition to meeting the capital ratio requirements of Basel III, the Firm also must maintain minimum capital and leverage ratios in order to be "well-capitalized." The following table represents the ratios that the Firm and its IDI subsidiaries must maintain in order to meet the definition of "well-capitalized" under the regulations issued by the Federal Reserve and the Prompt Corrective Action ("PCA") requirements of the FDIC Improvement Act ("FDICIA"), respectively.

	Well-capitalized ratios	
	BHC	IDI
Capital ratios		
CET1	—%	6.5%
Tier 1 capital	6.0	8.0
Total capital	10.0	10.0
Tier 1 leverage	—	5.0
SLR ^(a)	5.0	6.0

(a) In the case of the SLR, the Fully Phased-In well-capitalized ratio is effective January 1, 2018.

Capital

The following table presents reconciliations of total stockholders' equity to Basel III Fully Phased-In CET1 capital, Tier 1 capital and Basel III Advanced and Standardized Fully Phased-In Total capital as of December 31, 2017 and 2016. For additional information on the components of regulatory capital, see Note 26.

Capital components

(in millions)	December 31, 2017	December 31, 2016
Total stockholders' equity	\$ 255,693	\$ 254,190
Less: Preferred stock	26,068	26,068
Common stockholders' equity	229,625	228,122
Less:		
Goodwill	47,507	47,288
Other intangible assets	855	862
Add:		
Certain Deferred tax liabilities ^{(a)(b)}	2,204	3,230
Less: Other CET1 capital adjustments ^(b)	223	1,468
Standardized/Advanced Fully Phased-In CET1 capital	183,244	181,734
Preferred stock	26,068	26,068
Less:		
Other Tier 1 adjustments ^(c)	748	328
Standardized/Advanced Fully Phased-In Tier 1 capital	\$ 208,564	\$ 207,474
Long-term debt and other instruments qualifying as Tier 2 capital	\$ 14,827	\$ 15,253
Qualifying allowance for credit losses	14,672	14,854
Other	(103)	(94)
Standardized Fully Phased-In Tier 2 capital	\$ 29,396	\$ 30,013
Standardized Fully Phased-In Total capital	\$ 237,960	\$ 237,487
Adjustment in qualifying allowance for credit losses for Advanced Tier 2 capital	(10,462)	(10,961)
Advanced Fully Phased-In Tier 2 capital	\$ 18,934	\$ 19,052
Advanced Fully Phased-In Total capital	\$ 227,498	\$ 226,526

- (a) Represents deferred tax liabilities related to tax-deductible goodwill and identifiable intangibles created in nontaxable transactions, which are netted against goodwill and other intangibles when calculating TCE.
- (b) Includes the effect from the revaluation of the Firm's net deferred tax liability as a result of the enactment of the TCJA.
- (c) Includes the deduction associated with the permissible holdings of covered funds (as defined by the Volcker Rule). The deduction was not material as of December 31, 2017 and 2016.

The following table presents reconciliations of the Firm's Basel III Transitional CET1 capital to the Firm's Basel III Fully Phased-In CET1 capital as of December 31, 2017 and 2016.

(in millions)	December 31, 2017	December 31, 2016
Transitional CET1 capital	\$ 183,300	\$ 182,967
AOCI phase-in ^(a)	128	(156)
CET1 capital deduction phase-in ^(b)	(20)	(695)
Intangible assets deduction phase-in ^(c)	(160)	(312)
Other adjustments to CET1 capital ^(d)	(4)	(70)
Fully Phased-In CET1 capital	\$ 183,244	\$ 181,734

- (a) Includes the remaining balance of accumulated other comprehensive income ("AOCI") related to AFS debt securities and defined benefit pension and other postretirement employee benefit ("OPEB") plans that will qualify as Basel III CET1 capital upon full phase-in.
- (b) Predominantly includes regulatory adjustments related to changes in DVA, as well as CET1 deductions for defined benefit pension plan assets and deferred tax assets related to tax attributes, including NOLs.
- (c) Relates to intangible assets, other than goodwill and MSRs, that are required to be deducted from CET1 capital upon full phase-in.
- (d) Includes minority interest and the Firm's investments in its own CET1 capital instruments.

Capital rollforward

The following table presents the changes in Basel III Fully Phased-In CET1 capital, Tier 1 capital and Tier 2 capital for the year ended December 31, 2017.

Year Ended December 31, (in millions)	2017
Standardized/Advanced CET1 capital at December 31, 2016	\$ 181,734
Net income applicable to common equity ^(a)	22,778
Dividends declared on common stock	(7,542)
Net purchase of treasury stock	(13,741)
Changes in additional paid-in capital	(1,048)
Changes related to AOCI	536
Adjustment related to DVA ^(b)	468
Changes related to other CET1 capital adjustments ^(c)	59
Increase in Standardized/Advanced CET1 capital	1,510
Standardized/Advanced CET1 capital at December 31, 2017	\$ 183,244
Standardized/Advanced Tier 1 capital at December 31, 2016	\$ 207,474
Change in CET1 capital	1,510
Net issuance of noncumulative perpetual preferred stock	—
Other	(420)
Increase in Standardized/Advanced Tier 1 capital	1,090
Standardized/Advanced Tier 1 capital at December 31, 2017	\$ 208,564
Standardized Tier 2 capital at December 31, 2016	\$ 30,013
Change in long-term debt and other instruments qualifying as Tier 2	(426)
Change in qualifying allowance for credit losses	(182)
Other	(9)
Decrease in Standardized Tier 2 capital	(617)
Standardized Tier 2 capital at December 31, 2017	\$ 29,396
Standardized Total capital at December 31, 2017	\$ 237,960
Advanced Tier 2 capital at December 31, 2016	\$ 19,052
Change in long-term debt and other instruments qualifying as Tier 2	(426)
Change in qualifying allowance for credit losses	317
Other	(9)
Decrease in Advanced Tier 2 capital	(118)
Advanced Tier 2 capital at December 31, 2017	\$ 18,934
Advanced Total capital at December 31, 2017	\$ 227,498

- (a) Includes a \$2.4 billion decrease to net income as a result of the enactment of the TCJA. For additional information related to the impact of the TCJA, see Note 24.
- (b) Includes DVA related to structured notes recorded in AOCI.
- (c) Includes the effect from the revaluation of the Firm's net deferred tax liability as a result of the enactment of the TCJA.

Management's discussion and analysis

RWA rollforward

The following table presents changes in the components of RWA under Basel III Standardized and Advanced Fully Phased-In for the year ended December 31, 2017. The amounts in the rollforward categories are estimates, based on the predominant driver of the change.

Year ended December 31, 2017 (in millions)	Standardized			Advanced			
	Credit risk RWA	Market risk RWA	Total RWA	Credit risk RWA	Market risk RWA	Operational risk	Total RWA
December 31, 2016	\$ 1,365,137 ^(d)	\$ 127,679	\$ 1,492,816 ^(d)	\$ 959,523	\$ 127,657	\$ 400,000	\$ 1,487,180
Model & data changes ^(a)	(8,214)	1,739	(6,475)	(14,189)	1,739	—	(12,450)
Portfolio runoff ^(b)	(13,600)	—	(13,600)	(16,100)	—	—	(16,100)
Movement in portfolio levels ^(c)	42,737	(5,716)	37,021	(6,329)	(5,605)	—	(11,934)
Changes in RWA	20,923	(3,977)	16,946	(36,618)	(3,866)	—	(40,484)
December 31, 2017	\$ 1,386,060	\$ 123,702	\$ 1,509,762	\$ 922,905	\$ 123,791	\$ 400,000	\$ 1,446,696

- (a) Model & data changes refer to material movements in levels of RWA as a result of revised methodologies and/or treatment per regulatory guidance (exclusive of rule changes).
- (b) Portfolio runoff for credit risk RWA primarily reflects (under both the Standardized and Advanced approaches) reduced risk from position rollofs in legacy portfolios in Home Lending, the sale of the student loan portfolio during the second quarter of 2017, and the sale of reverse mortgages in CIB during the third quarter of 2017.
- (c) Movement in portfolio levels for credit risk RWA refers to changes primarily in book size, composition, credit quality, and market movements; and for market risk RWA refers to changes in position and market movements.
- (d) The prior period amounts have been revised to conform with the current period presentation.

Supplementary leverage ratio

The SLR is defined as Tier 1 capital under Basel III divided by the Firm's total leverage exposure. Total leverage exposure is calculated by taking the Firm's total average on-balance sheet assets, less amounts permitted to be deducted for Tier 1 capital, and adding certain off-balance sheet exposures, such as undrawn commitments and derivatives potential future exposure.

The following table presents the components of the Firm's Fully Phased-In SLR as of December 31, 2017 and 2016.

(in millions, except ratio)	December 31, 2017	December 31, 2016
Tier 1 capital	\$ 208,564	\$ 207,474
Total average assets	2,562,155	2,532,457
Less: Adjustments for deductions from Tier 1 capital	47,333	46,977
Total adjusted average assets ^(a)	2,514,822	2,485,480
Off-balance sheet exposures ^(b)	690,193	707,359
Total leverage exposure	\$ 3,205,015	\$ 3,192,839
SLR	6.5%	6.5%

- (a) Adjusted average assets, for purposes of calculating the SLR, includes total quarterly average assets adjusted for on-balance sheet assets that are subject to deduction from Tier 1 capital, predominantly goodwill and other intangible assets.
- (b) Off-balance sheet exposures are calculated as the average of the three month-end spot balances during the reporting quarter.

As of December 31, 2017, JPMorgan Chase Bank, N.A.'s and Chase Bank USA, N.A.'s Fully Phased-In SLRs are approximately 6.7% and 11.8%, respectively.

Line of business equity

Each business segment is allocated capital by taking into consideration stand-alone peer comparisons and regulatory capital requirements. For 2016, capital was allocated to each business segment for, among other things, goodwill and other intangibles associated with acquisitions effected by the line of business. ROE is measured and internal targets for expected returns are established as key measures of a business segment's performance.

On at least an annual basis, the Firm assesses the level of capital required for each line of business as well as the assumptions and methodologies used to allocate capital. Through the end of 2016, capital was allocated to the lines of business based on a single measure, Basel III Advanced Fully Phased-In RWA. Effective January 1, 2017, the Firm's methodology used to allocate capital to the Firm's business segments was updated. The new methodology incorporates Basel III Standardized Fully Phased-In RWA (as well as Basel III Advanced Fully Phased-In RWA), leverage, the GSIB surcharge, and a simulation of capital in a severe stress environment. The methodology will continue to be weighted towards Basel III Advanced Fully Phased-In RWA because the Firm believes it to be the best proxy for economic risk. The Firm will consider further changes to its capital allocation methodology as the regulatory framework evolves. In addition, under the new methodology, capital is no longer allocated to each line of business for goodwill and other intangibles associated with acquisitions effected by the line of business. The Firm will continue to establish internal ROE targets for its business segments, against which they will be measured, as a key performance indicator.

The table below reflects the Firm's assessed level of capital allocated to each line of business as of the dates indicated.

Line of business equity (Allocated capital)

(in billions)	January 1, 2018	December 31,	
		2017	2016
Consumer & Community Banking	\$ 51.0	\$ 51.0	\$ 51.0
Corporate & Investment Bank	70.0	70.0	64.0
Commercial Banking	20.0	20.0	16.0
Asset & Wealth Management	9.0	9.0	9.0
Corporate	79.6	79.6	88.1
Total common stockholders' equity	\$ 229.6	\$ 229.6	\$ 228.1

Planning and stress testing

Comprehensive Capital Analysis and Review

The Federal Reserve requires large bank holding companies, including the Firm, to submit a capital plan on an annual basis. The Federal Reserve uses the CCAR and Dodd-Frank Act stress test processes to ensure that large BHCs have sufficient capital during periods of economic and financial stress, and have robust, forward-looking capital assessment and planning processes in place that address each BHC's unique risks to enable it to absorb losses under certain stress scenarios. Through the CCAR, the Federal Reserve evaluates each BHC's capital adequacy and internal capital adequacy assessment processes ("ICAAP"), as well as its plans to make capital distributions, such as dividend payments or stock repurchases.

On June 28, 2017, the Federal Reserve informed the Firm that it did not object, on either a quantitative or qualitative basis, to the Firm's 2017 capital plan. For information on actions taken by the Firm's Board of Directors following the 2017 CCAR results, see Capital actions on pages 89-90.

The Firm's CCAR process is integrated into and employs the same methodologies utilized in the Firm's ICAAP process, as discussed below.

Internal Capital Adequacy Assessment Process

Semiannually, the Firm completes the ICAAP, which provides management with a view of the impact of severe and unexpected events on earnings, balance sheet positions, reserves and capital. The Firm's ICAAP integrates stress testing protocols with capital planning.

The process assesses the potential impact of alternative economic and business scenarios on the Firm's earnings and capital. Economic scenarios, and the parameters underlying those scenarios, are defined centrally and applied uniformly across the businesses. These scenarios are articulated in terms of macroeconomic factors, which are key drivers of business results; global market shocks, which generate short-term but severe trading losses; and idiosyncratic operational risk events. The scenarios are intended to capture and stress key vulnerabilities and idiosyncratic risks facing the Firm. However, when defining a broad range of scenarios, actual events can always be worse. Accordingly, management considers additional stresses outside these scenarios, as necessary. ICAAP results are reviewed by management and the Audit Committee.

Capital actions

Preferred stock

Preferred stock dividends declared were \$1.7 billion for the year ended December 31, 2017.

On October 20, 2017, the Firm issued \$1.3 billion of fixed-to-floating rate non-cumulative preferred stock, Series CC, with an initial dividend rate of 4.625%. On December 1, 2017, the Firm redeemed all \$1.3 billion of its outstanding 5.50% non-cumulative preferred stock, Series O.

For additional information on the Firm's preferred stock, see Note 20.

Trust preferred securities

On December 18, 2017, the Delaware trusts that issued seven series of outstanding trust preferred securities were liquidated, \$1.6 billion of trust preferred and \$56 million of common securities originally issued by those trusts were cancelled, and the junior subordinated debentures previously held by each trust issuer were distributed pro rata to the holders of the corresponding series of trust preferred and common securities.

The Firm redeemed \$1.6 billion of trust preferred securities in the year ended December 31, 2016.

Common stock dividends

The Firm's common stock dividend policy reflects JPMorgan Chase's earnings outlook, desired dividend payout ratio, capital objectives, and alternative investment opportunities.

On September 19, 2017, the Firm announced that its Board of Directors increased the quarterly common stock dividend to \$0.56 per share, effective with the dividend paid on October 31, 2017. The Firm's dividends are subject to the Board of Directors' approval on a quarterly basis.

For information regarding dividend restrictions, see Note 20 and Note 25.

Management's discussion and analysis

The following table shows the common dividend payout ratio based on net income applicable to common equity.

Year ended December 31,	2017	2016	2015
Common dividend payout ratio	33%	30%	28%

Common equity

During the year ended December 31, 2017, warrant holders exercised their right to purchase 9.9 million shares of the Firm's common stock. The Firm issued from treasury stock 5.4 million shares of its common stock as a result of these exercises. As of December 31, 2017, 15.0 million warrants remained outstanding, compared with 24.9 million outstanding as of December 31, 2016.

Effective June 28, 2017, the Firm's Board of Directors authorized the repurchase of up to \$19.4 billion of common equity (common stock and warrants) between July 1, 2017 and June 30, 2018, as part of its annual capital plan.

As of December 31, 2017, \$9.8 billion of authorized repurchase capacity remained under the common equity repurchase program.

The following table sets forth the Firm's repurchases of common equity for the years ended December 31, 2017, 2016 and 2015. There were no repurchases of warrants during the years ended December 31, 2017, 2016 and 2015.

Year ended December 31, (in millions)	2017	2016	2015
Total number of shares of common stock repurchased	166.6	140.4	89.8
Aggregate purchase price of common stock repurchases	\$15,410	\$ 9,082	\$ 5,616

The Firm may, from time to time, enter into written trading plans under Rule 10b5-1 of the Securities Exchange Act of 1934 to facilitate repurchases in accordance with the common equity repurchase program. A Rule 10b5-1 repurchase plan allows the Firm to repurchase its equity during periods when it would not otherwise be repurchasing common equity – for example, during internal trading blackout periods. All purchases under Rule 10b5-1 plans must be made according to predefined schedules established when the Firm is not aware of material nonpublic information.

The authorization to repurchase common equity will be utilized at management's discretion, and the timing of purchases and the exact amount of common equity that may be repurchased is subject to various factors, including market conditions; legal and regulatory considerations affecting the amount and timing of repurchase activity; the Firm's capital position (taking into account goodwill and intangibles); internal capital generation; and alternative investment opportunities. The repurchase program does not include specific price targets or timetables; may be executed through open market purchases or privately negotiated transactions, or utilizing Rule 10b5-1 plans; and may be suspended by management at any time.

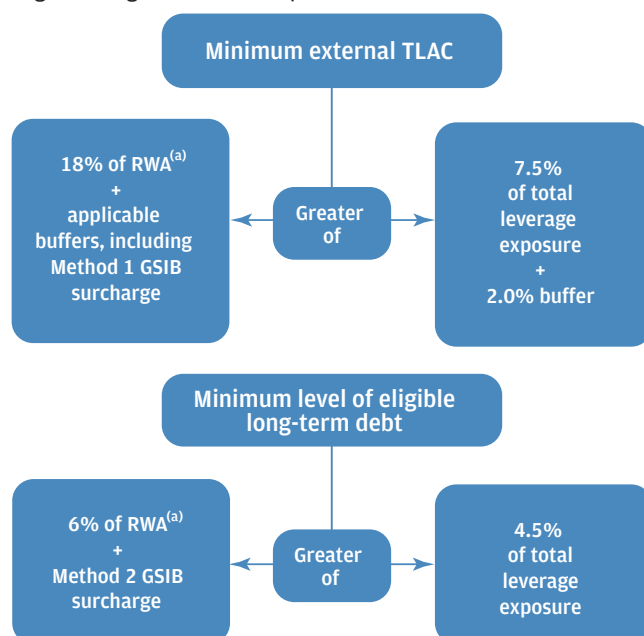
For additional information regarding repurchases of the Firm's equity securities, see Part II, Item 5: Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities on page 28.

Other capital requirements

TLAC

On December 15, 2016, the Federal Reserve issued its final TLAC rule which requires the top-tier holding companies of eight U.S. GSIB holding companies, including the Firm, to maintain minimum levels of external TLAC and external long-term debt that satisfies certain eligibility criteria ("eligible LTD"), effective January 1, 2019.

The minimum external TLAC and the minimum level of eligible long-term debt requirements are shown below:



(a) RWA is the greater of Standardized and Advanced.

The final TLAC rule permanently grandfathered all long-term debt issued before December 31, 2016, to the extent these securities would be ineligible because they contained impermissible acceleration rights or were governed by non-U.S. law. As of December 31, 2017, the Firm was compliant with the requirements under the current rule to which it will be subject on January 1, 2019.

Broker-dealer regulatory capital

JPMorgan Securities

JPMorgan Chase's principal U.S. broker-dealer subsidiary is JPMorgan Securities. JPMorgan Securities is subject to Rule 15c3-1 under the Securities Exchange Act of 1934 (the "Net Capital Rule"). JPMorgan Securities is also registered as a futures commission merchant and subject to Rule 1.17 of the CFTC.

JPMorgan Securities has elected to compute its minimum net capital requirements in accordance with the "Alternative Net Capital Requirements" of the Net Capital Rule.

In accordance with the market and credit risk standards of Appendix E of the Net Capital Rule, JPMorgan Securities is eligible to use the alternative method of computing net capital if, in addition to meeting its minimum net capital requirements, it maintains tentative net capital of at least \$1.0 billion and is also required to notify the SEC in the event that tentative net capital is less than \$5.0 billion. As of December 31, 2017, JPMorgan Securities had tentative net capital in excess of the minimum and notification requirements. The following table presents JPMorgan Securities' net capital information:

December 31, 2017 (in billions)	Net capital	
	Actual	Minimum
JPMorgan Securities	\$ 13.6	\$ 2.8

J.P. Morgan Securities plc

J.P. Morgan Securities plc is a wholly owned subsidiary of JPMorgan Chase Bank, N.A. and is the Firm's principal operating subsidiary in the U.K. It has authority to engage in banking, investment banking and broker-dealer activities.

J.P. Morgan Securities plc is jointly regulated by the U.K. PRA and the FCA. J.P. Morgan Securities plc is subject to the European Union Capital Requirements Regulation and the U.K. PRA capital rules, each of which implemented Basel III and thereby subject J.P. Morgan Securities plc to its requirements.

The following table presents J.P. Morgan Securities plc's capital information:

December 31, 2017 (in billions, except ratios)	Total capital	CET1 ratio		Total capital ratio	
	Estimated	Estimated	Minimum	Estimated	Minimum
J.P. Morgan Securities plc	\$ 39.6	15.9%	4.5%	15.9%	8.0%

LIQUIDITY RISK MANAGEMENT

Liquidity risk is the risk that the Firm will be unable to meet its contractual and contingent financial obligations as they arise or that it does not have the appropriate amount, composition and tenor of funding and liquidity to support its assets and liabilities.

Liquidity risk oversight

The Firm has a liquidity risk oversight function whose primary objective is to provide assessment, measurement, monitoring, and control of liquidity risk across the Firm. Liquidity risk oversight is managed through a dedicated firmwide Liquidity Risk Oversight group. The CIO, Treasury and Corporate ("CTC") CRO, who reports to the Firm's CRO, as part of the IRM function, is responsible for firmwide Liquidity Risk Oversight. Liquidity Risk Oversight's responsibilities include:

- Establishing and monitoring limits, indicators, and thresholds, including liquidity risk appetite tolerances;
- Monitoring internal firmwide and material legal entity liquidity stress tests, and monitoring and reporting regulatory defined liquidity stress testing;
- Approving or escalating for review liquidity stress assumptions;
- Monitoring liquidity positions, balance sheet variances and funding activities, and
- Conducting ad hoc analysis to identify potential emerging liquidity risks.

Liquidity management

Treasury and CIO is responsible for liquidity management. The primary objectives of effective liquidity management are to:

- Ensure that the Firm's core businesses and material legal entities are able to operate in support of client needs and meet contractual and contingent financial obligations through normal economic cycles as well as during stress events, and
- Manage an optimal funding mix and availability of liquidity sources.

The Firm manages liquidity and funding using a centralized, global approach across its entities, taking into consideration both their current liquidity profile and any potential changes over time, in order to optimize liquidity sources and uses.

In the context of the Firm's liquidity management, Treasury and CIO is responsible for:

- Analyzing and understanding the liquidity characteristics of the assets and liabilities of the Firm, lines of business and legal entities, taking into account legal, regulatory, and operational restrictions;
- Developing internal liquidity stress testing assumptions;
- Defining and monitoring firmwide and legal entity-specific liquidity strategies, policies, guidelines, reporting and contingency funding plans;

- Managing liquidity within the Firm's approved liquidity risk appetite tolerances and limits;
- Managing compliance with regulatory requirements related to funding and liquidity risk, and
- Setting transfer pricing in accordance with underlying liquidity characteristics of balance sheet assets and liabilities as well as certain off-balance sheet items.

Risk governance and measurement

Specific committees responsible for liquidity governance include the firmwide ALCO as well as line of business and regional ALCOs, and the CTC Risk Committee. In addition, the DRPC reviews and recommends to the Board of Directors, for formal approval, the Firm's liquidity risk tolerances, liquidity strategy, and liquidity policy at least annually. For further discussion of ALCO and other risk-related committees, see Enterprise-wide Risk Management on pages 75-137.

Internal stress testing

Liquidity stress tests are intended to ensure that the Firm has sufficient liquidity under a variety of adverse scenarios, including scenarios analyzed as part of the Firm's resolution and recovery planning. Stress scenarios are produced for JPMorgan Chase & Co. ("Parent Company") and the Firm's material legal entities on a regular basis, and ad hoc stress tests are performed, as needed, in response to specific market events or concerns. Liquidity stress tests assume all of the Firm's contractual financial obligations are met and take into consideration:

- Varying levels of access to unsecured and secured funding markets,
- Estimated non-contractual and contingent cash outflows, and
- Potential impediments to the availability and transferability of liquidity between jurisdictions and material legal entities such as regulatory, legal or other restrictions.

Liquidity outflow assumptions are modeled across a range of time horizons and currency dimensions and contemplate both market and idiosyncratic stresses.

Results of stress tests are considered in the formulation of the Firm's funding plan and assessment of its liquidity position. The Parent Company acts as a source of funding for the Firm through equity and long-term debt issuances, and the IHC provides funding support to the ongoing operations of the Parent Company and its subsidiaries, as necessary. The Firm maintains liquidity at the Parent Company and the IHC, in addition to liquidity held at the operating subsidiaries, at levels sufficient to comply with liquidity risk tolerances and minimum liquidity requirements, and to manage through periods of stress where access to normal funding sources is disrupted.

Contingency funding plan

The Firm's contingency funding plan ("CFP"), which is approved by the firmwide ALCO and the DRPC, is a compilation of procedures and action plans for managing liquidity through stress events. The CFP incorporates the limits and indicators set by the Liquidity Risk Oversight group. These limits and indicators are reviewed regularly to identify the emergence of risks or vulnerabilities in the Firm's liquidity position. The CFP identifies the alternative contingent funding and liquidity resources available to the Firm and its legal entities in a period of stress.

LCR and HQLA

The LCR rule requires the Firm to maintain an amount of unencumbered HQLA that is sufficient to meet its estimated total net cash outflows over a prospective 30 calendar-day period of significant stress. HQLA is the amount of liquid assets that qualify for inclusion in the LCR. HQLA primarily consist of unencumbered cash and certain high quality liquid securities as defined in the LCR rule.

Under the LCR rule, the amount of HQLA held by JPMorgan Chase Bank N.A. and Chase Bank USA, N.A. that are in excess of each entity's standalone 100% minimum LCR requirement, and that are not transferable to non-bank affiliates, must be excluded from the Firm's reported HQLA. Effective January 1, 2017, the LCR is required to be a minimum of 100%.

On December 19, 2016, the Federal Reserve published final LCR public disclosure requirements for certain BHCs and non-bank financial companies. Beginning with the second quarter of 2017, the Firm disclosed its average LCR for the quarter and the key quantitative components of the average LCR, along with a qualitative discussion of material drivers of the ratio, changes over time, and causes of such changes. The Firm will continue to make available its U.S. LCR Disclosure report on a quarterly basis on the Firm's website at: (<https://investor.shareholder.com/jpmorganchase/basel.cfm>)

The following table summarizes the Firm's average LCR for the three months ended December 31, 2017 based on the Firm's current interpretation of the finalized LCR framework.

Average amount (in millions)	Three months ended December 31, 2017	
HQLA		
Eligible cash ^(a)	\$	370,126
Eligible securities ^{(b)(c)}		189,955
Total HQLA^(d)	\$	560,081
Net cash outflows	\$	472,078
LCR		119%
Net excess HQLA^(d)	\$	88,003

(a) Represents cash on deposit at central banks, primarily Federal Reserve Banks.

(b) Predominantly U.S. Agency MBS, U.S. Treasuries, and sovereign bonds net of applicable haircuts under the LCR rules

(c) HQLA eligible securities may be reported in securities borrowed or purchased under resale agreements, trading assets, or securities on the Firm's Consolidated balance sheets.

(d) Excludes average excess HQLA at JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. that are not transferable to non-bank affiliates.

For the three months ended December 31, 2017, the Firm's average LCR was 119%, compared with an average of 120% for the three months ended September 30, 2017. The decrease in the ratio was largely attributable to a decrease in average HQLA, driven primarily by long-term debt maturities. The Firm's average LCR may fluctuate from period to period, due to changes in its HQLA and estimated net cash outflows under the LCR as a result of ongoing business activity. The Firm's HQLA are expected to be available to meet its liquidity needs in a time of stress.

Other liquidity sources

As of December 31, 2017, in addition to assets reported in the Firm's HQLA under the LCR rule, the Firm had approximately \$208 billion of unencumbered marketable securities, such as equity securities and fixed income debt securities, available to raise liquidity, if required. This includes HQLA-eligible securities included as part of the excess liquidity at JPMorgan Chase Bank, N.A. that are not transferable to non-bank affiliates.

As of December 31, 2017, the Firm also had approximately \$277 billion of available borrowing capacity at various Federal Home Loan Banks ("FHLBs"), discount windows at Federal Reserve Banks and various other central banks as a result of collateral pledged by the Firm to such banks. This borrowing capacity excludes the benefit of securities reported in the Firm's HQLA or other unencumbered securities that are currently pledged at Federal Reserve Bank discount windows. Although available, the Firm does not view the borrowing capacity at Federal Reserve Bank discount windows and the various other central banks as a primary source of liquidity.

NSFR

The net stable funding ratio ("NSFR") is intended to measure the adequacy of "available" and "required" amounts of stable funding over a one-year horizon. On April 26, 2016, the U.S. NSFR proposal was released for large banks and BHCs and was largely consistent with the Basel Committee's final standard.

While the final U.S. NSFR rule has yet to be released, as of December 31, 2017 the Firm estimates that it was compliant with the proposed 100% minimum NSFR based on its current understanding of the proposed rule.

Management's discussion and analysis

Funding

Sources of funds

Management believes that the Firm's unsecured and secured funding capacity is sufficient to meet its on- and off-balance sheet obligations.

The Firm funds its global balance sheet through diverse sources of funding including a stable deposit franchise as well as secured and unsecured funding in the capital markets. The Firm's loan portfolio is funded with a portion of the Firm's deposits, through securitizations and, with respect to a portion of the Firm's real estate-related loans, with secured borrowings from the FHLBs. Deposits in excess of the amount utilized to fund loans are primarily invested in the Firm's investment securities portfolio or deployed in cash or other short-term liquid investments based on their interest rate and liquidity risk characteristics. Securities

borrowed or purchased under resale agreements and trading assets-debt and equity instruments are primarily funded by the Firm's securities loaned or sold under agreements to repurchase, trading liabilities-debt and equity instruments, and a portion of the Firm's long-term debt and stockholders' equity. In addition to funding securities borrowed or purchased under resale agreements and trading assets-debt and equity instruments, proceeds from the Firm's debt and equity issuances are used to fund certain loans and other financial and non-financial assets, or may be invested in the Firm's investment securities portfolio. See the discussion below for additional information relating to Deposits, Short-term funding, and Long-term funding and issuance.

Deposits

The table below summarizes, by line of business, the period-end and average deposit balances as of and for the years ended December 31, 2017 and 2016.

Deposits As of or for the year ended December 31, (in millions)	Year ended December 31,			
			Average	
	2017	2016	2017	2016
Consumer & Community Banking	\$ 659,885	\$ 618,337	\$ 640,219	\$ 586,637
Corporate & Investment Bank	455,883	412,434	447,697	409,680
Commercial Banking	181,512	179,532	176,884	172,835
Asset & Wealth Management	146,407	161,577	148,982	153,334
Corporate	295	3,299	3,604	5,482
Total Firm	\$ 1,443,982	\$ 1,375,179	\$ 1,417,386	\$ 1,327,968

A key strength of the Firm is its diversified deposit franchise, through each of its lines of business, which provides a stable source of funding and limits reliance on the wholesale funding markets. A significant portion of the Firm's deposits are consumer and wholesale operating deposits, which are both considered to be stable sources of liquidity. Wholesale operating deposits are considered to be stable sources of liquidity because they are generated from customers that maintain operating service relationships with the Firm.

The table below shows the loan and deposit balances, the loans-to-deposits ratios, and deposits as a percentage of total liabilities, as of December 31, 2017 and 2016.

As of December 31, (in billions except ratios)	2017	2016
Deposits	\$ 1,444.0	\$ 1,375.2
Deposits as a % of total liabilities	63%	61%
Loans	930.7	894.8
Loans-to-deposits ratio	64%	65%

Deposits increased due to both higher consumer and wholesale deposits. The higher consumer deposits reflect the continuation of strong growth from new and existing customers, and low attrition rates. The higher wholesale deposits largely were driven by growth in client cash management activity in CIB's Securities Services business, partially offset by lower balances in AWM reflecting balance migration predominantly into the Firm's investment-related products.

The Firm believes average deposit balances are generally more representative of deposit trends than period-end deposit balances. The increase in average deposits for the year ended December 31, 2017 compared with the year ended December 31, 2016, was driven by an increase in both consumer and wholesale deposits. For further discussions of deposit and liability balance trends, see the discussion of the Firm's business segments results and the Consolidated Balance Sheet Analysis on pages 55-74 and pages 47-48, respectively.

The following table summarizes short-term and long-term funding, excluding deposits, as of December 31, 2017 and 2016, and average balances for the years ended December 31, 2017 and 2016. For additional information, see the Consolidated Balance Sheets Analysis on pages 47-48 and Note 19.

Sources of funds (excluding deposits)

As of or for the year ended December 31, (in millions)			Average	
	2017	2016	2017	2016
Commercial paper	\$ 24,186	\$ 11,738	\$ 19,920	\$ 15,001
Other borrowed funds	27,616	22,705	26,612	21,139
Total short-term borrowings	\$ 51,802	\$ 34,443	\$ 46,532	\$ 36,140
Obligations of Firm-administered multi-seller conduits^(a)	\$ 3,045	\$ 2,719	\$ 3,206	\$ 5,153
Securities loaned or sold under agreements to repurchase:				
Securities sold under agreements to repurchase ^(b)	\$ 146,432	\$ 149,826	\$ 171,973	\$ 160,458
Securities loaned ^(c)	7,910	12,137	11,526	13,195
Total securities loaned or sold under agreements to repurchase^(d)	\$ 154,342	\$ 161,963	\$ 183,499	\$ 173,653
Senior notes	\$ 155,852	\$ 151,042	\$ 154,352	\$ 153,768
Trust preferred securities ^(e)	690	2,345	2,276	3,724
Subordinated debt ^(e)	16,553	21,940	18,832	24,224
Structured notes	45,727	37,292	42,918	35,978
Total long-term unsecured funding	\$ 218,822	\$ 212,619	\$ 218,378	\$ 217,694
Credit card securitization ^(a)	\$ 21,278	\$ 31,181	\$ 25,933	\$ 29,428
Other securitizations ^{(a)(f)}	—	1,527	626	1,669
FHLB advances	60,617	79,519	69,916	73,260
Other long-term secured funding ^(g)	4,641	3,107	3,195	4,619
Total long-term secured funding	\$ 86,536	\$ 115,334	\$ 99,670	\$ 108,976
Preferred stock^(h)	\$ 26,068	\$ 26,068	26,212	\$ 26,068
Common stockholders' equity^(h)	\$ 229,625	\$ 228,122	230,350	\$ 224,631

(a) Included in beneficial interest issued by consolidated variable interest entities on the Firm's Consolidated balance sheets.

(b) Excludes long-term structured repurchase agreements of \$1.3 billion and \$1.8 billion as of December 31, 2017 and 2016, respectively, and average balances of \$1.5 billion and \$2.9 billion for the years ended December 31, 2017 and 2016, respectively.

(c) Excludes long-term securities loaned of \$1.3 billion and \$1.2 billion as of December 31, 2017 and 2016, respectively, and average balances of \$1.3 billion for both the years ended December 31, 2017 and 2016.

(d) Excludes federal funds purchased.

(e) Subordinated debt includes \$1.6 billion of junior subordinated debentures distributed pro rata to the holders of the \$1.6 billion of trust preferred securities which were cancelled on December 18, 2017. For further information see Note 19.

(f) Other securitizations includes securitizations of student loans. The Firm deconsolidated the student loan securitization entities in the second quarter of 2017 as it no longer had a controlling financial interest in these entities as a result of the sale of the student loan portfolio. The Firm's wholesale businesses also securitize loans for client-driven transactions, which are not considered to be a source of funding for the Firm and are not included in the table.

(g) Includes long-term structured notes which are secured.

(h) For additional information on preferred stock and common stockholders' equity see Capital Risk Management on pages 82-91, Consolidated statements of changes in stockholders' equity, Note 20 and Note 21.

Short-term funding

The Firm's sources of short-term secured funding primarily consist of securities loaned or sold under agreements to repurchase. These instruments are secured predominantly by high-quality securities collateral, including government-issued debt and agency MBS, and constitute a significant portion of the federal funds purchased and securities loaned or sold under repurchase agreements on the Consolidated balance sheets. The increase in the average balance of securities loaned or sold under agreements to repurchase for the year ended December 31, 2017, compared to December 31, 2016, was largely due to client activities in CIB. The balances associated with securities loaned or sold under agreements to repurchase fluctuate over time due to customers' investment and financing activities; the Firm's demand for financing; the ongoing management of the mix of the Firm's liabilities, including its secured and unsecured financing (for both the investment

securities and market-making portfolios); and other market and portfolio factors.

The Firm's sources of short-term unsecured funding primarily consist of issuances of wholesale commercial paper. The increase in short-term unsecured funding was primarily due to higher issuance of commercial paper reflecting in part a change in the mix of funding from securities sold under repurchase agreements for CIB Markets activities.

Long-term funding and issuance

Long-term funding provides additional sources of stable funding and liquidity for the Firm. The Firm's long-term funding plan is driven primarily by expected client activity, liquidity considerations, and regulatory requirements, including TLAC. Long-term funding objectives include maintaining diversification, maximizing market access and

Management's discussion and analysis

optimizing funding costs. The Firm evaluates various funding markets, tenors and currencies in creating its optimal long-term funding plan.

The significant majority of the Firm's long-term unsecured funding is issued by the Parent Company to provide maximum flexibility in support of both bank and non-bank subsidiary funding needs. The Parent Company advances substantially all net funding proceeds to its subsidiary, the IHC. The IHC does not issue debt to external counterparties. The following table summarizes long-term unsecured issuance and maturities or redemptions for the years ended December 31, 2017 and 2016. For additional information, see Note 19.

Long-term unsecured funding

Year ended December 31, (in millions)	2017	2016
Issuance		
Senior notes issued in the U.S. market	\$ 21,192	\$ 25,639
Senior notes issued in non-U.S. markets	2,210	7,063
Total senior notes	23,402	32,702
Subordinated debt	—	1,093
Structured notes	29,040	22,865
Total long-term unsecured funding - issuance	\$ 52,442	\$ 56,660
Maturities/redemptions		
Senior notes	\$ 22,337	\$ 29,989
Trust preferred securities	—	1,630
Subordinated debt	6,901	3,596
Structured notes	22,581	15,925
Total long-term unsecured funding - maturities/redemptions	\$ 51,819	\$ 51,140

The Firm raises secured long-term funding through securitization of consumer credit card loans and advances from the FHLBs.

The following table summarizes the securitization issuance and FHLB advances and their respective maturities or redemption for the years ended December 31, 2017 and 2016.

Long-term secured funding

Year ended December 31,	Issuance		Maturities/Redemptions	
(in millions)	2017	2016	2017	2016
Credit card securitization	\$ 1,545	\$ 8,277	\$ 11,470	\$ 5,025
Other securitizations ^(a)	—	—	55	233
FHLB advances	—	17,150	18,900	9,209
Other long-term secured funding ^(b)	2,354	455	731	2,645
Total long-term secured funding	\$ 3,899	\$ 25,882	\$ 31,156	\$ 17,112

(a) Other securitizations includes securitizations of student loans. The Firm deconsolidated the student loan securitization entities in the second quarter of 2017 as it no longer had a controlling financial interest in these entities as a result of the sale of the student loan portfolio.

(b) Includes long-term structured notes which are secured.

The Firm's wholesale businesses also securitize loans for client-driven transactions; those client-driven loan securitizations are not considered to be a source of funding for the Firm and are not included in the table above. For further description of the client-driven loan securitizations, see Note 14.

Credit ratings

The cost and availability of financing are influenced by credit ratings. Reductions in these ratings could have an adverse effect on the Firm's access to liquidity sources, increase the cost of funds, trigger additional collateral or funding requirements and decrease the number of investors and counterparties willing to lend to the Firm. Additionally, the Firm's funding requirements for VIEs and other third-

party commitments may be adversely affected by a decline in credit ratings. For additional information on the impact of a credit ratings downgrade on the funding requirements for VIEs, and on derivatives and collateral agreements, see SPEs on page 50, and credit risk, liquidity risk and credit-related contingent features in Note 5 on page 186.

The credit ratings of the Parent Company and the Firm's principal bank and non-bank subsidiaries as of December 31, 2017, were as follows.

December 31, 2017	JPMorgan Chase & Co.			JPMorgan Chase Bank, N.A. Chase Bank USA, N.A.			J.P. Morgan Securities LLC J.P. Morgan Securities plc		
	Long-term issuer	Short-term issuer	Outlook	Long-term issuer	Short-term issuer	Outlook	Long-term issuer	Short-term issuer	Outlook
Moody's Investors Service	A3	P-2	Stable	Aa3	P-1	Stable	A1	P-1	Stable
Standard & Poor's	A-	A-2	Stable	A+	A-1	Stable	A+	A-1	Stable
Fitch Ratings	A+	F1	Stable	AA-	F1+	Stable	AA-	F1+	Stable

On February 22, 2017, Moody's published its updated rating methodologies for securities firms. As a result of this methodology change, J.P. Morgan Securities LLC's long-term issuer rating was downgraded by one notch from Aa3 to A1; the short-term issuer rating was unchanged and the outlook remained stable.

On June 1, 2017, JPMorgan Chase Bank, N.A. terminated its guarantee of the payment of all obligations of J.P. Morgan Securities plc arising after such termination. J.P. Morgan Securities plc, whose credit ratings previously reflected the benefit of this guarantee, is now rated on a stand-alone, non-guaranteed basis.

Downgrades of the Firm's long-term ratings by one or two notches could result in an increase in its cost of funds, and access to certain funding markets could be reduced as noted above. The nature and magnitude of the impact of ratings downgrades depends on numerous contractual and behavioral factors which the Firm believes are incorporated in its liquidity risk and stress testing metrics. The Firm believes that it maintains sufficient liquidity to withstand a

potential decrease in funding capacity due to ratings downgrades.

JPMorgan Chase's unsecured debt does not contain requirements that would call for an acceleration of payments, maturities or changes in the structure of the existing debt, provide any limitations on future borrowings or require additional collateral, based on unfavorable changes in the Firm's credit ratings, financial ratios, earnings, or stock price.

Critical factors in maintaining high credit ratings include a stable and diverse earnings stream, strong capital ratios, strong credit quality and risk management controls, diverse funding sources, and disciplined liquidity monitoring procedures. Rating agencies continue to evaluate economic and geopolitical trends, regulatory developments, future profitability, risk management practices, and litigation matters, as well as their broader ratings methodologies. Changes in any of these factors could lead to changes in the Firm's credit ratings.

REPUTATION RISK MANAGEMENT

Reputation risk is the potential that an action, inaction, transaction, investment or event will reduce trust in the Firm's integrity or competence by its various constituents, including clients, counterparties, investors, regulators, employees and the broader public. Maintaining the Firm's reputation is the responsibility of each individual employee of the Firm. The Firm's Reputation Risk Governance policy explicitly vests each employee with the responsibility to consider the reputation of the Firm when engaging in any activity. Because the types of events that could harm the Firm's reputation are so varied across the Firm's lines of business, each line of business has a separate reputation risk governance infrastructure in place, which consists of

three key elements: clear, documented escalation criteria appropriate to the business; a designated primary discussion forum – in most cases, one or more dedicated reputation risk committees; and a list of designated contacts to whom questions relating to reputation risk should be referred. Any matter giving rise to reputation risk that originates in a corporate function is required to be escalated directly to Firmwide Reputation Risk Governance ("FRRG") or to the relevant Risk Committee. Reputation risk governance is overseen by FRRG, which provides oversight of the governance infrastructure and process to support the consistent identification, escalation, management and monitoring of reputation risk issues firmwide.

CREDIT AND INVESTMENT RISK MANAGEMENT

Credit and investment risk is the risk associated with the default or change in credit profile of a client, counterparty or customer; or loss of principal or a reduction in expected returns on investments.

Credit risk management

Credit risk is the risk associated with the default or change in credit profile of a client, counterparty or customer. The Firm provides credit to a variety of customers, ranging from large corporate and institutional clients to individual consumers and small businesses. In its consumer businesses, the Firm is exposed to credit risk primarily through its home lending, credit card, auto, and business banking businesses. In its wholesale businesses, the Firm is exposed to credit risk through its underwriting, lending, market-making, and hedging activities with and for clients and counterparties, as well as through its operating services activities (such as cash management and clearing activities), securities financing activities, investment securities portfolio, and cash placed with banks.

Credit risk management is an independent risk management function that monitors, measures and manages credit risk throughout the Firm and defines credit risk policies and procedures. The credit risk function reports to the Firm's CRO. The Firm's credit risk management governance includes the following activities:

- Establishing a comprehensive credit risk policy framework
- Monitoring, measuring and managing credit risk across all portfolio segments, including transaction and exposure approval
- Setting industry concentration limits and establishing underwriting guidelines
- Assigning and managing credit authorities in connection with the approval of all credit exposure
- Managing criticized exposures and delinquent loans
- Estimating credit losses and ensuring appropriate credit risk-based capital management

Risk identification and measurement

The Credit Risk Management function monitors, measures, manages and limits credit risk across the Firm's businesses. To measure credit risk, the Firm employs several methodologies for estimating the likelihood of obligor or counterparty default. Methodologies for measuring credit risk vary depending on several factors, including type of asset (e.g., consumer versus wholesale), risk measurement parameters (e.g., delinquency status and borrower's credit score versus wholesale risk-rating) and risk management and collection processes (e.g., retail collection center versus centrally managed workout groups). Credit risk measurement is based on the probability of default of an obligor or counterparty, the loss severity given a default event and the exposure at default.

Based on these factors and related market-based inputs, the Firm estimates credit losses for its exposures. Probable credit losses inherent in the consumer and wholesale held-for-investment loan portfolios are reflected in the allowance for loan losses, and probable credit losses inherent in lending-related commitments are reflected in the allowance for lending-related commitments. These losses are estimated using statistical analyses and other factors as described in Note 13. In addition, potential and unexpected credit losses are reflected in the allocation of credit risk capital and represent the potential volatility of actual losses relative to the established allowances for loan losses and lending-related commitments. The analyses for these losses include stress testing that considers alternative economic scenarios as described in the Stress testing section below. For further information, see Critical Accounting Estimates used by the Firm on pages 138-140.

The methodologies used to estimate credit losses depend on the characteristics of the credit exposure, as described below.

Scored exposure

The scored portfolio is generally held in CCB and predominantly includes residential real estate loans, credit card loans, and certain auto and business banking loans. For the scored portfolio, credit loss estimates are based on statistical analysis of credit losses over discrete periods of time. The statistical analysis uses portfolio modeling, credit scoring, and decision-support tools, which consider loan-level factors such as delinquency status, credit scores, collateral values, and other risk factors. Credit loss analyses also consider, as appropriate, uncertainties and other factors, including those related to current macroeconomic and political conditions, the quality of underwriting standards, and other internal and external factors. The factors and analysis are updated on a quarterly basis or more frequently as market conditions dictate.

Risk-rated exposure

Risk-rated portfolios are generally held in CIB, CB and AWM, but also include certain business banking and auto dealer loans held in CCB that are risk-rated because they have characteristics similar to commercial loans. For the risk-rated portfolio, credit loss estimates are based on estimates of the probability of default ("PD") and loss severity given a default. The probability of default is the likelihood that a borrower will default on its obligation; the loss given default ("LGD") is the estimated loss on the loan that would be realized upon the default and takes into consideration collateral and structural support for each credit facility. The estimation process includes assigning risk ratings to each borrower and credit facility to differentiate risk within the portfolio. These risk ratings are reviewed regularly by Credit Risk Management and revised as needed to reflect the borrower's current financial position, risk profile and related collateral. The calculations and assumptions are

Management's discussion and analysis

based on both internal and external historical experience and management judgment and are reviewed regularly.

Stress testing

Stress testing is important in measuring and managing credit risk in the Firm's credit portfolio. The process assesses the potential impact of alternative economic and business scenarios on estimated credit losses for the Firm. Economic scenarios and the underlying parameters are defined centrally, articulated in terms of macroeconomic factors and applied across the businesses. The stress test results may indicate credit migration, changes in delinquency trends and potential losses in the credit portfolio. In addition to the periodic stress testing processes, management also considers additional stresses outside these scenarios, including industry and country-specific stress scenarios, as necessary. The Firm uses stress testing to inform decisions on setting risk appetite both at a Firm and LOB level, as well as to assess the impact of stress on individual counterparties.

Risk monitoring and management

The Firm has developed policies and practices that are designed to preserve the independence and integrity of the approval and decision-making process of extending credit to ensure credit risks are assessed accurately, approved properly, monitored regularly and managed actively at both the transaction and portfolio levels. The policy framework establishes credit approval authorities, concentration limits, risk-rating methodologies, portfolio review parameters and guidelines for management of distressed exposures. In addition, certain models, assumptions and inputs used in evaluating and monitoring credit risk are independently validated by groups that are separate from the line of businesses.

Consumer credit risk is monitored for delinquency and other trends, including any concentrations at the portfolio level, as certain of these trends can be modified through changes in underwriting policies and portfolio guidelines. Consumer Risk Management evaluates delinquency and other trends against business expectations, current and forecasted economic conditions, and industry benchmarks. Historical and forecasted economic performance and trends are incorporated into the modeling of estimated consumer credit losses and are part of the monitoring of the credit risk profile of the portfolio.

Wholesale credit risk is monitored regularly at an aggregate portfolio, industry, and individual client and counterparty level with established concentration limits that are reviewed and revised as deemed appropriate by management, typically on an annual basis. Industry and counterparty limits, as measured in terms of exposure and economic risk appetite, are subject to stress-based loss constraints. In addition, wrong-way risk – the risk that exposure to a counterparty is positively correlated with the impact of a default by the same counterparty, which could cause exposure to increase at the same time as the counterparty's capacity to meet its obligations is decreasing – is actively

monitored as this risk could result in greater exposure at default compared with a transaction with another counterparty that does not have this risk.

Management of the Firm's wholesale credit risk exposure is accomplished through a number of means, including:

- Loan underwriting and credit approval process
- Loan syndications and participations
- Loan sales and securitizations
- Credit derivatives
- Master netting agreements
- Collateral and other risk-reduction techniques

In addition to Credit Risk Management, an independent Credit Review function is responsible for:

- Independently validating or changing the risk grades assigned to exposures in the Firm's wholesale and commercial-oriented retail credit portfolios, and assessing the timeliness of risk grade changes initiated by responsible business units; and
- Evaluating the effectiveness of business units' credit management processes, including the adequacy of credit analyses and risk grading/LGD rationales, proper monitoring and management of credit exposures, and compliance with applicable grading policies and underwriting guidelines.

For further discussion of consumer and wholesale loans, see Note 12.

Risk reporting

To enable monitoring of credit risk and effective decision-making, aggregate credit exposure, credit quality forecasts, concentration levels and risk profile changes are reported regularly to senior members of Credit Risk Management. Detailed portfolio reporting of industry; clients, counterparties and customers; product and geographic concentrations occurs monthly, and the appropriateness of the allowance for credit losses is reviewed by senior management at least on a quarterly basis. Through the risk reporting and governance structure, credit risk trends and limit exceptions are provided regularly to, and discussed with, risk committees, senior management and the Board of Directors as appropriate.

CREDIT PORTFOLIO

In the following tables, reported loans include loans retained (i.e., held-for-investment); loans held-for-sale; and certain loans accounted for at fair value. The following tables do not include certain loans the Firm accounts for at fair value and classifies as trading assets. For further information regarding these loans, see Note 2 and Note 3. For additional information on the Firm's loans, lending-related commitments, and derivative receivables, including the Firm's accounting policies, see Note 12, Note 27, and Note 5, respectively.

For further information regarding the credit risk inherent in the Firm's cash placed with banks, investment securities portfolio, and securities financing portfolio, see Note 4, Note 10, and Note 11, respectively.

For discussion of the consumer credit environment and consumer loans, see Consumer Credit Portfolio on pages 102-107 and Note 12. For discussion of the wholesale credit environment and wholesale loans, see Wholesale Credit Portfolio on pages 108-116 and Note 12.

Total credit portfolio

December 31, (in millions)	Credit exposure		Nonperforming ^{(e)(f)}	
	2017	2016	2017	2016
Loans retained	\$ 924,838	\$ 889,907	\$ 5,943	\$ 6,721
Loans held-for-sale	3,351	2,628	—	162
Loans at fair value	2,508	2,230	—	—
Total loans - reported	930,697	894,765	5,943	6,883
Derivative receivables	56,523	64,078	130	223
Receivables from customers and other ^(a)	26,272	17,560	—	—
Total credit-related assets	1,013,492	976,403	6,073	7,106
Assets acquired in loan satisfactions				
Real estate owned	NA	NA	311	370
Other	NA	NA	42	59
Total assets acquired in loan satisfactions	NA	NA	353	429
Lending-related commitments	991,482	975,152 ^(d)	731	506
Total credit portfolio	\$ 2,004,974	\$ 1,951,555^(d)	\$ 7,157	\$ 8,041
Credit derivatives used in credit portfolio management activities ^(b)	\$ (17,609)	\$ (22,114)	\$ —	\$ —
Liquid securities and other cash collateral held against derivatives ^(c)	(16,108)	(22,705)	NA	NA

Year ended December 31, (in millions, except ratios)	2017	2016
Net charge-offs ^(g)	\$ 5,387	\$ 4,692
Average retained loans		
Loans	898,979	861,345
Loans - reported, excluding residential real estate PCI loans	865,887	822,973
Net charge-off rates ^(g)		
Loans	0.60%	0.54%
Loans - excluding PCI	0.62	0.57

- (a) Receivables from customers and other primarily represents held-for-investment margin loans to brokerage customers.
- (b) Represents the net notional amount of protection purchased and sold through credit derivatives used to manage both performing and nonperforming wholesale credit exposures; these derivatives do not qualify for hedge accounting under U.S. GAAP. For additional information, see Credit derivatives on pages 115-116 and Note 5.
- (c) Includes collateral related to derivative instruments where an appropriate legal opinion has not been either sought or obtained.
- (d) The prior period amounts have been revised to conform with the current period presentation.
- (e) Excludes PCI loans. The Firm is recognizing interest income on each pool of PCI loans as each of the pools is performing.
- (f) At December 31, 2017 and 2016, nonperforming assets excluded: (1) mortgage loans insured by U.S. government agencies of \$4.3 billion and \$5.0 billion, respectively, that are 90 or more days past due; (2) student loans insured by U.S. government agencies under the FFELP of zero and \$263 million, respectively, that are 90 or more days past due; and (3) Real estate owned ("REO") insured by U.S. government agencies of \$95 million and \$142 million, respectively. These amounts have been excluded based upon the government guarantee. In addition, the Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status as permitted by regulatory guidance issued by the Federal Financial Institutions Examination Council ("FFIEC").
- (g) For the year ended December 31, 2017, excluding net charge-offs of \$467 million related to the student loan portfolio sale, the net charge-off rate for loans would have been 0.55% and for loans - excluding PCI would have been 0.57%.

CONSUMER CREDIT PORTFOLIO

The Firm's retained consumer portfolio consists primarily of residential real estate loans, credit card loans, auto loans, and business banking loans, as well as associated lending-related commitments. The Firm's focus is on serving primarily the prime segment of the consumer credit market. Originated mortgage loans are retained in the mortgage portfolio, securitized or sold to U.S. government agencies and U.S. government-sponsored enterprises; other types of consumer loans are typically retained on the balance sheet. The credit performance of the consumer portfolio continues to benefit from discipline in credit underwriting as well as improvement in the economy driven by increasing home prices and low unemployment. The total amount of residential real estate loans delinquent 30+ days, excluding government guaranteed and purchased credit impaired loans, increased from December 31, 2016 due to the impact of recent hurricanes; however, the 30+ day delinquency rate decreased due to growth in the portfolio. The Credit Card 30+ day delinquency rate and the net charge-off rate increased from the prior year, in line with expectations. For further information on consumer loans, see Note 12. For further information on lending-related commitments, see Note 27.

The following table presents consumer credit-related information with respect to the credit portfolio held by CCB, prime mortgage and home equity loans held by AWM, and prime mortgage loans held by Corporate. For further information about the Firm's nonaccrual and charge-off accounting policies, see Note 12.

Consumer credit portfolio

As of or for the year ended December 31, (in millions, except ratios)	Credit exposure		Nonaccrual loans ^{(k)(l)}		Net charge-offs/ (recoveries) ^{(e)(m)(n)}		Average annual net charge-off rate ^{(e)(m)(n)}	
	2017	2016	2017	2016	2017	2016	2017	2016
Consumer, excluding credit card								
Loans, excluding PCI loans and loans held-for-sale								
Residential mortgage ^(a)	\$ 216,496	\$ 192,486	\$ 2,175	\$ 2,256	\$ (10)	\$ 16	—%	0.01%
Home equity	33,450	39,063	1,610	1,845	69	189	0.19	0.45
Auto ^{(b)(c)}	66,242	65,814	141	214	331	285	0.51	0.45
Consumer & Business Banking ^{(a)(c)(d)}	25,789	24,307	283	287	257	257	1.03	1.10
Student ^{(a)(e)}	—	7,057	—	165	498	162	NM	2.13
Total loans, excluding PCI loans and loans held-for-sale	341,977	328,727	4,209	4,767	1,145	909	0.34	0.28
Loans - PCI								
Home equity	10,799	12,902	NA	NA	NA	NA	NA	NA
Prime mortgage	6,479	7,602	NA	NA	NA	NA	NA	NA
Subprime mortgage	2,609	2,941	NA	NA	NA	NA	NA	NA
Option ARMs ^(f)	10,689	12,234	NA	NA	NA	NA	NA	NA
Total loans - PCI	30,576	35,679	NA	NA	NA	NA	NA	NA
Total loans - retained	372,553	364,406	4,209	4,767	1,145	909	0.31	0.25
Loans held-for-sale	128	238	—	53	—	—	—	—
Total consumer, excluding credit card loans	372,681	364,644	4,209	4,820	1,145	909	0.31	0.25
Lending-related commitments ^(g)	48,553	53,247	ⓐ					
Receivables from customers ^(h)	133	120						
Total consumer exposure, excluding credit card	421,367	418,011	ⓐ					
Credit Card								
Loans retained ⁽ⁱ⁾	149,387	141,711	—	—	4,123	3,442	2.95	2.63
Loans held-for-sale	124	105	—	—	—	—	—	—
Total credit card loans	149,511	141,816	—	—	4,123	3,442	2.95	2.63
Lending-related commitments ^(g)	572,831	553,891						
Total credit card exposure	722,342	695,707						
Total consumer credit portfolio	\$ 1,143,709	\$ 1,113,718	ⓐ	\$ 4,209	\$ 4,820	\$ 5,268	\$ 4,351	1.04% 0.89%
Memo: Total consumer credit portfolio, excluding PCI	\$ 1,113,133	\$ 1,078,039	ⓐ	\$ 4,209	\$ 4,820	\$ 5,268	\$ 4,351	1.11% 0.96%

- (a) Certain loan portfolios have been reclassified. The prior period amounts have been revised to conform with the current period presentation.
- (b) At December 31, 2017 and 2016, excluded operating lease assets of \$17.1 billion and \$13.2 billion, respectively. These operating lease assets are included in other assets on the Firm's Consolidated balance sheets. The risk of loss on these assets relates to the residual value of the leased vehicles, which is managed through projection of the lease residual value at lease origination, periodic review of residual values, and through arrangements with certain auto manufacturers that mitigates this risk.
- (c) Includes certain business banking and auto dealer risk-rated loans that apply the wholesale methodology for determining the allowance for loan losses; these loans are managed by CCB, and therefore, for consistency in presentation, are included within the consumer portfolio.
- (d) Predominantly includes Business Banking loans.
- (e) For the year ended December 31, 2017, excluding net charge-offs of \$467 million related to the student loan portfolio sale, the net charge-off rate for Total consumer, excluding credit card and PCI loans and loans held-for-sale would have been 0.20%; Total consumer - retained excluding credit card loans would have been 0.18%; Total consumer credit portfolio would have been 0.95%; and Total consumer credit portfolio, excluding PCI loans would have been 1.01%.
- (f) At December 31, 2017 and 2016, approximately 68% and 66%, respectively, of the PCI option adjustable rate mortgages ("ARMs") portfolio has been modified into fixed-rate, fully amortizing loans.
- (g) Credit card and home equity lending-related commitments represent the total available lines of credit for these products. The Firm has not experienced, and does not anticipate, that all available lines of credit would be used at the same time. For credit card and home equity commitments (if certain conditions are met), the Firm can reduce or cancel these lines of credit by providing the borrower notice or, in some cases as permitted by law, without notice. For further information, see Note 27.
- (h) Receivables from customers represent held-for-investment margin loans to brokerage customers that are collateralized through assets maintained in the clients' brokerage accounts. These receivables are reported within accrued interest and accounts receivable on the Firm's Consolidated balance sheets.
- (i) Includes billed interest and fees net of an allowance for uncollectible interest and fees.
- (j) The prior period amounts have been revised to conform with the current period presentation.
- (k) At December 31, 2017 and 2016, nonaccrual loans excluded loans 90 or more days past due as follows: (1) mortgage loans insured by U.S. government agencies of \$4.3 billion and \$5.0 billion, respectively; and (2) student loans insured by U.S. government agencies under the FFELP of zero and \$263 million, respectively. These amounts have been excluded from nonaccrual loans based upon the government guarantee. In addition, the Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status, as permitted by regulatory guidance issued by the FFIEC.
- (l) Excludes PCI loans. The Firm is recognizing interest income on each pool of PCI loans as each of the pools is performing.
- (m) Net charge-offs and net charge-off rates excluded write-offs in the PCI portfolio of \$86 million and \$156 million for the years ended December 31, 2017 and 2016. These write-offs decreased the allowance for loan losses for PCI loans. See Allowance for Credit Losses on pages 117-119 for further details.
- (n) Average consumer loans held-for-sale were \$1.5 billion and \$496 million for the years ended December 31, 2017 and 2016, respectively. These amounts were excluded when calculating net charge-off rates.

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Consumer, excluding credit card

Portfolio analysis

Consumer loan balances increased from December 31, 2016 predominantly due to originations of high-quality prime mortgage loans that have been retained on the balance sheet, partially offset by the sale of the student loan portfolio as well as paydowns and the charge-off or liquidation of delinquent loans.

PCI loans are excluded from the following discussions of individual loan products and are addressed separately below. For further information about the Firm's consumer portfolio, including information about delinquencies, loan modifications and other credit quality indicators, see Note 12.

Residential mortgage: The residential mortgage portfolio predominantly consists of high-quality prime mortgage loans with a small component (approximately 1%) of subprime mortgage loans. These subprime mortgage loans continue to run-off and are performing in line with expectations. The residential mortgage portfolio, including loans held-for-sale, increased from December 31, 2016 due to retained originations of primarily high-quality fixed rate prime mortgage loans partially offset by paydowns. Residential mortgage 30+ day delinquencies increased from December 31, 2016 due to the impact of recent hurricanes. Nonaccrual loans decreased from the prior year primarily as a result of loss mitigation activities. There was a net recovery for the year ended December 31, 2017 compared to a net charge-off for the year ended December 31, 2016, reflecting continued improvement in home prices and delinquencies.

At December 31, 2017 and 2016, the Firm's residential mortgage portfolio, including loans held-for-sale, included \$8.6 billion and \$9.5 billion, respectively, of mortgage loans insured and/or guaranteed by U.S. government agencies, of which \$6.2 billion and \$7.0 billion, respectively, were 30 days or more past due (of these past due loans, \$4.3 billion and \$5.0 billion, respectively, were 90 days or more past due). The Firm monitors its exposure to certain potential unrecoverable claim payments related to government insured loans and considers this exposure in estimating the allowance for loan losses.

At December 31, 2017 and 2016, the Firm's residential mortgage portfolio included \$20.2 billion and \$19.1 billion, respectively, of interest-only loans. These loans have an interest-only payment period generally followed by an adjustable-rate or fixed-rate fully amortizing payment period to maturity and are typically originated as higher-balance loans to higher-income borrowers. To date, losses on this portfolio generally have been consistent with the broader residential mortgage portfolio. The Firm continues to monitor the risks associated with these loans.

Home equity: The home equity portfolio declined from December 31, 2016 primarily reflecting loan paydowns. The amount of 30+ day delinquencies decreased from December 31, 2016 but was impacted by recent hurricanes. Nonaccrual loans decreased from December 31, 2016 primarily as a result of loss mitigation activities. Net charge-offs for the year ended December 31, 2017 declined when compared with the prior year, partially as a result of lower loan balances.

At December 31, 2017, approximately 90% of the Firm's home equity portfolio consists of home equity lines of credit ("HELOCs") and the remainder consists of home equity loans ("HELOANs"). HELOANs are generally fixed-rate, closed-end, amortizing loans, with terms ranging from 3-30 years. In general, HELOCs originated by the Firm are revolving loans for a 10-year period, after which time the HELOC recasts into a loan with a 20-year amortization period.

The carrying value of HELOCs outstanding was \$30 billion at December 31, 2017. Of such amounts, \$14 billion have recast from interest-only to fully amortizing payments or have been modified and \$5 billion are interest-only balloon HELOCs, which primarily mature after 2030. The Firm manages the risk of HELOCs during their revolving period by closing or reducing the undrawn line to the extent permitted by law when borrowers are exhibiting a material deterioration in their credit risk profile.

The Firm monitors risks associated with junior lien loans where the borrower has a senior lien loan that is more than 90 days delinquent or has been modified. These loans are considered “high-risk seconds” and are classified as nonaccrual as they are considered to pose a higher risk of default than other junior lien loans. At December 31, 2017, the Firm estimated that the carrying value of its home equity portfolio contained approximately \$725 million of current junior lien loans that were considered high-risk seconds, compared with \$1.1 billion at December 31, 2016. For further information, see Note 12.

Auto: The auto loan portfolio, which predominantly consists of prime-quality loans, was relatively flat compared with December 31, 2016, as new originations were largely offset by paydowns and the charge-off or liquidation of delinquent loans. Nonaccrual loans decreased compared with December 31, 2016. Net charge-offs for the year ended December 31, 2017 increased compared with the prior year, primarily as a result of an incremental adjustment recorded in accordance with regulatory guidance regarding the timing of loss recognition for certain loans in bankruptcy and loans where assets were acquired in loan satisfaction.

Consumer & Business banking: Consumer & Business Banking loans increased compared with December 31, 2016 as growth due to loan originations was partially offset by paydowns and the charge-off or liquidation of delinquent loans. Nonaccrual loans and net charge-offs were relatively flat compared with prior year.

Student: The Firm wrote down and subsequently sold the student loan portfolio during 2017. Net charge-offs for the year ended December 31, 2017 increased as a result of the write-down.

Purchased credit-impaired loans: PCI loans decreased as the portfolio continues to run off. As of December 31, 2017, approximately 11% of the option ARM PCI loans were delinquent and approximately 68% of the portfolio had been modified into fixed-rate, fully amortizing loans. The borrowers for substantially all of the remaining loans are making amortizing payments, although such payments are not necessarily fully amortizing. This latter group of loans is subject to the risk of payment shock due to future payment recast. Default rates generally increase on option ARM loans when payment recast results in a payment increase. The expected increase in default rates is considered in the Firm’s quarterly impairment assessment.

The following table provides a summary of lifetime principal loss estimates included in either the nonaccretable difference or the allowance for loan losses.

Summary of PCI loans lifetime principal loss estimates

December 31, (in billions)	Lifetime loss estimates ^(a)		Life-to-date liquidation losses ^(b)	
	2017	2016	2017	2016
Home equity	\$ 14.2	\$ 14.4	\$ 12.9	\$ 12.8
Prime mortgage	4.0	4.0	3.8	3.7
Subprime mortgage	3.3	3.2	3.1	3.1
Option ARMs	10.0	10.0	9.7	9.7
Total	\$ 31.5	\$ 31.6	\$ 29.5	\$ 29.3

(a) Includes the original nonaccretable difference established in purchase accounting of \$30.5 billion for principal losses plus additional principal losses recognized subsequent to acquisition through the provision and allowance for loan losses. The remaining nonaccretable difference for principal losses was \$842 million and \$1.1 billion at December 31, 2017 and 2016, respectively.

(b) Represents both realization of loss upon loan resolution and any principal forgiven upon modification.

For further information on the Firm’s PCI loans, including write-offs, see Note 12.

Geographic composition of residential real estate loans

At December 31, 2017, \$152.8 billion, or 63% of the total retained residential real estate loan portfolio, excluding mortgage loans insured by U.S. government agencies and PCI loans, were concentrated in California, New York, Illinois, Texas and Florida, compared with \$139.9 billion, or 63%, at December 31, 2016. For additional information on the geographic composition of the Firm’s residential real estate loans, see Note 12.

Current estimated loan-to-values of residential real estate loans

Average current estimated loan-to-value (“LTV”) ratios have declined consistent with improvements in home prices, customer pay downs, and charge-offs or liquidations of higher LTV loans. For further information on current estimated LTVs of residential real estate loans, see Note 12.

Loan modification activities for residential real estate loans

The performance of modified loans generally differs by product type due to differences in both the credit quality and the types of modifications provided. Performance metrics for modifications to the residential real estate portfolio, excluding PCI loans, that have been seasoned more than six months show weighted-average redefault rates of 24% for residential mortgages and 21% for home equity. The cumulative performance metrics for modifications to the PCI residential real estate portfolio that have been seasoned more than six months show weighted average redefault rates of 20% for home equity, 19% for prime mortgages, 16% for option ARMs and 34% for subprime mortgages. The cumulative redefault rates reflect the performance of modifications completed under both the U.S. Government’s Home Affordable Modification Program (“HAMP”) and the Firm’s proprietary modification programs

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(primarily the Firm's modification program that was modeled after HAMP) from October 1, 2009, through December 31, 2017.

Certain loans that were modified under HAMP and the Firm's proprietary modification programs have interest rate reset provisions ("step-rate modifications"). Interest rates on these loans generally began to increase commencing in 2014 by 1% per year, and will continue to do so until the rate reaches a specified cap. The cap on these loans is typically at a prevailing market interest rate for a fixed-rate mortgage loan as of the modification date. At December 31, 2017, the carrying value of non-PCI loans and the unpaid principal balance of PCI loans modified in step-rate modifications, which have not yet met their specified caps, were \$3 billion and \$7 billion, respectively. The Firm continues to monitor this risk exposure and the impact of these potential interest rate increases is considered in the Firm's allowance for loan losses.

The following table presents information as of December 31, 2017 and 2016, relating to modified retained residential real estate loans for which concessions have been granted to borrowers experiencing financial difficulty. For further information on modifications for the years ended December 31, 2017 and 2016, see Note 12.

Modified residential real estate loans

December 31, (in millions)	2017		2016	
	Retained loans	Nonaccrual retained loans ^(d)	Retained loans	Nonaccrual retained loans ^(d)
Modified residential real estate loans, excluding PCI loans^{(a)(b)}				
Residential mortgage	5,620	1,743	6,032	1,755
Home equity	\$ 2,118	\$ 1,032	\$ 2,264	\$ 1,116
Total modified residential real estate loans, excluding PCI loans	\$ 7,738	\$ 2,775	\$ 8,296	\$ 2,871
Modified PCI loans^(c)				
Home equity	\$ 2,277	NA	\$ 2,447	NA
Prime mortgage	4,490	NA	5,052	NA
Subprime mortgage	2,678	NA	2,951	NA
Option ARMs	8,276	NA	9,295	NA
Total modified PCI loans	\$17,721	NA	\$19,745	NA

(a) Amounts represent the carrying value of modified residential real estate loans.

(b) At December 31, 2017 and 2016, \$3.8 billion and \$3.4 billion, respectively, of loans modified subsequent to repurchase from Ginnie Mae in accordance with the standards of the appropriate government agency (i.e., Federal Housing Administration ("FHA"), U.S. Department of Veterans Affairs ("VA"), Rural Housing Service of the U.S. Department of Agriculture ("RHS")) are not included in the table above. When such loans perform subsequent to modification in accordance with Ginnie Mae guidelines, they are generally sold back into Ginnie Mae loan pools. Modified loans that do not re-perform become subject to foreclosure. For additional information about sales of loans in securitization transactions with Ginnie Mae, see Note 14.

(c) Amounts represent the unpaid principal balance of modified PCI loans.

(d) As of December 31, 2017 and 2016, nonaccrual loans included \$2.2 billion and \$2.3 billion, respectively, of troubled debt restructuring ("TDRs") for which the borrowers were less than 90 days past due. For additional information about loans modified in a TDR that are on nonaccrual status, see Note 12.

Nonperforming assets

The following table presents information as of December 31, 2017 and 2016, about consumer, excluding credit card, nonperforming assets.

Nonperforming assets^(a)

December 31, (in millions)	2017	2016
Nonaccrual loans^(b)		
Residential real estate ^(c)	\$ 3,785	\$ 4,154
Other consumer ^(c)	424	666
Total nonaccrual loans	4,209	4,820
Assets acquired in loan satisfactions		
Real estate owned	225	292
Other	40	57
Total assets acquired in loan satisfactions	265	349
Total nonperforming assets	\$ 4,474	\$ 5,169

(a) At December 31, 2017 and 2016, nonperforming assets excluded: (1) mortgage loans insured by U.S. government agencies of \$4.3 billion and \$5.0 billion, respectively, that are 90 or more days past due; (2) student loans insured by U.S. government agencies under the FFELP of zero and \$263 million, respectively, that are 90 or more days past due; and (3) real estate owned insured by U.S. government agencies of \$95 million and \$142 million, respectively. These amounts have been excluded based upon the government guarantee.

(b) Excludes PCI loans which are accounted for on a pool basis. Since each pool is accounted for as a single asset with a single composite interest rate and an aggregate expectation of cash flows, the past-due status of the pools, or that of individual loans within the pools, is not meaningful. The Firm is recognizing interest income on each pool of loans as each of the pools is performing.

(c) Certain loan portfolios have been reclassified. The prior period amounts have been revised to conform with the current period presentation.

Nonaccrual loans in the residential real estate portfolio at December 31, 2017 decreased to \$3.8 billion from \$4.2 billion at December 31, 2016, of which 26% and 29% were greater than 150 days past due, respectively. In the aggregate, the unpaid principal balance of residential real estate loans greater than 150 days past due was charged down by approximately 40% and 43% to the estimated net realizable value of the collateral at December 31, 2017 and 2016, respectively.

Active and suspended foreclosure: For information on loans that were in the process of active or suspended foreclosure, see Note 12.

Nonaccrual loans: The following table presents changes in the consumer, excluding credit card, nonaccrual loans for the years ended December 31, 2017 and 2016.

Nonaccrual loan activity

Year ended December 31, (in millions)	2017	2016
Beginning balance	\$ 4,820	\$ 5,413
Additions	3,525	3,858
Reductions:		
Principal payments and other ^(a)	1,577	1,437
Charge-offs	699	843
Returned to performing status	1,509	1,589
Foreclosures and other liquidations	351	582
Total reductions	4,136	4,451
Net changes	(611)	(593)
Ending balance	\$ 4,209	\$ 4,820

(a) Other reductions includes loan sales.

Credit card

Total credit card loans increased from December 31, 2016 due to strong new account growth and higher sales volume. The December 31, 2017 30+ day delinquency rate increased to 1.80% from 1.61% at December 31, 2016, while the December 31, 2017 90+ day delinquency rate increased to 0.92% from 0.81% at December 31, 2016, in line with expectations. Net charge-offs increased for the year ended December 31, 2017 primarily due to growth in newer vintages which, as anticipated, have higher loss rates than the more seasoned portion of the portfolio. The credit card portfolio continues to reflect a largely well-seasoned portfolio that has strong U.S. geographic diversification.

Loans outstanding in the top five states of California, Texas, New York, Florida and Illinois consisted of \$67.2 billion in receivables, or 45% of the retained loan portfolio, at December 31, 2017, compared with \$62.8 billion, or 44%, at December 31, 2016. For more information on the geographic and FICO composition of the Firm's credit card loans, see Note 12.

Modifications of credit card loans

At both December 31, 2017 and 2016, the Firm had \$1.2 billion of credit card loans outstanding that have been modified in TDRs. These balances included both credit card loans with modified payment terms and credit card loans that reverted back to their pre-modification payment terms because the cardholder did not comply with the modified payment terms.

Consistent with the Firm's policy, all credit card loans typically remain on accrual status until charged off. However, the Firm establishes an allowance, which is offset against loans and charged to interest income, for the estimated uncollectible portion of accrued and billed interest and fee income.

For additional information about loan modification programs to borrowers, see Note 12.

WHOLESALE CREDIT PORTFOLIO

In its wholesale businesses, the Firm is exposed to credit risk through its underwriting, lending, market-making, and hedging activities with and for clients and counterparties, as well as through its operating services activities (such as cash management and clearing activities), securities financing activities, investment securities portfolio, and cash placed with banks. A portion of the loans originated or acquired by the Firm's wholesale businesses is generally retained on the balance sheet. The Firm distributes a significant percentage of the loans it originates into the market as part of its syndicated loan business and to manage portfolio concentrations and credit risk.

The wholesale credit portfolio was stable for the year ended December 31, 2017, characterized by low levels of criticized exposure, nonaccrual loans and charge-offs. See industry discussion on pages 109-112 for further information. The increase in retained loans was driven by new originations in CB and higher loans to Private Banking clients in AWM, which was partially offset by paydowns in CIB. Discipline in underwriting across all areas of lending continues to be a key point of focus. The wholesale portfolio is actively managed, in part by conducting ongoing, in-depth reviews of client credit quality and transaction structure inclusive of collateral where applicable, and of industry, product and client concentrations.

In the following tables, the Firm's wholesale credit portfolio includes exposure held in CIB, CB, AWM and Corporate, and excludes all exposure managed by CCB.

Wholesale credit portfolio

December 31, (in millions)	Credit exposure		Nonperforming ^(c)	
	2017	2016	2017	2016
Loans retained	\$402,898	\$383,790	\$1,734	\$1,954
Loans held-for-sale	3,099	2,285	—	109
Loans at fair value	2,508	2,230	—	—
Loans - reported	408,505	388,305	1,734	2,063
Derivative receivables	56,523	64,078	130	223
Receivables from customers and other ^(a)	26,139	17,440	—	—
Total wholesale credit-related assets	491,167	469,823	1,864	2,286
Lending-related commitments	370,098	368,014	731	506
Total wholesale credit exposure	\$861,265	\$837,837	\$2,595	\$2,792
Credit derivatives used in credit portfolio management activities ^(b)	\$ (17,609)	\$ (22,114)	\$ —	\$ —
Liquid securities and other cash collateral held against derivatives	(16,108)	(22,705)	NA	NA

- (a) Receivables from customers and other include \$26.0 billion and \$17.3 billion of held-for-investment margin loans at December 31, 2017 and 2016, respectively, to brokerage customers in CIB Prime Services and in AWM; these are classified in accrued interest and accounts receivable on the Consolidated balance sheets.
- (b) Represents the net notional amount of protection purchased and sold through credit derivatives used to manage both performing and nonperforming wholesale credit exposures; these derivatives do not qualify for hedge accounting under U.S. GAAP. For additional information, see Credit derivatives on pages 115-116, and Note 5.
- (c) Excludes assets acquired in loan satisfactions.

The following tables present the maturity and ratings profiles of the wholesale credit portfolio as of December 31, 2017 and 2016. The ratings scale is based on the Firm's internal risk ratings, which generally correspond to the ratings assigned by S&P and Moody's. For additional information on wholesale loan portfolio risk ratings, see Note 12.

Wholesale credit exposure - maturity and ratings profile

December 31, 2017 (in millions, except ratios)	Maturity profile ^(d)				Ratings profile			
	Due in 1 year or less	Due after 1 year through 5 years	Due after 5 years	Total	Investment- grade	Noninvestment- grade	Total	Total % of IG
					AAA/Aaa to BBB-/Baa3	BB+/Ba1 & below		
Loans retained	\$ 121,643	\$ 177,033	\$ 104,222	\$ 402,898	\$ 311,681	\$ 91,217	\$ 402,898	77%
Derivative receivables				56,523			56,523	
Less: Liquid securities and other cash collateral held against derivatives				(16,108)			(16,108)	
Total derivative receivables, net of all collateral	9,882	10,463	20,070	40,415	32,373	8,042	40,415	80
Lending-related commitments	80,273	275,317	14,508	370,098	274,127	95,971	370,098	74
Subtotal	211,798	462,813	138,800	813,411	618,181	195,230	813,411	76
Loans held-for-sale and loans at fair value ^(a)				5,607			5,607	
Receivables from customers and other				26,139			26,139	
Total exposure - net of liquid securities and other cash collateral held against derivatives				\$ 845,157			\$ 845,157	
Credit derivatives used in credit portfolio management activities ^{(b)(c)}	\$ (1,807)	\$ (11,011)	\$ (4,791)	\$ (17,609)	\$ (14,984)	\$ (2,625)	\$ (17,609)	85%

December 31, 2016 (in millions, except ratios)	Maturity profile ^(d)				Ratings profile			
	Due in 1 year or less	Due after 1 year through 5 years	Due after 5 years	Total	Investment- grade	Noninvestment- grade	Total	Total % of IG
					AAA/Aaa to BBB-/Baa3	BB+/Ba1 & below		
Loans retained	\$ 117,238	\$ 167,235	\$ 99,317	\$ 383,790	\$ 289,923	\$ 93,867	\$ 383,790	76%
Derivative receivables				64,078			64,078	
Less: Liquid securities and other cash collateral held against derivatives				(22,705)			(22,705)	
Total derivative receivables, net of all collateral	14,019	8,510	18,844	41,373	33,081	8,292	41,373	80
Lending-related commitments	88,399	271,825	7,790	368,014	269,820	98,194	368,014	73
Subtotal	219,656	447,570	125,951	793,177	592,824	200,353	793,177	75
Loans held-for-sale and loans at fair value ^(a)				4,515			4,515	
Receivables from customers and other				17,440			17,440	
Total exposure - net of liquid securities and other cash collateral held against derivatives				\$ 815,132			\$ 815,132	
Credit derivatives used in credit portfolio management activities ^{(b)(c)}	\$ (1,354)	\$ (16,537)	\$ (4,223)	\$ (22,114)	\$ (18,710)	\$ (3,404)	\$ (22,114)	85%

(a) Represents loans held-for-sale, primarily related to syndicated loans and loans transferred from the retained portfolio, and loans at fair value.

(b) These derivatives do not qualify for hedge accounting under U.S. GAAP.

(c) The notional amounts are presented on a net basis by underlying reference entity and the ratings profile shown is based on the ratings of the reference entity on which protection has been purchased. Predominantly all of the credit derivatives entered into by the Firm where it has purchased protection used in credit portfolio management activities, are executed with investment-grade counterparties.

(d) The maturity profile of retained loans, lending-related commitments and derivative receivables is based on remaining contractual maturity. Derivative contracts that are in a receivable position at December 31, 2017, may become payable prior to maturity based on their cash flow profile or changes in market conditions.

Wholesale credit exposure - industry exposures

The Firm focuses on the management and diversification of its industry exposures, and pays particular attention to industries with actual or potential credit concerns. Exposures deemed criticized align with the U.S. banking regulators' definition of criticized exposures, which consist

of the special mention, substandard and doubtful categories. The total criticized component of the portfolio, excluding loans held-for-sale and loans at fair value, was \$15.6 billion at December 31, 2017, compared with \$19.8 billion at December 31, 2016, driven by a 47% decrease in the Oil & Gas portfolio.

Management's discussion and analysis

In 2017, the Firm revised its methodology for the assignment of industry classifications, to better monitor and manage concentrations. This largely resulted in the re-assignment of holding companies from All other to the industry of risk category based on the primary business activity of the holding company's underlying entities. In the tables and industry discussions below, the prior period amounts have been revised to conform with the current period presentation.

Below are summaries of the Firm's exposures as of December 31, 2017 and 2016. For additional information on industry concentrations, see Note 4.

Wholesale credit exposure – industries^(a)

As of or for the year ended December 31, 2017 (in millions)			Noninvestment-grade			Selected metrics				
	Credit exposure ^(e)	Investment-grade	Noncriticized	Criticized performing	Criticized nonperforming	30 days or more past due and accruing loans	Net charge-offs/(recoveries)	Credit derivative hedges ^(f)	Liquid securities and other cash collateral held against derivative receivables	
Real Estate	\$ 139,409	\$ 115,401	\$ 23,012	\$ 859	\$ 137	\$ 254	\$ (4)	\$ –	\$ (2)	
Consumer & Retail	87,679	55,737	29,619	1,791	532	30	34	(275)	(9)	
Technology, Media & Telecommunications	59,274	36,510	20,453	2,258	53	14	(12)	(910)	(19)	
Healthcare	55,997	42,643	12,731	585	38	82	(1)	–	(207)	
Industrials	55,272	37,198	16,770	1,159	145	150	(1)	(196)	(21)	
Banks & Finance Cos	49,037	34,654	13,767	612	4	1	6	(1,216)	(3,174)	
Oil & Gas	41,317	21,430	14,854	4,046	987	22	71	(747)	(1)	
Asset Managers	32,531	28,029	4,484	4	14	27	–	–	(5,290)	
Utilities	29,317	24,486	4,383	227	221	–	11	(160)	(56)	
State & Municipal Govt ^(b)	28,633	27,977	656	–	–	12	5	(130)	(524)	
Central Govt	19,182	18,741	376	65	–	4	–	(10,095)	(2,520)	
Chemicals & Plastics	15,945	11,107	4,764	74	–	4	–	–	–	
Transportation	15,797	9,870	5,302	527	98	9	14	(32)	(131)	
Automotive	14,820	9,321	5,278	221	–	10	1	(284)	–	
Metals & Mining	14,171	6,989	6,822	321	39	3	(13)	(316)	(1)	
Insurance	14,089	11,028	2,981	–	80	1	–	(157)	(2,195)	
Financial Markets Infrastructure	5,036	4,775	261	–	–	–	–	–	(23)	
Securities Firms	4,113	2,559	1,553	1	–	–	–	(274)	(335)	
All other ^(c)	147,900	134,110	13,283	260	247	901	8	(2,817)	(1,600)	
Subtotal	\$ 829,519	\$ 632,565	\$ 181,349	\$ 13,010	\$ 2,595	\$ 1,524	\$ 119	\$ (17,609)	\$ (16,108)	
Loans held-for-sale and loans at fair value	5,607									
Receivables from customers and other	26,139									
Total^(d)	\$ 861,265									

As of or for the year ended December 31, 2016 (in millions)	Selected metrics									
	Noninvestment-grade					30 days or more past due and accruing loans	Net charge- offs/ (recoveries)	Credit derivative hedges ^(f)	Liquid securities and other cash collateral held against derivative receivables ^(g)	
	Credit exposure ^(e)	Investment- grade	Noncriticized	Criticized performing	Criticized nonperforming					
Real Estate	\$ 134,287	\$ 104,869	\$ 28,281	\$ 937	\$ 200	\$ 206	\$ (7)	\$ (54)	\$ (11)	
Consumer & Retail	84,804	54,730	28,255	1,571	248	75	24	(424)	(69)	
Technology, Media & Telecommunications	63,324	39,998	21,751	1,559	16	9	2	(589)	(30)	
Healthcare	49,445	39,244	9,279	882	40	86	37	(286)	(246)	
Industrials	55,733	36,710	17,854	1,033	136	128	3	(434)	(40)	
Banks & Finance Cos	48,393	35,385	12,560	438	10	21	(2)	(1,336)	(7,337)	
Oil & Gas	40,367	18,629	12,274	8,069	1,395	31	233	(1,532)	(18)	
Asset Managers	33,201	29,194	4,006	1	—	17	—	—	(5,737)	
Utilities	29,672	24,203	4,959	424	86	8	—	(306)	—	
State & Municipal Govt ^(b)	28,263	27,603	624	6	30	107	(1)	(130)	—	
Central Govt	20,408	20,123	276	9	—	4	—	(11,691)	(4,183)	
Chemicals & Plastics	15,043	10,405	4,452	156	30	3	—	(35)	(3)	
Transportation	19,096	12,178	6,421	444	53	9	10	(93)	(188)	
Automotive	16,736	9,235	7,299	201	1	7	—	(401)	(14)	
Metals & Mining	13,419	5,523	6,744	1,133	19	—	36	(621)	(62)	
Insurance	13,510	10,918	2,459	—	133	9	—	(275)	(2,538)	
Financial Markets Infrastructure	8,732	7,980	752	—	—	—	—	—	(390)	
Securities Firms	4,211	1,812	2,399	—	—	—	—	(273)	(491)	
All other ^(c)	137,238	124,661	11,988	303	286	598	6	(3,634)	(1,348)	
Subtotal	\$ 815,882	\$ 613,400	\$ 182,633	\$ 17,166	\$ 2,683	\$ 1,318	\$ 341	\$ (22,114)	\$ (22,705)	
Loans held-for-sale and loans at fair value	4,515									
Receivables from customers and other	17,440									
Total ^(d)	\$ 837,837									

- (a) The industry rankings presented in the table as of December 31, 2016, are based on the industry rankings of the corresponding exposures at December 31, 2017, not actual rankings of such exposures at December 31, 2016.
- (b) In addition to the credit risk exposure to states and municipal governments (both U.S. and non-U.S.) at December 31, 2017 and 2016, noted above, the Firm held: \$9.8 billion and \$9.1 billion, respectively, of trading securities; \$32.3 billion and \$31.6 billion, respectively, of AFS securities; and \$14.4 billion and \$14.5 billion, respectively, of HTM securities, issued by U.S. state and municipal governments. For further information, see Note 2 and Note 10.
- (c) All other includes: individuals; SPEs; and private education and civic organizations, representing approximately 59%, 37% and 4%, respectively, at both December 31, 2017 and December 31, 2016.
- (d) Excludes cash placed with banks of \$421.0 billion and \$380.2 billion, at December 31, 2017 and 2016, respectively, which is predominantly placed with various central banks, primarily Federal Reserve Banks.
- (e) Credit exposure is net of risk participations and excludes the benefit of credit derivatives used in credit portfolio management activities held against derivative receivables or loans and liquid securities and other cash collateral held against derivative receivables.
- (f) Represents the net notional amounts of protection purchased and sold through credit derivatives used to manage the credit exposures; these derivatives do not qualify for hedge accounting under U.S. GAAP. The All other category includes purchased credit protection on certain credit indices.
- (g) Prior period amounts have been revised to conform with the current period presentation.

Management's discussion and analysis

Presented below is additional detail on certain industries to which the Firm has exposure.

Real Estate

Exposure to the Real Estate industry increased \$5.1 billion during the year ended December 31, 2017, to \$139.4 billion predominantly driven by multifamily lending within CB. For the year ended December 31, 2017, the investment-grade percentage of the portfolio was 83%, up from 78% for the year ended December 31, 2016. For further information on Real Estate loans, see Note 12.

(in millions, except ratios)	December 31, 2017				
	Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn ^(c)
Multifamily ^(a)	\$ 84,635	\$ 34	\$ 84,669	89%	92%
Other	54,620	120	54,740	74	66
Total Real Estate Exposure ^(b)	139,255	154	139,409	83	82

(in millions, except ratios)	December 31, 2016				
	Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn ^(c)
Multifamily ^(a)	\$ 80,280	\$ 34	\$ 80,314	82%	90%
Other	53,801	172	53,973	72	62
Total Real Estate Exposure ^(b)	134,081	207	134,287	78	79

(a) Multifamily exposure is largely in California.

(b) Real Estate exposure is predominantly secured; unsecured exposure is largely investment-grade.

(c) Represents drawn exposure as a percentage of credit exposure.

Oil & Gas and Natural Gas Pipelines

Exposure to the Oil & Gas and Natural Gas Pipeline portfolios increased by \$1.1 billion during the year ended December 31, 2017 to \$45.9 billion. During the year ended December 31, 2017, the credit quality of this exposure continued to improve, with the investment-grade percentage increasing from 48% to 53% and criticized exposure decreasing by \$4.5 billion.

(in millions, except ratios)	December 31, 2017				
	Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn ^(d)
Exploration & Production ("E&P") and Oilfield Services	\$ 20,558	\$ 1,175	\$ 21,733	34%	33%
Other Oil & Gas ^(a)	19,032	552	19,584	72	28
Total Oil & Gas	39,590	1,727	41,317	52	31
Natural Gas Pipelines ^(b)	4,507	38	4,545	66	14
Total Oil & Gas and Natural Gas Pipelines ^(c)	\$ 44,097	\$ 1,765	\$ 45,862	53	29

(in millions, except ratios)	December 31, 2016				
	Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn ^(d)
E&P and Oilfield Services	\$ 20,971	\$ 1,256	\$ 22,227	27%	35%
Other Oil & Gas ^(a)	17,518	622	18,140	70	31
Total Oil & Gas	38,489	1,878	40,367	46	33
Natural Gas Pipelines ^(b)	4,253	106	4,359	66	30
Total Oil & Gas and Natural Gas Pipelines ^(c)	\$ 42,742	\$ 1,984	\$ 44,726	48	33

(a) Other Oil & Gas includes Integrated Oil & Gas companies, Midstream/Oil Pipeline companies and refineries.

(b) Natural Gas Pipelines is reported within the Utilities Industry.

(c) Secured lending is \$14.0 billion and \$14.3 billion at December 31, 2017 and December 31, 2016, respectively, approximately half of which is reserve-based lending to the Exploration & Production sub-sector; unsecured exposure is largely investment-grade.

(d) Represents drawn exposure as a percentage of credit exposure.

Loans

In the normal course of its wholesale business, the Firm provides loans to a variety of clients, ranging from large corporate and institutional clients to high-net-worth individuals. For further discussion on loans, including information on credit quality indicators and sales of loans, see Note 12.

The following table presents the change in the nonaccrual loan portfolio for the years ended December 31, 2017 and 2016.

Wholesale nonaccrual loan activity^(a)

Year ended December 31, (in millions)	2017	2016
Beginning balance	\$ 2,063	\$ 1,016
Additions	1,482	2,981
Reductions:		
Paydowns and other	1,137	1,148
Gross charge-offs	200	385
Returned to performing status	189	242
Sales	285	159
Total reductions	1,811	1,934
Net changes	(329)	1,047
Ending balance	\$ 1,734	\$ 2,063

(a) Loans are placed on nonaccrual status when management believes full payment of principal or interest is not expected, regardless of delinquency status, or when principal or interest have been in default for a period of 90 days or more unless the loan is both well-secured and in the process of collection.

The following table presents net charge-offs/recoveries, which are defined as gross charge-offs less recoveries, for the years ended December 31, 2017 and 2016. The amounts in the table below do not include gains or losses from sales of nonaccrual loans.

Wholesale net charge-offs/(recoveries)

Year ended December 31, (in millions, except ratios)	2017	2016
Loans - reported		
Average loans retained	\$ 392,263	\$ 371,778
Gross charge-offs	212	398
Gross recoveries	(93)	(57)
Net charge-offs	119	341
Net charge-off rate	0.03%	0.09%

Lending-related commitments

The Firm uses lending-related financial instruments, such as commitments (including revolving credit facilities) and guarantees, to meet the financing needs of its clients. The contractual amounts of these financial instruments represent the maximum possible credit risk should the counterparties draw down on these commitments or the Firm fulfill its obligations under these guarantees, and the counterparties subsequently fail to perform according to the terms of these contracts. Most of these commitments and guarantees are refinanced, extended, cancelled, or expire without being drawn upon or a default occurring. In the Firm's view, the total contractual amount of these wholesale lending-related commitments is not representative of the Firm's expected future credit exposure or funding requirements. For further information on wholesale lending-related commitments, see Note 27.

Clearing services

The Firm provides clearing services for clients entering into securities and derivative transactions. Through the provision of these services the Firm is exposed to the risk of non-performance by its clients and may be required to share in losses incurred by central counterparties. Where possible, the Firm seeks to mitigate its credit risk to its clients through the collection of adequate margin at inception and throughout the life of the transactions and can also cease provision of clearing services if clients do not adhere to their obligations under the clearing agreement. For further discussion of clearing services, see Note 27.

Management's discussion and analysis

Derivative contracts

In the normal course of business, the Firm uses derivative instruments predominantly for market-making activities. Derivatives enable counterparties to manage exposures to fluctuations in interest rates, currencies and other markets. The Firm also uses derivative instruments to manage its own credit and other market risk exposure. The nature of the counterparty and the settlement mechanism of the derivative affect the credit risk to which the Firm is exposed. For OTC derivatives the Firm is exposed to the credit risk of the derivative counterparty. For exchange-traded derivatives ("ETD"), such as futures and options, and "cleared" over-the-counter ("OTC-cleared") derivatives, the Firm is generally exposed to the credit risk of the relevant CCP. Where possible, the Firm seeks to mitigate its credit risk exposures arising from derivative transactions through the use of legally enforceable master netting arrangements and collateral agreements. For further discussion of derivative contracts, counterparties and settlement types, see Note 5.

The following table summarizes the net derivative receivables for the periods presented.

Derivative receivables

December 31, (in millions)	2017	2016
Interest rate	\$ 24,673	\$ 28,302
Credit derivatives	869	1,294
Foreign exchange	16,151	23,271
Equity	7,882	4,939
Commodity	6,948	6,272
Total, net of cash collateral	56,523	64,078
Liquid securities and other cash collateral held against derivative receivables ^(a)	(16,108)	(22,705)
Total, net of all collateral	\$ 40,415	\$ 41,373

(a) Includes collateral related to derivative instruments where an appropriate legal opinion has not been either sought or obtained.

Derivative receivables reported on the Consolidated balance sheets were \$56.5 billion and \$64.1 billion at December 31, 2017 and 2016, respectively. Derivative receivables decreased predominantly as a result of client-driven market-making activities in CIB Markets, which reduced foreign exchange and interest rate derivative receivables, and increased equity derivative receivables, driven by market movements.

Derivative receivables amounts represent the fair value of the derivative contracts after giving effect to legally enforceable master netting agreements and cash collateral held by the Firm. However, in management's view, the appropriate measure of current credit risk should also take into consideration additional liquid securities (primarily U.S. government and agency securities and other group of seven nations ("G7") government bonds) and other cash collateral held by the Firm aggregating \$16.1 billion and \$22.7 billion at December 31, 2017 and 2016, respectively, that may be used as security when the fair value of the client's exposure is in the Firm's favor.

In addition to the collateral described in the preceding paragraph, the Firm also holds additional collateral (primarily cash, G7 government securities, other liquid government-agency and guaranteed securities, and corporate debt and equity securities) delivered by clients at the initiation of transactions, as well as collateral related to contracts that have a non-daily call frequency and collateral that the Firm has agreed to return but has not yet settled as of the reporting date. Although this collateral does not reduce the balances and is not included in the table above, it is available as security against potential exposure that could arise should the fair value of the client's derivative transactions move in the Firm's favor. The derivative receivables fair value, net of all collateral, also does not include other credit enhancements, such as letters of credit. For additional information on the Firm's use of collateral agreements, see Note 5.

While useful as a current view of credit exposure, the net fair value of the derivative receivables does not capture the potential future variability of that credit exposure. To capture the potential future variability of credit exposure, the Firm calculates, on a client-by-client basis, three measures of potential derivatives-related credit loss: Peak, Derivative Risk Equivalent ("DRE"), and Average exposure ("AVG"). These measures all incorporate netting and collateral benefits, where applicable.

Peak represents a conservative measure of potential exposure to a counterparty calculated in a manner that is broadly equivalent to a 97.5% confidence level over the life of the transaction. Peak is the primary measure used by the Firm for setting of credit limits for derivative transactions, senior management reporting and derivatives exposure management. DRE exposure is a measure that expresses the risk of derivative exposure on a basis intended to be equivalent to the risk of loan exposures. DRE is a less extreme measure of potential credit loss than Peak and is used for aggregating derivative credit risk exposures with loans and other credit risk.

Finally, AVG is a measure of the expected fair value of the Firm's derivative receivables at future time periods, including the benefit of collateral. AVG exposure over the total life of the derivative contract is used as the primary metric for pricing purposes and is used to calculate credit risk capital and the CVA, as further described below. The three year AVG exposure was \$29.0 billion and \$31.1 billion at December 31, 2017 and 2016, respectively, compared with derivative receivables, net of all collateral, of \$40.4 billion and \$41.4 billion at December 31, 2017 and 2016, respectively.

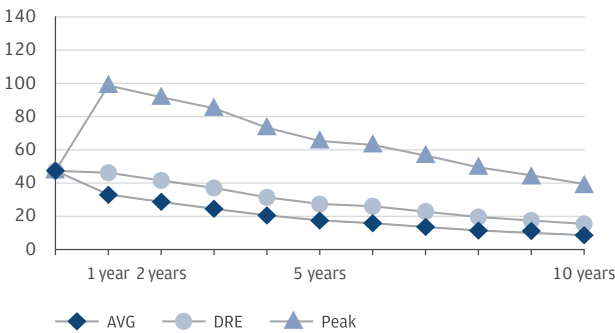
The fair value of the Firm's derivative receivables incorporates CVA to reflect the credit quality of counterparties. CVA is based on the Firm's AVG to a counterparty and the counterparty's credit spread in the credit derivatives market. The Firm believes that active risk management is essential to controlling the dynamic credit risk in the derivatives portfolio. In addition, the Firm's risk management process takes into consideration the potential

impact of wrong-way risk, which is broadly defined as the potential for increased correlation between the Firm’s exposure to a counterparty (AVG) and the counterparty’s credit quality. Many factors may influence the nature and magnitude of these correlations over time. To the extent that these correlations are identified, the Firm may adjust the CVA associated with that counterparty’s AVG. The Firm risk manages exposure to changes in CVA by entering into credit derivative transactions, as well as interest rate, foreign exchange, equity and commodity derivative transactions.

The accompanying graph shows exposure profiles to the Firm’s current derivatives portfolio over the next 10 years as calculated by the Peak, DRE and AVG metrics. The three measures generally show that exposure will decline after the first year, if no new trades are added to the portfolio.

Exposure profile of derivatives measures

December 31, 2017
(in billions)



The following table summarizes the ratings profile by derivative counterparty of the Firm’s derivative receivables, including credit derivatives, net of all collateral, at the dates indicated. The ratings scale is based on the Firm’s internal ratings, which generally correspond to the ratings as assigned by S&P and Moody’s.

Ratings profile of derivative receivables

Rating equivalent December 31, (in millions, except ratios)	2017		2016	
	Exposure net of all collateral	% of exposure net of all collateral	Exposure net of all collateral	% of exposure net of all collateral
AAA/Aaa to AA-/Aa3	\$ 11,529	29%	\$ 11,449	28%
A+/A1 to A-/A3	6,919	17	8,505	20
BBB+/Baa1 to BBB-/Baa3	13,925	34	13,127	32
BB+/Ba1 to B-/B3	7,397	18	7,308	18
CCC+/Caa1 and below	645	2	984	2
Total	\$ 40,415	100%	\$ 41,373	100%

As previously noted, the Firm uses collateral agreements to mitigate counterparty credit risk. The percentage of the Firm’s over-the-counter derivatives transactions subject to collateral agreements – excluding foreign exchange spot trades, which are not typically covered by collateral agreements due to their short maturity and centrally cleared trades that are settled daily – was approximately 90% as of December 31, 2017, largely unchanged compared with December 31, 2016.

Credit derivatives

The Firm uses credit derivatives for two primary purposes: first, in its capacity as a market-maker, and second, as an end-user to manage the Firm’s own credit risk associated with various exposures. For a detailed description of credit derivatives, see Credit derivatives in Note 5.

Credit portfolio management activities

Included in the Firm’s end-user activities are credit derivatives used to mitigate the credit risk associated with traditional lending activities (loans and unfunded commitments) and derivatives counterparty exposure in the Firm’s wholesale businesses (collectively, “credit portfolio management” activities). Information on credit portfolio management activities is provided in the table below. For further information on derivatives used in credit portfolio management activities, see Credit derivatives in Note 5.

The Firm also uses credit derivatives as an end-user to manage other exposures, including credit risk arising from certain securities held in the Firm’s market-making businesses. These credit derivatives are not included in credit portfolio management activities; for further information on these credit derivatives as well as credit derivatives used in the Firm’s capacity as a market-maker in credit derivatives, see Credit derivatives in Note 5.

Management's discussion and analysis

Credit derivatives used in credit portfolio management activities

December 31, (in millions)	Notional amount of protection purchased ^(a)	
	2017	2016
Credit derivatives used to manage:		
Loans and lending-related commitments	\$ 1,867	\$ 2,430
Derivative receivables	15,742	19,684
Credit derivatives used in credit portfolio management activities	\$ 17,609	\$ 22,114

(a) Amounts are presented net, considering the Firm's net protection purchased or sold with respect to each underlying reference entity or index.

The credit derivatives used in credit portfolio management activities do not qualify for hedge accounting under U.S. GAAP; these derivatives are reported at fair value, with gains and losses recognized in principal transactions revenue. In contrast, the loans and lending-related commitments being risk-managed are accounted for on an accrual basis. This asymmetry in accounting treatment,

between loans and lending-related commitments and the credit derivatives used in credit portfolio management activities, causes earnings volatility that is not representative, in the Firm's view, of the true changes in value of the Firm's overall credit exposure.

The effectiveness of credit default swaps ("CDS") as a hedge against the Firm's exposures may vary depending on a number of factors, including the named reference entity (i.e., the Firm may experience losses on specific exposures that are different than the named reference entities in the purchased CDS); the contractual terms of the CDS (which may have a defined credit event that does not align with an actual loss realized by the Firm); and the maturity of the Firm's CDS protection (which in some cases may be shorter than the Firm's exposures). However, the Firm generally seeks to purchase credit protection with a maturity date that is the same or similar to the maturity date of the exposure for which the protection was purchased, and remaining differences in maturity are actively monitored and managed by the Firm.

ALLOWANCE FOR CREDIT LOSSES

JPMorgan Chase's allowance for credit losses covers the retained consumer and wholesale loan portfolios, as well as the Firm's wholesale and certain consumer lending-related commitments.

For a further discussion of the components of the allowance for credit losses and related management judgments, see Critical Accounting Estimates Used by the Firm on pages 138-140 and Note 13.

At least quarterly, the allowance for credit losses is reviewed by the CRO, the CFO and the Controller of the Firm, and discussed with the Board of Directors' Risk Policy Committee ("DRPC") and the Audit Committee. As of December 31, 2017, JPMorgan Chase deemed the allowance for credit losses to be appropriate and sufficient to absorb probable credit losses inherent in the portfolio.

The allowance for credit losses decreased as of December 31, 2017, driven by:

- a net reduction in the wholesale allowance, reflecting credit quality improvements in the Oil & Gas, Natural Gas Pipelines, and Metals & Mining portfolios (compared with additions to the allowance in the prior year driven by downgrades in the same portfolios)

largely offset by

- a net increase in the consumer allowance, reflecting
 - additions to the allowance for the credit card and business banking portfolios, driven by loan growth in both of these portfolios and higher loss rates in the credit card portfolio,

largely offset by

- a reduction in the allowance for the residential real estate portfolio, predominantly driven by continued improvement in home prices and delinquencies, and
- the utilization of the allowance in connection with the sale of the student loan portfolio.

For additional information on the consumer and wholesale credit portfolios, see Consumer Credit Portfolio on pages 102-107, Wholesale Credit Portfolio on pages 108-116 and Note 12.

Management's discussion and analysis

Summary of changes in the allowance for credit losses

Year ended December 31, (in millions, except ratios)	2017				2016			
	Consumer, excluding credit card	Credit card	Wholesale	Total	Consumer, excluding credit card	Credit card	Wholesale	Total
Allowance for loan losses								
Beginning balance at January 1,	\$ 5,198	\$ 4,034	\$ 4,544	\$ 13,776	\$ 5,806	\$ 3,434	\$ 4,315	\$ 13,555
Gross charge-offs	1,779	4,521	212	6,512	1,500	3,799	398	5,697
Gross recoveries	(634)	(398)	(93)	(1,125)	(591)	(357)	(57)	(1,005)
Net charge-offs^(a)	1,145	4,123	119	5,387	909	3,442	341	4,692
Write-offs of PCI loans ^(b)	86	—	—	86	156	—	—	156
Provision for loan losses	613	4,973	(286)	5,300	467	4,042	571	5,080
Other	(1)	—	2	1	(10)	—	(1)	(11)
Ending balance at December 31,	\$ 4,579	\$ 4,884	\$ 4,141	\$ 13,604	\$ 5,198	\$ 4,034	\$ 4,544	\$ 13,776
Impairment methodology								
Asset-specific ^(c)	\$ 246	\$ 383	\$ 461	\$ 1,090	\$ 308	\$ 358	\$ 342	\$ 1,008
Formula-based	2,108	4,501	3,680	10,289	2,579	3,676	4,202	10,457
PCI	2,225	—	—	2,225	2,311	—	—	2,311
Total allowance for loan losses	\$ 4,579	\$ 4,884	\$ 4,141	\$ 13,604	\$ 5,198	\$ 4,034	\$ 4,544	\$ 13,776
Allowance for lending-related commitments								
Beginning balance at January 1,	\$ 26	\$ —	\$ 1,052	\$ 1,078	\$ 14	\$ —	\$ 772	\$ 786
Provision for lending-related commitments	7	—	(17)	(10)	—	—	281	281
Other	—	—	—	—	12	—	(1)	11
Ending balance at December 31,	\$ 33	\$ —	\$ 1,035	\$ 1,068	\$ 26	\$ —	\$ 1,052	\$ 1,078
Impairment methodology								
Asset-specific	\$ —	\$ —	\$ 187	\$ 187	\$ —	\$ —	\$ 169	\$ 169
Formula-based	33	—	848	881	26	—	883	909
Total allowance for lending-related commitments^(d)	\$ 33	\$ —	\$ 1,035	\$ 1,068	\$ 26	\$ —	\$ 1,052	\$ 1,078
Total allowance for credit losses	\$ 4,612	\$ 4,884	\$ 5,176	\$ 14,672	\$ 5,224	\$ 4,034	\$ 5,596	\$ 14,854
Memo:								
Retained loans, end of period	\$ 372,553	\$ 149,387	\$ 402,898	\$ 924,838	\$ 364,406	\$ 141,711	\$ 383,790	\$ 889,907
Retained loans, average	366,798	139,918	392,263	898,979	358,486	131,081	371,778	861,345
PCI loans, end of period	30,576	—	3	30,579	35,679	—	3	35,682
Credit ratios								
Allowance for loan losses to retained loans	1.23%	3.27%	1.03%	1.47%	1.43%	2.85%	1.18%	1.55%
Allowance for loan losses to retained nonaccrual loans ^(e)	109	NM	239	229	109	NM	233	205
Allowance for loan losses to retained nonaccrual loans excluding credit card	109	NM	239	147	109	NM	233	145
Net charge-off rate ^(a)	0.31	2.95	0.03	0.60	0.25	2.63	0.09	0.54
Credit ratios, excluding residential real estate PCI loans								
Allowance for loan losses to retained loans	0.69	3.27	1.03	1.27	0.88	2.85	1.18	1.34
Allowance for loan losses to retained nonaccrual loans ^(e)	56	NM	239	191	61	NM	233	171
Allowance for loan losses to retained nonaccrual loans excluding credit card	56	NM	239	109	61	NM	233	111
Net charge-off rate ^(a)	0.34%	2.95%	0.03%	0.62%	0.28%	2.63%	0.09%	0.57%

Note: In the table above, the financial measures which exclude the impact of PCI loans are non-GAAP financial measures.

- (a) For the year ended December 31, 2017, excluding net charge-offs of \$467 million related to the student loan portfolio sale, the net charge-off rate for Consumer, excluding credit card would have been 0.18%; total Firm would have been 0.55%; Consumer, excluding credit card and PCI loans would have been 0.20%; and total Firm, excluding PCI would have been 0.57%.
- (b) Write-offs of PCI loans are recorded against the allowance for loan losses when actual losses for a pool exceed estimated losses that were recorded as purchase accounting adjustments at the time of acquisition. A write-off of a PCI loan is recognized when the underlying loan is removed from a pool (e.g., upon liquidation).
- (c) Includes risk-rated loans that have been placed on nonaccrual status and loans that have been modified in a TDR. The asset-specific credit card allowance for loan losses modified in a TDR is calculated based on the loans' original contractual interest rates and does not consider any incremental penalty rates.
- (d) The allowance for lending-related commitments is reported in accounts payable and other liabilities on the Consolidated balance sheets.
- (e) The Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status as permitted by regulatory guidance.

Provision for credit losses

The following table presents the components of the Firm's provision for credit losses:

Year ended December 31, (in millions)	Provision for loan losses			Provision for lending-related commitments			Total provision for credit losses		
	2017	2016	2015	2017	2016	2015	2017	2016	2015
Consumer, excluding credit card	\$ 613	\$ 467	\$ (82)	\$ 7	\$ —	\$ 1	\$ 620	\$ 467	\$ (81)
Credit card	4,973	4,042	3,122	—	—	—	4,973	4,042	3,122
Total consumer	5,586	4,509	3,040	7	—	1	5,593	4,509	3,041
Wholesale	(286)	571	623	(17)	281	163	(303)	852	786
Total	\$ 5,300	\$ 5,080	\$ 3,663	\$ (10)	\$ 281	\$ 164	\$ 5,290	\$ 5,361	\$ 3,827

Provision for credit losses

The provision for credit losses decreased as of December 31, 2017 as a result of:

- a net \$422 million reduction in the wholesale allowance for credit losses, reflecting credit quality improvements in the Oil & Gas, Natural Gas Pipelines, and Metals & Mining portfolios, compared with an addition of \$511 million in the prior year driven by downgrades in the same portfolios.

The decrease was predominantly offset by

- a higher consumer provision driven by
 - \$450 million of higher net charge-offs, primarily in the credit card portfolio due to growth in newer vintages which, as anticipated, have higher loss rates than the more seasoned portion of the portfolio, partially offset by a decrease in net charge-offs in the residential real estate portfolio reflecting continued improvement in home prices and delinquencies,
 - a \$218 million impact in connection with the sale of the student loan portfolio, and
 - a \$416 million higher addition to the allowance for credit losses.

Current year additions to the consumer allowance included:

- an \$850 million addition to the allowance for credit losses in the credit card portfolio, compared to a \$600 million addition in the prior year, due to higher loss rates and loan growth in both years, and
- a \$50 million addition to the allowance for credit losses in the business banking portfolio, driven by loan growth

the additions were partially offset by

- a \$316 million net reduction in the allowance for credit losses in the residential real estate portfolio, compared to a \$517 million net reduction in the prior year, reflecting continued improvement in home prices and delinquencies in both years.

INVESTMENT PORTFOLIO RISK MANAGEMENT

Investment portfolio risk is the risk associated with the loss of principal or a reduction in expected returns on investments arising from the investment securities portfolio held by Treasury and CIO in connection with the Firm's balance sheet or asset-liability management objectives or from principal investments managed in various LOBs in predominantly privately-held financial assets and instruments. Investments are typically intended to be held over extended periods and, accordingly, the Firm has no expectation for short-term realized gains with respect to these investments.

Investment securities risk

Investment securities risk includes the exposure associated with the default of principal plus coupon payments. This risk is minimized given that Treasury and CIO generally invest in high-quality securities. At December 31, 2017, the investment securities portfolio was \$248.0 billion, and the average credit rating of the securities comprising the portfolio was AA+ (based upon external ratings where available and where not available, based primarily upon internal ratings that correspond to ratings as defined by S&P and Moody's). For further information on the investment securities portfolio, see Note 10 on pages 203-208. For further information on the market risk inherent in the portfolio, see Market Risk Management on pages 121-128. For further information on related liquidity risk, see Liquidity Risk on pages 92-97.

Governance and oversight

Investment securities risks are governed by the Firm's Risk Appetite framework, and discussed at the CIO, Treasury and Corporate (CTC) Risk Committee with regular updates to the DRPC.

The Firm's independent control functions are responsible for reviewing the appropriateness of the carrying value of investment securities in accordance with relevant policies. Approved levels for investment securities are established for each risk category, including capital and credit risks.

Principal investment risk

Principal investments are typically private non-traded financial instruments representing ownership or other forms of junior capital. Principal investments cover multiple asset classes and are made either in stand-alone investing businesses or as part of a broader business platform. As of December 31, 2017, the carrying value of the principal investment portfolios included tax-oriented investments (e.g., affordable housing and alternative energy investments) of \$14.0 billion and private equity and various debt and equity instruments of \$5.5 billion. Increasingly, new principal investment activity seeks to enhance or accelerate LOB strategic business initiatives. The Firm's principal investments are managed under various LOBs and are reflected within the respective LOB financial results.

Governance and oversight

The Firm's approach to managing principal risk is consistent with the Firm's general risk governance structure. A Firmwide risk policy framework exists for all principal investing activities. All investments are approved by investment committees that include executives who are independent from the investing businesses.

The Firm's independent control functions are responsible for reviewing the appropriateness of the carrying value of investments in accordance with relevant policies. Approved levels for investments are established for each relevant business in order to manage the overall size of the portfolios.

Industry, geographic and position level concentration limits have been set and are intended to ensure diversification of the portfolios. The Firm also conducts stress testing on these portfolios using specific scenarios that estimate losses based on significant market moves and/or other risk events.

MARKET RISK MANAGEMENT

Market risk is the risk associated with the effect of changes in market factors, such as interest and foreign exchange rates, equity and commodity prices, credit spreads or implied volatilities, on the value of assets and liabilities held for both the short and long term.

Market Risk Management

Market Risk Management monitors market risks throughout the Firm and defines market risk policies and procedures. The Market Risk Management function reports to the Firm's CRO.

Market Risk Management seeks to manage risk, facilitate efficient risk/return decisions, reduce volatility in operating performance and provide transparency into the Firm's market risk profile for senior management, the Board of Directors and regulators. Market Risk Management is responsible for the following functions:

- Establishment of a market risk policy framework
- Independent measurement, monitoring and control of line of business and firmwide market risk
- Definition, approval and monitoring of limits
- Performance of stress testing and qualitative risk assessments

Risk measurement

Tools used to measure risk

There is no single measure to capture market risk and therefore the Firm uses various metrics, both statistical and nonstatistical, to assess risk including:

- VaR
- Economic-value stress testing
- Nonstatistical risk measures
- Loss advisories
- Profit and loss drawdowns
- Earnings-at-risk
- Other sensitivities

Risk monitoring and control

Market risk exposure is managed primarily through a series of limits set in the context of the market environment and business strategy. In setting limits, the Firm takes into consideration factors such as market volatility, product liquidity and accommodation of client business, and management experience. The Firm maintains different levels of limits. Corporate level limits include VaR and stress limits. Similarly, line of business limits include VaR and stress limits and may be supplemented by loss advisories, nonstatistical measurements and profit and loss drawdowns. Limits may also be set within the lines of business, as well at the portfolio or legal entity level.

Market Risk Management sets limits and regularly reviews and updates them as appropriate, with any changes approved by line of business management and Market Risk Management. Senior management, including the Firm's CEO and CRO, are responsible for reviewing and approving certain of these risk limits on an ongoing basis. All limits that have not been reviewed within specified time periods by Market Risk Management are escalated to senior management. The lines of business are responsible for adhering to established limits against which exposures are monitored and reported.

Limit breaches are required to be reported in a timely manner to limit approvers, Market Risk Management and senior management. In the event of a breach, Market Risk Management consults with senior management of the Firm and the line of business senior management to determine the appropriate course of action required to return the applicable positions to compliance, which may include a reduction in risk in order to remedy the breach. Certain Firm or line of business-level limits that have been breached for three business days or longer, or by more than 30%, are escalated to senior management and the Firmwide Risk Committee.

Management's discussion and analysis

The following table summarizes by line of business the predominant business activities that give rise to market risk, and certain market risk tools used to measure those risks.

Risk identification and classification by line of business

Line of Business	Predominant business activities and related market risks	Positions included in Risk Management VaR	Positions included in earnings-at-risk	Positions included in other sensitivity-based measures
CCB	- Services mortgage loans which give rise to complex, non-linear interest rate and basis risk - Non-linear risk arises primarily from prepayment options embedded in mortgages and changes in the probability of newly originated mortgage commitments actually closing - Basis risk results from differences in the relative movements of the rate indices underlying mortgage exposure and other interest rates - Originates loans and takes deposits	- Mortgage pipeline loans, classified as derivatives - Warehouse loans, classified as trading assets - debt instruments - MSRs - Hedges of pipeline loans, warehouse loans and MSRs, classified as derivatives - Interest-only securities, classified as trading assets - debt instruments, and related hedges, classified as derivatives	- Retained loan portfolio - Deposits	
CIB	- Makes markets and services clients across fixed income, foreign exchange, equities and commodities - Market risk arises from changes in market prices (e.g., rates and credit spreads) resulting in a potential decline in net income - Originates loans and takes deposits	- Trading assets/liabilities - debt and marketable equity instruments, and derivatives, including hedges of the retained loan portfolio - Certain securities purchased, loaned or sold under resale agreements and securities borrowed - Fair value option elected liabilities - Derivative CVA and associated hedges	- Retained loan portfolio - Deposits	- Private equity investments measured at fair value - Derivatives FVA and fair value option elected liabilities DVA
CB	- Engages in traditional wholesale banking activities which include extensions of loans and credit facilities and taking deposits - Risk arises from changes in interest rates and prepayment risk with potential for adverse impact on net interest income and interest-rate sensitive fees		- Retained loan portfolio - Deposits	
AWM	- Provides initial capital investments in products such as mutual funds, which give rise to market risk arising from changes in market prices in such products - Originates loans and takes deposits	Debt securities held in advance of distribution to clients, classified as trading assets - debt instruments	- Retained loan portfolio - Deposits	- Initial seed capital investments and related hedges, classified as derivatives - Capital invested alongside third-party investors, typically in privately distributed collective vehicles managed by AWM (i.e., co-investments)
Corporate	Manages the Firm's liquidity, funding, structural interest rate and foreign exchange risks arising from activities undertaken by the Firm's four major reportable business segments	- Derivative positions measured at fair value through noninterest revenue in earnings - Marketable equity investments measured at fair value through noninterest revenue in earnings	- Deposits with banks - Investment securities portfolio and related interest rate hedges - Long-term debt and related interest rate hedges	- Private equity investments measured at fair value - Foreign exchange exposure related to Firm-issued non-USD long-term debt ("LTD") and related hedges

Value-at-risk

JPMorgan Chase utilizes VaR, a statistical risk measure, to estimate the potential loss from adverse market moves in a normal market environment. The Firm has a single VaR framework used as a basis for calculating Risk Management VaR and Regulatory VaR.

The framework is employed across the Firm using historical simulation based on data for the previous 12 months. The framework's approach assumes that historical changes in market values are representative of the distribution of potential outcomes in the immediate future. The Firm believes the use of Risk Management VaR provides a stable measure of VaR that is closely aligned to the day-to-day risk management decisions made by the lines of business, and provides the appropriate information needed to respond to risk events on a daily basis.

The Firm's Risk Management VaR is calculated assuming a one-day holding period and an expected tail-loss methodology which approximates a 95% confidence level. Risk Management VaR provides a consistent framework to measure risk profiles and levels of diversification across product types and is used for aggregating risks and monitoring limits across businesses. VaR results are reported to senior management, the Board of Directors and regulators.

Under the Firm's Risk Management VaR methodology, assuming current changes in market values are consistent with the historical changes used in the simulation, the Firm would expect to incur VaR "back-testing exceptions," defined as losses greater than that predicted by VaR estimates, an average of five times every 100 trading days. The number of VaR back-testing exceptions observed can differ from the statistically expected number of back-testing exceptions if the current level of market volatility is materially different from the level of market volatility during the 12 months of historical data used in the VaR calculation.

Underlying the overall VaR model framework are individual VaR models that simulate historical market returns for individual products and/or risk factors. To capture material market risks as part of the Firm's risk management framework, comprehensive VaR model calculations are performed daily for businesses whose activities give rise to market risk. These VaR models are granular and incorporate numerous risk factors and inputs to simulate daily changes in market values over the historical period; inputs are selected based on the risk profile of each portfolio, as sensitivities and historical time series used to generate daily market values may be different across product types or risk management systems. The VaR model results across all portfolios are aggregated at the Firm level.

As VaR is based on historical data, it is an imperfect measure of market risk exposure and potential losses, and it is not used to estimate the impact of stressed market conditions or to manage any impact from potential stress events. In addition, based on their reliance on available historical data, limited time horizons, and other factors, VaR measures are inherently limited in their ability to measure certain risks and to predict losses, particularly those associated with market illiquidity and sudden or severe shifts in market conditions.

For certain products, specific risk parameters are not captured in VaR due to the lack of inherent liquidity and availability of appropriate historical data. The Firm uses proxies to estimate the VaR for these and other products when daily time series are not available. It is likely that using an actual price-based time series for these products, if available, would affect the VaR results presented. The Firm therefore considers other measures such as stress testing and nonstatistical measures, in addition to VaR, to capture and manage its market risk positions.

The daily market data used in VaR models may be different than the independent third-party data collected for VCG price testing in its monthly valuation process. For example, in cases where market prices are not observable, or where proxies are used in VaR historical time series, the data sources may differ (see Valuation process in Note 2 for further information on the Firm's valuation process). Because VaR model calculations require daily data and a consistent source for valuation, it may not be practical to use the data collected in the VCG monthly valuation process for VaR model calculations.

The Firm's VaR model calculations are periodically evaluated and enhanced in response to changes in the composition of the Firm's portfolios, changes in market conditions, improvements in the Firm's modeling techniques and measurements, and other factors. Such changes may affect historical comparisons of VaR results. For information regarding model reviews and approvals, see Model Risk Management on page 137.

The Firm calculates separately a daily aggregated VaR in accordance with regulatory rules ("Regulatory VaR"), which is used to derive the Firm's regulatory VaR-based capital requirements under Basel III. This Regulatory VaR model framework currently assumes a ten business-day holding period and an expected tail loss methodology which approximates a 99% confidence level. Regulatory VaR is applied to "covered" positions as defined by Basel III, which may be different than the positions included in the Firm's Risk Management VaR. For example, credit derivative hedges of accrual loans are included in the Firm's Risk Management VaR, while Regulatory VaR excludes these credit derivative hedges. In addition, in contrast to the Firm's Risk Management VaR, Regulatory VaR currently excludes the diversification benefit for certain VaR models.

Management's discussion and analysis

For additional information on Regulatory VaR and the other components of market risk regulatory capital for the Firm (e.g., VaR-based measure, stressed VaR-based measure and the respective backtesting), see JPMorgan Chase's Basel III

Pillar 3 Regulatory Capital Disclosures reports, which are available on the Firm's website at: (<http://investor.shareholder.com/jpmorganchase/basel.cfm>).

The table below shows the results of the Firm's Risk Management VaR measure using a 95% confidence level.

Total VaR

As of or for the year ended December 31, (in millions)	2017			2016		
	Avg.	Min	Max	Avg.	Min	Max
CIB trading VaR by risk type						
Fixed income	\$ 28	\$ 20	\$ 40	\$ 45	\$ 33	\$ 65
Foreign exchange	10	4	20	12	7	27
Equities	12	8	19	13	5	32
Commodities and other	7	4	10	9	7	11
Diversification benefit to CIB trading VaR	(30) ^(a)	NM ^(b)	NM ^(b)	(36) ^(a)	NM ^(b)	NM ^(b)
CIB trading VaR	27	14 ^(b)	38 ^(b)	43	28 ^(b)	79 ^(b)
Credit portfolio VaR	7	3	12	12	10	16
Diversification benefit to CIB VaR	(6) ^(a)	NM ^(b)	NM ^(b)	(10) ^(a)	NM ^(b)	NM ^(b)
CIB VaR	28	17 ^(b)	39 ^(b)	45	32 ^(b)	81 ^(b)
 CCB VaR	 2	 1	 4	 3	 1	 6
Corporate VaR	4	1	16 ^(c)	6	3	13 ^(c)
AWM VaR	—	—	—	2	—	4
Diversification benefit to other VaR	(1) ^(a)	NM ^(b)	NM ^(b)	(3) ^(a)	NM ^(b)	NM ^(b)
Other VaR	5	2 ^(b)	16 ^(b)	8	4 ^(b)	16 ^(b)
Diversification benefit to CIB and other VaR	(4) ^(a)	NM ^(b)	NM ^(b)	(8) ^(a)	NM ^(b)	NM ^(b)
Total VaR	\$ 29	\$ 17 ^(b)	\$ 42 ^(b)	\$ 45	\$ 33 ^(b)	\$ 78 ^(b)

- (a) Average portfolio VaR is less than the sum of the VaR of the components described above, which is due to portfolio diversification. The diversification effect reflects that the risks are not perfectly correlated.
- (b) Diversification benefit represents the difference between the total VaR and each reported level and the sum of its individual components. Diversification benefit reflects the non-additive nature of VaR due to imperfect correlation across lines of business and risk types. The maximum and minimum VaR for each portfolio may have occurred on different trading days than the components and consequently diversification benefit is not meaningful.
- (c) Maximum Corporate VaR was higher than the prior year, due to a Private Equity position that became publicly traded in the fourth quarter of 2017. Previously, this position was included in other sensitivity-based measures.

Average Total VaR decreased \$16 million for the year-ended December 31, 2017 as compared with the prior year. The reduction is a result of refinements made to VaR models for certain asset-backed products, changes made to the scope of positions included in VaR in the third quarter of 2016, and lower volatility in the one-year historical look-back period.

In addition, Credit Portfolio VaR declined by \$5 million reflecting the sale of select positions and lower volatility in the one-year historical look-back period.

In the first quarter of 2017, the Firm refined the historical proxy time series inputs to certain VaR models. These refinements are intended to more appropriately reflect the risk exposure from certain asset-backed products. In the absence of this refinement, the average Total VaR, CIB fixed income VaR, CIB trading VaR and CIB VaR would have each been higher by \$4 million for the year ended December 31, 2017.

VaR can vary significantly as positions change, market volatility fluctuates, and diversification benefits change.

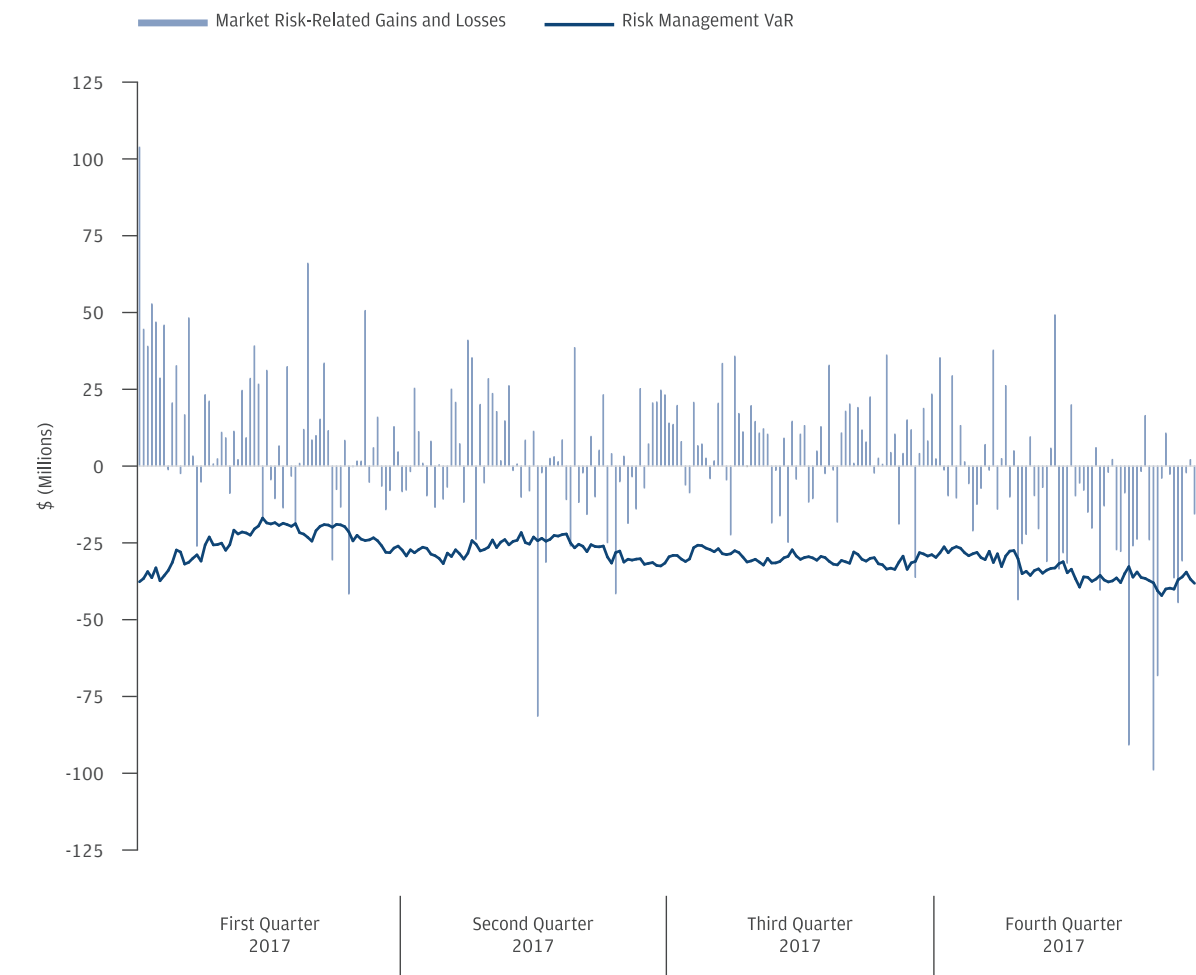
VaR back-testing

The Firm evaluates the effectiveness of its VaR methodology by back-testing, which compares the daily Risk Management VaR results with the daily gains and losses actually recognized on market-risk related revenue.

The Firm's definition of market risk-related gains and losses is consistent with the definition used by the banking regulators under Basel III. Under this definition market risk-related gains and losses are defined as: gains and losses on the positions included in the Firm's Risk Management VaR, excluding fees, commissions, certain valuation adjustments (e.g., liquidity and FVA), net interest income, and gains and losses arising from intraday trading.

The following chart compares actual daily market risk-related gains and losses with the Firm's Risk Management VaR for the year ended December 31, 2017. As the chart presents market risk-related gains and losses related to those positions included in the Firm's Risk Management VaR, the results in the table below differ from the results of back-testing disclosed in the Market Risk section of the Firm's Basel III Pillar 3 Regulatory Capital Disclosures reports, which are based on Regulatory VaR applied to covered positions. The chart shows that for the year ended December 31, 2017 the Firm observed 15 VaR back-testing exceptions and posted gains on 145 of the 258 days.

**Daily Market Risk-Related Gains and Losses
vs. Risk Management VaR (1-day, 95% Confidence level)**
Year ended December 31, 2017



Management's discussion and analysis

Other risk measures

Economic-value stress testing

Along with VaR, stress testing is an important tool in measuring and controlling risk. While VaR reflects the risk of loss due to adverse changes in markets using recent historical market behavior as an indicator of losses, stress testing is intended to capture the Firm's exposure to unlikely but plausible events in abnormal markets. The Firm runs weekly stress tests on market-related risks across the lines of business using multiple scenarios that assume significant changes in risk factors such as credit spreads, equity prices, interest rates, currency rates and commodity prices.

The Firm uses a number of standard scenarios that capture different risk factors across asset classes including geographical factors, specific idiosyncratic factors and extreme tail events. The stress framework calculates multiple magnitudes of potential stress for both market rallies and market sell-offs for each risk factor and combines them in multiple ways to capture different market scenarios. For example, certain scenarios assess the potential loss arising from current exposures held by the Firm due to a broad sell-off in bond markets or an extreme widening in corporate credit spreads. The flexibility of the stress testing framework allows risk managers to construct new, specific scenarios that can be used to form decisions about future possible stress events.

Stress testing complements VaR by allowing risk managers to shock current market prices to more extreme levels relative to those historically realized, and to stress test the relationships between market prices under extreme scenarios. Stress scenarios are defined and reviewed by Market Risk Management, and significant changes are reviewed by the relevant LOB Risk Committees and may be redefined on a periodic basis to reflect current market conditions.

Stress-test results, trends and qualitative explanations based on current market risk positions are reported to the respective LOBs and the Firm's senior management to allow them to better understand the sensitivity of positions to certain defined events and to enable them to manage their risks with more transparency. Results are also reported to the Board of Directors.

The Firm's stress testing framework is utilized in calculating results for the Firm's CCAR and ICAAP processes. In addition, the results are incorporated into the quarterly assessment of the Firm's Risk Appetite Framework and are also presented to the DRPC.

Nonstatistical risk measures

Nonstatistical risk measures include sensitivities to variables used to value positions, such as credit spread sensitivities, interest rate basis point values and market values. These measures provide granular information on the Firm's market risk exposure. They are aggregated by line of business and by risk type, and are also used for monitoring internal market risk limits.

Loss advisories and profit and loss drawdowns

Loss advisories and profit and loss drawdowns are tools used to highlight trading losses above certain levels of risk tolerance. Profit and loss drawdowns are defined as the decline in net profit and loss since the year-to-date peak revenue level.

Earnings-at-risk

The VaR and sensitivity measures illustrate the economic sensitivity of the Firm's Consolidated balance sheets to changes in market variables.

The effect of interest rate exposure on the Firm's reported net income is also important as interest rate risk represents one of the Firm's significant market risks. Interest rate risk arises not only from trading activities but also from the Firm's traditional banking activities, which include extension of loans and credit facilities, taking deposits and issuing debt. The Firm evaluates its structural interest rate risk exposure through earnings-at-risk, which measures the extent to which changes in interest rates will affect the Firm's net interest income and interest rate-sensitive fees. For a summary by line of business, identifying positions included in earnings-at-risk, see the table on page 122.

The CTC Risk Committee establishes the Firm's structural interest rate risk policies and market risk limits, which are subject to approval by the DRPC. Treasury and CIO, working in partnership with the lines of business, calculates the Firm's structural interest rate risk profile and reviews it with senior management including the CTC Risk Committee and the Firm's ALCO. In addition, oversight of structural interest rate risk is managed through a dedicated risk function reporting to the CTC CRO. This risk function is responsible for providing independent oversight and governance around assumptions and establishing and monitoring limits for structural interest rate risk. The Firm manages structural interest rate risk generally through its investment securities portfolio and interest rate derivatives.

Structural interest rate risk can occur due to a variety of factors, including:

- Differences in the timing among the maturity or repricing of assets, liabilities and off-balance sheet instruments
- Differences in the amounts of assets, liabilities and off-balance sheet instruments that are repricing at the same time
- Differences in the amounts by which short-term and long-term market interest rates change (for example, changes in the slope of the yield curve)
- The impact of changes in the maturity of various assets, liabilities or off-balance sheet instruments as interest rates change

The Firm manages interest rate exposure related to its assets and liabilities on a consolidated, firmwide basis. Business units transfer their interest rate risk to Treasury and CIO through funds transfer pricing, which takes into account the elements of interest rate exposure that can be risk-managed in financial markets. These elements include asset and liability balances and contractual rates of interest, contractual principal payment schedules, expected prepayment experience, interest rate reset dates and maturities, rate indices used for repricing, and any interest rate ceilings or floors for adjustable rate products. All transfer-pricing assumptions are dynamically reviewed.

The Firm generates a baseline for net interest income and certain interest rate-sensitive fees, and then conducts simulations of changes for interest rate-sensitive assets and liabilities denominated in U.S. dollars and other currencies (“non-U.S. dollar” currencies). This simulation primarily includes, retained loans, deposits, deposits with banks, investment securities, long term debt and any related interest rate hedges, and excludes other positions in risk management VaR and other sensitivity-based measures as described on page 122.

Earnings-at-risk scenarios estimate the potential change in this baseline, over the following 12 months utilizing multiple assumptions. These scenarios consider the impact on exposures as a result of changes in interest rates from baseline rates, as well as pricing sensitivities of deposits, optionality and changes in product mix. The scenarios include forecasted balance sheet changes, as well as modeled prepayment and reinvestment behavior, but do not include assumptions about actions that could be taken by the Firm in response to any such instantaneous rate changes. Mortgage prepayment assumptions are based on scenario interest rates compared with underlying contractual rates, the time since origination, and other factors which are updated periodically based on historical experience. The pricing sensitivity of deposits in the baseline and scenarios use assumed rates paid which may differ from actual rates paid due to timing lags and other factors. The Firm’s earnings-at-risk scenarios are periodically evaluated and enhanced in response to changes in the composition of the Firm’s balance sheet, changes in market conditions, improvements in the Firm’s simulation and other factors.

The Firm’s U.S. dollar sensitivities are presented in the table below.

JPMorgan Chase’s 12-month earnings-at-risk sensitivity profiles

U.S. dollar (in billions)	Instantaneous change in rates			
	+200 bps	+100 bps	-100 bps	-200 bps
December 31, 2017	\$ 2.4	\$ 1.7	(3.6) ^(a)	NM ^(b)
December 31, 2016	\$ 4.0	\$ 2.4	NM ^(b)	NM ^(b)

(a) As a result of the 2017 increase in the Fed Funds target rate to between 1.25% and 1.50%, the -100 bps sensitivity has been included.

(b) Given the level of market interest rates, these downward parallel earnings-at-risk scenarios are not considered to be meaningful.

The non-U.S. dollar sensitivities for an instantaneous increase in rates by 200 and 100 basis points results in a 12-month benefit to net interest income of approximately \$800 million and \$500 million, respectively, at December 31, 2017 and were not material at December 31, 2016. The non-U.S. dollar sensitivities for an instantaneous decrease in rates by 200 and 100 basis points were not material to the Firm’s earnings-at-risk at December 31, 2017 and 2016.

The Firm’s sensitivity to rates is largely a result of assets repricing at a faster pace than deposits.

The Firm’s net U.S. dollar sensitivities for an instantaneous increase in rates by 200 and 100 basis points decreased by approximately \$1.6 billion and \$700 million, respectively, when compared to December 31, 2016. The primary driver of that decrease was the updating of the Firm’s baseline to reflect higher interest rates. As higher interest rates are reflected in the Firm’s baselines, the magnitude of the sensitivity to further increases in rates would be expected to be less significant.

Separately, another U.S. dollar interest rate scenario used by the Firm – involving a steeper yield curve with long-term rates rising by 100 basis points and short-term rates staying at current levels – results in a 12-month benefit to net interest income of approximately \$700 million and \$800 million at December 31, 2017 and 2016, respectively. The increase in net interest income under this scenario reflects the Firm reinvesting at the higher long-term rates, with funding costs remaining unchanged. The results of the comparable non-U.S. dollar scenarios were not material to the Firm at December 31, 2017 and 2016.

Non-U.S. dollar foreign exchange risk

Non-U.S. dollar FX risk is the risk that changes in foreign exchange rates affect the value of the Firm's assets or liabilities or future results. The Firm has structural non-U.S. dollar FX exposures arising from capital investments, forecasted expense and revenue, the investment securities

portfolio and non-U.S. dollar-denominated debt issuance. Treasury and CIO, working in partnership with the lines of business, primarily manage these risks on behalf of the Firm. Treasury and CIO may hedge certain of these risks using derivatives within risk limits governed by the CTC Risk Committee.

Other sensitivity-based measures

The Firm quantifies the market risk of certain investment and funding activities by assessing the potential impact on net revenue and OCI due to changes in relevant market variables. For additional information on the positions captured in other sensitivity-based measures, please refer to the Risk identification and classification table on page 122.

The table below represents the potential impact to net revenue or OCI for market risk sensitive instruments that are not included in VaR or earnings-at-risk. Where appropriate, instruments used for hedging purposes are reported along with the positions being hedged. The sensitivities disclosed in the table below may not be representative of the actual gain or loss that would have been realized at December 31, 2017, as the movement in market parameters across maturities may vary and are not intended to imply management's expectation of future deterioration in these sensitivities.

Gain/(loss) (in millions)				
Activity	Description	Sensitivity measure	December 31, 2017	December 31, 2016
Investment activities				
Investment management activities	Consists of seed capital and related hedges; and fund co-investments	10% decline in market value	\$ (110)	\$ (166)
Other investments	Consists of private equity and other investments held at fair value	10% decline in market value	(338)	(358)
Funding activities				
Non-USD LTD cross-currency basis	Represents the basis risk on derivatives used to hedge the foreign exchange risk on the non-USD LTD	1 basis point parallel tightening of cross currency basis	(10)	(7)
Non-USD LTD hedges foreign currency ("FX") exposure	Primarily represents the foreign exchange revaluation on the fair value of the derivative hedges	10% depreciation of currency	(13)	(23)
Derivatives - funding spread risk	Impact of changes in the spread related to derivatives FVA	1 basis point parallel increase in spread	(6)	(4)
Fair value option elected liabilities - funding spread risk	Impact of changes in the spread related to fair value option elected liabilities DVA ^(a)	1 basis point parallel increase in spread	22	17
Fair value option elected liabilities - interest rate sensitivity	Interest rate sensitivity on fair value option liabilities resulting from a change in the Firm's own credit spread ^(a)	1 basis point parallel increase in spread	(1)	NA

(a) Impact recognized through OCI.

COUNTRY RISK MANAGEMENT

The Firm has a country risk management framework for monitoring and assessing how financial, economic, political or other significant developments adversely affect the value of the Firm's exposures related to a particular country or set of countries. The Country Risk Management group actively monitors the various portfolios which may be impacted by these developments to ensure the Firm's exposures are diversified and that exposure levels are appropriate given the Firm's strategy and risk tolerance relative to a country.

Organization and management

Country Risk Management is an independent risk management function that assesses, manages and monitors country risk originated across the Firm. The Firmwide Risk Executive for Country Risk reports to the Firm's CRO.

The Firm's country risk management function includes the following activities:

- Establishing policies, procedures and standards consistent with a comprehensive country risk framework
- Assigning sovereign ratings, and assessing country risks and establishing risk tolerance relative to a country
- Measuring and monitoring country risk exposure and stress across the Firm
- Managing and approving country limits and reporting trends and limit breaches to senior management
- Developing surveillance tools, such as signaling models and ratings indicators, for early identification of potential country risk concerns
- Providing country risk scenario analysis

Sources and measurement

The Firm is exposed to country risk through its lending and deposits, investing, and market-making activities, whether cross-border or locally funded. Country exposure includes activity with both government and private-sector entities in a country. Under the Firm's internal country risk management approach, country exposure is reported based on the country where the majority of the assets of the obligor, counterparty, issuer or guarantor are located or where the majority of its revenue is derived, which may be different than the domicile (legal residence) or country of incorporation of the obligor, counterparty, issuer or guarantor. Country exposures are generally measured by considering the Firm's risk to an immediate default of the counterparty or obligor, with zero recovery. Assumptions are sometimes required in determining the measurement and allocation of country exposure, particularly in the case of certain non-linear or index exposures. The use of different measurement approaches or assumptions could affect the amount of reported country exposure.

Under the Firm's internal country risk measurement framework:

- Lending exposures are measured at the total committed amount (funded and unfunded), net of the allowance for credit losses and cash and marketable securities collateral received
- Deposits are measured as the cash balances placed with central and commercial banks
- Securities financing exposures are measured at their receivable balance, net of collateral received
- Debt and equity securities are measured at the fair value of all positions, including both long and short positions
- Counterparty exposure on derivative receivables is measured at the derivative's fair value, net of the fair value of the related collateral. Counterparty exposure on derivatives can change significantly because of market movements
- Credit derivatives protection purchased and sold is reported based on the underlying reference entity and is measured at the notional amount of protection purchased or sold, net of the fair value of the recognized derivative receivable or payable. Credit derivatives protection purchased and sold in the Firm's market-making activities is measured on a net basis, as such activities often result in selling and purchasing protection related to the same underlying reference entity; this reflects the manner in which the Firm manages these exposures

Some activities may create contingent or indirect exposure related to a country (for example, providing clearing services or secondary exposure to collateral on securities financing receivables). These exposures are managed in the normal course of business through the Firm's credit, market, and operational risk governance, rather than through Country Risk Management.

The Firm's internal country risk reporting differs from the reporting provided under the FFIEC bank regulatory requirements. For further information on the FFIEC's reporting methodology, see Cross-border outstandings on page 296 of the 2017 Form 10-K.

Stress testing

Stress testing is an important component of the Firm's country risk management framework, which aims to estimate and limit losses arising from a country crisis by measuring the impact of adverse asset price movements to a country based on market shocks combined with counterparty specific assumptions. Country Risk Management periodically designs and runs tailored stress scenarios to test vulnerabilities to individual countries, or groups of countries, in response to specific or potential market events, sector performance concerns and geopolitical risks. These tailored stress results are used to assess potential risk reduction across the Firm, as necessary.

Management's discussion and analysis

Risk Reporting

To enable effective risk management of country risk to the Firm, country nominal exposure and stress are measured and reported weekly, and used by Country Risk Management to identify trends, and monitor high usages and breaches against limits.

The following table presents the Firm's top 20 exposures by country (excluding the U.S.) as of December 31, 2017. The selection of countries represents the Firm's largest total exposures by country, based on the Firm's internal country risk management approach, and does not represent the Firm's view of any actual or potentially adverse credit conditions. Country exposures may fluctuate from period to period due to client activity and market flows.

Top 20 country exposures (excluding the U.S.)^(a)

(in billions)	December 31, 2017			
	Lending and deposits ^(b)	Trading and investing ^{(c)(d)}	Other ^(e)	Total exposure
Germany	\$ 43.3	\$ 13.8	\$ 0.3	\$ 57.4
United Kingdom	32.0	11.5	2.8	46.3
Japan	24.7	5.7	0.4	30.8
France	12.5	6.6	0.3	19.4
China	9.6	5.5	1.2	16.3
Canada	12.2	2.5	0.2	14.9
Switzerland	8.5	1.5	3.9	13.9
India	5.3	6.1	0.9	12.3
Australia	5.8	5.6	—	11.4
Luxembourg	8.7	0.8	—	9.5
Netherlands	6.6	0.8	0.6	8.0
Spain	4.7	2.1	0.1	6.9
South Korea	4.6	1.9	0.3	6.8
Italy	3.5	3.1	0.1	6.7
Singapore	4.0	1.2	1.1	6.3
Mexico	4.0	1.2	—	5.2
Brazil	3.2	1.4	0.5	5.1
Hong Kong	2.3	0.9	1.6	4.8
Saudi Arabia	3.8	0.7	—	4.5
Belgium	2.7	1.5	—	4.2

(a) Country exposures above reflect 86% of total firmwide non U.S. exposure.

(b) Lending and deposits includes loans and accrued interest receivable (net of collateral and the allowance for loan losses), deposits with banks (including central banks), acceptances, other monetary assets, issued letters of credit net of participations, and unused commitments to extend credit. Excludes intra-day and operating exposures, such as from settlement and clearing activities.

(c) Includes market-making inventory, AFS securities, counterparty exposure on derivative and securities financings net of collateral and hedging.

(d) Includes single reference entity ("single-name"), index and other multiple reference entity transactions for which one or more of the underlying reference entities is in a country listed in the above table.

(e) Includes capital invested in local entities and physical commodity inventory.

OPERATIONAL RISK MANAGEMENT

Operational risk is the risk associated with inadequate or failed internal processes, people and systems, or from external events; operational risk includes cybersecurity risk, business and technology resiliency risk, payment fraud risk, and third-party outsourcing risk. Operational risk is inherent in the Firm's activities and can manifest itself in various ways, including fraudulent acts, business interruptions, inappropriate employee behavior, failure to comply with applicable laws and regulations or failure of vendors to perform in accordance with their arrangements. These events could result in financial losses, litigation and regulatory fines, as well as other damages to the Firm. The goal is to keep operational risk at appropriate levels in light of the Firm's financial position, the characteristics of its businesses, and the markets and regulatory environments in which it operates.

Operational Risk Management Framework

To monitor and control operational risk, the Firm has an Operational Risk Management Framework ("ORMF") which is designed to enable the Firm to maintain a sound and well-controlled operational environment. The ORMF has four main components: Governance, Risk Identification and Assessment, Measurement, and Monitoring and Reporting.

Governance

The lines of business and corporate functions are responsible for owning and managing their operational risks. The Firmwide Oversight and Control Group, which consists of control officers within each line of business and corporate function, is responsible for the day-to-day execution of the ORMF.

Line of business and corporate function control committees oversee the operational risk and control environments of their respective businesses and functions. These committees escalate operational risk issues to the FCC, as appropriate. For additional information on the FCC, see Enterprise-wide Risk Management on pages 75–137.

The Firmwide Risk Executive for Operational Risk Governance ("ORG"), a direct report to the CRO, is responsible for defining the ORMF and establishing minimum standards for its execution. Operational Risk Officers report to both the line of business CROs and to the Firmwide Risk Executive for ORG, and are independent of the respective businesses or corporate functions they oversee.

The Firm's Operational Risk Governance Policy is approved by the DRPC. This policy establishes the Operational Risk Management Framework for the Firm.

Risk identification and assessment

The Firm utilizes several tools to identify, assess, mitigate and manage its operational risk. One such tool is the Risk and Control Self-Assessment ("RCSA") program which is executed by LOBs and corporate functions in accordance with the minimum standards established by ORG. As part of the RCSA program, lines of business and corporate functions identify key operational risks inherent in their activities, evaluate the effectiveness of relevant controls in place to mitigate identified risks, and define actions to reduce residual risk. Action plans are developed for identified control issues and businesses and corporate functions are held accountable for tracking and resolving issues in a timely manner. Operational Risk Officers independently challenge the execution of the RCSA program and evaluate the appropriateness of the residual risk results.

In addition to the RCSA program, the Firm tracks and monitors events that have led to or could lead to actual operational risk losses, including litigation-related events. Responsible businesses and corporate functions analyze their losses to evaluate the effectiveness of their control environment to assess where controls have failed, and to determine where targeted remediation efforts may be required. ORG provides oversight of these activities and may also perform independent assessments of significant operational risk events and areas of concentrated or emerging risk.

Measurement

In addition to the level of actual operational risk losses, operational risk measurement includes operational risk-based capital and operational risk loss projections under both baseline and stressed conditions.

The primary component of the operational risk capital estimate is the Loss Distribution Approach ("LDA") statistical model, which simulates the frequency and severity of future operational risk loss projections based on historical data. The LDA model is used to estimate an aggregate operational risk loss over a one-year time horizon, at a 99.9% confidence level. The LDA model incorporates actual internal operational risk losses in the quarter following the period in which those losses were realized, and the calculation generally continues to reflect such losses even after the issues or business activities giving rise to the losses have been remediated or reduced.

As required under the Basel III capital framework, the Firm's operational risk-based capital methodology, which uses the Advanced Measurement Approach, incorporates internal and external losses as well as management's view of tail risk captured through operational risk scenario analysis, and evaluation of key business environment and internal control metrics.

Management's discussion and analysis

The Firm considers the impact of stressed economic conditions on operational risk losses and develops a forward looking view of material operational risk events that may occur in a stressed environment. The Firm's operational risk stress testing framework is utilized in calculating results for the Firm's CCAR and ICAAP processes.

For information related to operational risk RWA, CCAR or ICAAP, see Capital Risk Management section, pages 82–91.

Monitoring and reporting

ORG has established standards for consistent operational risk monitoring and reporting. The standards also reinforce escalation protocols to senior management and to the Board of Directors. Operational risk reports are produced on a firmwide basis as well as by line of business and corporate function.

Subcategories and examples of operational risks

As mentioned previously, operational risk can manifest itself in various ways. Operational risk subcategories such as Compliance risk, Conduct risk, Legal risk and Estimations and Model risk, as well as other operational risks, can lead to losses which are captured through the Firm's operational risk measurement processes. More information on Compliance risk, Conduct risk, Legal risk and Estimations and Model risk subcategories are discussed on pages 134, 135, 136 and 137, respectively. Details on other select examples of operational risks are provided below.

Cybersecurity risk

Cybersecurity risk is an important, continuous and evolving focus for the Firm. The Firm devotes significant resources to protecting and continuing to improve the security of the Firm's computer systems, software, networks and other technology assets. The Firm's security efforts are intended to protect against, among other things, cybersecurity attacks by unauthorized parties to obtain access to confidential information, destroy data, disrupt or degrade service, sabotage systems or cause other damage. The Firm continues to make significant investments in enhancing its cyberdefense capabilities and to strengthen its partnerships with the appropriate government and law enforcement agencies and other businesses in order to understand the full spectrum of cybersecurity risks in the operating environment, enhance defenses and improve resiliency against cybersecurity threats. The Firm actively participates in discussions of cybersecurity risks with law enforcement, government officials, peer and industry groups, and has significantly increased efforts to educate employees and certain clients on the topic. Third parties with which the Firm does business or that facilitate the Firm's business activities (e.g., vendors, exchanges, clearing houses, central depositories, and financial intermediaries) could also be sources of cybersecurity risk to the Firm. Third party cybersecurity incidents such as system breakdowns or failures, misconduct by the employees of such parties, or cyberattacks could affect their ability to deliver a product or service to the Firm or result in lost or compromised information of the Firm or its clients. Clients can also be

sources of cybersecurity risk to the Firm, particularly when their activities and systems are beyond the Firm's own security and control systems. As a result, the Firm engages in regular and ongoing discussions with certain vendors and clients regarding cybersecurity risks and opportunities to improve security. However, where cybersecurity incidents are due to client failure to maintain the security of their own systems and processes, clients will generally be responsible for losses incurred.

To protect the confidentiality, integrity and availability of the Firm's infrastructure, resources and information, the Firm leverages the ORMF to ensure risks are identified and managed within defined corporate tolerances. The Firm's Board of Directors and the Audit Committee are regularly briefed on the Firm's cybersecurity policies and practices and ongoing efforts to improve security, as well as its efforts regarding significant cybersecurity events.

Business and technology resiliency risk

Business disruptions can occur due to forces beyond the Firm's control such as severe weather, power or telecommunications loss, flooding, transit strikes, terrorist threats or infectious disease. The safety of the Firm's employees and customers is of the highest priority. The Firm's global resiliency program is intended to enable the Firm to recover its critical business functions and supporting assets (i.e., staff, technology and facilities) in the event of a business interruption. The program includes corporate governance, awareness and training, as well as strategic and tactical initiatives to identify, assess, and manage business interruption and public safety risks.

The strength and proficiency of the Firm's global resiliency program has played an integral role in maintaining the Firm's business operations during and after various events.

Payment fraud risk

Payment fraud risk is the risk of external and internal parties unlawfully obtaining personal monetary benefit through misdirected or otherwise improper payment, and exposing the Firm to financial or reputational harm. Over the past year, the risk of payment fraud remained at a heightened level across the industry. The complexities of these attacks along with perpetrators' strategies continue to evolve. A Payments Control Program has been established that includes Cybersecurity, Operations, Technology, Risk and the lines of business to manage the risk, implement controls and provide employee and client education and awareness training. In addition, a new wholesale fraud detection solution has been introduced which monitors high value payments for certain anomalies. The Firm's monitoring of customer behavior is periodically evaluated and enhanced, and attempts to detect and mitigate new strategies implemented by fraud perpetrators. The Firm's consumer and wholesale businesses collaborate closely to deploy risk mitigation controls across their businesses.

Third-party outsourcing risk

To identify and manage the operational risk inherent in its outsourcing activities, the Firm has a Third-Party Oversight (“TPO”) framework to assist lines of business and corporate functions in selecting, documenting, onboarding, monitoring and managing their supplier relationships. The objective of the TPO framework is to hold third parties to the same high level of operational performance as is expected of the Firm’s internal operations. The Corporate Third-Party Oversight group is responsible for Firmwide TPO training, monitoring, reporting and standards.

Insurance

One of the ways in which operational risk may be mitigated is through insurance maintained by the Firm. The Firm purchases insurance from commercial insurers and utilizes a wholly-owned captive insurer, Park Assurance Company, to ensure compliance with local laws and regulations (e.g., workers compensation), as well as to serve other needs (e.g., property loss and public liability). Insurance may also be required by third parties with whom the Firm does business. The insurance purchased is reviewed and approved by senior management.

COMPLIANCE RISK MANAGEMENT

Compliance risk, a subcategory of operational risk, is the risk of failure to comply with applicable laws, rules and regulations.

Overview

Each line of business and function is accountable for managing its compliance risk. The Firm's Compliance Organization ("Compliance"), which is independent of the lines of business, works closely with senior management to provide independent review, monitoring and oversight of business operations with a focus on compliance with the legal and regulatory obligations applicable to the delivery of the Firm's products and services to clients and customers.

These compliance risks relate to a wide variety of legal and regulatory obligations, depending on the line of business and the jurisdiction, and include those related to financial products and services, relationships and interactions with clients and customers, and employee activities. For example, compliance risks include those associated with anti-money laundering compliance, trading activities, market conduct, and complying with the rules and regulations related to the offering of products and services across jurisdictional borders, among others. Compliance risk is also inherent in the Firm's fiduciary activities, including the failure to exercise the applicable high standard of care (such as the duties of loyalty or care), to act in the best interest of clients and customers or to treat clients and customers fairly.

Other Functions provide oversight of significant regulatory obligations that are specific to their respective areas of responsibility.

Compliance implements various practices designed to identify and mitigate compliance risk by establishing policies, testing, monitoring, training and providing guidance.

Governance and oversight

Compliance is led by the Firm's CCO who reports to the Firm's CRO.

The Firm maintains oversight and coordination of its Compliance Risk Management practices through the Firm's CCO, lines of business CCOs and regional CCOs to implement the Compliance program globally across the lines of business and regions. The Firm's CCO is a member of the FCC and the FRC. The Firm's CCO also provides regular updates to the Audit Committee and DRPC. In addition, certain Special Purpose Committees of the Board have been established to oversee the Firm's compliance with regulatory Consent Orders.

The Firm has a Code of Conduct (the "Code"). Each employee is given annual training on the Code and is required annually to affirm his or her compliance with the Code. All new hires must complete Code training shortly after their start date with the Firm. The Code sets forth the Firm's expectation that employees will conduct themselves with integrity at all times and provides the principles that govern employee conduct with clients, customers, shareholders and one another, as well as with the markets and communities in which the Firm does business. The Code requires employees to promptly report any known or suspected violation of the Code, any internal Firm policy, or any law or regulation applicable to the Firm's business. It also requires employees to report any illegal conduct, or conduct that violates the underlying principles of the Code, by any of the Firm's employees, customers, suppliers, contract workers, business partners, or agents. The Code prohibits retaliation against anyone who raises an issue or concern in good faith. Specified compliance officers are specially trained and designated as "code specialists" who act as a resource to employees on questions related to the Code. Employees can report any known or suspected violations of the Code through the Code Reporting Hotline by phone or the internet. The Hotline is anonymous, except in certain non-U.S. jurisdictions where laws prohibit anonymous reporting, and is available 24/7 globally, with translation services. It is maintained by an outside service provider. Annually, the Chief Compliance Office and Human Resources report to the Audit Committee on the Code of Conduct program and provide an update on the employee completion rate for Code of Conduct training and affirmation.

CONDUCT RISK MANAGEMENT

Conduct risk, a subcategory of operational risk, is the risk that any action or inaction by an employee of the Firm could lead to unfair client/customer outcomes, compromise the Firm's reputation, impact the integrity of the markets in which the Firm operates, or reflect poorly on the Firm's culture.

Overview

Each line of business or function is accountable for identifying and managing its conduct risk to provide appropriate engagement, ownership and sustainability of a culture consistent with the Firm's How We Do Business Principles ("Principles"). The Principles serve as a guide for how employees are expected to conduct themselves. With the Principles serving as a guide, the Firm's Code sets out the Firm's expectations for each employee and provides information and resources to help employees conduct business ethically and in compliance with the law everywhere the Firm operates. For further discussion of the Code, see Compliance Risk Management on page 134.

Governance and oversight

The CMDC is the Board-level Committee with primary oversight of the firm's Culture and Conduct Program. The Audit Committee is responsible for reviewing the program established by management to monitor compliance with the Code. Additionally, the DRPC reviews, at least annually, the Firm's qualitative factors included in the Risk Appetite Framework, including conduct risk. The DRPC also meets annually with the CMDC to review and discuss aspects of the

Firm's compensation practices. Finally, the Culture & Conduct Risk Committee provides oversight of certain culture and conduct risk initiatives at the Firm.

Conduct risk management is incorporated into various aspects of people management practices throughout the employee life cycle, including recruiting, onboarding, training and development, performance management, promotion and compensation processes. Businesses undertake annual RCSA assessments, and, as part of these reviews, identify their respective key inherent operational risks (including conduct risks), evaluate the design and effectiveness of their controls, identify control gaps and develop associated action plans. Each LOB and designated corporate function completes an assessment of conduct risk quarterly, reviews metrics and issues which may involve conduct risk, and provides business conduct training as appropriate.

The Firm's Know Your Employee framework generally addresses how the Firm manages, oversees and responds to workforce conduct related matters that may otherwise expose the Firm to financial, reputational, compliance and other operating risks. The Firm also has a HR Control Forum, the primary purpose of which is to discuss conduct and accountability for more significant risk and control issues and review, when appropriate, employee actions including but not limited to promotion and compensation actions.

LEGAL RISK MANAGEMENT

Legal risk, a subcategory of operational risk, is the risk of loss primarily caused by the actual or alleged failure to meet legal obligations that arise from the rule of law in jurisdictions in which the Firm operates, agreements with clients and customers, and products and services offered by the Firm.

Overview

The global Legal function ("Legal") provides legal services and advice to the Firm. Legal is responsible for managing the Firm's exposure to Legal risk by:

- managing actual and potential litigation and enforcement matters, including internal reviews and investigations related to such matters
- advising on products and services, including contract negotiation and documentation
- advising on offering and marketing documents and new business initiatives
- managing dispute resolution
- interpreting existing laws, rules and regulations, and advising on changes thereto
- advising on advocacy in connection with contemplated and proposed laws, rules and regulations, and
- providing legal advice to the LOBs and corporate functions, in alignment with the lines of defense described under Enterprise-wide Risk Management.

Legal selects, engages and manages outside counsel for the Firm on all matters in which outside counsel is engaged. In addition, Legal advises the Firm's Conflicts Office which reviews the Firm's wholesale transactions that may have the potential to create conflicts of interest for the Firm.

Governance and oversight

The Firm's General Counsel reports to the CEO and is a member of the Operating Committee, the Firmwide Risk Committee and the Firmwide Control Committee. The General Counsel's leadership team includes a General Counsel for each line of business, the heads of the Litigation and Corporate & Regulatory practices, as well as the Firm's Corporate Secretary. Each region (e.g., Latin America, Asia Pacific) has a General Counsel who is responsible for managing legal risk across all lines of business and functions in the region.

The Firm's General Counsel and other members of Legal report on significant legal matters at each meeting of the Firm's Board of Directors, at least quarterly to the Audit Committee, and periodically to the DRPC.

Legal serves on and advises various committees (including new business initiative and reputation risk committees) and advises the Firm's businesses to protect the Firm's reputation beyond any particular legal requirements.

ESTIMATIONS AND MODEL RISK MANAGEMENT

Estimations and Model risk, a subcategory of operational risk, is the potential for adverse consequences from decisions based on incorrect or misused estimation outputs.

The Firm uses models and other analytical and judgment-based estimations across various businesses and functions. The estimation methods are of varying levels of sophistication and are used for many purposes, such as the valuation of positions and measurement of risk, assessing regulatory capital requirements, conducting stress testing, and making business decisions. A dedicated independent function, Model Risk Governance and Review (“MRGR”), defines and governs the Firm’s model risk management policies and certain analytical and judgment-based estimations, such as those used in risk management, budget forecasting and capital planning and analysis. MRGR reports to the Firm’s CRO.

Model risks are owned by the users of the models within the various businesses and functions in the Firm based on the specific purposes of such models. Users and developers of models are responsible for developing, implementing and testing their models, as well as referring models to the Model Risk function for review and approval. Once models have been approved, model users and developers are responsible for maintaining a robust operating environment, and must monitor and evaluate the performance of the models on an ongoing basis. Model users and developers may seek to enhance models in response to changes in the portfolios and in product and market developments, as well as to capture improvements in available modeling techniques and systems capabilities.

Models are tiered based on an internal standard according to their complexity, the exposure associated with the model and the Firm’s reliance on the model. This tiering is subject to the approval of the Model Risk function. A model review conducted by the Model Risk function considers the model’s suitability for the specific uses to which it will be put. The factors considered in reviewing a model include whether the model accurately reflects the characteristics of the product and its significant risks, the selection and reliability of model inputs, consistency with models for similar products, the appropriateness of any model-related adjustments, and sensitivity to input parameters and assumptions that cannot be observed from the market. When reviewing a model, the Model Risk function analyzes and challenges the model methodology and the reasonableness of model assumptions and may perform or require additional testing, including back-testing of model outcomes. Model reviews are approved by the appropriate level of management within the Model Risk function based on the relevant model tier.

Under the Firm’s Estimations and Model Risk Management Policy, the Model Risk function reviews and approves new models, as well as material changes to existing models, prior to implementation in the operating environment. In certain circumstances, the head of the Model Risk function may grant exceptions to the Firm’s policy to allow a model to be used prior to review or approval. The Model Risk function may also require the user to take appropriate actions to mitigate the model risk if it is to be used in the interim. These actions will depend on the model and may include, for example, limitation of trading activity.

The governance of analytical and judgment-based estimations, such as those used in risk management, budget forecasting, and capital planning and analysis, within MRGR’s scope, follows a consistent approach to the governance of models.

For a summary of valuations based on valuation models and other valuation techniques, see Critical Accounting Estimates Used by the Firm on pages 138-140 and Note 2.

CRITICAL ACCOUNTING ESTIMATES USED BY THE FIRM

JPMorgan Chase's accounting policies and use of estimates are integral to understanding its reported results. The Firm's most complex accounting estimates require management's judgment to ascertain the appropriate carrying value of assets and liabilities. The Firm has established policies and control procedures intended to ensure that estimation methods, including any judgments made as part of such methods, are well-controlled, independently reviewed and applied consistently from period to period. The methods used and judgments made reflect, among other factors, the nature of the assets or liabilities and the related business and risk management strategies, which may vary across the Firm's businesses and portfolios. In addition, the policies and procedures are intended to ensure that the process for changing methodologies occurs in an appropriate manner. The Firm believes its estimates for determining the carrying value of its assets and liabilities are appropriate. The following is a brief description of the Firm's critical accounting estimates involving significant judgments.

Allowance for credit losses

JPMorgan Chase's allowance for credit losses covers the retained consumer and wholesale loan portfolios, as well as the Firm's wholesale and certain consumer lending-related commitments. The allowance for loan losses is intended to adjust the carrying value of the Firm's loan assets to reflect probable credit losses inherent in the loan portfolio as of the balance sheet date. Similarly, the allowance for lending-related commitments is established to cover probable credit losses inherent in the lending-related commitments portfolio as of the balance sheet date.

The allowance for credit losses includes a formula-based component, an asset-specific component, and a component related to PCI loans. The determination of each of these components involves significant judgment on a number of matters. For further discussion of these components, areas of judgment and methodologies used in establishing the Firm's allowance for credit losses, see Note 13.

Allowance for credit losses sensitivity

The Firm's allowance for credit losses is sensitive to numerous factors, which may differ depending on the portfolio. Changes in economic conditions or in the Firm's assumptions and estimates could affect its estimate of probable credit losses inherent in the portfolio at the balance sheet date. The Firm uses its best judgment to assess these economic conditions and loss data in estimating the allowance for credit losses and these estimates are subject to periodic refinement based on changes to underlying external or Firm-specific historical data. The use of alternate estimates, data sources, adjustments to modeled loss estimates for model imprecision and other factors would result in a different estimated allowance for credit losses, as well as impact any related sensitivities described below. During the second quarter of 2017, the Firm refined its loss estimates relating to the wholesale credit portfolio. See Note 13 for further discussion.

To illustrate the potential magnitude of certain alternate judgments, the Firm estimates that changes in the following inputs would have the following effects on the Firm's modeled credit loss estimates as of December 31, 2017, without consideration of any offsetting or correlated effects of other inputs in the Firm's allowance for loan losses:

- A combined 5% decline in housing prices and a 100 basis point increase in unemployment rates from current levels could imply:
 - an increase to modeled credit loss estimates of approximately \$525 million for PCI loans.
 - an increase to modeled annual credit loss estimates of approximately \$100 million for residential real estate, excluding PCI loans.
- For credit card loans, a 100 basis point increase in unemployment rates from current levels could imply an increase to modeled annual loss estimates of approximately \$1.0 billion.
- An increase in PD factors consistent with a one-notch downgrade in the Firm's internal risk ratings for its entire wholesale loan portfolio could imply an increase in the Firm's modeled credit loss estimates of approximately \$1.4 billion.
- A 100 basis point increase in estimated loss given default ("LGD") for the Firm's entire wholesale loan portfolio could imply an increase in the Firm's modeled credit loss estimates of approximately \$175 million.

The purpose of these sensitivity analyses is to provide an indication of the isolated impacts of hypothetical alternative assumptions on modeled loss estimates. The changes in the inputs presented above are not intended to imply management's expectation of future deterioration of those risk factors. In addition, these analyses are not intended to estimate changes in the overall allowance for loan losses, which would also be influenced by the judgment management applies to the modeled loss estimates to reflect the uncertainty and imprecision of these modeled loss estimates based on then-current circumstances and conditions.

It is difficult to estimate how potential changes in specific factors might affect the overall allowance for credit losses because management considers a variety of factors and inputs in estimating the allowance for credit losses. Changes in these factors and inputs may not occur at the same rate and may not be consistent across all geographies or product types, and changes in factors may be directionally inconsistent, such that improvement in one factor may offset deterioration in other factors. In addition, it is difficult to predict how changes in specific economic conditions or assumptions could affect borrower behavior or other factors considered by management in estimating the allowance for credit losses. Given the process the Firm follows and the judgments made in evaluating the risk factors related to its loss estimates, management believes that its current estimate of the allowance for credit losses is appropriate.

Fair value of financial instruments, MSRs and commodities inventory

JPMorgan Chase carries a portion of its assets and liabilities at fair value. The majority of such assets and liabilities are measured at fair value on a recurring basis. Certain assets and liabilities are measured at fair value on a nonrecurring basis, including certain mortgage, home equity and other loans, where the carrying value is based on the fair value of the underlying collateral.

Assets measured at fair value

The following table includes the Firm's assets measured at fair value and the portion of such assets that are classified within level 3 of the valuation hierarchy. For further information, see Note 2.

December 31, 2017 (in billions, except ratio data)	Total assets at fair value	Total level 3 assets
Trading debt and equity instruments	\$ 325.3	\$ 5.4
Derivative receivables ^(a)	56.5	6.0
Trading assets	381.8	11.4
AFS securities	202.2	0.3
Loans	2.5	0.3
MSRs	6.0	6.0
Other	33.2	1.2
Total assets measured at fair value on a recurring basis	625.7	19.2
Total assets measured at fair value on a nonrecurring basis	1.3	0.8
Total assets measured at fair value	\$ 627.0	\$ 20.0
Total Firm assets	\$ 2,533.6	
Level 3 assets as a percentage of total Firm assets ^(a)		0.8%
Level 3 assets as a percentage of total Firm assets at fair value ^(a)		3.2%

(a) For purposes of the table above, the derivative receivables total reflects the impact of netting adjustments; however, the \$6.0 billion of derivative receivables classified as level 3 does not reflect the netting adjustment as such netting is not relevant to a presentation based on the transparency of inputs to the valuation of an asset. The level 3 balances would be reduced if netting were applied, including the netting benefit associated with cash collateral.

Valuation

Details of the Firm's processes for determining fair value are set out in Note 2. Estimating fair value requires the application of judgment. The type and level of judgment required is largely dependent on the amount of observable market information available to the Firm. For instruments valued using internally developed valuation models and other valuation techniques that use significant unobservable inputs and are therefore classified within level 3 of the valuation hierarchy, judgments used to estimate fair value are more significant than those required when estimating the fair value of instruments classified within levels 1 and 2.

In arriving at an estimate of fair value for an instrument within level 3, management must first determine the appropriate valuation technique to use. Second, the lack of observability of certain significant inputs requires management to assess all relevant empirical data in deriving valuation inputs including, for example, transaction details, yield curves, interest rates, prepayment rates, default rates, volatilities, correlations, equity or debt prices,

valuations of comparable instruments, foreign exchange rates and credit curves. For further discussion of the valuation of level 3 instruments, including unobservable inputs used, see Note 2.

For instruments classified in levels 2 and 3, management judgment must be applied to assess the appropriate level of valuation adjustments to reflect counterparty credit quality, the Firm's creditworthiness, market funding rates, liquidity considerations, unobservable parameters, and for portfolios that meet specified criteria, the size of the net open risk position. The judgments made are typically affected by the type of product and its specific contractual terms, and the level of liquidity for the product or within the market as a whole. For further discussion of valuation adjustments applied by the Firm see Note 2.

Imprecision in estimating unobservable market inputs or other factors can affect the amount of gain or loss recorded for a particular position. Furthermore, while the Firm believes its valuation methods are appropriate and consistent with those of other market participants, the methods and assumptions used reflect management judgment and may vary across the Firm's businesses and portfolios.

The Firm uses various methodologies and assumptions in the determination of fair value. The use of methodologies or assumptions different than those used by the Firm could result in a different estimate of fair value at the reporting date. For a detailed discussion of the Firm's valuation process and hierarchy, and its determination of fair value for individual financial instruments, see Note 2.

Goodwill impairment

Under U.S. GAAP, goodwill must be allocated to reporting units and tested for impairment at least annually. The Firm's process and methodology used to conduct goodwill impairment testing is described in Note 15.

Management applies significant judgment when estimating the fair value of its reporting units. Estimates of fair value are dependent upon estimates of the future earnings potential of the Firm's reporting units, long-term growth rates and the estimated market cost of equity. Imprecision in estimating these factors can affect the estimated fair value of the reporting units.

Based upon the updated valuations for all of its reporting units, the Firm concluded that the goodwill allocated to its reporting units was not impaired at December 31, 2017. The fair values of these reporting units exceeded their carrying values by approximately 15% or higher and did not indicate a significant risk of goodwill impairment based on current projections and valuations. Such valuations do not reflect the impact of the TCJA that was enacted in December 2017 as such impact would not alter the conclusion that goodwill is not impaired.

The projections for all of the Firm's reporting units are consistent with management's current short-term business outlook assumptions, and in the longer term, incorporate a set of macroeconomic assumptions and the Firm's best estimates of long-term growth and returns on equity of its

Management's discussion and analysis

businesses. Where possible, the Firm uses third-party and peer data to benchmark its assumptions and estimates.

Declines in business performance, increases in credit losses, increases in capital requirements, as well as deterioration in economic or market conditions, adverse estimates of regulatory or legislative changes or increases in the estimated market cost of equity, could cause the estimated fair values of the Firm's reporting units or their associated goodwill to decline in the future, which could result in a material impairment charge to earnings in a future period related to some portion of the associated goodwill.

For additional information on goodwill, see Note 15.

Credit card rewards liability

JPMorgan Chase offers credit cards with various reward programs which allow cardholders to earn reward points based on their account activity and the terms and conditions of the rewards program. Generally, there are no limits on the points that an eligible cardholder can earn, nor do they expire, and these points can be redeemed for a variety of rewards, including cash (predominantly in the form of account credits), gift cards and travel.

The Firm maintains a rewards liability which represents the estimated cost of reward points earned and expected to be redeemed by cardholders. The rewards liability is sensitive to various assumptions, including cost per point and redemption rates for each of the various reward programs, which are evaluated periodically. The liability is accrued as the cardholder earns the benefit and is reduced when the cardholder redeems points. This liability was \$4.9 billion and \$3.8 billion at December 31, 2017 and 2016, respectively, and is recorded in accounts payable and other liabilities on the Consolidated balance sheets.

Income taxes

JPMorgan Chase is subject to the income tax laws of the various jurisdictions in which it operates, including U.S. federal, state and local, and non-U.S. jurisdictions. These laws are often complex and may be subject to different interpretations. To determine the financial statement impact of accounting for income taxes, including the provision for income tax expense and unrecognized tax benefits, JPMorgan Chase must make assumptions and judgments about how to interpret and apply these complex tax laws to numerous transactions and business events, as well as make judgments regarding the timing of when certain items may affect taxable income in the U.S. and non-U.S. tax jurisdictions.

JPMorgan Chase's interpretations of tax laws around the world are subject to review and examination by the various taxing authorities in the jurisdictions where the Firm operates, and disputes may occur regarding its view on a tax position. These disputes over interpretations with the various taxing authorities may be settled by audit, administrative appeals or adjudication in the court systems of the tax jurisdictions in which the Firm operates. JPMorgan Chase regularly reviews whether it may be assessed additional income taxes as a result of the resolution of these matters, and the Firm records additional reserves as appropriate. In addition, the Firm may revise its estimate of income taxes due to changes in income tax

laws, legal interpretations, and business strategies. It is possible that revisions in the Firm's estimate of income taxes may materially affect the Firm's results of operations in any reporting period.

The Firm's provision for income taxes is composed of current and deferred taxes. Deferred taxes arise from differences between assets and liabilities measured for financial reporting versus income tax return purposes. Deferred tax assets are recognized if, in management's judgment, their realizability is determined to be more likely than not. The Firm has also recognized deferred tax assets in connection with certain tax attributes, including NOLs. The Firm performs regular reviews to ascertain whether its deferred tax assets are realizable. These reviews include management's estimates and assumptions regarding future taxable income, which also incorporates various tax planning strategies, including strategies that may be available to utilize NOLs before they expire. In connection with these reviews, if it is determined that a deferred tax asset is not realizable, a valuation allowance is established. The valuation allowance may be reversed in a subsequent reporting period if the Firm determines that, based on revised estimates of future taxable income or changes in tax planning strategies, it is more likely than not that all or part of the deferred tax asset will become realizable. As of December 31, 2017, management has determined it is more likely than not that the Firm will realize its deferred tax assets, net of the existing valuation allowance.

Prior to December 31, 2017, U.S. federal income taxes had not been provided on the undistributed earnings of certain non-U.S. subsidiaries, to the extent that such earnings had been reinvested abroad for an indefinite period of time. The Firm will no longer maintain the indefinite reinvestment assertion on the undistributed earnings of those non-U.S. subsidiaries in light of the enactment of the TCJA. The U.S. federal and state and local income taxes associated with the undistributed and previously untaxed earnings of those non-U.S. subsidiaries was included in the deemed repatriation charge recorded as of December 31, 2017.

The Firm adjusts its unrecognized tax benefits as necessary when additional information becomes available. Uncertain tax positions that meet the more-likely-than-not recognition threshold are measured to determine the amount of benefit to recognize. An uncertain tax position is measured at the largest amount of benefit that management believes is more likely than not to be realized upon settlement. It is possible that the reassessment of JPMorgan Chase's unrecognized tax benefits may have a material impact on its effective income tax rate in the period in which the reassessment occurs.

The income tax expense for the current year includes a reasonable estimate recorded under SEC Staff Accounting Bulletin No. 118 resulting from the enactment of the TCJA.

For additional information on income taxes, see Note 24.

Litigation reserves

For a description of the significant estimates and judgments associated with establishing litigation reserves, see Note 29.

ACCOUNTING AND REPORTING DEVELOPMENTS

SEC Staff Accounting Bulletin adopted during 2017

Bulletin	Summary of guidance	Effects on financial statements
Application of U.S. GAAP related to the Tax Cuts and Jobs Act ("TCJA") (SEC Staff Accounting Bulletin No. 118) <i>Issued December 2017</i>	- Provides guidance on the accounting for income taxes in the context of the TCJA. - For impacts of the tax law changes that are reasonably estimable, requires the recognition of provisional amounts in year-end 2017 financial statements. - Provides a 1-year measurement period in which to refine previously recorded provisional amounts based on new information or interpretations.	- The TCJA resulted in a \$2.4 billion decrease in net income driven by a deemed repatriation charge and adjustments to the value of the Firm's tax oriented investments, partially offset by a benefit from the revaluation of the Firm's net deferred tax liability. Certain of these amounts may be refined in accordance with SEC Staff Accounting Bulletin No. 118. - Refer to Note 24 for additional information related to the impacts of the TCJA.

FASB Standards issued but not adopted as of December 31, 2017

Standard	Summary of guidance	Effects on financial statements
Revenue recognition - revenue from contracts with customers <i>Issued May 2014</i>	- Requires that revenue from contracts with customers be recognized upon transfer of control of a good or service in the amount of consideration expected to be received. - Changes the accounting for certain contract costs, including whether they may be offset against revenue in the Consolidated statements of income, and requires additional disclosures about revenue and contract costs. - May be adopted using a full retrospective approach or a modified, cumulative effect approach wherein the guidance is applied only to existing contracts as of the date of initial application, and to new contracts transacted after that date.	- Adopted January 1, 2018. - The Firm adopted the revenue recognition guidance using the full retrospective method of adoption. - The adoption of the guidance did not result in any material changes in the timing of the Firm's revenue recognition, but will require gross presentation of certain costs currently offset against revenue. This change in presentation will be reflected in the first quarter of 2018 and will increase both noninterest revenue and noninterest expense for the Firm by \$1.1 billion and \$900 million for the years ended December 31, 2017 and 2016, respectively. The increase is predominantly associated with certain distribution costs in AWM (currently offset against Asset management, administration and commissions), with the remainder of the increase associated with certain underwriting costs in CIB (currently offset against Investment banking fees). - The Firm's Note 6 qualitative disclosures are consistent with the guidance.
Recognition and measurement of financial assets and financial liabilities <i>Issued January 2016</i>	- Requires that certain equity instruments be measured at fair value, with changes in fair value recognized in earnings. - Provides a measurement alternative for equity securities without readily determinable fair values to be measured at cost less impairment (if any), plus or minus observable price changes from an identical or similar investment of the same issuer. Any such price changes will be reflected in earnings beginning in the period of adoption. - Generally requires a cumulative-effect adjustment to retained earnings as of the beginning of the reporting period of adoption, except for those equity securities that are eligible for the measurement alternative.	- The Firm early adopted the provisions of this guidance related to presenting DVA in OCI for financial liabilities where the fair value option has been elected, effective January 1, 2016. The Firm adopted the portions of the guidance that were not eligible for early adoption on January 1, 2018. - Upon adoption, the Firm elected the measurement alternative for its equity securities that do not have readily determinable fair values, and the Firm did not record a cumulative-effect adjustment related to the adoption of this guidance.

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FASB Standards issued but not adopted as of December 31, 2017 (continued)

Standard	Summary of guidance	Effects on financial statements
Classification of certain cash receipts and cash payments in the statement of cash flows <i>Issued August 2016</i>	- Provides targeted amendments to the classification of certain cash flows, including treatment of cash payments for settlement of zero-coupon debt instruments and distributions received from equity method investments. - Requires retrospective application to all periods presented.	- Adopted January 1, 2018. - No material impact upon adoption as the Firm was either in compliance with the amendments or the amounts to which it is applied are immaterial.
Treatment of restricted cash on the statement of cash flows <i>Issued November 2016</i>	- Requires inclusion of restricted cash in the cash and cash equivalents balances in the Consolidated statements of cash flows. - Requires additional disclosures to supplement the Consolidated statements of cash flows. - Requires retrospective application to all periods presented.	- Adopted January 1, 2018. - The adoption of the guidance will result in reclassification of restricted cash balances into Cash and restricted cash on the Consolidated statements of cash flows in the first quarter of 2018. The Firm will include Cash and due from banks and Deposits with banks in Cash and restricted cash in the Consolidated statements of cash flows, resulting in Deposits with banks no longer being reflected in Investing activities. - In addition, to align with the presentation of Cash and restricted cash on the Consolidated statements of cash flows, the Firm will reclassify restricted cash balances to Cash and due from banks and to Deposits with banks from Other assets and disclose the total for Cash and restricted cash on the Firm's Consolidated balance sheets in the first quarter of 2018.
Definition of a business <i>Issued January 2017</i>	- Narrows the definition of a business and clarifies that, to be considered a business, the fair value of the gross assets acquired (or disposed of) may not be substantially all concentrated in a single identifiable asset or a group of similar assets. - In addition, in order to be considered a business, a set of activities and assets must include, at a minimum, an input and a substantive process that together significantly contribute to the ability to create outputs.	- Adopted January 1, 2018. - No impact upon adoption because the guidance is to be applied prospectively. Subsequent to adoption, fewer transactions will be treated as acquisitions or dispositions of a business.
Presentation of net periodic pension cost and net periodic postretirement benefit cost <i>Issued March 2017</i>	- Requires the service cost component of net periodic pension and postretirement benefit cost to be reported separately in the consolidated results of operations from the other components (e.g., expected return on assets, interest costs, amortization of gains/losses and prior service costs). - Requires retrospective application and presentation in the consolidated results of operations of the service cost component in the same line item as other employee compensation costs and presentation of the other components in a different line item from the service cost component.	- Adopted January 1, 2018. - The adoption of the guidance in the first quarter of 2018 will result in an increase in compensation expense and a reduction in other expense of \$223 million and \$250 million for the years ended December 31, 2017 and 2016, respectively.
Premium amortization on purchased callable debt securities <i>Issued March 2017</i>	- Requires amortization of premiums to the earliest call date on debt securities with call features that are explicit, noncontingent and callable at fixed prices and on preset dates. - Does not impact securities held at a discount; the discount continues to be amortized to the contractual maturity. - Requires adoption on a modified retrospective basis through a cumulative-effect adjustment directly to retained earnings as of the beginning of the period of adoption.	- The Firm early adopted the new guidance on January 1, 2018. - The new guidance primarily impacts obligations of U.S. states and municipalities held in the Firm's investment securities portfolio. - The adoption of this guidance resulted in a cumulative-effect adjustment that reduced retained earnings by approximately \$505 million as of January 1, 2018, with a corresponding increase of \$261 million (after tax) in AOCI and related adjustments to securities and tax liabilities. - Subsequent to adoption, although the guidance will reduce the interest income recognized prior to the earliest call date for callable debt securities held at a premium, the effect of this guidance on the Firm's net interest income is not expected to be material.

FASB Standards issued but not adopted as of December 31, 2017 (continued)

Standard	Summary of guidance	Effects on financial statements
Hedge accounting <i>Issued August 2017</i>	- Reduces earnings volatility by better aligning the accounting with the economics of the risk management activities. - Expands the ability for certain hedges of interest rate risk to qualify for hedge accounting. - Allows recognition of ineffectiveness in cash flow hedges and net investment hedges in OCI. - Allows a one-time election at adoption to transfer certain securities classified as held-to-maturity to available-for-sale. - Simplifies hedge documentation requirements.	- The Firm early adopted the new guidance on January 1, 2018. - The adoption of the guidance resulted in a cumulative-effect adjustment that increased retained earnings in the amount of \$34 million, with related adjustments to debt carrying values and AOCI. - The Firm will also amend its qualitative and quantitative disclosures within its derivative instruments note to the Consolidated Financial Statements in the first quarter of 2018. - In accordance with the new guidance, the Firm elected to transfer certain securities from HTM to AFS. The amendments provide the Firm with additional hedge accounting alternatives for its AFS securities (including those transferred under the election) to be considered as the Firm manages its structural interest rate risk and regulatory capital. The Firm is currently evaluating those risk management alternatives and intends to manage the transferred securities in a manner consistent with its existing AFS securities. This transfer is a non-cash transaction at fair value.
Reclassification of Certain Tax Effects from AOCI <i>Issued February 2018</i>	- Provides an election to reclassify from AOCI to retained earnings stranded tax effects due to the revaluation of deferred tax assets and liabilities as a result of changes in applicable tax rates under the TCJA. - Requires additional disclosures related to the Firm's election to reclassify amounts from AOCI to retained earnings and the Firm's policy for releasing income tax effects from AOCI. - The guidance may be applied on a modified retrospective basis through a cumulative-effect adjustment directly to retained earnings as of the beginning of the period of adoption.	- The Firm early adopted the new guidance on January 1, 2018. - The adoption of the guidance resulted in a cumulative-effect adjustment that increased retained earnings in the amount of \$288 million in the first quarter of 2018. This amount is an estimate that may be refined in accordance with SEC Staff Accounting Bulletin No. 118, and represents the removal of the stranded tax effects from AOCI, thereby allowing the tax effects within AOCI to reflect the new respective corporate income tax rates. - Refer to Note 24 for additional information related to the impacts of the TCJA.
Leases <i>Issued February 2016</i>	- Requires lessees to recognize all leases longer than twelve months on the Consolidated balance sheets as lease liabilities with corresponding right-of-use assets. - Requires lessees and lessors to classify most leases using principles similar to existing lease accounting, but eliminates the "bright line" classification tests. - Permits the Firm to generally account for its existing leases consistent with current guidance, except for the incremental balance sheet recognition. - Expands qualitative and quantitative disclosures regarding leasing arrangements. - May be adopted using a modified cumulative effect approach wherein the guidance is applied only to existing contracts as of the date of initial application, and to new contracts transacted after that date.	- Required effective date: January 1, 2019.^(a) - The Firm is in the process of its implementation which has included an initial evaluation of its leasing contracts and activities. As a lessee, the Firm is developing its methodology to estimate the right-of-use assets and lease liabilities, which is based on the present value of lease payments. The Firm expects to recognize lease liabilities and corresponding right-of-use assets (at their present value) related to predominantly all of the \$10 billion of future minimum payments required under operating leases as disclosed in Note 28. However, the population of contracts subject to balance sheet recognition and their initial measurement remains under evaluation. The Firm does not expect material changes to the recognition of operating lease expense in its Consolidated statements of income. - The Firm plans to adopt the new guidance in the first quarter of 2019.

Management's discussion and analysis

FASB Standards issued but not adopted as of December 31, 2017 (continued)

Standard	Summary of guidance	Effects on financial statements
Financial instruments – credit losses <i>Issued June 2016</i>	- Replaces existing incurred loss impairment guidance and establishes a single allowance framework for financial assets carried at amortized cost (including HTM securities), which will reflect management's estimate of credit losses over the full remaining expected life of the financial assets. - Eliminates existing guidance for PCI loans, and requires recognition of an allowance for expected credit losses on financial assets purchased with more than insignificant credit deterioration since origination. - Amends existing impairment guidance for AFS securities to incorporate an allowance, which will allow for reversals of impairment losses in the event that the credit of an issuer improves. - Requires a cumulative-effect adjustment to retained earnings as of the beginning of the reporting period of adoption.	- Required effective date: January 1, 2020.^(a) - The Firm has begun its implementation efforts by establishing a Firmwide, cross-discipline governance structure. The Firm is currently identifying key interpretive issues, and is assessing existing credit loss forecasting models and processes against the new guidance to determine what modifications may be required. - The Firm expects that the new guidance will result in an increase in its allowance for credit losses due to several factors, including: - The allowance related to the Firm's loans and commitments will increase to cover credit losses over the full remaining expected life of the portfolio, and will consider expected future changes in macroeconomic conditions - The nonaccretable difference on PCI loans will be recognized as an allowance, offset by an increase in the carrying value of the related loans - An allowance will be established for estimated credit losses on HTM securities - The extent of the increase is under evaluation, but will depend upon the nature and characteristics of the Firm's portfolio at the adoption date, and the macroeconomic conditions and forecasts at that date.
Goodwill <i>Issued January 2017</i>	- Requires an impairment loss to be recognized when the estimated fair value of a reporting unit falls below its carrying value. - Eliminates the second condition in the current guidance that requires an impairment loss to be recognized only if the estimated implied fair value of the goodwill is below its carrying value.	- Required effective date: January 1, 2020.^(a) - Based on current impairment test results, the Firm does not expect a material effect on the Consolidated Financial Statements. - After adoption, the guidance may result in more frequent goodwill impairment losses due to the removal of the second condition. - The Firm is evaluating the timing of adoption.

(a) Early adoption is permitted.

FORWARD-LOOKING STATEMENTS

From time to time, the Firm has made and will make forward-looking statements. These statements can be identified by the fact that they do not relate strictly to historical or current facts. Forward-looking statements often use words such as “anticipate,” “target,” “expect,” “estimate,” “intend,” “plan,” “goal,” “believe,” or other words of similar meaning. Forward-looking statements provide JPMorgan Chase’s current expectations or forecasts of future events, circumstances, results or aspirations. JPMorgan Chase’s disclosures in this Annual Report contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. The Firm also may make forward-looking statements in its other documents filed or furnished with the SEC. In addition, the Firm’s senior management may make forward-looking statements orally to investors, analysts, representatives of the media and others.

All forward-looking statements are, by their nature, subject to risks and uncertainties, many of which are beyond the Firm’s control. JPMorgan Chase’s actual future results may differ materially from those set forth in its forward-looking statements. While there is no assurance that any list of risks and uncertainties or risk factors is complete, below are certain factors which could cause actual results to differ from those in the forward-looking statements:

- Local, regional and global business, economic and political conditions and geopolitical events;
- Changes in laws and regulatory requirements, including capital and liquidity requirements affecting the Firm’s businesses, and the ability of the Firm to address those requirements;
- Heightened regulatory and governmental oversight and scrutiny of JPMorgan Chase’s business practices, including dealings with retail customers;
- Changes in trade, monetary and fiscal policies and laws;
- Changes in income tax laws and regulations;
- Securities and capital markets behavior, including changes in market liquidity and volatility;
- Changes in investor sentiment or consumer spending or savings behavior;
- Ability of the Firm to manage effectively its capital and liquidity, including approval of its capital plans by banking regulators;
- Changes in credit ratings assigned to the Firm or its subsidiaries;
- Damage to the Firm’s reputation;
- Ability of the Firm to deal effectively with an economic slowdown or other economic or market disruption;
- Technology changes instituted by the Firm, its counterparties or competitors;
- The success of the Firm’s business simplification initiatives and the effectiveness of its control agenda;
- Ability of the Firm to develop new products and services, and the extent to which products or services previously sold by the Firm (including but not limited to mortgages and asset-backed securities) require the Firm to incur liabilities or absorb losses not contemplated at their initiation or origination;
- Acceptance of the Firm’s new and existing products and services by the marketplace and the ability of the Firm to innovate and to increase market share;
- Ability of the Firm to attract and retain qualified employees;
- Ability of the Firm to control expenses;
- Competitive pressures;
- Changes in the credit quality of the Firm’s customers and counterparties;
- Adequacy of the Firm’s risk management framework, disclosure controls and procedures and internal control over financial reporting;
- Adverse judicial or regulatory proceedings;
- Changes in applicable accounting policies, including the introduction of new accounting standards;
- Ability of the Firm to determine accurate values of certain assets and liabilities;
- Occurrence of natural or man-made disasters or calamities or conflicts and the Firm’s ability to deal effectively with disruptions caused by the foregoing;
- Ability of the Firm to maintain the security of its financial, accounting, technology, data processing and other operational systems and facilities;
- Ability of the Firm to withstand disruptions that may be caused by any failure of its operational systems or those of third parties;
- Ability of the Firm to effectively defend itself against cyberattacks and other attempts by unauthorized parties to access information of the Firm or its customers or to disrupt the Firm’s systems; and
- The other risks and uncertainties detailed in Part I, Item 1A: Risk Factors in the Firm’s Annual Report on Form 10-K for the year ended December 31, 2017.

Any forward-looking statements made by or on behalf of the Firm speak only as of the date they are made, and JPMorgan Chase does not undertake to update forward-looking statements. The reader should, however, consult any further disclosures of a forward-looking nature the Firm may make in any subsequent Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, or Current Reports on Form 8-K.

Management's report on internal control over financial reporting

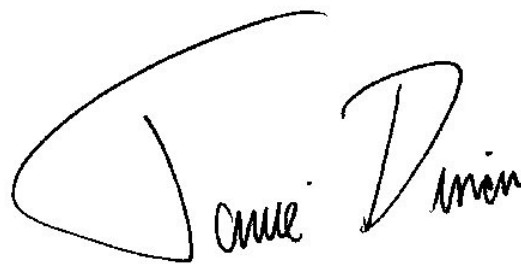
Management of JPMorgan Chase & Co. ("JPMorgan Chase" or the "Firm") is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is a process designed by, or under the supervision of, the Firm's principal executive and principal financial officers, or persons performing similar functions, and effected by JPMorgan Chase's Board of Directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America.

JPMorgan Chase's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records, that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the Firm's assets; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Firm are being made only in accordance with authorizations of JPMorgan Chase's management and directors; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Firm's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate. Management has completed an assessment of the effectiveness of the Firm's internal control over financial reporting as of December 31, 2017. In making the assessment, management used the "Internal Control – Integrated Framework" ("COSO 2013") promulgated by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO").

Based upon the assessment performed, management concluded that as of December 31, 2017, JPMorgan Chase's internal control over financial reporting was effective based upon the COSO 2013 framework. Additionally, based upon management's assessment, the Firm determined that there were no material weaknesses in its internal control over financial reporting as of December 31, 2017.

The effectiveness of the Firm's internal control over financial reporting as of December 31, 2017, has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report which appears herein.

A handwritten signature in black ink, appearing to read "James Dimon". The signature is stylized with a large, sweeping initial "J" and a cursive "Dimon".

James Dimon
Chairman and Chief Executive Officer

A handwritten signature in black ink, appearing to read "Marianne Lake". The signature is cursive and fluid, with a large initial "M".

Marianne Lake
Executive Vice President and Chief Financial Officer

February 27, 2018



To the Board of Directors and Stockholders of JPMorgan Chase & Co.:

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of JPMorgan Chase & Co. and its subsidiaries (the "Firm") as of December 31, 2017 and 2016, and the related consolidated statements of income, comprehensive income, changes in stockholders' equity and cash flows for each of the three years in the period ended December 31, 2017, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Firm's internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Firm as of December 31, 2017 and 2016, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2017 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Firm maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Basis for Opinions

The Firm's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's report on internal control over financial reporting. Our responsibility is to express opinions on the Firm's consolidated financial statements and on the Firm's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Firm in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

A handwritten signature in dark ink that reads "PricewaterhouseCoopers LLP". The signature is written in a cursive, flowing style.

February 27, 2018

We have served as the Firm's auditor since 1965.

Consolidated statements of income

Year ended December 31, (in millions, except per share data)	2017	2016	2015
Revenue			
Investment banking fees	\$ 7,248	\$ 6,448	\$ 6,751
Principal transactions	11,347	11,566	10,408
Lending- and deposit-related fees	5,933	5,774	5,694
Asset management, administration and commissions	15,377	14,591	15,509
Securities gains/(losses)	(66)	141	202
Mortgage fees and related income	1,616	2,491	2,513
Card income	4,433	4,779	5,924
Other income	3,639	3,795	3,032
Noninterest revenue	49,527	49,585	50,033
Interest income	64,372	55,901	50,973
Interest expense	14,275	9,818	7,463
Net interest income	50,097	46,083	43,510
Total net revenue	99,624	95,668	93,543
Provision for credit losses	5,290	5,361	3,827
Noninterest expense			
Compensation expense	31,009	29,979	29,750
Occupancy expense	3,723	3,638	3,768
Technology, communications and equipment expense	7,706	6,846	6,193
Professional and outside services	6,840	6,655	7,002
Marketing	2,900	2,897	2,708
Other expense	6,256	5,756	9,593
Total noninterest expense	58,434	55,771	59,014
Income before income tax expense	35,900	34,536	30,702
Income tax expense	11,459	9,803	6,260
Net income	\$ 24,441	\$ 24,733	\$ 24,442
Net income applicable to common stockholders^(a)	\$ 22,567	\$ 22,834	\$ 22,651
Net income per common share data			
Basic earnings per share	\$ 6.35	\$ 6.24	\$ 6.05
Diluted earnings per share	6.31	6.19	6.00
Weighted-average basic shares^(a)	3,551.6	3,658.8	3,741.2
Weighted-average diluted shares^(a)	3,576.8	3,690.0	3,773.6
Cash dividends declared per common share	\$ 2.12	\$ 1.88	\$ 1.72

(a) The prior period amounts have been revised to conform with the current period presentation. The revision had no impact on the Firm's reported earnings per share.

The Notes to Consolidated Financial Statements are an integral part of these statements.

Consolidated statements of comprehensive income

Year ended December 31, (in millions)	2017		2016		2015
Net income	\$	24,441	\$	24,733	\$ 24,442
Other comprehensive income/(loss), after-tax					
Unrealized gains/(losses) on investment securities		640		(1,105)	(2,144)
Translation adjustments, net of hedges		(306)		(2)	(15)
Cash flow hedges		176		(56)	51
Defined benefit pension and OPEB plans		738		(28)	111
DVA on fair value option elected liabilities		(192)		(330)	—
Total other comprehensive income/(loss), after-tax		1,056		(1,521)	(1,997)
Comprehensive income	\$	25,497	\$	23,212	\$ 22,445

The Notes to Consolidated Financial Statements are an integral part of these statements.

Consolidated balance sheets

December 31, (in millions, except share data)	2017	2016
Assets		
Cash and due from banks	\$ 25,827	\$ 23,873
Deposits with banks	404,294	365,762
Federal funds sold and securities purchased under resale agreements (included \$14,732 and \$21,506 at fair value)	198,422	229,967
Securities borrowed (included \$3,049 and \$0 at fair value)	105,112	96,409
Trading assets (included assets pledged of \$110,061 and \$115,847)	381,844	372,130
Securities (included \$202,225 and \$238,891 at fair value and assets pledged of \$17,969 and \$16,115)	249,958	289,059
Loans (included \$2,508 and \$2,230 at fair value)	930,697	894,765
Allowance for loan losses	(13,604)	(13,776)
Loans, net of allowance for loan losses	917,093	880,989
Accrued interest and accounts receivable	67,729	52,330
Premises and equipment	14,159	14,131
Goodwill, MSRs and other intangible assets	54,392	54,246
Other assets (included \$16,128 and \$7,557 at fair value and assets pledged of \$1,526 and \$1,603)	114,770	112,076
Total assets^(a)	\$ 2,533,600	\$ 2,490,972
Liabilities		
Deposits (included \$21,321 and \$13,912 at fair value)	\$ 1,443,982	\$ 1,375,179
Federal funds purchased and securities loaned or sold under repurchase agreements (included \$697 and \$687 at fair value)	158,916	165,666
Short-term borrowings (included \$9,191 and \$9,105 at fair value)	51,802	34,443
Trading liabilities	123,663	136,659
Accounts payable and other liabilities (included \$9,208 and \$9,120 at fair value)	189,383	190,543
Beneficial interests issued by consolidated VIEs (included \$45 and \$120 at fair value)	26,081	39,047
Long-term debt (included \$47,519 and \$37,686 at fair value)	284,080	295,245
Total liabilities^(a)	2,277,907	2,236,782
Commitments and contingencies (see Notes 27, 28 and 29)		
Stockholders' equity		
Preferred stock (\$1 par value; authorized 200,000,000 shares; issued 2,606,750 shares)	26,068	26,068
Common stock (\$1 par value; authorized 9,000,000,000 shares; issued 4,104,933,895 shares)	4,105	4,105
Additional paid-in capital	90,579	91,627
Retained earnings	177,676	162,440
Accumulated other comprehensive income	(119)	(1,175)
Shares held in restricted stock units ("RSU") trust, at cost (472,953 shares)	(21)	(21)
Treasury stock, at cost (679,635,064 and 543,744,003 shares)	(42,595)	(28,854)
Total stockholders' equity	255,693	254,190
Total liabilities and stockholders' equity	\$ 2,533,600	\$ 2,490,972

(a) The following table presents information on assets and liabilities related to VIEs that are consolidated by the Firm at December 31, 2017 and 2016. The difference between total VIE assets and liabilities represents the Firm's interests in those entities, which were eliminated in consolidation.

December 31, (in millions)	2017	2016
Assets		
Trading assets	\$ 1,449	\$ 3,185
Loans	68,995	75,614
All other assets	2,674	3,321
Total assets	\$ 73,118	\$ 82,120
Liabilities		
Beneficial interests issued by consolidated VIEs	\$ 26,081	\$ 39,047
All other liabilities	349	490
Total liabilities	\$ 26,430	\$ 39,537

The assets of the consolidated VIEs are used to settle the liabilities of those entities. The holders of the beneficial interests do not have recourse to the general credit of JPMorgan Chase. At December 31, 2017 and 2016, the Firm provided limited program-wide credit enhancement of \$2.7 billion and \$2.4 billion, respectively, related to its Firm-administered multi-seller conduits, which are eliminated in consolidation. For further discussion, see Note 14.

The Notes to Consolidated Financial Statements are an integral part of these statements.

Consolidated statements of changes in stockholders' equity

Year ended December 31, (in millions, except per share data)	2017	2016	2015
Preferred stock			
Balance at January 1	\$ 26,068	\$ 26,068	\$ 20,063
Issuance	1,258	—	6,005
Redemption	(1,258)	—	—
Balance at December 31	26,068	26,068	26,068
Common stock			
Balance at January 1 and December 31	4,105	4,105	4,105
Additional paid-in capital			
Balance at January 1	91,627	92,500	93,270
Shares issued and commitments to issue common stock for employee share-based compensation awards	(734)	(334)	(436)
Other	(314)	(539)	(334)
Balance at December 31	90,579	91,627	92,500
Retained earnings			
Balance at January 1	162,440	146,420	129,977
Cumulative effect of change in accounting principle	—	(154)	—
Net income	24,441	24,733	24,442
Dividends declared:			
Preferred stock	(1,663)	(1,647)	(1,515)
Common stock (\$2.12, \$1.88 and \$1.72 per share for 2017, 2016 and 2015, respectively)	(7,542)	(6,912)	(6,484)
Balance at December 31	177,676	162,440	146,420
Accumulated other comprehensive income			
Balance at January 1	(1,175)	192	2,189
Cumulative effect of change in accounting principle	—	154	—
Other comprehensive income/(loss)	1,056	(1,521)	(1,997)
Balance at December 31	(119)	(1,175)	192
Shares held in RSU Trust, at cost			
Balance at January 1 and December 31	(21)	(21)	(21)
Treasury stock, at cost			
Balance at January 1	(28,854)	(21,691)	(17,856)
Repurchase	(15,410)	(9,082)	(5,616)
Reissuance	1,669	1,919	1,781
Balance at December 31	(42,595)	(28,854)	(21,691)
Total stockholders' equity	\$ 255,693	\$ 254,190	\$ 247,573

The Notes to Consolidated Financial Statements are an integral part of these statements.

Consolidated statements of cash flows

Year ended December 31, (in millions)	2017	2016	2015
Operating activities			
Net income	\$ 24,441	\$ 24,733	\$ 24,442
Adjustments to reconcile net income to net cash provided by/(used in) operating activities:			
Provision for credit losses	5,290	5,361	3,827
Depreciation and amortization	6,179	5,478	4,940
Deferred tax expense	2,312	4,651	1,333
Other	2,136	1,799	1,785
Originations and purchases of loans held-for-sale	(94,628)	(61,107)	(48,109)
Proceeds from sales, securitizations and paydowns of loans held-for-sale	93,270	60,196	49,363
Net change in:			
Trading assets	5,673	(20,007)	62,212
Securities borrowed	(8,653)	2,313	12,165
Accrued interest and accounts receivable	(15,868)	(5,815)	22,664
Other assets	4,318	(4,517)	(3,701)
Trading liabilities	(26,256)	5,198	(28,972)
Accounts payable and other liabilities	(8,518)	3,740	(23,361)
Other operating adjustments	7,803	(1,827)	(5,122)
Net cash provided by/(used in) operating activities	(2,501)	20,196	73,466
Investing activities			
Net change in:			
Deposits with banks	(38,532)	(25,747)	144,462
Federal funds sold and securities purchased under resale agreements	31,448	(17,468)	3,190
Held-to-maturity securities:			
Proceeds from paydowns and maturities	4,563	6,218	6,099
Purchases	(2,349)	(143)	(6,204)
Available-for-sale securities:			
Proceeds from paydowns and maturities	56,117	65,950	76,448
Proceeds from sales	90,201	48,592	40,444
Purchases	(105,309)	(123,959)	(70,804)
Proceeds from sales and securitizations of loans held-for-investment	15,791	15,429	18,604
Other changes in loans, net	(61,650)	(80,996)	(108,962)
All other investing activities, net	(563)	(2,825)	3,703
Net cash provided by/(used in) investing activities	(10,283)	(114,949)	106,980
Financing activities			
Net change in:			
Deposits	57,022	97,336	(88,678)
Federal funds purchased and securities loaned or sold under repurchase agreements	(6,739)	13,007	(39,415)
Short-term borrowings	16,540	(2,461)	(57,828)
Beneficial interests issued by consolidated VIEs	(1,377)	(5,707)	(5,632)
Proceeds from long-term borrowings	56,271	83,070	79,611
Payments of long-term borrowings	(83,079)	(68,949)	(67,247)
Proceeds from issuance of preferred stock	1,258	—	5,893
Redemption of preferred stock	(1,258)	—	—
Treasury stock repurchased	(15,410)	(9,082)	(5,616)
Dividends paid	(8,993)	(8,476)	(7,873)
All other financing activities, net	407	(467)	(726)
Net cash provided by/(used in) financing activities	14,642	98,271	(187,511)
Effect of exchange rate changes on cash and due from banks	96	(135)	(276)
Net increase/(decrease) in cash and due from banks	1,954	3,383	(7,341)
Cash and due from banks at the beginning of the period	23,873	20,490	27,831
Cash and due from banks at the end of the period	\$ 25,827	\$ 23,873	\$ 20,490
Cash interest paid	\$ 14,153	\$ 9,508	\$ 7,220
Cash income taxes paid, net	4,325	2,405	9,423

The Notes to Consolidated Financial Statements are an integral part of these statements.

Note 1 – Basis of presentation

JPMorgan Chase & Co. (“JPMorgan Chase” or the “Firm”), a financial holding company incorporated under Delaware law in 1968, is a leading global financial services firm and one of the largest banking institutions in the U.S., with operations worldwide. The Firm is a leader in investment banking, financial services for consumers and small business, commercial banking, financial transaction processing and asset management. For a discussion of the Firm’s business segments, see Note 31.

The accounting and financial reporting policies of JPMorgan Chase and its subsidiaries conform to U.S. GAAP. Additionally, where applicable, the policies conform to the accounting and reporting guidelines prescribed by regulatory authorities.

Certain amounts reported in prior periods have been reclassified to conform with the current presentation.

Consolidation

The Consolidated Financial Statements include the accounts of JPMorgan Chase and other entities in which the Firm has a controlling financial interest. All material intercompany balances and transactions have been eliminated.

Assets held for clients in an agency or fiduciary capacity by the Firm are not assets of JPMorgan Chase and are not included on the Consolidated balance sheets.

The Firm determines whether it has a controlling financial interest in an entity by first evaluating whether the entity is a voting interest entity or a variable interest entity.

Voting Interest Entities

Voting interest entities are entities that have sufficient equity and provide the equity investors voting rights that enable them to make significant decisions relating to the entity’s operations. For these types of entities, the Firm’s determination of whether it has a controlling interest is primarily based on the amount of voting equity interests held. Entities in which the Firm has a controlling financial interest, through ownership of the majority of the entities’ voting equity interests, or through other contractual rights that give the Firm control, are consolidated by the Firm.

Investments in companies in which the Firm has significant influence over operating and financing decisions (but does not own a majority of the voting equity interests) are accounted for (i) in accordance with the equity method of accounting (which requires the Firm to recognize its proportionate share of the entity’s net earnings), or (ii) at fair value if the fair value option was elected. These investments are generally included in other assets, with income or loss included in other income.

Certain Firm-sponsored asset management funds are structured as limited partnerships or certain limited liability companies. For many of these entities, the Firm is the general partner or managing member, but the non-affiliated partners or members have the ability to remove the Firm as the general partner or managing member without cause

(i.e., kick-out rights), based on a simple majority vote, or the non-affiliated partners or members have rights to participate in important decisions. Accordingly, the Firm does not consolidate these voting interest entities. However, in the limited cases where the non-managing partners or members do not have substantive kick-out or participating rights, the Firm evaluates the funds as VIEs and consolidates if it is the general partner or managing member and has a potentially significant interest.

The Firm’s investment companies have investments in both publicly-held and privately-held entities, including investments in buyouts, growth equity and venture opportunities. These investments are accounted for under investment company guidelines and accordingly, irrespective of the percentage of equity ownership interests held, are carried on the Consolidated balance sheets at fair value, and are recorded in other assets, with income or loss included in noninterest revenue.

Variable Interest Entities

VIEs are entities that, by design, either (1) lack sufficient equity to permit the entity to finance its activities without additional subordinated financial support from other parties, or (2) have equity investors that do not have the ability to make significant decisions relating to the entity’s operations through voting rights, or do not have the obligation to absorb the expected losses, or do not have the right to receive the residual returns of the entity.

The most common type of VIE is an SPE. SPEs are commonly used in securitization transactions in order to isolate certain assets and distribute the cash flows from those assets to investors. The basic SPE structure involves a company selling assets to the SPE; the SPE funds the purchase of those assets by issuing securities to investors. The legal documents that govern the transaction specify how the cash earned on the assets must be allocated to the SPE’s investors and other parties that have rights to those cash flows. SPEs are generally structured to insulate investors from claims on the SPE’s assets by creditors of other entities, including the creditors of the seller of the assets.

The primary beneficiary of a VIE (i.e., the party that has a controlling financial interest) is required to consolidate the assets and liabilities of the VIE. The primary beneficiary is the party that has both (1) the power to direct the activities of the VIE that most significantly impact the VIE’s economic performance; and (2) through its interests in the VIE, the obligation to absorb losses or the right to receive benefits from the VIE that could potentially be significant to the VIE.

To assess whether the Firm has the power to direct the activities of a VIE that most significantly impact the VIE’s economic performance, the Firm considers all the facts and circumstances, including its role in establishing the VIE and its ongoing rights and responsibilities. This assessment includes, first, identifying the activities that most significantly impact the VIE’s economic performance; and

Notes to consolidated financial statements

second, identifying which party, if any, has power over those activities. In general, the parties that make the most significant decisions affecting the VIE (such as asset managers, collateral managers, servicers, or owners of call options or liquidation rights over the VIE's assets) or have the right to unilaterally remove those decision-makers are deemed to have the power to direct the activities of a VIE.

To assess whether the Firm has the obligation to absorb losses of the VIE or the right to receive benefits from the VIE that could potentially be significant to the VIE, the Firm considers all of its economic interests, including debt and equity investments, servicing fees, and derivatives or other arrangements deemed to be variable interests in the VIE. This assessment requires that the Firm apply judgment in determining whether these interests, in the aggregate, are considered potentially significant to the VIE. Factors considered in assessing significance include: the design of the VIE, including its capitalization structure; subordination of interests; payment priority; relative share of interests held across various classes within the VIE's capital structure; and the reasons why the interests are held by the Firm.

The Firm performs on-going reassessments of: (1) whether entities previously evaluated under the majority voting-interest framework have become VIEs, based on certain events, and are therefore subject to the VIE consolidation framework; and (2) whether changes in the facts and circumstances regarding the Firm's involvement with a VIE cause the Firm's consolidation conclusion to change.

Use of estimates in the preparation of consolidated financial statements

The preparation of the Consolidated Financial Statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, revenue and expense, and disclosures of contingent assets and liabilities. Actual results could be different from these estimates.

Foreign currency translation

JPMorgan Chase revalues assets, liabilities, revenue and expense denominated in non-U.S. currencies into U.S. dollars using applicable exchange rates.

Gains and losses relating to translating functional currency financial statements for U.S. reporting are included in OCI within stockholders' equity. Gains and losses relating to nonfunctional currency transactions, including non-U.S. operations where the functional currency is the U.S. dollar, are reported in the Consolidated statements of income.

Offsetting assets and liabilities

U.S. GAAP permits entities to present derivative receivables and derivative payables with the same counterparty and the related cash collateral receivables and payables on a net basis on the Consolidated balance sheets when a legally enforceable master netting agreement exists. U.S. GAAP also permits securities sold and purchased under repurchase agreements and securities borrowed or loaned

under securities loan agreements to be presented net when specified conditions are met, including the existence of a legally enforceable master netting agreement. The Firm has elected to net such balances when the specified conditions are met.

The Firm uses master netting agreements to mitigate counterparty credit risk in certain transactions, including derivative, securities repurchase and reverse repurchase, and securities loaned and borrow transactions. A master netting agreement is a single agreement with a counterparty that permits multiple transactions governed by that agreement to be terminated or accelerated and settled through a single payment in a single currency in the event of a default (e.g., bankruptcy, failure to make a required payment or securities transfer or deliver collateral or margin when due). Upon the exercise of derivatives termination rights by the non-defaulting party (i) all transactions are terminated, (ii) all transactions are valued and the positive values of "in the money" transactions are netted against the negative values of "out of the money" transactions and (iii) the only remaining payment obligation is of one of the parties to pay the netted termination amount. Upon exercise of default rights under repurchase agreements and securities loan agreements in general (i) all transactions are terminated and accelerated, (ii) all values of securities or cash held or to be delivered are calculated, and all such sums are netted against each other and (iii) the only remaining payment obligation is of one of the parties to pay the netted termination amount.

Typical master netting agreements for these types of transactions also often contain a collateral/margin agreement that provides for a security interest in, or title transfer of, securities or cash collateral/margin to the party that has the right to demand margin (the "demanding party"). The collateral/margin agreement typically requires a party to transfer collateral/margin to the demanding party with a value equal to the amount of the margin deficit on a net basis across all transactions governed by the master netting agreement, less any threshold. The collateral/margin agreement grants to the demanding party, upon default by the counterparty, the right to set-off any amounts payable by the counterparty against any posted collateral or the cash equivalent of any posted collateral/margin. It also grants to the demanding party the right to liquidate collateral/margin and to apply the proceeds to an amount payable by the counterparty.

For further discussion of the Firm's derivative instruments, see Note 5. For further discussion of the Firm's repurchase and reverse repurchase agreements, and securities borrowing and lending agreements, see Note 11.

Statements of cash flows

For JPMorgan Chase's Consolidated statements of cash flows, cash is defined as those amounts included in cash and due from banks.

Significant accounting policies

The following table identifies JPMorgan Chase's other significant accounting policies and the Note and page where a detailed description of each policy can be found.

Fair value measurement	Note 2	Page 155
Fair value option	Note 3	Page 174
Derivative instruments	Note 5	Page 179
Noninterest revenue	Note 6	Page 192
Interest income and interest expense	Note 7	Page 195
Pension and other postretirement employee benefit plans	Note 8	Page 195
Employee share-based incentives	Note 9	Page 201
Securities	Note 10	Page 203
Securities financing activities	Note 11	Page 208
Loans	Note 12	Page 211
Allowance for credit losses	Note 13	Page 231
Variable interest entities	Note 14	Page 236
Goodwill and Mortgage servicing rights	Note 15	page 244
Premises and equipment	Note 16	page 248
Long-term debt	Note 19	page 249
Income taxes	Note 24	page 255
Off-balance sheet lending-related financial instruments, guarantees and other commitments	Note 27	page 261
Litigation	Note 29	page 268

Note 2 – Fair value measurement

JPMorgan Chase carries a portion of its assets and liabilities at fair value. These assets and liabilities are predominantly carried at fair value on a recurring basis (i.e., assets and liabilities that are measured and reported at fair value on the Firm's Consolidated balance sheets). Certain assets (e.g., held-for-sale loans), liabilities and unfunded lending-related commitments are measured at fair value on a nonrecurring basis; that is, they are not measured at fair value on an ongoing basis but are subject to fair value adjustments only in certain circumstances (for example, when there is evidence of impairment).

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Fair value is based on quoted market prices or inputs, where available. If prices or quotes are not available, fair value is based on valuation models and other valuation techniques that consider relevant transaction characteristics (such as maturity) and use as inputs observable or unobservable market parameters, including yield curves, interest rates, volatilities, equity or debt prices, foreign exchange rates and credit curves. Valuation adjustments may be made to ensure that financial instruments are recorded at fair value, as described below.

The level of precision in estimating unobservable market inputs or other factors can affect the amount of gain or loss recorded for a particular position. Furthermore, while the Firm believes its valuation methods are appropriate and

consistent with those of other market participants, the methods and assumptions used reflect management judgment and may vary across the Firm's businesses and portfolios.

The Firm uses various methodologies and assumptions in the determination of fair value. The use of different methodologies or assumptions by other market participants compared with those used by the Firm could result in the Firm deriving a different estimate of fair value at the reporting date.

Valuation process

Risk-taking functions are responsible for providing fair value estimates for assets and liabilities carried on the Consolidated balance sheets at fair value. The Firm's VCG, which is part of the Firm's Finance function and independent of the risk-taking functions, is responsible for verifying these estimates and determining any fair value adjustments that may be required to ensure that the Firm's positions are recorded at fair value. The VGF is composed of senior finance and risk executives and is responsible for overseeing the management of risks arising from valuation activities conducted across the Firm. The VGF is chaired by the Firmwide head of the VCG (under the direction of the Firm's Controller), and includes sub-forums covering the CIB, CCB, CB, AWM and certain corporate functions including Treasury and CIO.

Price verification process

The VCG verifies fair value estimates provided by the risk-taking functions by leveraging independently derived prices, valuation inputs and other market data, where available. Where independent prices or inputs are not available, the VCG performs additional review to ensure the reasonableness of the estimates. The additional review may include evaluating the limited market activity including client unwinds, benchmarking valuation inputs to those used for similar instruments, decomposing the valuation of structured instruments into individual components, comparing expected to actual cash flows, reviewing profit and loss trends, and reviewing trends in collateral valuation. There are also additional levels of management review for more significant or complex positions.

The VCG determines any valuation adjustments that may be required to the estimates provided by the risk-taking functions. No adjustments to quoted prices are applied for instruments classified within level 1 of the fair value hierarchy (see below for further information on the fair value hierarchy). For other positions, judgment is required to assess the need for valuation adjustments to appropriately reflect liquidity considerations, unobservable parameters, and, for certain portfolios that meet specified criteria, the size of the net open risk position. The determination of such adjustments follows a consistent framework across the Firm:

- Liquidity valuation adjustments are considered where an observable external price or valuation parameter exists but is of lower reliability, potentially due to lower market activity. Liquidity valuation adjustments are applied and determined based on current market conditions. Factors that may be considered in determining the liquidity adjustment include analysis of: (1) the estimated bid-offer spread for the instrument being traded; (2) alternative pricing points for similar instruments in active markets; and (3) the range of reasonable values that the price or parameter could take.
- The Firm manages certain portfolios of financial instruments on the basis of net open risk exposure and, as permitted by U.S. GAAP, has elected to estimate the fair value of such portfolios on the basis of a transfer of the entire net open risk position in an orderly transaction. Where this is the case, valuation adjustments may be necessary to reflect the cost of exiting a larger-than-normal market-size net open risk position. Where applied, such adjustments are based on factors that a relevant market participant would consider in the transfer of the net open risk position, including the size of the adverse market move that is likely to occur during the period required to reduce the net open risk position to a normal market-size.
- Unobservable parameter valuation adjustments may be made when positions are valued using prices or input parameters to valuation models that are unobservable due to a lack of market activity or because they cannot be implied from observable market data. Such prices or parameters must be estimated and are, therefore, subject to management judgment. Unobservable

parameter valuation adjustments are applied to reflect the uncertainty inherent in the resulting valuation estimate.

- Where appropriate, the Firm also applies adjustments to its estimates of fair value in order to appropriately reflect counterparty credit quality (CVA), the Firm's own creditworthiness (DVA) and the impact of funding (FVA), using a consistent framework across the Firm. For more information on such adjustments see Credit and funding adjustments on page 171 of this Note.

Valuation model review and approval

If prices or quotes are not available for an instrument or a similar instrument, fair value is generally determined using valuation models that consider relevant transaction data such as maturity and use as inputs market-based or independently sourced parameters. Where this is the case the price verification process described above is applied to the inputs to those models.

Under the Firm's Estimations and Model Risk Management Policy, the Model Risk function reviews and approves new models, as well as material changes to existing models, prior to implementation in the operating environment. In certain circumstances, the head of the Model Risk function may grant exceptions to the Firm's policy to allow a model to be used prior to review or approval. The Model Risk function may also require the user to take appropriate actions to mitigate the model risk if it is to be used in the interim. These actions will depend on the model and may include, for example, limitation of trading activity.

Valuation hierarchy

A three-level valuation hierarchy has been established under U.S. GAAP for disclosure of fair value measurements. The valuation hierarchy is based on the transparency of inputs to the valuation of an asset or liability as of the measurement date. The three levels are defined as follows.

- Level 1 - inputs to the valuation methodology are quoted prices (unadjusted) for identical assets or liabilities in active markets.
- Level 2 - inputs to the valuation methodology include quoted prices for similar assets and liabilities in active markets, and inputs that are observable for the asset or liability, either directly or indirectly, for substantially the full term of the financial instrument.
- Level 3 - one or more inputs to the valuation methodology are unobservable and significant to the fair value measurement.

A financial instrument's categorization within the valuation hierarchy is based on the lowest level of input that is significant to the fair value measurement.

The following table describes the valuation methodologies generally used by the Firm to measure its significant products/instruments at fair value, including the general classification of such instruments pursuant to the valuation hierarchy.

Product/instrument	Valuation methodology	Classifications in the valuation hierarchy
Securities financing agreements	Valuations are based on discounted cash flows, which consider: • Derivative features: for further information refer to the discussion of derivatives below. • Market rates for the respective maturity • Collateral characteristics	Predominantly level 2
Loans and lending-related commitments – wholesale		
Loans carried at fair value (e.g., trading loans and non-trading loans) and associated lending-related commitments	Where observable market data is available, valuations are based on: • Observed market prices (circumstances are infrequent) • Relevant broker quotes • Observed market prices for similar instruments Where observable market data is unavailable or limited, valuations are based on discounted cash flows, which consider the following: • Credit spreads derived from the cost of CDS; or benchmark credit curves developed by the Firm, by industry and credit rating • Prepayment speed • Collateral characteristics	Level 2 or 3
Loans held-for-investment and associated lending-related commitments	Valuations are based on discounted cash flows, which consider: • Credit spreads, derived from the cost of CDS; or benchmark credit curves developed by the Firm, by industry and credit rating • Prepayment speed Lending-related commitments are valued similarly to loans and reflect the portion of an unused commitment expected, based on the Firm's average portfolio historical experience, to become funded prior to an obligor default. For information regarding the valuation of loans measured at collateral value, see Note 12.	Predominantly level 3
Loans – consumer		
Held-for-investment consumer loans, excluding credit card	Valuations are based on discounted cash flows, which consider: • Credit losses - which consider expected and current default rates, and loss severity • Prepayment speed • Discount rates • Servicing costs For information regarding the valuation of loans measured at collateral value, see Note 12.	Predominantly level 2
Held-for-investment credit card receivables	Valuations are based on discounted cash flows, which consider: • Credit costs - the allowance for loan losses is considered a reasonable proxy for the credit cost • Projected interest income, late-fee revenue and loan repayment rates • Discount rates • Servicing costs	Level 3
Trading loans – conforming residential mortgage loans expected to be sold (CCB, CIB)	Fair value is based on observable prices for mortgage-backed securities with similar collateral and incorporates adjustments to these prices to account for differences between the securities and the value of the underlying loans, which include credit characteristics, portfolio composition, and liquidity.	Predominantly level 2

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Product/instrument	Valuation methodology, inputs and assumptions	Classifications in the valuation hierarchy
Investment and trading securities	Quoted market prices are used where available.	Level 1
	In the absence of quoted market prices, securities are valued based on: • Observable market prices for similar securities • Relevant broker quotes • Discounted cash flows In addition, the following inputs to discounted cash flows are used for the following products: Mortgage- and asset-backed securities specific inputs: • Collateral characteristics • Deal-specific payment and loss allocations • Current market assumptions related to yield, prepayment speed, conditional default rates and loss severity Collateralized loan obligations ("CLOs") specific inputs: • Collateral characteristics • Deal-specific payment and loss allocations • Expected prepayment speed, conditional default rates, loss severity • Credit spreads • Credit rating data	Level 2 or 3
Physical commodities	Valued using observable market prices or data.	Predominantly level 1 and 2
Derivatives	Exchange-traded derivatives that are actively traded and valued using the exchange price.	Level 1
	Derivatives that are valued using models such as the Black-Scholes option pricing model, simulation models, or a combination of models that may use observable or unobservable valuation inputs as well as considering the contractual terms. The key valuation inputs used will depend on the type of derivative and the nature of the underlying instruments and may include equity prices, commodity prices, interest rate yield curves, foreign exchange rates, volatilities, correlations, CDS spreads and recovery rates. Additionally, the credit quality of the counterparty and of the Firm as well as market funding levels may also be considered. In addition, specific inputs used for derivatives that are valued based on models with significant unobservable inputs are as follows: Structured credit derivatives specific inputs include: • CDS spreads and recovery rates • Credit correlation between the underlying debt instruments Equity option specific inputs include: • Equity volatilities • Equity correlation • Equity-FX correlation • Equity-IR correlation Interest rate and FX exotic options specific inputs include: • Interest rate spread volatility • Interest rate correlation • Foreign exchange correlation • Interest rate-FX correlation Commodity derivatives specific inputs include: • Commodity volatility • Forward commodity price Additionally, adjustments are made to reflect counterparty credit quality (CVA) and the impact of funding (FVA). See page 171 of this Note.	Level 2 or 3

Product/instrument	Valuation methodology, inputs and assumptions	Classification in the valuation hierarchy
Mortgage servicing rights	See Mortgage servicing rights in Note 15.	Level 3
Private equity direct investments	Fair value is estimated using all available information; the range of potential inputs include: • Transaction prices • Trading multiples of comparable public companies • Operating performance of the underlying portfolio company • Adjustments as required, since comparable public companies are not identical to the company being valued, and for company-specific issues and lack of liquidity. • Additional available inputs relevant to the investment.	Level 2 or 3
Fund investments (e.g., mutual/collective investment funds, private equity funds, hedge funds, and real estate funds)	Net asset value • NAV is supported by the ability to redeem and purchase at the NAV level. • Adjustments to the NAV as required, for restrictions on redemption (e.g., lock-up periods or withdrawal limitations) or where observable activity is limited.	Level 1 Level 2 or 3^(a)
Beneficial interests issued by consolidated VIEs	Valued using observable market information, where available. In the absence of observable market information, valuations are based on the fair value of the underlying assets held by the VIE.	Level 2 or 3
Long-term debt, not carried at fair value	Valuations are based on discounted cash flows, which consider: • Market rates for respective maturity	Predominantly level 2
Structured notes (included in deposits, short-term borrowings and long-term debt)	• Valuations are based on discounted cash flow analyses that consider the embedded derivative and the terms and payment structure of the note. • The embedded derivative features are considered using models such as the Black-Scholes option pricing model, simulation models, or a combination of models that may use observable or unobservable valuation inputs, depending on the embedded derivative. The specific inputs used vary according to the nature of the embedded derivative features, as described in the discussion above regarding derivatives valuation. Adjustments are then made to this base valuation to reflect the Firm's own credit risk (DVA). See page 171 of this Note.	Level 2 or 3

(a) Excludes certain investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient.

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The following table presents the assets and liabilities reported at fair value as of December 31, 2017 and 2016, by major product category and fair value hierarchy.

Assets and liabilities measured at fair value on a recurring basis

December 31, 2017 (in millions)	Fair value hierarchy			Derivative netting adjustments	Total fair value
	Level 1	Level 2	Level 3		
Federal funds sold and securities purchased under resale agreements	\$ —	\$ 14,732	\$ —	\$ —	\$ 14,732
Securities borrowed	—	3,049	—	—	3,049
Trading assets:					
Debt instruments:					
Mortgage-backed securities:					
U.S. government agencies ^(a)	—	41,515	307	—	41,822
Residential - nonagency	—	1,835	60	—	1,895
Commercial - nonagency	—	1,645	11	—	1,656
Total mortgage-backed securities	—	44,995	378	—	45,373
U.S. Treasury and government agencies ^(a)	30,758	6,475	1	—	37,234
Obligations of U.S. states and municipalities	—	9,067	744	—	9,811
Certificates of deposit, bankers' acceptances and commercial paper	—	226	—	—	226
Non-U.S. government debt securities	28,887	28,831	78	—	57,796
Corporate debt securities	—	24,146	312	—	24,458
Loans ^(b)	—	35,242	2,719	—	37,961
Asset-backed securities	—	3,284	153	—	3,437
Total debt instruments	59,645	152,266	4,385	—	216,296
Equity securities	87,346	197	295	—	87,838
Physical commodities ^(c)	4,924	1,322	—	—	6,246
Other	—	14,197	690	—	14,887
Total debt and equity instruments^(d)	151,915	167,982	5,370	—	325,267
Derivative receivables:					
Interest rate	181	314,107	1,704	(291,319)	24,673
Credit	—	21,995	1,209	(22,335)	869
Foreign exchange	841	158,834	557	(144,081)	16,151
Equity	—	37,722	2,318	(32,158)	7,882
Commodity	—	19,875	210	(13,137)	6,948
Total derivative receivables^{(e)(f)}	1,022	552,533	5,998	(503,030)	56,523
Total trading assets^(g)	152,937	720,515	11,368	(503,030)	381,790
Available-for-sale securities:					
Mortgage-backed securities:					
U.S. government agencies ^(a)	—	70,280	—	—	70,280
Residential - nonagency	—	11,366	1	—	11,367
Commercial - nonagency	—	5,025	—	—	5,025
Total mortgage-backed securities	—	86,671	1	—	86,672
U.S. Treasury and government agencies ^(a)	22,745	—	—	—	22,745
Obligations of U.S. states and municipalities	—	32,338	—	—	32,338
Certificates of deposit	—	59	—	—	59
Non-U.S. government debt securities	18,140	9,154	—	—	27,294
Corporate debt securities	—	2,757	—	—	2,757
Asset-backed securities:					
Collateralized loan obligations	—	20,720	276	—	20,996
Other	—	8,817	—	—	8,817
Equity securities	547	—	—	—	547
Total available-for-sale securities	41,432	160,516	277	—	202,225
Loans	—	2,232	276	—	2,508
Mortgage servicing rights	—	—	6,030	—	6,030
Other assets ^(g)	13,795	343	1,265	—	15,403
Total assets measured at fair value on a recurring basis	\$ 208,164	\$ 901,387	\$ 19,216	\$ (503,030)	\$ 625,737
Deposits	\$ —	\$ 17,179	\$ 4,142	\$ —	\$ 21,321
Federal funds purchased and securities loaned or sold under repurchase agreements	—	697	—	—	697
Short-term borrowings	—	7,526	1,665	—	9,191
Trading liabilities:					
Debt and equity instruments ^(d)	64,664	21,183	39	—	85,886
Derivative payables:					
Interest rate	170	282,825	1,440	(277,306)	7,129
Credit	—	22,009	1,244	(21,954)	1,299
Foreign exchange	794	154,075	953	(143,349)	12,473
Equity	—	39,668	5,727	(36,203)	9,192
Commodity	—	21,017	884	(14,217)	7,684
Total derivative payables^{(e)(f)}	964	519,594	10,248	(493,029)	37,777
Total trading liabilities	65,628	540,777	10,287	(493,029)	123,663
Accounts payable and other liabilities	9,074	121	13	—	9,208
Beneficial interests issued by consolidated VIEs	—	6	39	—	45
Long-term debt	—	31,394	16,125	—	47,519
Total liabilities measured at fair value on a recurring basis	\$ 74,702	\$ 597,700	\$ 32,271	\$ (493,029)	\$ 211,644

December 31, 2016 (in millions)	Fair value hierarchy			Derivative netting adjustments	Total fair value
	Level 1	Level 2	Level 3		
Federal funds sold and securities purchased under resale agreements	\$ —	\$ 21,506	\$ —	\$ —	\$ 21,506
Securities borrowed	—	—	—	—	—
Trading assets:					
Debt instruments:					
Mortgage-backed securities:					
U.S. government agencies ^(a)	13	40,586	392	—	40,991
Residential - nonagency	—	1,552	83	—	1,635
Commercial - nonagency	—	1,321	17	—	1,338
Total mortgage-backed securities	13	43,459	492	—	43,964
U.S. Treasury and government agencies ^(a)	19,554	5,201	—	—	24,755
Obligations of U.S. states and municipalities	—	8,403	649	—	9,052
Certificates of deposit, bankers' acceptances and commercial paper	—	1,649	—	—	1,649
Non-U.S. government debt securities	28,443	23,076	46	—	51,565
Corporate debt securities	—	22,751	576	—	23,327
Loans ^(b)	—	28,965	4,837	—	33,802
Asset-backed securities	—	5,250	302	—	5,552
Total debt instruments	48,010	138,754	6,902	—	193,666
Equity securities	96,759	281	231	—	97,271
Physical commodities ^(c)	5,341	1,620	—	—	6,961
Other	—	9,341	761	—	10,102
Total debt and equity instruments^(d)	150,110	149,996	7,894	—	308,000
Derivative receivables:					
Interest rate	715	602,747	2,501	(577,661)	28,302
Credit	—	28,256	1,389	(28,351)	1,294
Foreign exchange	812	231,743	870	(210,154)	23,271
Equity	—	34,032	908	(30,001)	4,939
Commodity	158	18,360	125	(12,371)	6,272
Total derivative receivables^(e)	1,685	915,138	5,793	(858,538)	64,078
Total trading assets^(f)	151,795	1,065,134	13,687	(858,538)	372,078
Available-for-sale securities:					
Mortgage-backed securities:					
U.S. government agencies ^(a)	—	64,005	—	—	64,005
Residential - nonagency	—	14,442	1	—	14,443
Commercial - nonagency	—	9,104	—	—	9,104
Total mortgage-backed securities	—	87,551	1	—	87,552
U.S. Treasury and government agencies ^(a)	44,072	29	—	—	44,101
Obligations of U.S. states and municipalities	—	31,592	—	—	31,592
Certificates of deposit	—	106	—	—	106
Non-U.S. government debt securities	22,793	12,495	—	—	35,288
Corporate debt securities	—	4,958	—	—	4,958
Asset-backed securities:					
Collateralized loan obligations	—	26,738	663	—	27,401
Other	—	6,967	—	—	6,967
Equity securities	926	—	—	—	926
Total available-for-sale securities	67,791	170,436	664	—	238,891
Loans	—	1,660	570	—	2,230
Mortgage servicing rights	—	—	6,096	—	6,096
Other assets ^(g)	4,357	—	2,223	—	6,580
Total assets measured at fair value on a recurring basis	\$ 223,943	\$ 1,258,736	\$ 23,240	\$ (858,538)	\$ 647,381
Deposits	\$ —	\$ 11,795	\$ 2,117	\$ —	\$ 13,912
Federal funds purchased and securities loaned or sold under repurchase agreements	—	687	—	—	687
Short-term borrowings	—	7,971	1,134	—	9,105
Trading liabilities:					
Debt and equity instruments ^(d)	68,304	19,081	43	—	87,428
Derivative payables:					
Interest rate	539	569,001	1,238	(559,963)	10,815
Credit	—	27,375	1,291	(27,255)	1,411
Foreign exchange	902	231,815	2,254	(214,463)	20,508
Equity	—	35,202	3,160	(30,222)	8,140
Commodity	173	20,079	210	(12,105)	8,357
Total derivative payables^(e)	1,614	883,472	8,153	(844,008)	49,231
Total trading liabilities	69,918	902,553	8,196	(844,008)	136,659
Accounts payable and other liabilities	9,107	—	13	—	9,120
Beneficial interests issued by consolidated VIEs	—	72	48	—	120
Long-term debt	—	24,836 ^(h)	12,850 ^(h)	—	37,686
Total liabilities measured at fair value on a recurring basis	\$ 79,025	\$ 947,914^(h)	\$ 24,358^(h)	\$ (844,008)	\$ 207,289

- (a) At December 31, 2017 and 2016, included total U.S. government-sponsored enterprise obligations of \$78.0 billion and \$80.6 billion, respectively, which were predominantly mortgage-related.
- (b) At December 31, 2017 and 2016, included within trading loans were \$11.4 billion and \$16.5 billion, respectively, of residential first-lien mortgages, and \$4.2 billion and \$3.3 billion, respectively, of commercial first-lien mortgages. Residential mortgage loans include conforming mortgage loans originated with the intent to sell to U.S. government agencies of \$5.7 billion and \$11.0 billion, respectively, and reverse mortgages of \$836 million and \$2.0 billion, respectively.
- (c) Physical commodities inventories are generally accounted for at the lower of cost or net realizable value. "Net realizable value" is a term defined in U.S. GAAP as not exceeding fair value less costs to sell ("transaction costs"). Transaction costs for the Firm's physical commodities inventories are either not applicable or immaterial to the value of the inventory. Therefore, net realizable value approximates fair value for the Firm's physical commodities inventories. When fair value hedging has been applied (or when net

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realizable value is below cost), the carrying value of physical commodities approximates fair value, because under fair value hedge accounting, the cost basis is adjusted for changes in fair value. For a further discussion of the Firm's hedge accounting relationships, see Note 5. To provide consistent fair value disclosure information, all physical commodities inventories have been included in each period presented.

- (d) Balances reflect the reduction of securities owned (long positions) by the amount of identical securities sold but not yet purchased (short positions).
- (e) As permitted under U.S. GAAP, the Firm has elected to net derivative receivables and derivative payables and the related cash collateral received and paid when a legally enforceable master netting agreement exists. For purposes of the tables above, the Firm does not reduce derivative receivables and derivative payables balances for this netting adjustment, either within or across the levels of the fair value hierarchy, as such netting is not relevant to a presentation based on the transparency of inputs to the valuation of an asset or liability. The level 3 balances would be reduced if netting were applied, including the netting benefit associated with cash collateral.
- (f) Reflects the Firm's adoption of rulebook changes made by two CCPs that require or allow the Firm to treat certain OTC-cleared derivative transactions as daily settled. For further information, see Note 5.
- (g) Certain investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not required to be classified in the fair value hierarchy. At December 31, 2017 and 2016, the fair values of these investments, which include certain hedge funds, private equity funds, real estate and other funds, were \$779 million and \$1.0 billion, respectively. Included in these balances at December 31, 2017 and 2016, were trading assets of \$54 million and \$52 million, respectively, and other assets of \$725 million and \$977 million, respectively.
- (h) The prior period amounts have been revised to conform with the current period presentation.

Transfers between levels for instruments carried at fair value on a recurring basis

For the years ended December 31, 2017 and 2016, there were no significant transfers between levels 1 and 2.

During the year ended December 31, 2017, transfers from level 3 to level 2 included the following:

- \$1.5 billion of trading loans driven by an increase in observability.
- \$1.2 billion of gross equity derivative payables as a result of an increase in observability and a decrease in the significance of unobservable inputs.

During the year ended December 31, 2017, transfers from level 2 to level 3 included the following:

- \$1.0 billion of gross equity derivative receivables and \$2.5 billion of gross equity derivative payables as a result of a decrease in observability and an increase in the significance of unobservable inputs.
- \$1.7 billion of long-term debt driven by a decrease in observability and an increase in the significance of unobservable inputs for certain structured notes.

During the year ended December 31, 2016, transfers from level 3 to level 2 included the following:

- \$1.4 billion of long-term debt driven by an increase in observability and a reduction in the significance of unobservable inputs for certain structured notes.

During the year ended December 31, 2016, transfers from level 2 to level 3 included the following:

- \$1.1 billion of gross equity derivative receivables and \$1.0 billion of gross equity derivative payables as a result of a decrease in observability and an increase in the significance of unobservable inputs.

- \$1.0 billion of trading loans driven by a decrease in observability.

During the year ended December 31, 2015, transfers from level 3 to level 2 included the following:

- \$3.1 billion of long-term debt and \$1.0 billion of deposits driven by an increase in observability on certain structured notes with embedded interest rate and FX derivatives and a reduction in the significance of unobservable inputs for certain structured notes with embedded equity derivatives.
- \$2.1 billion of gross equity derivatives for both receivables and payables as a result of an increase in observability and a decrease in the significance of unobservable inputs; partially offset by transfers into level 3 resulting in net transfers of approximately \$1.2 billion for both receivables and payables.
- \$2.8 billion of trading loans driven by an increase in observability of certain collateralized financing transactions.
- \$2.4 billion of corporate debt driven by a decrease in the significance of unobservable inputs and an increase in observability for certain structured products.

During the year ended December 31, 2015, there were no significant transfers from level 2 to level 3.

All transfers are assumed to occur at the beginning of the quarterly reporting period in which they occur.

Level 3 valuations

The Firm has established well-structured processes for determining fair value, including for instruments where fair value is estimated using significant unobservable inputs (level 3). For further information on the Firm's valuation process and a detailed discussion of the determination of fair value for individual financial instruments, see pages 155-159 of this Note.

Estimating fair value requires the application of judgment. The type and level of judgment required is largely dependent on the amount of observable market information available to the Firm. For instruments valued using internally developed valuation models and other valuation techniques that use significant unobservable inputs and are therefore classified within level 3 of the fair value hierarchy, judgments used to estimate fair value are more significant than those required when estimating the fair value of instruments classified within levels 1 and 2.

In arriving at an estimate of fair value for an instrument within level 3, management must first determine the appropriate valuation model or other valuation technique to use. Second, due to the lack of observability of significant inputs, management must assess all relevant empirical data in deriving valuation inputs including transaction details, yield curves, interest rates, prepayment speed, default rates, volatilities, correlations, equity or debt prices, valuations of comparable instruments, foreign exchange rates and credit curves.

The following table presents the Firm's primary level 3 financial instruments, the valuation techniques used to measure the fair value of those financial instruments, the significant unobservable inputs, the range of values for those inputs and, for certain instruments, the weighted averages of such inputs. While the determination to classify an instrument within level 3 is based on the significance of the unobservable inputs to the overall fair value measurement, level 3 financial instruments typically include observable components (that is, components that are actively quoted and can be validated to external sources) in addition to the unobservable components. The level 1 and/or level 2 inputs are not included in the table. In addition, the Firm manages the risk of the observable components of level 3 financial instruments using securities and derivative positions that are classified within levels 1 or 2 of the fair value hierarchy.

The range of values presented in the table is representative of the highest and lowest level input used to value the significant groups of instruments within a product/instrument classification. Where provided, the weighted averages of the input values presented in the table are calculated based on the fair value of the instruments that the input is being used to value.

In the Firm's view, the input range and the weighted average value do not reflect the degree of input uncertainty or an assessment of the reasonableness of the Firm's estimates and assumptions. Rather, they reflect the characteristics of the various instruments held by the Firm and the relative distribution of instruments within the range of characteristics. For example, two option contracts may have similar levels of market risk exposure and valuation uncertainty, but may have significantly different implied volatility levels because the option contracts have different underlyings, tenors, or strike prices. The input range and weighted average values will therefore vary from period-to-period and parameter-to-parameter based on the characteristics of the instruments held by the Firm at each balance sheet date.

For the Firm's derivatives and structured notes positions classified within level 3 at December 31, 2017, interest rate correlation inputs used in estimating fair value were concentrated towards the upper end of the range; equity correlation, equity-FX and equity-IR correlation inputs were concentrated in the middle of the range; commodity correlation inputs were concentrated in the middle of the range; credit correlation inputs were concentrated towards the lower end of the range; and the interest rate-foreign exchange ("IR-FX") correlation inputs were concentrated towards the lower end of the range. In addition, the interest rate spread volatility inputs used in estimating fair value were distributed across the range; equity volatilities and commodity volatilities were concentrated towards the lower end of the range; and forward commodity prices used in estimating the fair value of commodity derivatives were concentrated towards the lower end of the range. Recovery rate, yield, prepayment speed, conditional default rate, loss severity and price inputs used in estimating the fair value of credit derivatives were distributed across the range; and credit spreads were concentrated towards the lower end of the range.

Notes to consolidated financial statements

Level 3 inputs^(a)

December 31, 2017

Product/Instrument	Fair value (in millions)	Principal valuation technique	Unobservable inputs ^(g)	Range of input values	Weighted average
Residential mortgage-backed securities and loans ^(b)	\$ 1,418	Discounted cash flows	Yield	3% - 16%	6%
			Prepayment speed	0% - 13%	9%
			Conditional default rate	0% - 5%	1%
			Loss severity	0% - 84%	3%
Commercial mortgage-backed securities and loans ^(c)	714	Market comparables	Price	\$ 0 - \$100	\$94
Obligations of U.S. states and municipalities	744	Market comparables	Price	\$ 59 - \$100	\$98
Corporate debt securities	312	Market comparables	Price	\$ 3 - \$111	\$82
Loans ^(d)	1,242	Market comparables	Price	\$ 4 - \$103	\$84
Asset-backed securities	276	Discounted cash flows	Credit spread	204bps - 205bps	205bps
			Prepayment speed	20%	20%
			Conditional default rate	2%	2%
			Loss severity	30%	30%
	153	Market comparables	Price	\$ 2 - \$160	\$79
Net interest rate derivatives	28	Option pricing	Interest rate spread volatility	27bps - 38bps	
			Interest rate correlation	(50)% - 98%	
			IR-FX correlation	60% - 70%	
	236	Discounted cash flows	Prepayment speed	0% - 30%	
Net credit derivatives	(37)	Discounted cash flows	Credit correlation	40 % - 75%	
			Credit spread	6bps - 1,489bps	
			Recovery rate	20% - 70%	
			Yield	1% - 20%	
			Prepayment speed	4% - 21%	
			Conditional default rate	0% - 100%	
			Loss severity	4% - 100%	
	2	Market comparables	Price	\$ 10 - \$98	
Net foreign exchange derivatives	(200)	Option pricing	IR-FX correlation	(50)% - 70%	
	(196)	Discounted cash flows	Prepayment speed	7%	
Net equity derivatives	(3,409)	Option pricing	Equity volatility	20% - 55%	
			Equity correlation	0 % - 85%	
			Equity-FX correlation	(50)% - 30%	
			Equity-IR correlation	10 % - 40%	
Net commodity derivatives	(674)	Option pricing	Forward commodity price	\$ 54 - \$68 per barrel	
			Commodity volatility	5 % - 46%	
			Commodity correlation	(40)% - 70%	
MSRs	6,030	Discounted cash flows	Refer to Note 15		
Other assets	984	Discounted cash flows	Credit spread	40bps - 70bps	55bps
			Yield	8% - 60%	47%
	971	Market comparables	EBITDA multiple	4.7x - 10.6x	8.9x
Long-term debt, short-term borrowings, and deposits ^(e)	21,932	Option pricing	Interest rate spread volatility	27bps - 38bps	
			Interest rate correlation	(50)% - 98%	
			IR-FX correlation	(50)% - 70%	
			Equity correlation	0% - 85%	
			Equity-FX correlation	(50)% - 30%	
			Equity-IR correlation	10% - 40%	
Other level 3 assets and liabilities, net ^(f)	283				

(a) The categories presented in the table have been aggregated based upon the product type, which may differ from their classification on the Consolidated balance sheets. Furthermore, the inputs presented for each valuation technique in the table are, in some cases, not applicable to every instrument valued using the technique as the characteristics of the instruments can differ.

- (b) Includes U.S. government agency securities of \$297 million, nonagency securities of \$61 million and trading loans of \$1.1 billion.
- (c) Includes U.S. government agency securities of \$10 million, nonagency securities of \$11 million, trading loans of \$417 million and non-trading loans of \$276 million.
- (d) Includes trading loans of \$1.2 billion.
- (e) Long-term debt, short-term borrowings and deposits include structured notes issued by the Firm that are predominantly financial instruments containing embedded derivatives. The estimation of the fair value of structured notes includes the derivative features embedded within the instrument. The significant unobservable inputs are broadly consistent with those presented for derivative receivables.
- (f) Includes level 3 assets and liabilities that are insignificant both individually and in aggregate.
- (g) Price is a significant unobservable input for certain instruments. When quoted market prices are not readily available, reliance is generally placed on price-based internal valuation techniques. The price input is expressed assuming a par value of \$100.

Changes in and ranges of unobservable inputs

The following discussion provides a description of the impact on a fair value measurement of a change in each unobservable input in isolation, and the interrelationship between unobservable inputs, where relevant and significant. The impact of changes in inputs may not be independent, as a change in one unobservable input may give rise to a change in another unobservable input. Where relationships do exist between two unobservable inputs, those relationships are discussed below. Relationships may also exist between observable and unobservable inputs (for example, as observable interest rates rise, unobservable prepayment rates decline); such relationships have not been included in the discussion below. In addition, for each of the individual relationships described below, the inverse relationship would also generally apply.

The following discussion also provides a description of attributes of the underlying instruments and external market factors that affect the range of inputs used in the valuation of the Firm's positions.

Yield – The yield of an asset is the interest rate used to discount future cash flows in a discounted cash flow calculation. An increase in the yield, in isolation, would result in a decrease in a fair value measurement.

Credit spread – The credit spread is the amount of additional annualized return over the market interest rate that a market participant would demand for taking exposure to the credit risk of an instrument. The credit spread for an instrument forms part of the discount rate used in a discounted cash flow calculation. Generally, an increase in the credit spread would result in a decrease in a fair value measurement.

The yield and the credit spread of a particular mortgage-backed security primarily reflect the risk inherent in the instrument. The yield is also impacted by the absolute level of the coupon paid by the instrument (which may not correspond directly to the level of inherent risk). Therefore, the range of yield and credit spreads reflects the range of risk inherent in various instruments owned by the Firm. The risk inherent in mortgage-backed securities is driven by the subordination of the security being valued and the characteristics of the underlying mortgages within the collateralized pool, including borrower FICO scores, LTV ratios for residential mortgages and the nature of the property and/or any tenants for commercial mortgages. For corporate debt securities, obligations of U.S. states and municipalities and other similar instruments, credit spreads reflect the credit quality of the obligor and the tenor of the obligation.

Prepayment speed – The prepayment speed is a measure of the voluntary unscheduled principal repayments of a prepayable obligation in a collateralized pool. Prepayment speeds generally decline as borrower delinquencies rise. An increase in prepayment speeds, in isolation, would result in a decrease in a fair value measurement of assets valued at a premium to par and an increase in a fair value measurement of assets valued at a discount to par.

Prepayment speeds may vary from collateral pool to collateral pool, and are driven by the type and location of the underlying borrower, and the remaining tenor of the obligation as well as the level and type (e.g., fixed or floating) of interest rate being paid by the borrower. Typically collateral pools with higher borrower credit quality have a higher prepayment rate than those with lower borrower credit quality, all other factors being equal.

Conditional default rate – The conditional default rate is a measure of the reduction in the outstanding collateral balance underlying a collateralized obligation as a result of defaults. While there is typically no direct relationship between conditional default rates and prepayment speeds, collateralized obligations for which the underlying collateral has high prepayment speeds will tend to have lower conditional default rates. An increase in conditional default rates would generally be accompanied by an increase in loss severity and an increase in credit spreads. An increase in the conditional default rate, in isolation, would result in a decrease in a fair value measurement. Conditional default rates reflect the quality of the collateral underlying a securitization and the structure of the securitization itself. Based on the types of securities owned in the Firm's market-making portfolios, conditional default rates are most typically at the lower end of the range presented.

Loss severity – The loss severity (the inverse concept is the recovery rate) is the expected amount of future realized losses resulting from the ultimate liquidation of a particular loan, expressed as the net amount of loss relative to the outstanding loan balance. An increase in loss severity is generally accompanied by an increase in conditional default rates. An increase in the loss severity, in isolation, would result in a decrease in a fair value measurement.

The loss severity applied in valuing a mortgage-backed security investment depends on factors relating to the underlying mortgages, including the LTV ratio, the nature of the lender's lien on the property and other instrument-specific factors.

Correlation – Correlation is a measure of the relationship between the movements of two variables (e.g., how the change in one variable influences the change in the other). Correlation is a pricing input for a derivative product where the payoff is driven by one or more underlying risks. Correlation inputs are related to the type of derivative (e.g., interest rate, credit, equity and foreign exchange) due to the nature of the underlying risks. When parameters are positively correlated, an increase in one parameter will result in an increase in the other parameter. When parameters are negatively correlated, an increase in one parameter will result in a decrease in the other parameter. An increase in correlation can result in an increase or a decrease in a fair value measurement. Given a short correlation position, an increase in correlation, in isolation, would generally result in a decrease in a fair value measurement. The range of correlation inputs between risks within the same asset class are generally narrower than those between underlying risks across asset classes. In addition, the ranges of credit correlation inputs tend to be narrower than those affecting other asset classes.

The level of correlation used in the valuation of derivatives with multiple underlying risks depends on a number of factors including the nature of those risks. For example, the correlation between two credit risk exposures would be different than that between two interest rate risk exposures. Similarly, the tenor of the transaction may also impact the correlation input, as the relationship between the underlying risks may be different over different time periods. Furthermore, correlation levels are very much dependent on market conditions and could have a relatively wide range of levels within or across asset classes over time, particularly in volatile market conditions.

Volatility – Volatility is a measure of the variability in possible returns for an instrument, parameter or market index given how much the particular instrument, parameter or index changes in value over time. Volatility is a pricing input for options, including equity options, commodity options, and interest rate options. Generally, the higher the volatility of the underlying, the riskier the instrument. Given a long position in an option, an increase in volatility, in isolation, would generally result in an increase in a fair value measurement.

The level of volatility used in the valuation of a particular option-based derivative depends on a number of factors, including the nature of the risk underlying the option (e.g., the volatility of a particular equity security may be significantly different from that of a particular commodity index), the tenor of the derivative as well as the strike price of the option.

EBITDA multiple – EBITDA multiples refer to the input (often derived from the value of a comparable company) that is multiplied by the historic and/or expected earnings before interest, taxes, depreciation and amortization (“EBITDA”) of a company in order to estimate the company’s value. An increase in the EBITDA multiple, in isolation, net of adjustments, would result in an increase in a fair value measurement.

Changes in level 3 recurring fair value measurements

The following tables include a rollforward of the Consolidated balance sheets amounts (including changes in fair value) for financial instruments classified by the Firm within level 3 of the fair value hierarchy for the years ended December 31, 2017, 2016 and 2015. When a determination is made to classify a financial instrument within level 3, the determination is based on the significance of the unobservable parameters to the overall fair value measurement. However, level 3 financial instruments typically include, in addition to the unobservable or level 3 components, observable components (that is, components that are actively quoted and can be validated to external sources); accordingly, the gains and losses in the table below include changes in fair value due in part to observable factors that are part of the valuation methodology. Also, the Firm risk-manages the observable components of level 3 financial instruments using securities and derivative positions that are classified within level 1 or 2 of the fair value hierarchy; as these level 1 and level 2 risk management instruments are not included below, the gains or losses in the following tables do not reflect the effect of the Firm’s risk management activities related to such level 3 instruments.

Year ended December 31, 2017 (in millions)	Fair value measurements using significant unobservable inputs								Change in unrealized gains/(losses) related to financial instruments held at Dec. 31, 2017	
	Fair value at January 1, 2017	Total realized/ unrealized gains/ (losses)	Purchases ^(f)	Sales	Settlements ^(g)	Transfers into level 3 ^(h)	Transfers (out of) level 3 ^(h)	Fair value at Dec. 31, 2017		
Assets:										
Trading assets:										
Debt instruments:										
Mortgage-backed securities:										
U.S. government agencies	\$ 392	\$ (11)	\$ 161	\$ (171)	\$ (70)	\$ 49	\$ (43)	\$ 307	\$ (20)	
Residential - nonagency	83	19	53	(30)	(64)	132	(133)	60	11	
Commercial - nonagency	17	9	27	(44)	(13)	64	(49)	11	1	
Total mortgage-backed securities	492	17	241	(245)	(147)	245	(225)	378	(8)	
U.S. Treasury and government agencies	—	—	—	—	—	1	—	1	—	
Obligations of U.S. states and municipalities	649	18	152	(70)	(5)	—	—	744	15	
Non-U.S. government debt securities	46	—	559	(518)	—	62	(71)	78	—	
Corporate debt securities	576	11	872	(612)	(497)	157	(195)	312	18	
Loans	4,837	333	2,389	(2,832)	(1,323)	806	(1,491)	2,719	43	
Asset-backed securities	302	32	354	(356)	(56)	75	(198)	153	—	
Total debt instruments	6,902	411	4,567	(4,633)	(2,028)	1,346	(2,180)	4,385	68	
Equity securities	231	39	176	(148)	(4)	59	(58)	295	21	
Other	761	100	30	(46)	(162)	17	(10)	690	39	
Total trading assets - debt and equity instruments	7,894	550 ^(c)	4,773	(4,827)	(2,194)	1,422	(2,248)	5,370	128 ^(c)	
Net derivative receivables: ^(a)										
Interest rate	1,263	72	60	(82)	(1,040)	(8)	(1)	264	(473)	
Credit	98	(164)	1	(6)	—	77	(41)	(35)	32	
Foreign exchange	(1,384)	43	13	(10)	854	(61)	149	(396)	42	
Equity	(2,252)	(417)	1,116	(551)	(245)	(1,482)	422	(3,409)	(161)	
Commodity	(85)	(149)	—	—	(433)	(6)	(1)	(674)	(718)	
Total net derivative receivables	(2,360)	(615) ^(c)	1,190	(649)	(864)	(1,480)	528	(4,250)	(1,278) ^(c)	
Available-for-sale securities:										
Asset-backed securities	663	15	—	(50)	(352)	—	—	276	14	
Other	1	—	—	—	—	—	—	1	—	
Total available-for-sale securities	664	15 ^(d)	—	(50)	(352)	—	—	277	14 ^(d)	
Loans	570	35 ^(c)	—	(26)	(303)	—	—	276	3 ^(c)	
Mortgage servicing rights	6,096	(232) ^(e)	1,103	(140)	(797)	—	—	6,030	(232) ^(e)	
Other assets	2,223	244 ^(c)	66	(177)	(870)	—	(221)	1,265	74 ^(c)	

Year ended December 31, 2017 (in millions)	Fair value measurements using significant unobservable inputs									Change in unrealized (gains)/losses related to financial instruments held at Dec. 31, 2017
	Fair value at January 1, 2017	Total realized/ unrealized (gains)/ losses	Purchases	Sales	Issuances	Settlements ^(g)	Transfers into level 3 ^(h)	Transfers (out of) level 3 ^(h)	Fair value at Dec. 31, 2017	
Liabilities: ^(b)										
Deposits	\$ 2,117	\$ 152 ^{(c)(i)}	\$ —	\$ —	\$ 3,027	\$ (291)	\$ 11	\$ (874)	\$ 4,142	\$ 198 ^{(c)(i)}
Federal funds purchased and securities loaned or sold under repurchase agreements	—	—	—	—	—	—	—	—	—	—
Short-term borrowings	1,134	42 ^{(c)(i)}	—	—	3,289	(2,748)	150	(202)	1,665	7 ^{(c)(i)}
Trading liabilities - debt and equity instruments	43	(3) ^(c)	(46)	48	—	3	3	(9)	39	— ^(c)
Accounts payable and other liabilities	13	(2)	(1)	—	—	3	—	—	13	(2)
Beneficial interests issued by consolidated VIEs	48	2 ^(c)	(122)	39	—	(6)	78	—	39	— ^(c)
Long-term debt	12,850	1,067 ^{(c)(i)}	—	—	12,458	(10,985)	1,660	(925)	16,125	552 ^{(c)(i)}

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Year ended December 31, 2016 (in millions)	Fair value measurements using significant unobservable inputs								Change in unrealized gains/(losses) related to financial instruments held at Dec. 31, 2016	
	Fair value at January 1, 2016	Total realized/ unrealized gains/ (losses)	Purchases ^(f)	Sales	Settlements ^(g)	Transfers into level 3 ^(h)	Transfers (out of) level 3 ^(h)	Fair value at Dec. 31, 2016		
Assets:										
Trading assets:										
Debt instruments:										
Mortgage-backed securities:										
U.S. government agencies	\$ 715	\$ (20)	\$ 135	\$ (295)	\$ (115)	\$ 111	\$ (139)	\$ 392	\$ (36)	
Residential - nonagency	194	4	252	(319)	(20)	67	(95)	83	5	
Commercial - nonagency	115	(11)	69	(29)	(3)	173	(297)	17	3	
Total mortgage-backed securities	1,024	(27)	456	(643)	(138)	351	(531)	492	(28)	
Obligations of U.S. states and municipalities	651	19	149	(132)	(38)	—	—	649	—	
Non-U.S. government debt securities	74	(4)	91	(97)	(7)	19	(30)	46	(7)	
Corporate debt securities	736	2	445	(359)	(189)	148	(207)	576	(22)	
Loans	6,604	(343)	2,228	(2,598)	(1,311)	1,044	(787)	4,837	(169)	
Asset-backed securities	1,832	39	655	(712)	(968)	288	(832)	302	19	
Total debt instruments	10,921	(314)	4,024	(4,541)	(2,651)	1,850	(2,387)	6,902	(207)	
Equity securities	265	—	90	(108)	(40)	29	(5)	231	7	
Other	744	79	649	(287)	(360)	26	(90)	761	28	
Total trading assets - debt and equity instruments	11,930	(235) ^(c)	4,763	(4,936)	(3,051)	1,905	(2,482)	7,894	(172) ^(c)	
Net derivative receivables: ^(a)										
Interest rate	876	756	193	(57)	(713)	(14)	222	1,263	(144)	
Credit	549	(742)	10	(2)	211	36	36	98	(622)	
Foreign exchange	(725)	67	64	(124)	(649)	(48)	31	(1,384)	(350)	
Equity	(1,514)	(145)	277	(852)	213	94	(325)	(2,252)	(86)	
Commodity	(935)	194	1	10	645	8	(8)	(85)	(36)	
Total net derivative receivables	(1,749)	130 ^(c)	545	(1,025)	(293)	76	(44)	(2,360)	(1,238) ^(c)	
Available-for-sale securities:										
Asset-backed securities	823	1	—	—	(119)	—	(42)	663	1	
Other	1	—	—	—	—	—	—	1	—	
Total available-for-sale securities	824	1 ^(d)	—	—	(119)	—	(42)	664	1 ^(d)	
Loans	1,518	(49) ^(c)	259	(7)	(838)	—	(313)	570	— ^(c)	
Mortgage servicing rights	6,608	(163) ^(e)	679	(109)	(919)	—	—	6,096	(163) ^(e)	
Other assets	2,401	130 ^(c)	487	(496)	(299)	—	—	2,223	48 ^(c)	

Year ended December 31, 2016 (in millions)	Fair value measurements using significant unobservable inputs								Change in unrealized (gains)/losses related to financial instruments held at Dec. 31, 2016
	Fair value at January 1, 2016	Total realized/ unrealized (gains)/ losses	Purchases	Sales	Issuances	Settlements ^(g)	Transfers into level 3 ^(h)	Transfers (out of) level 3 ^(h)	Fair value at Dec. 31, 2016
Liabilities:^(b)									
Deposits	\$ 2,950	\$ (56) ^(c)	\$ —	\$ —	\$ 1,375	\$ (1,283)	\$ —	\$ (869)	\$ 2,117
Federal funds purchased and securities loaned or sold under repurchase agreements	—	—	—	—	—	(2)	6	(4)	—
Short-term borrowings	639	(230) ^(c)	—	—	1,876	(1,210)	114	(55)	1,134
Trading liabilities - debt and equity instruments	63	(12) ^(c)	(15)	23	—	(22)	13	(7)	43
Accounts payable and other liabilities	19	—	—	—	—	(6)	—	—	13
Beneficial interests issued by consolidated VIEs	549	(31) ^(c)	—	—	143	(613)	—	—	48
Long-term debt	11,447 ⁽ⁱ⁾	147 ^{(c)(i)}	—	—	8,140 ⁽ⁱ⁾	(5,810)	315	(1,389)	12,850 ⁽ⁱ⁾

Year ended December 31, 2015 (in millions)	Fair value measurements using significant unobservable inputs								Change in unrealized gains/(losses) related to financial instruments held at Dec. 31, 2015	
	Fair value at January 1, 2015	Total realized/ unrealized gains/ (losses)	Purchases ^(f)	Sales	Settlements ^(g)	Transfers into level 3 ^(h)	Transfers (out of) level 3 ^(h)	Fair value at Dec. 31, 2015		
Assets:										
Trading assets:										
Debt instruments:										
Mortgage-backed securities:										
U.S. government agencies	\$ 922	\$ (28)	\$ 327	\$ (303)	\$ (132)	\$ 25	\$ (96)	\$ 715	\$ (27)	
Residential - nonagency	663	130	253	(611)	(23)	180	(398)	194	4	
Commercial - nonagency	306	(14)	246	(262)	(22)	117	(256)	115	(5)	
Total mortgage-backed securities	1,891	88	826	(1,176)	(177)	322	(750)	1,024	(28)	
Obligations of U.S. states and municipalities	1,273	14	352	(133)	(27)	5	(833)	651	(1)	
Non-U.S. government debt securities	302	9	205	(123)	(64)	16	(271)	74	(16)	
Corporate debt securities	2,989	(77)	1,171	(1,038)	(125)	179	(2,363)	736	2	
Loans	13,287	(174)	3,532	(4,661)	(3,112)	509	(2,777)	6,604	(181)	
Asset-backed securities	1,264	(41)	1,920	(1,229)	(35)	205	(252)	1,832	(32)	
Total debt instruments	21,006	(181)	8,006	(8,360)	(3,540)	1,236	(7,246)	10,921	(256)	
Equity securities	431	96	89	(193)	(26)	51	(183)	265	82	
Physical commodities	2	(2)	—	—	—	—	—	—	—	
Other	1,050	119	1,581	(1,313)	192	33	(918)	744	85	
Total trading assets - debt and equity instruments	22,489	32 ^(c)	9,676	(9,866)	(3,374)	1,320	(8,347)	11,930	(89) ^(c)	
Net derivative receivables: ^(a)										
Interest rate	626	962	513	(173)	(732)	6	(326)	876	263	
Credit	189	118	129	(136)	165	29	55	549	260	
Foreign exchange	(526)	657	19	(149)	(296)	36	(466)	(725)	49	
Equity	(1,785)	731	890	(1,262)	(158)	17	53	(1,514)	5	
Commodity	(565)	(856)	1	(24)	512	(30)	27	(935)	(41)	
Total net derivative receivables	(2,061)	1,612 ^(c)	1,552	(1,744)	(509)	58	(657)	(1,749)	536 ^(c)	
Available-for-sale securities:										
Asset-backed securities	908	(32)	51	(43)	(61)	—	—	823	(28)	
Other	129	—	—	—	(29)	—	(99)	1	—	
Total available-for-sale securities	1,037	(32) ^(d)	51	(43)	(90)	—	(99)	824	(28) ^(d)	
Loans	2,541	(133) ^(c)	1,290	(92)	(1,241)	—	(847)	1,518	(32) ^(c)	
Mortgage servicing rights	7,436	(405) ^(e)	985	(486)	(922)	—	—	6,608	(405) ^(e)	
Other assets	3,184	(29) ^(c)	346	(509)	(411)	—	(180)	2,401	(289) ^(c)	

Year ended December 31, 2015 (in millions)	Fair value measurements using significant unobservable inputs								Fair value at Dec. 31, 2015	Change in unrealized (gains)/losses related to financial instruments held at Dec. 31, 2015
	Fair value at January 1, 2015	Total realized/ unrealized (gains)/ losses	Purchases	Sales	Issuances	Settlements ^(g)	Transfers into level 3 ^(h)	Transfers (out of) level 3 ^(h)		
Liabilities:^(b)										
Deposits	\$ 2,859	\$ (39) ^(c)	\$ —	\$ —	\$ 1,993	\$ (850)	\$ —	\$ (1,013)	\$ 2,950	\$ (29) ^(c)
Short-term borrowings	1,453	(697) ^(c)	—	—	3,334	(2,963)	243	(731)	639	(57) ^(c)
Trading liabilities - debt and equity instruments	72	15 ^(c)	(163)	160	—	(17)	12	(16)	63	(4) ^(c)
Accounts payable and other liabilities	26	— ^(c)	—	—	—	(7)	—	—	19	—
Beneficial interests issued by consolidated VIEs	1,146	(82) ^(c)	—	—	286	(574)	—	(227)	549	(63) ^(c)
Long-term debt	11,877	(480) ^(c)	(58)	—	9,359	(6,465) ⁽ⁱ⁾	315	(3,101)	11,447 ⁽ⁱ⁾	385 ^{(c)(j)}

(a) All level 3 derivatives are presented on a net basis, irrespective of underlying counterparty.

Notes to consolidated financial statements

- (b) Level 3 liabilities as a percentage of total Firm liabilities accounted for at fair value (including liabilities measured at fair value on a nonrecurring basis) were 15%, 12% and 13% at December 31, 2017, 2016 and 2015, respectively.
- (c) Predominantly reported in principal transactions revenue, except for changes in fair value for CCB mortgage loans, and lending-related commitments originated with the intent to sell, and mortgage loan purchase commitments, which are reported in mortgage fees and related income.
- (d) Realized gains/(losses) on AFS securities, as well as other-than-temporary impairment ("OTTI") losses that are recorded in earnings, are reported in securities gains. Unrealized gains/(losses) are reported in OCI. Realized gains/(losses) and foreign exchange hedge accounting adjustments recorded in income on AFS securities were zero, zero, and \$(7) million for the years ended December 31, 2017, 2016 and 2015, respectively. Unrealized gains/(losses) recorded on AFS securities in OCI were \$15 million, \$1 million and \$(25) million for the years ended December 31, 2017, 2016 and 2015, respectively.
- (e) Changes in fair value for CCB MSRs are reported in mortgage fees and related income.
- (f) Loan originations are included in purchases
- (g) Includes financial assets and liabilities that have matured, been partially or fully repaid, impacts of modifications, and deconsolidation associated with beneficial interests in VIEs and other items.
- (h) All transfers into and/or out of level 3 are based on changes in the observability of the valuation inputs and are assumed to occur at the beginning of the quarterly reporting period in which they occur.
- (i) Realized (gains)/losses due to DVA for fair value option elected liabilities are reported in principal transactions revenue. Unrealized (gains)/losses are reported in OCI. Unrealized gains were \$48 million for the year ended December 31, 2017. There were no realized gains for the year ended December 31, 2017.
- (j) The prior period amounts have been revised to conform with the current period presentation.

Level 3 analysis

Consolidated balance sheets changes

Level 3 assets (including assets measured at fair value on a nonrecurring basis) were 0.8% of total Firm assets at December 31, 2017. The following describes significant changes to level 3 assets since December 31, 2016, for those items measured at fair value on a recurring basis. For further information on changes impacting items measured at fair value on a nonrecurring basis, see Assets and liabilities measured at fair value on a nonrecurring basis on page 172.

For the year ended December 31, 2017

Level 3 assets were \$19.2 billion at December 31, 2017, reflecting a decrease of \$4.0 billion from December 31, 2016, largely due to the following:

- \$2.5 billion decrease in trading assets – debt and equity instruments was predominantly driven by a decrease of \$2.1 billion in trading loans largely due to settlements, and a \$1.0 billion decrease in other assets due to settlements and transfers from level 3 to level 2 as a result of increased observability in certain valuation inputs

Gains and losses

The following describes significant components of total realized/unrealized gains/(losses) for instruments measured at fair value on a recurring basis for the years ended December 31, 2017, 2016 and 2015. For further information on these instruments, see Changes in level 3 recurring fair value measurements rollforward tables on pages 166–170.

2017

- \$1.3 billion of net losses on liabilities largely driven by market movements in long-term debt

2016

- There were no individually significant movements for the year ended December 31, 2016.

2015

- \$1.6 billion of net gains in interest rate, foreign exchange and equity derivative receivables largely due to market movements; partially offset by losses on commodity derivatives due to market movements
- \$1.3 billion of net gains in liabilities due to market movements

Credit and funding adjustments – derivatives

Derivatives are generally valued using models that use as their basis observable market parameters. These market parameters generally do not consider factors such as counterparty nonperformance risk, the Firm's own credit quality, and funding costs. Therefore, it is generally necessary to make adjustments to the base estimate of fair value to reflect these factors.

CVA represents the adjustment, relative to the relevant benchmark interest rate, necessary to reflect counterparty nonperformance risk. The Firm estimates CVA using a scenario analysis to estimate the expected positive credit exposure across all of the Firm's existing positions with each counterparty, and then estimates losses based on the probability of default and estimated recovery rate as a result of a counterparty credit event considering contractual factors designed to mitigate the Firm's credit exposure, such as collateral and legal rights of offset. The key inputs to this methodology are (i) the probability of a default event occurring for each counterparty, as derived from observed or estimated CDS spreads; and (ii) estimated recovery rates implied by CDS spreads, adjusted to consider the differences in recovery rates as a derivative creditor relative to those reflected in CDS spreads, which generally reflect senior unsecured creditor risk.

FVA represents the adjustment to reflect the impact of funding and is recognized where there is evidence that a market participant in the principal market would incorporate it in a transfer of the instrument. The Firm's FVA framework, applied to uncollateralized (including partially collateralized) over-the-counter ("OTC") derivatives incorporates key inputs such as: (i) the expected funding requirements arising from the Firm's positions with each counterparty and collateral arrangements; and (ii) the estimated market funding cost in the principal market which, for derivative liabilities, considers the Firm's credit risk (DVA). For collateralized derivatives, the fair value is estimated by discounting expected future cash flows at the relevant overnight indexed swap rate given the underlying collateral agreement with the counterparty, and therefore a separate FVA is not necessary.

The following table provides the impact of credit and funding adjustments on principal transactions revenue in the respective periods, excluding the effect of any associated hedging activities. The FVA reported below include the impact of the Firm's own credit quality on the inception value of liabilities as well as the impact of changes in the Firm's own credit quality over time.

Year ended December 31, (in millions)	2017	2016	2015
Credit and funding adjustments:			
Derivatives CVA	\$ 802	\$ (84)	\$ 620
Derivatives FVA	(295)	7	73

Valuation adjustments on fair value option elected liabilities

The valuation of the Firm's liabilities for which the fair value option has been elected requires consideration of the Firm's own credit risk. DVA on fair value option elected liabilities reflects changes (subsequent to the issuance of the liability) in the Firm's probability of default and LGD, which are estimated based on changes in the Firm's credit spread observed in the bond market. Effective January 1, 2016, the effect of DVA on fair value option elected liabilities is recognized in OCI. See Note 23 for further information.

Notes to consolidated financial statements

Assets and liabilities measured at fair value on a nonrecurring basis

The following tables present the assets reported on a nonrecurring basis at fair value as of December 31, 2017 and 2016, by major product category and fair value hierarchy.

December 31, 2017 (in millions)	Fair value hierarchy			Total fair value
	Level 1	Level 2	Level 3	
Loans	\$ —	\$ 238	\$ 596 ^(a)	\$ 834
Other assets	—	283	183	466
Total assets measured at fair value on a nonrecurring basis	\$ —	\$ 521	\$ 779 ^(a)	\$ 1,300

December 31, 2016 (in millions)	Fair value hierarchy			Total fair value
	Level 1	Level 2	Level 3	
Loans	\$ —	\$ 730	\$ 590	\$ 1,320
Other assets	—	5	232	237
Total assets measured at fair value on a nonrecurring basis	\$ —	\$ 735	\$ 822	\$ 1,557

(a) Of the \$779 million in level 3 assets measured at fair value on a nonrecurring basis as of December 31, 2017, \$442 million related to residential real estate loans carried at the net realizable value of the underlying collateral (e.g., collateral-dependent loans and other loans charged off in accordance with regulatory guidance). These amounts are classified as level 3 as they are valued using a broker's price opinion and discounted based upon the Firm's experience with actual liquidation values. These discounts to the broker price opinions ranged from 13% to 48% with a weighted average of 27%.

There were no material liabilities measured at fair value on a nonrecurring basis at December 31, 2017 and 2016.

Nonrecurring fair value changes

The following table presents the total change in value of assets and liabilities for which a fair value adjustment has been recognized for the years ended December 31, 2017 2016 and 2015, related to financial instruments held at those dates.

December 31, (in millions)	2017	2016	2015
Loans	\$ (159)	\$ (209)	\$ (226)
Other Assets	(148)	37	(60)
Accounts payable and other liabilities	(1)	—	(8)
Total nonrecurring fair value gains/ (losses)	\$ (308)	\$ (172)	\$ (294)

For further information about the measurement of impaired collateral-dependent loans, and other loans where the carrying value is based on the fair value of the underlying collateral (e.g., residential mortgage loans charged off in accordance with regulatory guidance), see Note 12.

Additional disclosures about the fair value of financial instruments that are not carried on the Consolidated balance sheets at fair value

U.S. GAAP requires disclosure of the estimated fair value of certain financial instruments, and the methods and significant assumptions used to estimate their fair value. Financial instruments within the scope of these disclosure requirements are included in the following table. However, certain financial instruments and all nonfinancial instruments are excluded from the scope of these disclosure requirements. Accordingly, the fair value disclosures provided in the following table include only a partial estimate of the fair value of JPMorgan Chase's assets and liabilities. For example, the Firm has developed long-term relationships with its customers through its deposit base and credit card accounts, commonly referred to as core

deposit intangibles and credit card relationships. In the opinion of management, these items, in the aggregate, add significant value to JPMorgan Chase, but their fair value is not disclosed in this Note.

Financial instruments for which carrying value approximates fair value

Certain financial instruments that are not carried at fair value on the Consolidated balance sheets are carried at amounts that approximate fair value, due to their short-term nature and generally negligible credit risk. These instruments include cash and due from banks, deposits with banks, federal funds sold, securities purchased under resale agreements and securities borrowed, short-term receivables and accrued interest receivable, short-term borrowings, federal funds purchased, securities loaned and sold under repurchase agreements, accounts payable, and accrued liabilities. In addition, U.S. GAAP requires that the fair value of deposit liabilities with no stated maturity (i.e., demand, savings and certain money market deposits) be equal to their carrying value; recognition of the inherent funding value of these instruments is not permitted.

The following table presents by fair value hierarchy classification the carrying values and estimated fair values at December 31, 2017 and 2016, of financial assets and liabilities, excluding financial instruments that are carried at fair value on a recurring basis, and their classification within the fair value hierarchy. For additional information regarding the financial instruments within the scope of this disclosure, and the methods and significant assumptions used to estimate their fair value, see pages 156-159 of this Note.

(in billions)	December 31, 2017					December 31, 2016				
	Estimated fair value hierarchy					Estimated fair value hierarchy				
	Carrying value	Level 1	Level 2	Level 3	Total estimated fair value	Carrying value	Level 1	Level 2	Level 3	Total estimated fair value
Financial assets										
Cash and due from banks	\$ 25.8	\$ 25.8	\$ —	\$ —	\$ 25.8	\$ 23.9	\$ 23.9	\$ —	\$ —	\$ 23.9
Deposits with banks	404.3	401.8	2.5	—	404.3	365.8	362.0	3.8	—	365.8
Accrued interest and accounts receivable	67.0	—	67.0	—	67.0	52.3	—	52.2	0.1	52.3
Federal funds sold and securities purchased under resale agreements	183.7	—	183.7	—	183.7	208.5	—	208.3	0.2	208.5
Securities borrowed	102.1	—	102.1	—	102.1	96.4	—	96.4	—	96.4
Securities, held-to-maturity	47.7	—	48.7	—	48.7	50.2	—	50.9	—	50.9
Loans, net of allowance for loan losses ^{(a)(b)}	914.6	—	213.2	707.1	920.3	878.8	—	24.1	851.0	875.1
Other	62.9	—	52.9	16.5	69.4	71.4	0.1	60.8	14.3	75.2
Financial liabilities										
Deposits	\$ 1,422.7	\$ —	\$ 1,422.7	\$ —	\$ 1,422.7	\$ 1,361.3	\$ —	\$ 1,361.3	\$ —	\$ 1,361.3
Federal funds purchased and securities loaned or sold under repurchase agreements	158.2	—	158.2	—	158.2	165.0	—	165.0	—	165.0
Short-term borrowings	42.6	—	42.4	0.2	42.6	25.3	—	25.3	—	25.3
Accounts payable and other liabilities	152.0	—	148.9	2.9	151.8	148.0	—	144.8	3.4	148.2
Beneficial interests issued by consolidated VIEs	26.0	—	26.0	—	26.0	38.9	—	38.9	—	38.9
Long-term debt and junior subordinated deferrable interest debentures	236.6	—	240.3	3.2	243.5	257.5	—	260.0	2.0	262.0

(a) Fair value is typically estimated using a discounted cash flow model that incorporates the characteristics of the underlying loans (including principal, contractual interest rate and contractual fees) and other key inputs, including expected lifetime credit losses, interest rates, prepayment rates, and primary origination or secondary market spreads. For certain loans, the fair value is measured based on the value of the underlying collateral. The difference between the estimated fair value and carrying value of a financial asset or liability is the result of the different methodologies used to determine fair value as compared with carrying value. For example, credit losses are estimated for a financial asset's remaining life in a fair value calculation but are estimated for a loss emergence period in the allowance for loan loss calculation; future loan income (interest and fees) is incorporated in a fair value calculation but is generally not considered in the allowance for loan losses. For a further discussion of the Firm's methodologies for estimating the fair value of loans and lending-related commitments, see Valuation hierarchy on pages 156-159.

(b) For the year ended December 31, 2017, the Firm transferred certain residential mortgage loans from Level 3 to Level 2 as a result of an increase in observability.

The majority of the Firm's lending-related commitments are not carried at fair value on a recurring basis on the Consolidated balance sheets. The carrying value of the wholesale allowance for lending-related commitments and the estimated fair value of these wholesale lending-related commitments were as follows for the periods indicated.

(in billions)	December 31, 2017					December 31, 2016				
	Estimated fair value hierarchy					Estimated fair value hierarchy				
	Carrying value ^(a)	Level 1	Level 2	Level 3	Total estimated fair value	Carrying value ^(a)	Level 1	Level 2	Level 3	Total estimated fair value
Wholesale lending-related commitments	\$ 1.1	\$ —	\$ —	\$ 1.6	\$ 1.6	\$ 1.1	\$ —	\$ —	\$ 2.1	\$ 2.1

(a) Excludes the current carrying values of the guarantee liability and the offsetting asset, each of which is recognized at fair value at the inception of the guarantees.

The Firm does not estimate the fair value of consumer lending-related commitments. In many cases, the Firm can reduce or cancel these commitments by providing the borrower notice or, in some cases as permitted by law, without notice. For a further discussion of the valuation of lending-related commitments, see page 157 of this Note.

Note 3 – Fair value option

The fair value option provides an option to elect fair value as an alternative measurement for selected financial assets, financial liabilities, unrecognized firm commitments, and written loan commitments.

The Firm has elected to measure certain instruments at fair value for several reasons including to mitigate income statement volatility caused by the differences between the measurement basis of elected instruments (e.g., certain instruments elected were previously accounted for on an accrual basis) and the associated risk management arrangements that are accounted for on a fair value basis, as well as to better reflect those instruments that are managed on a fair value basis.

The Firm's election of fair value includes the following instruments:

- Loans purchased or originated as part of securitization warehousing activity, subject to bifurcation accounting, or managed on a fair value basis, including lending-related commitments
- Certain securities financing arrangements with an embedded derivative and/or a maturity of greater than one year
- Owned beneficial interests in securitized financial assets that contain embedded credit derivatives, which would otherwise be required to be separately accounted for as a derivative instrument
- Structured notes, which are predominantly financial instruments that contain embedded derivatives, that are issued as part of CIB's client-driven activities
- Certain long-term beneficial interests issued by CIB's consolidated securitization trusts where the underlying assets are carried at fair value

Changes in fair value under the fair value option election

The following table presents the changes in fair value included in the Consolidated statements of income for the years ended December 31, 2017, 2016 and 2015, for items for which the fair value option was elected. The profit and loss information presented below only includes the financial instruments that were elected to be measured at fair value; related risk management instruments, which are required to be measured at fair value, are not included in the table.

December 31, (in millions)	2017			2016			2015		
	Principal transactions	All other income	Total changes in fair value recorded	Principal transactions	All other income	Total changes in fair value recorded	Principal transactions	All other income	Total changes in fair value recorded
Federal funds sold and securities purchased under resale agreements	\$ (97)	\$ —	\$ (97)	\$ (76)	\$ —	\$ (76)	\$ (38)	\$ —	\$ (38)
Securities borrowed	50	—	50	1	—	1	(6)	—	(6)
Trading assets:									
Debt and equity instruments, excluding loans	1,943	2 ^(c)	1,945	120	(1) ^(c)	119	756	(10) ^(c)	746
Loans reported as trading assets:									
Changes in instrument-specific credit risk	330	14 ^(c)	344	461	43 ^(c)	504	138	41 ^(c)	179
Other changes in fair value	217	747 ^(c)	964	79	684 ^(c)	763	232	818 ^(c)	1,050
Loans:									
Changes in instrument-specific credit risk	(1)	—	(1)	13	—	13	35	—	35
Other changes in fair value	(12)	3 ^(c)	(9)	(7)	—	(7)	4	—	4
Other assets	11	(55) ^(d)	(44)	20	62 ^(d)	82	79	(1) ^(d)	78
Deposits ^(a)	(533)	—	(533)	(134)	—	(134)	93	—	93
Federal funds purchased and securities loaned or sold under repurchase agreements	11	—	11	19	—	19	8	—	8
Short-term borrowings ^(a)	(747)	—	(747)	(236)	—	(236)	1,996	—	1,996
Trading liabilities	(1)	—	(1)	6	—	6	(20)	—	(20)
Beneficial interests issued by consolidated VIEs	—	—	—	23	—	23	49	—	49
Long-term debt ^{(a)(b)}	(2,022)	—	(2,022)	(773)	—	(773)	1,388	—	1,388

(a) Unrealized gains/(losses) due to instrument-specific credit risk (DVA) for liabilities for which the fair value option has been elected is recorded in OCI, while realized gains/(losses) are recorded in principal transactions revenue. DVA for 2015 was included in principal transactions revenue, and includes the impact of the Firm's own credit quality on the inception value of liabilities as well as the impact of changes in the Firm's own credit quality subsequent to issuance. See Notes 2 and 23 for further information. Realized gains/(losses) due to instrument-specific credit risk recorded in principal transaction revenue were not material for the years ended December 31, 2017 and 2016.

(b) Long-term debt measured at fair value predominantly relates to structured notes. Although the risk associated with the structured notes is actively managed, the gains/(losses) reported in this table do not include the income statement impact of the risk management instruments used to manage such risk.

(c) Reported in mortgage fees and related income.

(d) Reported in other income.

Determination of instrument-specific credit risk for items for which a fair value election was made

The following describes how the gains and losses that are attributable to changes in instrument-specific credit risk, were determined.

- Loans and lending-related commitments: For floating-rate instruments, all changes in value are attributed to instrument-specific credit risk. For fixed-rate instruments, an allocation of the changes in value for the period is made between those changes in value that are interest rate-related and changes in value that are credit-related. Allocations are generally based on an analysis of borrower-specific credit spread and recovery information, where available, or benchmarking to similar entities or industries.

- Long-term debt: Changes in value attributable to instrument-specific credit risk were derived principally from observable changes in the Firm's credit spread.
- Resale and repurchase agreements, securities borrowed agreements and securities lending agreements: Generally, for these types of agreements, there is a requirement that collateral be maintained with a market value equal to or in excess of the principal amount loaned; as a result, there would be no adjustment or an immaterial adjustment for instrument-specific credit risk related to these agreements.

Notes to consolidated financial statements

Difference between aggregate fair value and aggregate remaining contractual principal balance outstanding

The following table reflects the difference between the aggregate fair value and the aggregate remaining contractual principal balance outstanding as of December 31, 2017 and 2016, for loans, long-term debt and long-term beneficial interests for which the fair value option has been elected.

December 31, (in millions)	2017			2016		
	Contractual principal outstanding	Fair value	Fair value over/ (under) contractual principal outstanding	Contractual principal outstanding	Fair value	Fair value over/ (under) contractual principal outstanding
Loans^(a)						
Nonaccrual loans						
Loans reported as trading assets	\$ 4,219	\$ 1,371	\$ (2,848)	\$ 3,338	\$ 748	\$ (2,590)
Loans	39	—	(39)	—	—	—
Subtotal	4,258	1,371	(2,887)	3,338	748	(2,590)
All other performing loans						
Loans reported as trading assets	38,157	36,590	(1,567)	35,477	33,054	(2,423)
Loans	2,539	2,508	(31)	2,259	2,228	(31)
Total loans	\$ 44,954	\$ 40,469	\$ (4,485)	\$ 41,074	\$ 36,030	\$ (5,044)
Long-term debt						
Principal-protected debt	\$ 26,297 ^(c)	\$ 23,848	\$ (2,449)	\$ 21,602 ^(c)	\$ 19,195	\$ (2,407)
Nonprincipal-protected debt ^(b)	NA	23,671	NA	NA	18,491	NA
Total long-term debt	NA	\$ 47,519	NA	NA	\$ 37,686	NA
Long-term beneficial interests						
Nonprincipal-protected debt	NA	\$ 45	NA	NA	\$ 120	NA
Total long-term beneficial interests	NA	\$ 45	NA	NA	\$ 120	NA

(a) There were no performing loans that were ninety days or more past due as of December 31, 2017 and 2016.

(b) Remaining contractual principal is not applicable to nonprincipal-protected notes. Unlike principal-protected structured notes, for which the Firm is obligated to return a stated amount of principal at the maturity of the note, nonprincipal-protected structured notes do not obligate the Firm to return a stated amount of principal at maturity, but to return an amount based on the performance of an underlying variable or derivative feature embedded in the note. However, investors are exposed to the credit risk of the Firm as issuer for both nonprincipal-protected and principal protected notes.

(c) Where the Firm issues principal-protected zero-coupon or discount notes, the balance reflects the contractual principal payment at maturity or, if applicable, the contractual principal payment at the Firm's next call date.

At December 31, 2017 and 2016, the contractual amount of lending-related commitments for which the fair value option was elected was \$7.4 billion and \$4.6 billion respectively, with a corresponding fair value of \$(76) million and \$(118) million, respectively. For further information regarding off-balance sheet lending-related financial instruments, see Note 27.

Structured note products by balance sheet classification and risk component

The following table presents the fair value of the structured notes issued by the Firm, by balance sheet classification and the primary risk type.

(in millions)	December 31, 2017				December 31, 2016			
	Long-term debt	Short-term borrowings	Deposits	Total	Long-term debt	Short-term borrowings	Deposits	Total
Risk exposure								
Interest rate	\$ 22,056	\$ 69	\$ 8,058	\$ 30,183	\$ 16,296	\$ 184	\$ 4,296	\$ 20,776
Credit	4,329	1,312	—	5,641	3,267	225	—	3,492
Foreign exchange	2,841	147	38	3,026	2,365	135	6	2,506
Equity	17,581	7,106	6,548	31,235	14,831	8,234	5,481	28,546
Commodity	230	15	4,468	4,713	488	37	1,811	2,336
Total structured notes	\$ 47,037	\$ 8,649	\$ 19,112	\$ 74,798	\$ 37,247	\$ 8,815	\$ 11,594	\$ 57,656

Note 4 – Credit risk concentrations

Concentrations of credit risk arise when a number of clients, counterparties or customers are engaged in similar business activities or activities in the same geographic region, or when they have similar economic features that would cause their ability to meet contractual obligations to be similarly affected by changes in economic conditions.

JPMorgan Chase regularly monitors various segments of its credit portfolios to assess potential credit risk concentrations and to obtain additional collateral when deemed necessary and permitted under the Firm's agreements. Senior management is significantly involved in the credit approval and review process, and risk levels are adjusted as needed to reflect the Firm's risk appetite.

In the Firm's consumer portfolio, concentrations are evaluated primarily by product and by U.S. geographic region, with a key focus on trends and concentrations at the portfolio level, where potential credit risk concentrations can be remedied through changes in underwriting policies and portfolio guidelines. In the wholesale portfolio, credit risk concentrations are evaluated primarily by industry and monitored regularly on both an aggregate portfolio level and on an individual client or counterparty basis. The Firm's wholesale exposure is managed through loan syndications and participations, loan sales, securitizations, credit derivatives, master netting agreements, collateral and other risk-reduction techniques. For additional information on loans, see Note 12.

The Firm does not believe that its exposure to any particular loan product (e.g., option ARMs), or industry segment (e.g., real estate), or its exposure to residential real estate loans with high LTV ratios, results in a significant concentration of credit risk.

Terms of loan products and collateral coverage are included in the Firm's assessment when extending credit and establishing its allowance for loan losses.

Notes to consolidated financial statements

The table below presents both on-balance sheet and off-balance sheet consumer and wholesale-related credit exposure by the Firm's three credit portfolio segments as of December 31, 2017 and 2016.

In 2017 the Firm revised its methodology for the assignment of industry classifications, to better monitor and manage concentrations. This largely resulted in the re-assignment of holding companies from Other to the industry of risk category based on the primary business activity of the holding company's underlying entities. In the tables and industry discussions below, the prior period amounts have been revised to conform with the current period presentation.

December 31, (in millions)	2017				2016			
	Credit exposure ^(f)	On-balance sheet		Off-balance sheet ^(g)	Credit exposure	On-balance sheet		Off-balance sheet ^(g)
		Loans	Derivatives			Loans	Derivatives	
Consumer, excluding credit card	\$ 421,234	\$ 372,681	\$ —	\$ 48,553	\$ 417,891	\$ 364,644	\$ —	\$ 53,247 ^(h)
Receivables from customers ^(a)	133	—	—	—	120	—	—	—
Total Consumer, excluding credit card	421,367	372,681	—	48,553	418,011	364,644	—	53,247 ^(h)
Credit Card	722,342	149,511	—	572,831	695,707	141,816	—	553,891
Total consumer-related	1,143,709	522,192	—	621,384	1,113,718	506,460	—	607,138 ^(h)
Wholesale-related^(b)								
Real Estate	139,409	113,648	153	25,608	134,287	105,802	207	28,278
Consumer & Retail	87,679	31,044	1,114	55,521	84,804	29,929	1,082	53,793
Technology, Media & Telecommunications	59,274	13,665	2,265	43,344	63,324	14,063	1,293	47,968
Healthcare	55,997	16,273	2,191	37,533	49,445	15,545	2,280	31,620
Industrials	55,272	18,161	1,163	35,948	55,733	17,295	1,658	36,780
Banks & Finance Cos	49,037	25,879	6,816	16,342	48,393	22,714	12,257	13,422
Oil & Gas	41,317	12,621	1,727	26,969	40,367	13,253	1,878	25,236
Asset Managers	32,531	11,480	7,998	13,053	33,201	10,339	10,820	12,042
Utilities	29,317	6,187	2,084	21,046	29,672	7,208	888	21,576
State & Municipal Govt ^(c)	28,633	12,134	2,888	13,611	28,263	12,416	2,096	13,751
Central Govt	19,182	3,375	13,937	1,870	20,408	3,964	14,235	2,209
Chemicals & Plastics	15,945	5,654	208	10,083	15,043	5,292	271	9,480
Transportation	15,797	6,733	977	8,087	19,096	8,996	751	9,349
Automotive	14,820	4,903	342	9,575	16,736	4,964	1,196	10,576
Metals & Mining	14,171	4,728	702	8,741	13,419	4,350	439	8,630
Insurance	14,089	1,411	2,804	9,874	13,510	1,119	3,382	9,009
Financial Markets Infrastructure	5,036	351	3,499	1,186	8,732	347	3,884	4,501
Securities Firms	4,113	952	1,692	1,469	4,211	1,059	1,913	1,239
All other ^(d)	147,900	113,699	3,963	30,238	137,238	105,135	3,548	28,555
Subtotal	829,519	402,898	56,523	370,098	815,882	383,790	64,078	368,014
Loans held-for-sale and loans at fair value	5,607	5,607	—	—	4,515	4,515	—	—
Receivables from customers and other ^(a)	26,139	—	—	—	17,440	—	—	—
Total wholesale-related	861,265	408,505	56,523	370,098	837,837	388,305	64,078	368,014
Total exposure^{(e)(f)}	\$ 2,004,974	\$ 930,697	\$ 56,523	\$ 991,482	\$ 1,951,555	\$ 894,765	\$ 64,078	\$ 975,152 ^(h)

(a) Receivables from customers primarily represent held-for-investment margin loans to brokerage customers (Prime Services in CIB, AWM and CCB) that are collateralized through assets maintained in the clients' brokerage accounts, as such no allowance is held against these receivables. These receivables are reported within accrued interest and accounts receivable on the Firm's Consolidated balance sheets.

(b) The industry rankings presented in the table as of December 31, 2016, are based on the industry rankings of the corresponding exposures at December 31, 2017, not actual rankings of such exposures at December 31, 2016.

(c) In addition to the credit risk exposure to states and municipal governments (both U.S. and non-U.S.) at December 31, 2017 and 2016, noted above, the Firm held: \$9.8 billion and \$9.1 billion, respectively, of trading securities; \$32.3 billion and \$31.6 billion, respectively, of AFS securities; and \$14.4 billion and \$14.5 billion, respectively, of HTM securities, issued by U.S. state and municipal governments. For further information, see Note 2 and Note 10.

(d) All other includes: individuals; SPEs; and private education and civic organizations. For more information on exposures to SPEs, see Note 14.

(e) Excludes cash placed with banks of \$421.0 billion and \$380.2 billion, at December 31, 2017 and 2016, respectively, which is predominantly placed with various central banks, primarily Federal Reserve Banks.

(f) Credit exposure is net of risk participations and excludes the benefit of credit derivatives used in credit portfolio management activities held against derivative receivables or loans and liquid securities and other cash collateral held against derivative receivables.

(g) Represents lending-related financial instruments.

(h) The prior period amounts have been revised to conform with the current period presentation.

Note 5 – Derivative instruments

Derivative contracts derive their value from underlying asset prices, indices, reference rates, other inputs or a combination of these factors and may expose counterparties to risks and rewards of an underlying asset or liability without having to initially invest in, own or exchange the asset or liability. JPMorgan Chase makes markets in derivatives for clients and also uses derivatives to hedge or manage its own risk exposures. Predominantly all of the Firm's derivatives are entered into for market-making or risk management purposes.

Market-making derivatives

The majority of the Firm's derivatives are entered into for market-making purposes. Clients use derivatives to mitigate or modify interest rate, credit, foreign exchange, equity and commodity risks. The Firm actively manages the risks from its exposure to these derivatives by entering into other derivative transactions or by purchasing or selling other financial instruments that partially or fully offset the exposure from client derivatives.

Risk management derivatives

The Firm manages certain market and credit risk exposures using derivative instruments, including derivatives in hedge accounting relationships and other derivatives that are used to manage risks associated with specified assets and liabilities.

Interest rate contracts are used to minimize fluctuations in earnings that are caused by changes in interest rates. Fixed-rate assets and liabilities appreciate or depreciate in market value as interest rates change. Similarly, interest income and expense increases or decreases as a result of variable-rate assets and liabilities resetting to current market rates, and as a result of the repayment and subsequent origination or issuance of fixed-rate assets and liabilities at current market rates. Gains or losses on the derivative instruments that are related to such assets and liabilities are expected to substantially offset this variability in earnings. The Firm generally uses interest rate swaps, forwards and futures to manage the impact of interest rate fluctuations on earnings.

Foreign currency forward contracts are used to manage the foreign exchange risk associated with certain foreign currency-denominated (i.e., non-U.S. dollar) assets and liabilities and forecasted transactions, as well as the Firm's net investments in certain non-U.S. subsidiaries or branches whose functional currencies are not the U.S. dollar. As a result of fluctuations in foreign currencies, the U.S. dollar-equivalent values of the foreign currency-denominated assets and liabilities or the forecasted revenues or expenses increase or decrease. Gains or losses on the derivative instruments related to these foreign currency-denominated assets or liabilities, or forecasted transactions, are expected to substantially offset this variability.

Commodities contracts are used to manage the price risk of certain commodities inventories. Gains or losses on these derivative instruments are expected to substantially offset the depreciation or appreciation of the related inventory.

Credit derivatives are used to manage the counterparty credit risk associated with loans and lending-related commitments. Credit derivatives compensate the purchaser when the entity referenced in the contract experiences a credit event, such as bankruptcy or a failure to pay an obligation when due. Credit derivatives primarily consist of CDS. For a further discussion of credit derivatives, see the discussion in the Credit derivatives section on pages 189–191 of this Note.

For more information about risk management derivatives, see the risk management derivatives gains and losses table on page 189 of this Note, and the hedge accounting gains and losses tables on pages 187–189 of this Note.

Derivative counterparties and settlement types

The Firm enters into OTC derivatives, which are negotiated and settled bilaterally with the derivative counterparty. The Firm also enters into, as principal, certain ETD such as futures and options, and OTC-cleared derivative contracts with CCPs. ETD contracts are generally standardized contracts traded on an exchange and cleared by the CCP, which is the Firm's counterparty from the inception of the transactions. OTC-cleared derivatives are traded on a bilateral basis and then novated to the CCP for clearing.

Derivative clearing services

The Firm provides clearing services for clients in which the Firm acts as a clearing member at certain derivative exchanges and clearing houses. The Firm does not reflect the clients' derivative contracts in its Consolidated Financial Statements. For further information on the Firm's clearing services, see Note 27.

Accounting for derivatives

All free-standing derivatives that the Firm executes for its own account are required to be recorded on the Consolidated balance sheets at fair value.

As permitted under U.S. GAAP, the Firm nets derivative assets and liabilities, and the related cash collateral receivables and payables, when a legally enforceable master netting agreement exists between the Firm and the derivative counterparty. For further discussion of the offsetting of assets and liabilities, see Note 1. The accounting for changes in value of a derivative depends on whether or not the transaction has been designated and qualifies for hedge accounting. Derivatives that are not designated as hedges are reported and measured at fair value through earnings. The tabular disclosures on pages 183–189 of this Note provide additional information on the amount of, and reporting for, derivative assets, liabilities, gains and losses. For further discussion of derivatives embedded in structured notes, see Notes 2 and 3.

Derivatives designated as hedges

The Firm applies hedge accounting to certain derivatives executed for risk management purposes – generally interest rate, foreign exchange and commodity derivatives.

However, JPMorgan Chase does not seek to apply hedge accounting to all of the derivatives involved in the Firm's risk management activities. For example, the Firm does not apply hedge accounting to purchased CDS used to manage the credit risk of loans and lending-related commitments, because of the difficulties in qualifying such contracts as hedges. For the same reason, the Firm does not apply hedge accounting to certain interest rate, foreign exchange, and commodity derivatives used for risk management purposes.

To qualify for hedge accounting, a derivative must be highly effective at reducing the risk associated with the exposure being hedged. In addition, for a derivative to be designated as a hedge, the risk management objective and strategy must be documented. Hedge documentation must identify the derivative hedging instrument, the asset or liability or forecasted transaction and type of risk to be hedged, and how the effectiveness of the derivative is assessed prospectively and retrospectively. To assess effectiveness, the Firm uses statistical methods such as regression analysis, as well as nonstatistical methods including dollar-value comparisons of the change in the fair value of the derivative to the change in the fair value or cash flows of the hedged item. The extent to which a derivative has been, and is expected to continue to be, effective at offsetting changes in the fair value or cash flows of the hedged item must be assessed and documented at least quarterly. Any hedge ineffectiveness (i.e., the amount by which the gain or loss on the designated derivative instrument does not exactly offset the change in the hedged item attributable to the hedged risk) must be reported in current-period earnings. If it is determined that a derivative is not highly effective at hedging the designated exposure, hedge accounting is discontinued.

There are three types of hedge accounting designations: fair value hedges, cash flow hedges and net investment hedges. JPMorgan Chase uses fair value hedges primarily to hedge fixed-rate long-term debt, AFS securities and certain commodities inventories. For qualifying fair value hedges, the changes in the fair value of the derivative, and in the value of the hedged item for the risk being hedged, are recognized in earnings. If the hedge relationship is terminated, then the adjustment to the hedged item continues to be reported as part of the basis of the hedged item, and for benchmark interest rate hedges, is amortized to earnings as a yield adjustment. Derivative amounts affecting earnings are recognized consistent with the classification of the hedged item – primarily net interest income and principal transactions revenue.

JPMorgan Chase uses cash flow hedges primarily to hedge the exposure to variability in forecasted cash flows from floating-rate assets and liabilities and foreign currency-denominated revenue and expense. For qualifying cash flow hedges, the effective portion of the change in the fair value of the derivative is recorded in OCI and recognized in the Consolidated statements of income when the hedged cash flows affect earnings. Derivative amounts affecting earnings are recognized consistent with the classification of the hedged item – primarily interest income, interest expense, noninterest revenue and compensation expense. The ineffective portions of cash flow hedges are immediately recognized in earnings. If the hedge relationship is terminated, then the value of the derivative recorded in AOCI is recognized in earnings when the cash flows that were hedged affect earnings. For hedge relationships that are discontinued because a forecasted transaction is not expected to occur according to the original hedge forecast, any related derivative values recorded in AOCI are immediately recognized in earnings.

JPMorgan Chase uses net investment hedges to protect the value of the Firm's net investments in certain non-U.S. subsidiaries or branches whose functional currencies are not the U.S. dollar. For foreign currency qualifying net investment hedges, changes in the fair value of the derivatives are recorded in the translation adjustments account within AOCI.

The following table outlines the Firm's primary uses of derivatives and the related hedge accounting designation or disclosure category.

Type of Derivative	Use of Derivative	Designation and disclosure	Affected segment or unit	Page reference
Manage specifically identified risk exposures in qualifying hedge accounting relationships:				
• Interest rate	Hedge fixed rate assets and liabilities	Fair value hedge	Corporate	187
• Interest rate	Hedge floating-rate assets and liabilities	Cash flow hedge	Corporate	188
• Foreign exchange	Hedge foreign currency-denominated assets and liabilities	Fair value hedge	Corporate	187
• Foreign exchange	Hedge foreign currency-denominated forecasted revenue and expense	Cash flow hedge	Corporate	188
• Foreign exchange	Hedge the value of the Firm's investments in non-U.S. dollar functional currency entities	Net investment hedge	Corporate	189
• Commodity	Hedge commodity inventory	Fair value hedge	CIB	187
Manage specifically identified risk exposures not designated in qualifying hedge accounting relationships:				
• Interest rate	Manage the risk of the mortgage pipeline, warehouse loans and MSRs	Specified risk management	CCB	189
• Credit	Manage the credit risk of wholesale lending exposures	Specified risk management	CIB	189
• Commodity	Manage the risk of certain commodities-related contracts and investments	Specified risk management	CIB	189
• Interest rate and foreign exchange	Manage the risk of certain other specified assets and liabilities	Specified risk management	Corporate	189
Market-making derivatives and other activities:				
• Various	Market-making and related risk management	Market-making and other	CIB	189
• Various	Other derivatives	Market-making and other	CIB, Corporate	189

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Notional amount of derivative contracts

The following table summarizes the notional amount of derivative contracts outstanding as of December 31, 2017 and 2016.

December 31, (in billions)	Notional amounts ^(b)	
	2017	2016
Interest rate contracts		
Swaps	\$ 21,043	\$ 22,000
Futures and forwards	4,904	5,289
Written options	3,576	3,091
Purchased options	3,987	3,482
Total interest rate contracts	33,510	33,862
Credit derivatives^(a)	1,522	2,032
Foreign exchange contracts		
Cross-currency swaps	3,953	3,359
Spot, futures and forwards	5,923	5,341
Written options	786	734
Purchased options	776	721
Total foreign exchange contracts	11,438	10,155
Equity contracts		
Swaps	367	258
Futures and forwards	90	59
Written options	531	417
Purchased options	453	345
Total equity contracts	1,441	1,079
Commodity contracts		
Swaps	116	102
Spot, futures and forwards	168	130
Written options	98	83
Purchased options	93	94
Total commodity contracts	475	409
Total derivative notional amounts	\$ 48,386	\$ 47,537

(a) For more information on volumes and types of credit derivative contracts, see the Credit derivatives discussion on pages 189-191.

(b) Represents the sum of gross long and gross short third-party notional derivative contracts.

While the notional amounts disclosed above give an indication of the volume of the Firm's derivatives activity, the notional amounts significantly exceed, in the Firm's view, the possible losses that could arise from such transactions. For most derivative transactions, the notional amount is not exchanged; it is used simply as a reference to calculate payments.

Impact of derivatives on the Consolidated balance sheets

The following table summarizes information on derivative receivables and payables (before and after netting adjustments) that are reflected on the Firm's Consolidated balance sheets as of December 31, 2017 and 2016, by accounting designation (e.g., whether the derivatives were designated in qualifying hedge accounting relationships or not) and contract type.

Gross derivative balances as of December 31, 2017, reflect the Firm's adoption of rulebook changes made by two CCPs, that require or allow the Firm to treat certain OTC-cleared derivative transactions with that CCP as settled each day. If such rulebook changes had been in effect as of December 31, 2016, the impact would have been a reduction in gross derivative receivables and payables of \$227.1 billion and \$224.7 billion, respectively, and a corresponding decrease in amounts netted, with no impact to the Consolidated balance sheets.

Free-standing derivative receivables and payables^(a)

December 31, 2017 (in millions)	Gross derivative receivables			Net derivative receivables ^(b)	Gross derivative payables			Net derivative payables ^(b)
	Not designated as hedges	Designated as hedges	Total derivative receivables		Not designated as hedges	Designated as hedges	Total derivative payables	
Trading assets and liabilities								
Interest rate	\$ 313,276	\$ 2,716	\$ 315,992	\$ 24,673	\$ 283,092	\$ 1,344	\$ 284,436	\$ 7,129
Credit	23,205	—	23,205	869	23,252	—	23,252	1,299
Foreign exchange	159,740	491	160,231	16,151	154,601	1,221	155,822	12,473
Equity	40,040	—	40,040	7,882	45,395	—	45,395	9,192
Commodity	20,066	19	20,085	6,948	21,498	403	21,901	7,684
Total fair value of trading assets and liabilities	\$ 556,327	\$ 3,226	\$ 559,553	\$ 56,523	\$ 527,838	\$ 2,968	\$ 530,806	\$ 37,777

December 31, 2016 (in millions)	Gross derivative receivables			Net derivative receivables ^(b)	Gross derivative payables			Net derivative payables ^(b)
	Not designated as hedges	Designated as hedges	Total derivative receivables		Not designated as hedges	Designated as hedges	Total derivative payables	
Trading assets and liabilities								
Interest rate	\$ 601,557	\$ 4,406	\$ 605,963	\$ 28,302	\$ 567,894	\$ 2,884	\$ 570,778	\$ 10,815
Credit	29,645	—	29,645	1,294	28,666	—	28,666	1,411
Foreign exchange	232,137	1,289	233,426	23,271	233,823	1,148	234,971	20,508
Equity	34,940	—	34,940	4,939	38,362	—	38,362	8,140
Commodity	18,505	137	18,642	6,272	20,283	179	20,462	8,357
Total fair value of trading assets and liabilities	\$ 916,784	\$ 5,832	\$ 922,616	\$ 64,078	\$ 889,028	\$ 4,211	\$ 893,239	\$ 49,231

(a) Balances exclude structured notes for which the fair value option has been elected. See Note 3 for further information.

(b) As permitted under U.S. GAAP, the Firm has elected to net derivative receivables and derivative payables and the related cash collateral receivables and payables when a legally enforceable master netting agreement exists.

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Derivatives netting

The following tables present, as of December 31, 2017 and 2016, gross and net derivative receivables and payables by contract and settlement type. Derivative receivables and payables, as well as the related cash collateral from the same counterparty, have been netted on the Consolidated balance sheets where the Firm has obtained an appropriate legal opinion with respect to the master netting agreement. Where such a legal opinion has not been either sought or obtained, amounts are not eligible for netting on the Consolidated balance sheets, and those derivative receivables and payables are shown separately in the tables below.

In addition to the cash collateral received and transferred that is presented on a net basis with derivative receivables and payables, the Firm receives and transfers additional collateral (financial instruments and cash). These amounts mitigate counterparty credit risk associated with the Firm's derivative instruments, but are not eligible for net presentation:

- collateral that consists of non-cash financial instruments (generally U.S. government and agency securities and other G7 government securities) and cash collateral held at third party custodians, which are shown separately as "Collateral not nettable on the Consolidated balance sheets" in the tables below, up to the fair value exposure amount.
- the amount of collateral held or transferred that exceeds the fair value exposure at the individual counterparty level, as of the date presented, which is excluded from the tables below; and
- collateral held or transferred that relates to derivative receivables or payables where an appropriate legal opinion has not been either sought or obtained with respect to the master netting agreement, which is excluded from the tables below.

December 31, (in millions)	2017			2016		
	Gross derivative receivables	Amounts netted on the Consolidated balance sheets	Net derivative receivables	Gross derivative receivables	Amounts netted on the Consolidated balance sheets	Net derivative receivables
U.S. GAAP nettable derivative receivables						
Interest rate contracts:						
Over-the-counter ("OTC")	\$ 305,569	\$ (284,917)	\$ 20,652	\$ 365,227	\$ (342,173)	\$ 23,054
OTC-cleared	6,531	(6,318)	213	235,399	(235,261)	138
Exchange-traded ^(a)	185	(84)	101	241	(227)	14
Total interest rate contracts	312,285	(291,319)	20,966	600,867	(577,661)	23,206
Credit contracts:						
OTC	15,390	(15,165)	225	23,130	(22,612)	518
OTC-cleared	7,225	(7,170)	55	5,746	(5,739)	7
Total credit contracts	22,615	(22,335)	280	28,876	(28,351)	525
Foreign exchange contracts:						
OTC	155,289	(142,420)	12,869	226,271	(208,962)	17,309
OTC-cleared	1,696	(1,654)	42	1,238	(1,165)	73
Exchange-traded ^(a)	141	(7)	134	104	(27)	77
Total foreign exchange contracts	157,126	(144,081)	13,045	227,613	(210,154)	17,459
Equity contracts:						
OTC	22,024	(19,917)	2,107	20,868	(20,570)	298
Exchange-traded ^(a)	14,188	(12,241)	1,947	11,439	(9,431)	2,008
Total equity contracts	36,212	(32,158)	4,054	32,307	(30,001)	2,306
Commodity contracts:						
OTC	10,903	(4,436)	6,467	11,571	(5,605)	5,966
Exchange-traded ^(a)	8,854	(8,701)	153	6,794	(6,766)	28
Total commodity contracts	19,757	(13,137)	6,620	18,365	(12,371)	5,994
Derivative receivables with appropriate legal opinion	547,995	(503,030) ^(b)	44,965	908,028	(858,538) ^(b)	49,490
Derivative receivables where an appropriate legal opinion has not been either sought or obtained	11,558		11,558	14,588		14,588
Total derivative receivables recognized on the Consolidated balance sheets	\$ 559,553		\$ 56,523	\$ 922,616		\$ 64,078
Collateral not nettable on the Consolidated balance sheets^{(c)(d)}			(13,363)			(18,638)
Net amounts			\$ 43,160			\$ 45,440

December 31, (in millions)	2017			2016		
	Gross derivative payables	Amounts netted on the Consolidated balance sheets	Net derivative payables	Gross derivative payables	Amounts netted on the Consolidated balance sheets	Net derivative payables
U.S. GAAP nettable derivative payables						
Interest rate contracts:						
OTC	\$ 276,960	\$ (271,294)	\$ 5,666	\$ 338,502	\$ (329,325)	\$ 9,177
OTC-cleared	6,004	(5,928)	76	230,464	(230,463)	1
Exchange-traded ^(a)	127	(84)	43	196	(175)	21
Total interest rate contracts	283,091	(277,306)	5,785	569,162	(559,963)	9,199
Credit contracts:						
OTC	16,194	(15,170)	1,024	22,366	(21,614)	752
OTC-cleared	6,801	(6,784)	17	5,641	(5,641)	–
Total credit contracts	22,995	(21,954)	1,041	28,007	(27,255)	752
Foreign exchange contracts:						
OTC	150,966	(141,789)	9,177	228,300	(213,296)	15,004
OTC-cleared	1,555	(1,553)	2	1,158	(1,158)	–
Exchange-traded ^(a)	98	(7)	91	328	(9)	319
Total foreign exchange contracts	152,619	(143,349)	9,270	229,786	(214,463)	15,323
Equity contracts:						
OTC	28,193	(23,969)	4,224	24,688	(20,808)	3,880
Exchange-traded ^(a)	12,720	(12,234)	486	10,004	(9,414)	590
Total equity contracts	40,913	(36,203)	4,710	34,692	(30,222)	4,470
Commodity contracts:						
OTC	12,645	(5,508)	7,137	12,885	(5,252)	7,633
Exchange-traded ^(a)	8,870	(8,709)	161	7,099	(6,853)	246
Total commodity contracts	21,515	(14,217)	7,298	19,984	(12,105)	7,879
Derivative payables with appropriate legal opinion	521,133	(493,029) ^(b)	28,104	881,631	(844,008) ^(b)	37,623
Derivative payables where an appropriate legal opinion has not been either sought or obtained	9,673		9,673	11,608		11,608
Total derivative payables recognized on the Consolidated balance sheets	\$ 530,806		\$ 37,777	\$ 893,239		\$ 49,231
Collateral not nettable on the Consolidated balance sheets ^{(c)(d)}			(4,180)			(8,925)
Net amounts			\$ 33,597			\$ 40,306

(a) Exchange-traded derivative balances that relate to futures contracts are settled daily.

(b) Net derivatives receivable included cash collateral netted of \$55.5 billion and \$71.9 billion at December 31, 2017 and 2016, respectively. Net derivatives payable included cash collateral netted of \$45.5 billion and \$57.3 billion related to OTC and OTC-cleared derivatives at December 31, 2017 and 2016, respectively.

(c) Represents liquid security collateral as well as cash collateral held at third-party custodians related to derivative instruments where an appropriate legal opinion has been obtained. For some counterparties, the collateral amounts of financial instruments may exceed the derivative receivables and derivative payables balances. Where this is the case, the total amount reported is limited to the net derivative receivables and net derivative payables balances with that counterparty.

(d) Derivative collateral relates only to OTC and OTC-cleared derivative instruments.

Notes to consolidated financial statements

Liquidity risk and credit-related contingent features

In addition to the specific market risks introduced by each derivative contract type, derivatives expose JPMorgan Chase to credit risk – the risk that derivative counterparties may fail to meet their payment obligations under the derivative contracts and the collateral, if any, held by the Firm proves to be of insufficient value to cover the payment obligation. It is the policy of JPMorgan Chase to actively pursue, where possible, the use of legally enforceable master netting arrangements and collateral agreements to mitigate derivative counterparty credit risk. The amount of derivative receivables reported on the Consolidated balance sheets is the fair value of the derivative contracts after giving effect to legally enforceable master netting agreements and cash collateral held by the Firm.

While derivative receivables expose the Firm to credit risk, derivative payables expose the Firm to liquidity risk, as the derivative contracts typically require the Firm to post cash or securities collateral with counterparties as the fair value

of the contracts moves in the counterparties' favor or upon specified downgrades in the Firm's and its subsidiaries' respective credit ratings. Certain derivative contracts also provide for termination of the contract, generally upon a downgrade of either the Firm or the counterparty, at the fair value of the derivative contracts. The following table shows the aggregate fair value of net derivative payables related to OTC and OTC-cleared derivatives that contain contingent collateral or termination features that may be triggered upon a ratings downgrade, and the associated collateral the Firm has posted in the normal course of business, at December 31, 2017 and 2016.

OTC and OTC-cleared derivative payables containing downgrade triggers

December 31, (in millions)	2017	2016
Aggregate fair value of net derivative payables	\$ 11,916	\$ 21,550
Collateral posted	9,973	19,383

The following table shows the impact of a single-notch and two-notch downgrade of the long-term issuer ratings of JPMorgan Chase & Co. and its subsidiaries, predominantly JPMorgan Chase Bank, National Association ("JPMorgan Chase Bank, N.A."), at December 31, 2017 and 2016, related to OTC and OTC-cleared derivative contracts with contingent collateral or termination features that may be triggered upon a ratings downgrade. Derivatives contracts generally require additional collateral to be posted or terminations to be triggered when the predefined threshold rating is breached. A downgrade by a single rating agency that does not result in a rating lower than a preexisting corresponding rating provided by another major rating agency will generally not result in additional collateral (except in certain instances in which additional initial margin may be required upon a ratings downgrade), nor in termination payments requirements. The liquidity impact in the table is calculated based upon a downgrade below the lowest current rating of the rating agencies referred to in the derivative contract.

Liquidity impact of downgrade triggers on OTC and OTC-cleared derivatives

December 31, (in millions)	2017		2016	
	Single-notch downgrade	Two-notch downgrade	Single-notch downgrade	Two-notch downgrade
Amount of additional collateral to be posted upon downgrade ^(a)	\$ 79	\$ 1,989	\$ 560	\$ 2,497
Amount required to settle contracts with termination triggers upon downgrade ^(b)	320	650	606	1,049

(a) Includes the additional collateral to be posted for initial margin.

(b) Amounts represent fair values of derivative payables, and do not reflect collateral posted.

Derivatives executed in contemplation of a sale of the underlying financial asset

In certain instances the Firm enters into transactions in which it transfers financial assets but maintains the economic exposure to the transferred assets by entering into a derivative with the same counterparty in contemplation of the initial transfer. The Firm generally accounts for such transfers as collateralized financing transactions as described in Note 11, but in limited circumstances they may qualify to be accounted for as a sale and a derivative under U.S. GAAP. There were no such transfers accounted for as a sale where the associated derivative was outstanding at December 31, 2017, and such transfers at December 31, 2016 were not material.

Impact of derivatives on the Consolidated statements of income

The following tables provide information related to gains and losses recorded on derivatives based on their hedge accounting designation or purpose.

Fair value hedge gains and losses

The following tables present derivative instruments, by contract type, used in fair value hedge accounting relationships, as well as pre-tax gains/(losses) recorded on such derivatives and the related hedged items for the years ended December 31, 2017, 2016 and 2015, respectively. The Firm includes gains/(losses) on the hedging derivative and the related hedged item in the same line item in the Consolidated statements of income.

Year ended December 31, 2017 (in millions)	Gains/(losses) recorded in income			Income statement impact due to:	
	Derivatives	Hedged items	Total income statement impact	Hedge ineffectiveness ^(e)	Excluded components ^(f)
Contract type					
Interest rate ^{(a)(b)}	\$ (481)	\$ 1,359	\$ 878	\$ (18)	\$ 896
Foreign exchange ^(c)	(3,509)	3,507	(2)	—	(2)
Commodity ^(d)	(1,275)	1,348	73	29	44
Total	\$ (5,265)	\$ 6,214	\$ 949	\$ 11	\$ 938

Year ended December 31, 2016 (in millions)	Gains/(losses) recorded in income			Income statement impact due to:	
	Derivatives	Hedged items	Total income statement impact	Hedge ineffectiveness ^(e)	Excluded components ^(f)
Contract type					
Interest rate ^{(a)(b)}	\$ (482)	\$ 1,338	\$ 856	\$ 6	\$ 850
Foreign exchange ^(c)	2,435	(2,261)	174	—	174
Commodity ^(d)	(536)	586	50	(9)	59
Total	\$ 1,417	\$ (337)	\$ 1,080	\$ (3)	\$ 1,083

Year ended December 31, 2015 (in millions)	Gains/(losses) recorded in income			Income statement impact due to:	
	Derivatives	Hedged items	Total income statement impact	Hedge ineffectiveness ^(e)	Excluded components ^(f)
Contract type					
Interest rate ^{(a)(b)}	\$ 38	\$ 911	\$ 949	\$ 3	\$ 946
Foreign exchange ^(c)	6,030	(6,006)	24	—	24
Commodity ^(d)	1,153	(1,142)	11	(13)	24
Total	\$ 7,221	\$ (6,237)	\$ 984	\$ (10)	\$ 994

- (a) Primarily consists of hedges of the benchmark (e.g., London Interbank Offered Rate (“LIBOR”)) interest rate risk of fixed-rate long-term debt and AFS securities. Gains and losses were recorded in net interest income.
- (b) Excludes the amortization expense associated with the inception hedge accounting adjustment applied to the hedged item. This expense is recorded in net interest income and substantially offsets the income statement impact of the excluded components.
- (c) Primarily consists of hedges of the foreign currency risk of long-term debt and AFS securities for changes in spot foreign currency rates. Gains and losses related to the derivatives and the hedged items, due to changes in foreign currency rates, were recorded primarily in principal transactions revenue and net interest income.
- (d) Consists of overall fair value hedges of physical commodities inventories that are generally carried at the lower of cost or net realizable value (net realizable value approximates fair value). Gains and losses were recorded in principal transactions revenue.
- (e) Hedge ineffectiveness is the amount by which the gain or loss on the designated derivative instrument does not exactly offset the gain or loss on the hedged item attributable to the hedged risk.
- (f) The assessment of hedge effectiveness excludes certain components of the changes in fair values of the derivatives and hedged items such as forward points on foreign exchange forward contracts and time values.

Notes to consolidated financial statements

Cash flow hedge gains and losses

The following tables present derivative instruments, by contract type, used in cash flow hedge accounting relationships, and the pre-tax gains/(losses) recorded on such derivatives, for the years ended December 31, 2017, 2016 and 2015, respectively. The Firm includes the gain/(loss) on the hedging derivative and the change in cash flows on the hedged item in the same line item in the Consolidated statements of income.

Year ended December 31, 2017 (in millions)	Gains/(losses) recorded in income and other comprehensive income/(loss)				
	Derivatives - effective portion reclassified from AOCI to income	Hedge ineffectiveness recorded directly in income ^(c)	Total income statement impact	Derivatives - effective portion recorded in OCI	Total change in OCI for period
Contract type					
Interest rate ^(a)	\$ (17)	\$ —	\$ (17)	\$ 12	\$ 29
Foreign exchange ^(b)	(117)	—	(117)	135	252
Total	\$ (134)	\$ —	\$ (134)	\$ 147	\$ 281

Year ended December 31, 2016 (in millions)	Gains/(losses) recorded in income and other comprehensive income/(loss)				
	Derivatives - effective portion reclassified from AOCI to income	Hedge ineffectiveness recorded directly in income ^(c)	Total income statement impact	Derivatives - effective portion recorded in OCI	Total change in OCI for period
Contract type					
Interest rate ^(a)	\$ (74)	\$ —	\$ (74)	\$ (55)	\$ 19
Foreign exchange ^(b)	(286)	—	(286)	(395)	(109)
Total	\$ (360)	\$ —	\$ (360)	\$ (450)	\$ (90)

Year ended December 31, 2015 (in millions)	Gains/(losses) recorded in income and other comprehensive income/(loss)				
	Derivatives - effective portion reclassified from AOCI to income	Hedge ineffectiveness recorded directly in income ^(c)	Total income statement impact	Derivatives - effective portion recorded in OCI	Total change in OCI for period
Contract type					
Interest rate ^(a)	\$ (99)	\$ —	\$ (99)	\$ (44)	\$ 55
Foreign exchange ^(b)	(81)	—	(81)	(53)	28
Total	\$ (180)	\$ —	\$ (180)	\$ (97)	\$ 83

(a) Primarily consists of benchmark interest rate hedges of LIBOR-indexed floating-rate assets and floating-rate liabilities. Gains and losses were recorded in net interest income.

(b) Primarily consists of hedges of the foreign currency risk of non-U.S. dollar-denominated revenue and expense. The income statement classification of gains and losses follows the hedged item - primarily noninterest revenue and compensation expense.

(c) Hedge ineffectiveness is the amount by which the cumulative gain or loss on the designated derivative instrument exceeds the present value of the cumulative expected change in cash flows on the hedged item attributable to the hedged risk.

The Firm did not experience any forecasted transactions that failed to occur for the years ended 2017 and 2016. In 2015, the Firm reclassified approximately \$150 million of net losses from AOCI to other income because the Firm determined that it was probable that the forecasted interest payment cash flows would not occur as a result of the planned reduction in wholesale non-operating deposits.

Over the next 12 months, the Firm expects that approximately \$96 million (after-tax) of net gains recorded in AOCI at December 31, 2017, related to cash flow hedges will be recognized in income. For terminated cash flow hedges, the maximum length of time over which forecasted transactions are remaining is approximately five years. For open cash flow hedges, the maximum length of time over which forecasted transactions are hedged is approximately seven years. The Firm's longer-dated forecasted transactions relate to core lending and borrowing activities.

Net investment hedge gains and losses

The following table presents hedging instruments, by contract type, that were used in net investment hedge accounting relationships, and the pre-tax gains/(losses) recorded on such instruments for the years ended December 31, 2017, 2016 and 2015.

Year ended December 31, (in millions)	Gains/(losses) recorded in income and other comprehensive income/(loss)					
	2017		2016		2015	
	Excluded components recorded directly in income ^(a)	Effective portion recorded in OCI	Excluded components recorded directly in income ^(a)	Effective portion recorded in OCI	Excluded components recorded directly in income ^(a)	Effective portion recorded in OCI
Foreign exchange derivatives	\$(172)	\$(1,294)	\$(282)	\$262	\$(379)	\$1,885

(a) Certain components of hedging derivatives are permitted to be excluded from the assessment of hedge effectiveness, such as forward points on foreign exchange forward contracts. Amounts related to excluded components are recorded in other income. The Firm measures the ineffectiveness of net investment hedge accounting relationships based on changes in spot foreign currency rates and, therefore, there was no significant ineffectiveness for net investment hedge accounting relationships during 2017, 2016 and 2015.

Gains and losses on derivatives used for specified risk management purposes

The following table presents pre-tax gains/(losses) recorded on a limited number of derivatives, not designated in hedge accounting relationships, that are used to manage risks associated with certain specified assets and liabilities, including certain risks arising from the mortgage pipeline, warehouse loans, MSRs, wholesale lending exposures, foreign currency denominated assets and liabilities, and commodities-related contracts and investments.

Year ended December 31, (in millions)	Derivatives gains/(losses) recorded in income		
	2017	2016	2015
Contract type			
Interest rate ^(a)	\$ 331	\$ 1,174	\$ 853
Credit ^(b)	(74)	(282)	70
Foreign exchange ^(c)	(33)	27	25
Commodity ^(d)	—	—	(12)
Total	\$ 224	\$ 919	\$ 936

(a) Primarily represents interest rate derivatives used to hedge the interest rate risk inherent in the mortgage pipeline, warehouse loans and MSRs, as well as written commitments to originate warehouse loans. Gains and losses were recorded predominantly in mortgage fees and related income.

(b) Relates to credit derivatives used to mitigate credit risk associated with lending exposures in the Firm's wholesale businesses. These derivatives do not include credit derivatives used to mitigate counterparty credit risk arising from derivative receivables, which is included in gains and losses on derivatives related to market-making activities and other derivatives. Gains and losses were recorded in principal transactions revenue.

(c) Primarily relates to derivatives used to mitigate foreign exchange risk of specified foreign currency-denominated assets and liabilities. Gains and losses were recorded in principal transactions revenue.

(d) Primarily relates to commodity derivatives used to mitigate energy price risk associated with energy-related contracts and investments. Gains and losses were recorded in principal transactions revenue.

Gains and losses on derivatives related to market-making activities and other derivatives

The Firm makes markets in derivatives in order to meet the needs of customers and uses derivatives to manage certain risks associated with net open risk positions from its market-making activities, including the counterparty credit risk arising from derivative receivables. All derivatives not included in the hedge accounting or specified risk management categories above are included in this category. Gains and losses on these derivatives are primarily recorded in principal transactions revenue. See Note 6 for information on principal transactions revenue.

Credit derivatives

Credit derivatives are financial instruments whose value is derived from the credit risk associated with the debt of a third-party issuer (the reference entity) and which allow one party (the protection purchaser) to transfer that risk to another party (the protection seller). Credit derivatives expose the protection purchaser to the creditworthiness of the protection seller, as the protection seller is required to make payments under the contract when the reference entity experiences a credit event, such as a bankruptcy, a failure to pay its obligation or a restructuring. The seller of credit protection receives a premium for providing protection but has the risk that the underlying instrument referenced in the contract will be subject to a credit event.

The Firm is both a purchaser and seller of protection in the credit derivatives market and uses these derivatives for two primary purposes. First, in its capacity as a market-maker, the Firm actively manages a portfolio of credit derivatives by purchasing and selling credit protection, predominantly on corporate debt obligations, to meet the needs of customers. Second, as an end-user, the Firm uses credit derivatives to manage credit risk associated with lending exposures (loans and unfunded commitments) and derivatives counterparty exposures in the Firm's wholesale businesses, and to manage the credit risk arising from certain financial instruments in the Firm's market-making businesses. Following is a summary of various types of credit derivatives.

Credit default swaps

Credit derivatives may reference the credit of either a single reference entity ("single-name") or a broad-based index. The Firm purchases and sells protection on both single-name and index-reference obligations. Single-name CDS and index CDS contracts are either OTC or OTC-cleared derivative contracts. Single-name CDS are used to manage the default risk of a single reference entity, while index CDS contracts are used to manage the credit risk associated with the broader credit markets or credit market segments. Like the S&P 500 and other market indices, a CDS index consists of a portfolio of CDS across many reference entities. New series of CDS indices are periodically established with a new underlying portfolio of reference entities to reflect changes in the credit markets. If one of the reference entities in the index experiences a credit event, then the reference entity that defaulted is removed from the index. CDS can also be referenced against specific portfolios of reference names or against customized exposure levels based on specific client demands: for example, to provide protection against the first \$1 million of realized credit losses in a \$10 million portfolio of exposure. Such structures are commonly known as tranche CDS.

For both single-name CDS contracts and index CDS contracts, upon the occurrence of a credit event, under the terms of a CDS contract neither party to the CDS contract has recourse to the reference entity. The protection purchaser has recourse to the protection seller for the difference between the face value of the CDS contract and the fair value of the reference obligation at settlement of the credit derivative contract, also known as the recovery value. The protection purchaser does not need to hold the debt instrument of the underlying reference entity in order to receive amounts due under the CDS contract when a credit event occurs.

Credit-related notes

A credit-related note is a funded credit derivative where the issuer of the credit-related note purchases from the note investor credit protection on a reference entity or an index. Under the contract, the investor pays the issuer the par value of the note at the inception of the transaction, and in return, the issuer pays periodic payments to the investor, based on the credit risk of the referenced entity. The issuer also repays the investor the par value of the note at maturity unless the reference entity (or one of the entities that makes up a reference index) experiences a specified credit event. If a credit event occurs, the issuer is not obligated to repay the par value of the note, but rather, the issuer pays the investor the difference between the par value of the note and the fair value of the defaulted reference obligation at the time of settlement. Neither party to the credit-related note has recourse to the defaulting reference entity.

The following tables present a summary of the notional amounts of credit derivatives and credit-related notes the Firm sold and purchased as of December 31, 2017 and 2016. Upon a credit event, the Firm as a seller of protection would typically pay out only a percentage of the full notional amount of net protection sold, as the amount actually required to be paid on the contracts takes into account the recovery value of the reference obligation at the time of settlement. The Firm manages the credit risk on contracts to sell protection by purchasing protection with identical or similar underlying reference entities. Other purchased protection referenced in the following tables includes credit derivatives bought on related, but not identical, reference positions (including indices, portfolio coverage and other reference points) as well as protection purchased through credit-related notes.

The Firm does not use notional amounts of credit derivatives as the primary measure of risk management for such derivatives, because the notional amount does not take into account the probability of the occurrence of a credit event, the recovery value of the reference obligation, or related cash instruments and economic hedges, each of which reduces, in the Firm's view, the risks associated with such derivatives.

Total credit derivatives and credit-related notes

	Maximum payout/Notional amount			
	Protection sold	Protection purchased with identical underlyings ^(b)	Net protection (sold)/purchased ^(c)	Other protection purchased ^(d)
December 31, 2017 (in millions)				
Credit derivatives				
Credit default swaps	\$ (690,224)	\$ 702,098	\$ 11,874	\$ 5,045
Other credit derivatives ^(a)	(54,157)	59,158	5,001	11,747
Total credit derivatives	(744,381)	761,256	16,875	16,792
Credit-related notes	(18)	—	(18)	7,915
Total	\$ (744,399)	\$ 761,256	\$ 16,857	\$ 24,707
December 31, 2016 (in millions)				
Credit derivatives				
Credit default swaps	\$ (961,003)	\$ 974,252	\$ 13,249	\$ 7,935
Other credit derivatives ^(a)	(36,829)	31,859	(4,970)	19,991
Total credit derivatives	(997,832)	1,006,111	8,279	27,926
Credit-related notes	(41)	—	(41)	4,505
Total	\$ (997,873)	\$ 1,006,111	\$ 8,238	\$ 32,431

(a) Other credit derivatives largely consists of credit swap options.

(b) Represents the total notional amount of protection purchased where the underlying reference instrument is identical to the reference instrument on protection sold; the notional amount of protection purchased for each individual identical underlying reference instrument may be greater or lower than the notional amount of protection sold.

(c) Does not take into account the fair value of the reference obligation at the time of settlement, which would generally reduce the amount the seller of protection pays to the buyer of protection in determining settlement value.

(d) Represents protection purchased by the Firm on referenced instruments (single-name, portfolio or index) where the Firm has not sold any protection on the identical reference instrument.

The following tables summarize the notional amounts by the ratings, maturity profile, and total fair value, of credit derivatives and credit-related notes as of December 31, 2017 and 2016, where JPMorgan Chase is the seller of protection. The maturity profile is based on the remaining contractual maturity of the credit derivative contracts. The ratings profile is based on the rating of the reference entity on which the credit derivative contract is based. The ratings and maturity profile of credit derivatives and credit-related notes where JPMorgan Chase is the purchaser of protection are comparable to the profile reflected below.

Protection sold - credit derivatives and credit-related notes ratings^(a)/maturity profile

December 31, 2017 (in millions)	<1 year	1-5 years	>5 years	Total notional amount	Fair value of receivables ^(b)	Fair value of payables ^(b)	Net fair value
Risk rating of reference entity							
Investment-grade	\$ (159,286)	\$ (319,726)	\$ (39,429)	\$ (518,441)	\$ 8,516	\$ (1,134)	\$ 7,382
Noninvestment-grade	(73,394)	(134,125)	(18,439)	(225,958)	7,407	(5,313)	2,094
Total	\$ (232,680)	\$ (453,851)	\$ (57,868)	\$ (744,399)	\$ 15,923	\$ (6,447)	\$ 9,476
December 31, 2016 (in millions)							
Risk rating of reference entity							
Investment-grade	\$ (273,688)	\$ (383,586)	\$ (39,281)	\$ (696,555)	\$ 7,841	\$ (3,055)	\$ 4,786
Noninvestment-grade	(107,955)	(170,046)	(23,317)	(301,318)	8,184	(8,570)	(386)
Total	\$ (381,643)	\$ (553,632)	\$ (62,598)	\$ (997,873)	\$ 16,025	\$ (11,625)	\$ 4,400

(a) The ratings scale is primarily based on external credit ratings defined by S&P and Moody's.

(b) Amounts are shown on a gross basis, before the benefit of legally enforceable master netting agreements and cash collateral received by the Firm.

Note 6 – Noninterest revenue and noninterest expense

Investment banking fees

This revenue category includes debt and equity underwriting and advisory fees. As an underwriter, the Firm helps clients raise capital via public offering and private placement of various types of debt instruments and equity securities. Underwriting fees are primarily based on the issuance price and quantity of the underlying instruments, and are recognized as revenue typically upon execution of the client's transaction. The Firm also manages and syndicates loan arrangements. Credit arrangement and syndication fees, included within debt underwriting fees, are recorded as revenue after satisfying certain retention, timing and yield criteria.

The Firm also provides advisory services, assisting its clients with mergers and acquisitions, divestitures, restructuring and other complex transactions. Advisory fees are recognized as revenue typically upon execution of the client's transaction.

Year ended December 31, (in millions)	2017	2016	2015
Underwriting			
Equity	\$ 1,394	\$ 1,146	\$ 1,408
Debt	3,710	3,207	3,232
Total underwriting	5,104	4,353	4,640
Advisory	2,144	2,095	2,111
Total investment banking fees	\$ 7,248	\$ 6,448	\$ 6,751

Investment banking fees are earned primarily by CIB. See Note 31 for segment results.

Principal transactions

Principal transactions revenue is driven by many factors, including the bid-offer spread, which is the difference between the price at which the Firm is willing to buy a financial or other instrument and the price at which the Firm is willing to sell that instrument. It also consists of the realized (as a result of the sale of instruments, closing out or termination of transactions, or interim cash payments) and unrealized (as a result of changes in valuation) gains and losses on financial and other instruments (including those accounted for under the fair value option) primarily used in client-driven market-making activities and on private equity investments. In connection with its client-driven market-making activities, the Firm transacts in debt and equity instruments, derivatives and commodities (including physical commodities inventories and financial instruments that reference commodities).

Principal transactions revenue also includes certain realized and unrealized gains and losses related to hedge accounting and specified risk-management activities, including: (a) certain derivatives designated in qualifying hedge accounting relationships (primarily fair value hedges of commodity and foreign exchange risk), (b) certain derivatives used for specific risk management purposes, primarily to mitigate credit risk, foreign exchange risk and commodity risk, and (c) other derivatives. For further information on the income statement classification of gains and losses from derivatives activities, see Note 5.

In the financial commodity markets, the Firm transacts in OTC derivatives (e.g., swaps, forwards, options) and ETD that reference a wide range of underlying commodities. In the physical commodity markets, the Firm primarily purchases and sells precious and base metals and may hold other commodities inventories under financing and other arrangements with clients.

The following table presents all realized and unrealized gains and losses recorded in principal transactions revenue. This table excludes interest income and interest expense on trading assets and liabilities, which are an integral part of the overall performance of the Firm's client-driven market-making activities. See Note 7 for further information on interest income and interest expense. Trading revenue is presented primarily by instrument type. The Firm's client-driven market-making businesses generally utilize a variety of instrument types in connection with their market-making and related risk-management activities; accordingly, the trading revenue presented in the table below is not representative of the total revenue of any individual line of business.

Year ended December 31, (in millions)	2017	2016	2015
Trading revenue by instrument type			
Interest rate	\$ 2,479	\$ 2,325	\$ 1,933
Credit	1,329	2,096	1,735
Foreign exchange	2,746	2,827	2,557
Equity	3,873	2,994	2,990
Commodity	661	1,067	842
Total trading revenue	11,088	11,309	10,057
Private equity gains	259	257	351
Principal transactions	\$ 11,347	\$ 11,566	\$ 10,408

Principal transactions revenue is earned primarily by CIB. See Note 31 for segment results.

Lending- and deposit-related fees

Lending-related fees include fees earned from loan commitments, standby letters of credit, financial guarantees, and other loan-servicing activities. Deposit-related fees include fees earned in lieu of compensating balances, and fees earned from performing cash management activities and other deposit account services. Lending- and deposit-related fees in this revenue category are recognized over the period in which the related service is provided.

Year ended December 31, (in millions)	2017	2016	2015
Lending-related fees	\$ 1,110	\$ 1,114	\$ 1,148
Deposit-related fees	4,823	4,660	4,546
Total lending- and deposit-related fees	\$ 5,933	\$ 5,774	\$ 5,694

Lending- and deposit-related fees are earned by CCB, CIB, CB, and AWM. See Note 31 for segment results.

Asset management, administration and commissions

This revenue category includes fees from investment management and related services, custody, brokerage services and other products. The Firm manages assets on behalf of its clients, including investors in Firm-sponsored funds and owners of separately managed investment accounts. Management fees are typically based on the value of assets under management and are collected and recognized at the end of each period over which the management services are provided and the value of the managed assets is known. The Firm also receives performance-based management fees, which are earned based on exceeding certain benchmarks or other performance targets and are accrued and recognized when the probability of reversal is remote, typically at the end of the related billing period. The Firm has contractual arrangements with third parties to provide distribution and other services in connection with its asset management activities. Amounts paid to third-party service providers are recorded in professional and outside services expense.

Year ended December 31, (in millions)	2017	2016	2015
Asset management fees			
Investment management fees	\$ 9,526	\$ 8,865	\$ 9,403
All other asset management fees ^(a)	294	336	352
Total asset management fees	9,820	9,201	9,755
Total administration fees ^(b)	2,029	1,915	2,015
Commissions and other fees			
Brokerage commissions ^(c)	2,239	2,151	2,304
All other commissions and fees	1,289	1,324	1,435
Total commissions and fees	3,528	3,475	3,739
Total asset management, administration and commissions	\$ 15,377	\$ 14,591	\$ 15,509

(a) The Firm receives other asset management fees for services that are ancillary to investment management services, including commissions earned on sales or distribution of mutual funds to clients. These fees are recorded as revenue at the time the service is rendered or, in the case of certain distribution fees based on the underlying fund's asset value and/or investor redemption, recorded over time as the investor remains in the fund or upon investor redemption.

(b) The Firm receives administrative fees predominantly from custody, securities lending, fund services and securities clearance fees. These fees are recorded as revenue over the period in which the related service is provided.

(c) The Firm acts as a broker, facilitating its clients' purchase and sale of securities and other financial instruments. It collects and recognizes brokerage commissions as revenue upon occurrence of the client transaction. The Firm reports certain costs paid to third-party clearing houses and exchanges net against commission revenue.

Asset management, administration and commissions are earned primarily by AWM, CIB, CCB, and CB. See Note 31 for segment results.

Mortgage fees and related income

This revenue category primarily reflects CCB's Home Lending production and servicing revenue, including fees and income derived from mortgages originated with the intent to sell; mortgage sales and servicing including losses related to the repurchase of previously sold loans; the impact of risk-management activities associated with the mortgage pipeline, warehouse loans and MSRs; and revenue related to any residual interests held from mortgage securitizations. This revenue category also includes gains and losses on sales and lower of cost or fair value adjustments for mortgage loans held-for-sale, as well as changes in fair value for mortgage loans originated with the intent to sell and measured at fair value under the fair value option. Changes in the fair value of MSRs are reported in mortgage fees and related income. For a further discussion of MSRs, see Note 15. Net interest income from mortgage loans is recorded in interest income.

Card income

This revenue category includes interchange income from credit and debit cards and fees earned from processing card transactions for merchants, both of which are recognized when purchases are made by a cardholder. Card income also includes annual and other lending fees and costs, which are deferred and recognized on a straight-line basis over a 12-month period.

Certain Chase credit card products offer the cardholder the ability to earn points based on account activity, which the cardholder can choose to redeem for cash and non-cash rewards. The cost to the Firm related to these proprietary rewards programs varies based on multiple factors including the terms and conditions of the rewards programs, cardholder activity, cardholder reward redemption rates and cardholder reward selections. The Firm maintains a liability for its obligations under its rewards programs and reports the current-period cost as a reduction of card income.

Credit card revenue sharing agreements

The Firm has contractual agreements with numerous co-brand partners that grant the Firm exclusive rights to issue co-branded credit card products and market them to the customers of such partners. These partners endorse the co-brand credit card programs and provide their customer or member lists to the Firm. The partners may also conduct marketing activities and provide rewards redeemable under their own loyalty programs that the Firm will grant to co-brand credit cardholders based on account activity. The terms of these agreements generally range from five to ten years.

Notes to consolidated financial statements

The Firm typically makes payments to the co-brand credit card partners based on the cost of partners' marketing activities and loyalty program rewards provided to credit cardholders, new account originations and sales volumes. Payments to partners based on marketing efforts undertaken by the partners are expensed by the Firm as incurred and reported as noninterest expense. Payments for partner rewards are reported as a reduction of card income when incurred. Payments to partners based on new credit card account originations are accounted for as direct loan origination costs and are deferred and recognized as a reduction of card income on a straight-line basis over a 12-month period. Payments to partners based on sales volumes are reported as a reduction of card income when the related interchange income is earned.

Card income is earned primarily by CCB and CB. See Note 31 for segment results.

Other income

Other income on the Firm's Consolidated statements of income included the following:

Year ended December 31, (in millions)	2017	2016	2015
Operating lease income	\$ 3,613	\$ 2,724	\$ 2,081

Operating lease income is recognized on a straight-line basis over the lease term.

Noninterest expense

Other expense

Other expense on the Firm's Consolidated statements of income included the following:

Year ended December 31, (in millions)	2017	2016	2015
Legal expense/(benefit)	\$ (35)	\$ (317)	\$ 2,969
FDIC-related expense	1,492	1,296	1,227

Note 7 – Interest income and Interest expense

Interest income and interest expense are recorded in the Consolidated statements of income and classified based on the nature of the underlying asset or liability.

The following table presents the components of interest income and interest expense:

Year ended December 31, (in millions)	2017	2016	2015
Interest Income			
Loans	\$ 41,008	\$ 36,634	\$ 33,134
Taxable securities	5,535	5,538	6,550
Non-taxable securities ^(a)	1,847	1,766	1,706
Total securities	7,382	7,304	8,256
Trading assets	7,610	7,292	6,621
Federal funds sold and securities purchased under resale agreements	2,327	2,265	1,592
Securities borrowed ^(b)	(37)	(332)	(532)
Deposits with banks	4,219	1,863	1,250
All other interest-earning assets ^(c)	1,863	875	652
Total interest income	\$ 64,372	\$ 55,901	\$ 50,973
Interest expense			
Interest bearing deposits	\$ 2,857	\$ 1,356	\$ 1,252
Federal funds purchased and securities loaned or sold under repurchase agreements	1,611	1,089	609
Short-term borrowings ^(d)	481	203	175
Trading liabilities - debt and all other interest-bearing liabilities ^(e)	2,070	1,102	557
Long-term debt	6,753	5,564	4,435
Beneficial interest issued by consolidated VIEs	503	504	435
Total interest expense	\$ 14,275	\$ 9,818	\$ 7,463
Net interest income	\$ 50,097	\$ 46,083	\$ 43,510
Provision for credit losses	5,290	5,361	3,827
Net interest income after provision for credit losses	\$ 44,807	\$ 40,722	\$ 39,683

- (a) Represents securities that are tax-exempt for U.S. federal income tax purposes.
- (b) Negative interest income is related to client-driven demand for certain securities combined with the impact of low interest rates. This is matched book activity and the negative interest expense on the corresponding securities loaned is recognized in interest expense.
- (c) Includes held-for-investment margin loans, which are classified in accrued interest and accounts receivable, and all other interest-earning assets included in other assets.
- (d) Includes commercial paper.
- (e) Other interest-bearing liabilities include brokerage customer payables.

Interest income and interest expense includes the current-period interest accruals for financial instruments measured at fair value, except for derivatives and financial instruments containing embedded derivatives that would be separately accounted for in accordance with U.S. GAAP, absent the fair value option election; for those instruments, all changes in fair value including any interest elements, are reported in principal transactions revenue. For financial instruments that are not measured at fair value, the related interest is included within interest income or interest expense, as applicable. For further information on

accounting for interest income and interest expense related to loans, securities, securities financing (i.e. securities purchased or sold under resale or repurchase agreements; securities borrowed; and securities loaned) and long-term debt, see Notes 12, 10, 11 and 19, respectively.

Note 8 – Pension and other postretirement employee benefit plans

The Firm has various defined benefit pension plans and OPEB plans that provide benefits to its employees. The Firm has a qualified noncontributory U.S. defined benefit pension plan that provides benefits to substantially all U.S. employees. The Firm also has defined benefit pension plans that are offered in certain non-U.S. locations based on factors such as eligible compensation, age and/or years of service. It is the Firm's policy to fund the pension plans in amounts sufficient to meet the requirements under applicable laws. The Firm does not anticipate at this time any contribution to the U.S. defined benefit pension plan in 2018. The 2018 contributions to the non-U.S. defined benefit pension plans are expected to be \$46 million of which \$30 million are contractually required.

The Firm also has a number of nonqualified noncontributory defined benefit pension plans that are unfunded. These plans provide supplemental defined pension benefits to certain employees.

The Firm currently provides two qualified defined contribution plans in the U.S. and maintains other similar arrangements in certain non-U.S. locations.

The Firm offers postretirement medical and life insurance benefits to certain U.S. retirees and postretirement medical benefits to qualifying U.S. and U.K. employees.

The Firm defrays the cost of its U.S. OPEB obligation through corporate-owned life insurance ("COLI") purchased on the lives of eligible employees and retirees. While the Firm owns the COLI policies, COLI proceeds (death benefits, withdrawals and other distributions) may be used only to reimburse the Firm for its net postretirement benefit claim payments and related administrative expense. The Firm has generally funded its postretirement benefit obligations through contributions to the relevant trust on a pay-as-you-go basis. On December 21, 2017, the Firm contributed \$600 million of cash to the trust as a prefunding of a portion of its postretirement benefit obligations. The U.K. OPEB plan is unfunded.

Pension and OPEB accounting generally requires that the difference between plan assets at fair value and the benefit obligation be measured and recorded on the balance sheet. Plans that are overfunded (excess of plan assets over benefit obligation) are recorded in other assets and plans that are underfunded (excess benefit obligation over plan assets) are recorded within other liabilities. Gains or losses resulting from changes in the benefit obligation and the value of plan assets are recorded in other comprehensive income ("OCI") and recognized as part of the net periodic

Notes to consolidated financial statements

benefit cost over subsequent periods as discussed in the Gains and losses section of this Note. Additionally, service cost, interest cost, and investment returns that would

otherwise be classified separately are aggregated and reported net within compensation expense.

The following table presents the changes in benefit obligations, plan assets, the net funded status, and the pretax pension and OPEB amounts recorded in AOCI on the Consolidated balance sheets for the Firm's defined benefit pension and OPEB plans, and the weighted-average actuarial annualized assumptions for the projected and accumulated postretirement benefit obligations.

As of or for the year ended December 31, (in millions)	Defined benefit pension plans		OPEB plans ^(f)	
	2017	2016	2017	2016
Change in benefit obligation				
Benefit obligation, beginning of year	\$ (15,594)	\$ (15,259)	\$ (708)	\$ (744)
Benefits earned during the year	(330)	(332)	—	—
Interest cost on benefit obligations	(598)	(629)	(28)	(31)
Employee contributions	(7)	(7)	(16)	(19)
Net gain/(loss)	(721)	(743)	(4)	4
Benefits paid	841	851	76	76
Plan settlements	30	21	—	—
Expected Medicare Part D subsidy receipts	NA	NA	(1)	—
Foreign exchange impact and other	(321)	504	(3)	6
Benefit obligation, end of year^(a)	\$ (16,700)	\$ (15,594)	\$ (684)	\$ (708)
Change in plan assets				
Fair value of plan assets, beginning of year	\$ 17,703	\$ 17,636	\$ 1,956	\$ 1,855
Actual return on plan assets	2,356	1,375	233	131
Firm contributions	78	86	602	2
Employee contributions	7	7	—	—
Benefits paid	(841)	(851)	(34)	(32)
Plan settlements	(30)	(21)	—	—
Foreign exchange impact and other	330	(529)	—	—
Fair value of plan assets, end of year^{(a)(b)(c)}	\$ 19,603	\$ 17,703	\$ 2,757	\$ 1,956
Net funded status^(d)	\$ 2,903	\$ 2,109	\$ 2,073	\$ 1,248
Accumulated benefit obligation, end of year	\$ (16,530)	\$ (15,421)	NA	NA
Pretax pension and OPEB amounts recorded in AOCI				
Net gain/(loss)	\$ (2,800)	\$ (3,667)	\$ 271	\$ 138
Prior service credit/(loss)	6	42	—	—
Accumulated other comprehensive income/(loss), pretax, end of year	\$ (2,794)	\$ (3,625)	\$ 271	\$ 138
Weighted-average actuarial assumptions used to determine benefit obligations				
Discount Rate ^(e)	0.60 - 3.70%	0.60 - 4.30%	3.70%	4.20%
Rate of compensation increase ^(e)	2.25 - 3.00	2.25 - 3.00	NA	NA
Health care cost trend rate:				
Assumed for next year	NA	NA	5.00	5.00
Ultimate	NA	NA	5.00	5.00
Year when rate will reach ultimate	NA	NA	2018	2017

(a) At December 31, 2017 and 2016, included non-U.S. benefit obligations of \$(3.8) billion and \$(3.4) billion, and plan assets of \$3.9 billion and \$3.4 billion, respectively, predominantly in the U.K.

(b) At December 31, 2017 and 2016, approximately \$302 million and \$390 million, respectively, of U.S. defined benefit pension plan assets included participation rights under participating annuity contracts.

(c) At December 31, 2017 and 2016, defined benefit pension plan amounts that were not measured at fair value included \$377 million and \$130 million, respectively, of accrued receivables, and \$587 million and \$224 million, respectively, of accrued liabilities, for U.S. plans.

(d) Represents plans with an aggregate overfunded balance of \$5.6 billion and \$4.0 billion at December 31, 2017 and 2016, respectively, and plans with an aggregate underfunded balance of \$612 million and \$639 million at December 31, 2017 and 2016, respectively.

(e) For the U.S. defined benefit pension plans, the discount rate assumption is 3.70% and 4.30%, and the rate of compensation increase is 2.30% and 2.30%, for 2017 and 2016 respectively.

(f) Includes an unfunded postretirement benefit obligation of \$32 million and \$35 million at December 31, 2017 and 2016, respectively, for the U.K. plan.

Gains and losses

For the Firm's defined benefit pension plans, fair value is used to determine the expected return on plan assets. Amortization of net gains and losses is included in annual net periodic benefit cost if, as of the beginning of the year, the net gain or loss exceeds 10% of the greater of the PBO or the fair value of the plan assets. Any excess is amortized over the average future service period of defined benefit pension plan participants, which for the U.S. defined benefit pension plan is currently eight years and for the non-U.S. defined benefit pension plans is the period appropriate for the affected plan. In addition, prior service costs are amortized over the average remaining service period of active employees expected to receive benefits under the plan when the prior service cost is first recognized. The average remaining amortization period for the U.S. defined benefit pension plan for current prior service costs is three years.

For the Firm's OPEB plans, a calculated value that recognizes changes in fair value over a five-year period is used to determine the expected return on plan assets. This value is referred to as the market-related value of assets. Amortization of net gains and losses, adjusted for gains and losses not yet recognized, is included in annual net periodic benefit cost if, as of the beginning of the year, the net gain or loss exceeds 10% of the greater of the accumulated postretirement benefit obligation or the market-related value of assets. Any excess net gain or loss is amortized over the average expected lifetime of retired participants, which is currently eleven years; however, prior service costs resulting from plan changes are amortized over the average years of service remaining to full eligibility age, which is currently two years.

The following table presents the components of net periodic benefit costs reported in the Consolidated statements of income for the Firm's defined benefit pension, defined contribution and OPEB plans, and in other comprehensive income for the defined benefit pension and OPEB plans, and the weighted-average annualized actuarial assumptions for the net periodic benefit cost.

Year ended December 31, (in millions)	Pension plans			OPEB plans		
	2017	2016	2015	2017	2016	2015
Components of net periodic benefit cost						
Benefits earned during the year	\$ 330	\$ 332	\$ 377	\$ —	\$ —	\$ 1
Interest cost on benefit obligations	598	629	610	28	31	31
Expected return on plan assets	(968)	(1,030)	(1,079)	(97)	(105)	(106)
Amortization:						
Net (gain)/loss	250	257	282	—	—	—
Prior service cost/(credit)	(36)	(36)	(36)	—	—	—
Special termination benefits	—	—	1	—	—	—
Settlement loss	2	4	—	—	—	—
Net periodic defined benefit cost	\$ 176	\$ 156	\$ 155	\$ (69)	\$ (74)	\$ (74)
Other defined benefit pension plans ^(a)	24	25	24	NA	NA	NA
Total defined benefit plans	\$ 200	\$ 181	\$ 179	\$ (69)	\$ (74)	\$ (74)
Total defined contribution plans	814	789	769	NA	NA	NA
Total pension and OPEB cost included in compensation expense	\$ 1,014	\$ 970	\$ 948	\$ (69)	\$ (74)	\$ (74)
Changes in plan assets and benefit obligations recognized in other comprehensive income						
Net (gain)/loss arising during the year	\$ (669)	\$ 395	\$ (50)	\$ (133)	\$ (29)	\$ 21
Amortization of net loss	(250)	(257)	(282)	—	—	—
Amortization of prior service (cost)/credit	36	36	36	—	—	—
Settlement loss	(2)	(4)	—	—	—	—
Foreign exchange impact and other	54	(77)	(33)	—	—	—
Total recognized in other comprehensive income	\$ (831)	\$ 93	\$ (329)	\$ (133)	\$ (29)	\$ 21
Total recognized in net periodic benefit cost and other comprehensive income	\$ (655)	\$ 249	\$ (174)	\$ (202)	\$ (103)	\$ (53)
Weighted-average assumptions used to determine net periodic benefit costs						
Discount rate ^(b)	0.60 - 4.30 %	0.90 - 4.50%	1.00 - 4.00%	4.20%	4.40%	4.10%
Expected long-term rate of return on plan assets ^(b)	0.70 - 6.00	0.80 - 6.50	0.90 - 6.50	5.00	5.75	6.00
Rate of compensation increase ^(b)	2.25 - 3.00	2.25 - 4.30	2.75 - 4.20	NA	NA	NA
Health care cost trend rate						
Assumed for next year	NA	NA	NA	5.00	5.50	6.00
Ultimate	NA	NA	NA	5.00	5.00	5.00
Year when rate will reach ultimate	NA	NA	NA	2017	2017	2017

(a) Includes various defined benefit pension plans which are individually immaterial.

(b) The rate assumptions for the U.S. defined benefit pension plans are at the upper end of the range, except for the rate of compensation increase, which is 2.30% for 2017 and 3.50% for 2016 and 2015, respectively.

Notes to consolidated financial statements

The estimated pretax amounts that will be amortized from AOCI into net periodic benefit cost in 2018 are as follows.

(in millions)	Defined benefit pension plans	
Net loss/(gain)	\$	106
Prior service cost/(credit)	\$	(25)
Total	\$	81

Plan assumptions

JPMorgan Chase's expected long-term rate of return for defined benefit pension and OPEB plan assets is a blended weighted average, by asset allocation of the projected long-term returns for the various asset classes, taking into consideration local market conditions and the specific allocation of plan assets. Returns on asset classes are developed using a forward-looking approach and are not strictly based on historical returns. Consideration is also given to current market conditions and the short-term portfolio mix of each plan.

The discount rate used in determining the benefit obligation under the U.S. defined benefit pension and OPEB plans was provided by the Firm's actuaries. This rate was selected by reference to the yields on portfolios of bonds with maturity dates and coupons that closely match each of the plan's projected cash flows. The discount rate for the U.K. defined benefit pension plan represents a rate of appropriate duration from the analysis of yield curves provided by the Firm's actuaries.

At December 31, 2017, the Firm decreased the discount rates used to determine its benefit obligations for the U.S. defined benefit pension and OPEB plans in light of current market interest rates, which will increase expense by approximately \$66 million in 2018. The 2018 expected long-term rate of return on U.S. defined benefit pension plan assets and U.S. OPEB plan assets are 5.50% and 4.00%, respectively. As of December 31, 2017, the interest crediting rate assumption remained at 5.00%.

As of December 31, 2017, the effect of a one-percentage-point increase or decrease in the assumed health care cost trend rate is not material to the accumulated postretirement benefit obligation or total service and interest cost.

The following table represents the effect of a 25-basis point decline in the three listed rates below on estimated 2018 defined benefit pension and OPEB plan expense, as well as the effect on the postretirement benefit obligations.

(in millions)	Defined benefit pension and OPEB plan expense		Benefit obligation	
Expected long-term rate of return	\$	54		NA
Discount rate	\$	59	\$	583
Interest crediting rate for U.S. plans	\$	(41)	\$	(193)

Investment strategy and asset allocation

The assets of the Firm's defined benefit pension plans are held in various trusts and are invested in well-diversified portfolios of equity and fixed income securities, cash and cash equivalents, and alternative investments (e.g., hedge funds, private equity, real estate and real assets). The trust-owned assets of the Firm's U.S. OPEB plan are invested in cash and cash equivalents. COLI policies used to defray the cost of the Firm's U.S. OPEB plan are invested in separate accounts of an insurance company and are allocated to investments intended to replicate equity and fixed income indices.

The investment policies for the assets of the Firm's defined benefit pension plans are to optimize the risk-return relationship as appropriate to the needs and goals of each plan using a global portfolio of various asset classes diversified by market segment, economic sector, and issuer. Assets are managed by a combination of internal and external investment managers. The Firm regularly reviews the asset allocations and asset managers, as well as other factors that impact the portfolios, which are rebalanced when deemed necessary.

Investments held by the plans include financial instruments which are exposed to various risks such as interest rate, market and credit risks. Exposure to a concentration of credit risk is mitigated by the broad diversification of both U.S. and non-U.S. investment instruments. Additionally, the investments in each of the common/collective trust funds and/or registered investment companies are further diversified into various financial instruments. As of December 31, 2017, assets held by the Firm's defined benefit pension and OPEB plans do not include JPMorgan Chase common stock, except through indirect exposures through investments in third-party stock-index funds. The plans hold investments in funds that are sponsored or managed by affiliates of JPMorgan Chase in the amount of \$6.0 billion and \$4.6 billion, as of December 31, 2017 and 2016, respectively.

The following table presents the weighted-average asset allocation of the fair values of total plan assets at December 31 for the years indicated, as well as the respective approved asset allocation ranges by asset class.

December 31,	Defined benefit pension plans			OPEB plan ^(c)		
	Asset Allocation	% of plan assets		Asset Allocation	% of plan assets	
		2017	2016		2017 ^(d)	2016
Asset class						
Debt securities ^(a)	0-80%	42%	35%	30-70%	61%	50%
Equity securities	0-85	42	47	30-70	39	50
Real estate	0-10	3	4	—	—	—
Alternatives ^(b)	0-35	13	14	—	—	—
Total	100%	100%	100%	100%	100%	100%

(a) Debt securities primarily include cash, corporate debt, U.S. federal, state, local and non-U.S. government, and mortgage-backed securities.

(b) Alternatives primarily include limited partnerships.

(c) Represents the U.S. OPEB plan only, as the U.K. OPEB plan is unfunded.

(d) Change in percentage of plan assets due to the contribution to the U.S. OPEB plan.

Fair value measurement of the plans' assets and liabilities

For information on fair value measurements, including descriptions of level 1, 2, and 3 of the fair value hierarchy and the valuation methods employed by the Firm, see Note 2.

Pension and OPEB plan assets and liabilities measured at fair value

December 31, (in millions)	Defined benefit pension plans							
	2017				2016			
	Level 1	Level 2	Level 3	Total fair value	Level 1	Level 2	Level 3	Total fair value
Cash and cash equivalents	\$ 173	\$ 1	\$ —	\$ 174	\$ 196	\$ 2	\$ —	\$ 198
Equity securities	6,407	194	2	6,603	6,158	166	2	6,326
Mutual funds	325	—	—	325	—	—	—	—
Common/collective trust funds ^(a)	778	—	—	778	384	—	—	384
Limited partnerships ^(b)	60	—	—	60	62	—	—	62
Corporate debt securities ^(c)	—	2,644	4	2,648	—	2,506	4	2,510
U.S. federal, state, local and non-U.S. government debt securities	1,096	784	—	1,880	1,139	804	—	1,943
Mortgage-backed securities	92	100	2	194	42	75	—	117
Derivative receivables	—	203	—	203	—	243	—	243
Other ^(d)	2,353	60	302	2,715	1,497	53	390	1,940
Total assets measured at fair value^(e)	\$ 11,284	\$ 3,986	\$ 310	\$ 15,580	\$ 9,478	\$ 3,849	\$ 396	\$ 13,723
Derivative payables	\$ —	\$ (141)	\$ —	\$ (141)	\$ —	\$ (208)	\$ —	\$ (208)
Total liabilities measured at fair value^(e)	\$ —	\$ (141)	\$ —	\$ (141)	\$ —	\$ (208)	\$ —	\$ (208)

(a) At December 31, 2017 and 2016, common/collective trust funds primarily included a mix of short-term investment funds, domestic and international equity investments (including index) and real estate funds.

(b) Unfunded commitments to purchase limited partnership investments for the plans were \$605 million and \$735 million for 2017 and 2016, respectively.

(c) Corporate debt securities include debt securities of U.S. and non-U.S. corporations.

(d) Other consists primarily of money market funds and participating and non-participating annuity contracts. Money market funds are primarily classified within level 1 of the fair value hierarchy given they are valued using market observable prices. Participating and non-participating annuity contracts are classified within level 3 of the fair value hierarchy due to a lack of market mechanisms for transferring each policy and surrender restrictions.

(e) At December 31, 2017 and 2016, excludes \$4.4 billion and \$4.2 billion of certain investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient, which are not required to be classified in the fair value hierarchy, \$377 million and \$130 million of defined benefit pension plan receivables for investments sold and dividends and interest receivables, \$561 million and \$203 million of defined benefit pension plan payables for investments purchased, and \$26 million and \$21 million of other liabilities, respectively.

The assets of the U.S. OPEB plan consisted of \$600 million and \$0 million in cash and cash equivalents classified in level 1 of the valuation hierarchy and \$2.2 billion and \$2.0 billion of COLI policies classified in level 3 of the valuation hierarchy at December 31, 2017 and 2016, respectively.

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Changes in level 3 fair value measurements using significant unobservable inputs

(in millions)	Fair value, Beginning balance	Actual return on plan assets		Purchases, sales and settlements, net	Transfers in and/or out of level 3	Fair value, Ending balance
		Realized gains/(losses)	Unrealized gains/(losses)			
Year ended December 31, 2017						
U.S. defined benefit pension plan						
Annuity contracts and other ^(a)	\$ 396	\$ —	\$ 1	\$ (87)	\$ —	\$ 310
U.S. OPEB plan						
COLI policies	\$ 1,957	\$ —	\$ 200	\$ —	\$ —	\$ 2,157
Year ended December 31, 2016						
U.S. defined benefit pension plan						
Annuity contracts and other ^(a)	\$ 539	\$ —	\$ (157)	\$ —	\$ 14	\$ 396
U.S. OPEB plan						
COLI policies	\$ 1,855	\$ —	\$ 102	\$ —	\$ —	\$ 1,957

(a) Substantially all are participating and non-participating annuity contracts.

Estimated future benefit payments

The following table presents benefit payments expected to be paid, which include the effect of expected future service, for the years indicated. The OPEB medical and life insurance payments are net of expected retiree contributions.

Year ended December 31, (in millions)	Defined benefit pension plans	OPEB before Medicare Part D subsidy	Medicare Part D subsidy
2018	\$ 926	\$ 65	\$ 1
2019	922	63	1
2020	927	60	1
2021	944	57	—
2022	960	55	—
Years 2023-2027	4,925	235	2

Note 9 – Employee share-based incentives

Employee share-based awards

In 2017, 2016 and 2015, JPMorgan Chase granted long-term share-based awards to certain employees under its LTIP, as amended and restated effective May 19, 2015. Under the terms of the LTIP, as of December 31, 2017, 67 million shares of common stock were available for issuance through May 2019. The LTIP is the only active plan under which the Firm is currently granting share-based incentive awards. In the following discussion, the LTIP, plus prior Firm plans and plans assumed as the result of acquisitions, are referred to collectively as the “LTI Plans,” and such plans constitute the Firm’s share-based incentive plans.

RSUs are awarded at no cost to the recipient upon their grant. Generally, RSUs are granted annually and vest at a rate of 50% after two years and 50% after three years and are converted into shares of common stock as of the vesting date. In addition, RSUs typically include full-career eligibility provisions, which allow employees to continue to vest upon voluntary termination based on age or service-related requirements, subject to post-employment and other restrictions. All RSU awards are subject to forfeiture until vested and contain clawback provisions that may result in cancellation under certain specified circumstances. Generally, RSUs entitle the recipient to receive cash payments equivalent to any dividends paid on the underlying common stock during the period the RSUs are outstanding and, as such, are considered participating securities as discussed in Note 22.

In January 2017 and 2016, the Firm’s Board of Directors approved the grant of performance share units (“PSUs”) to members of the Firm’s Operating Committee under the variable compensation program for performance years 2016 and 2015. PSUs are subject to the Firm’s achievement of specified performance criteria over a three-year period. The number of awards that vest can range from zero to 150% of the grant amount. The awards vest and are converted into shares of common stock in the quarter after the end of the performance period, which is generally three years. In addition, dividends are notionally reinvested in the Firm’s common stock and will be delivered only in respect of any earned shares.

Once the PSUs have vested, the shares of common stock that are delivered, after applicable tax withholding, must be held for an additional two-year period, typically for a total combined vesting and holding period of five years from the grant date.

Under the LTI Plans, stock options and stock appreciation rights (“SARs”) have generally been granted with an exercise price equal to the fair value of JPMorgan Chase’s common stock on the grant date. The Firm periodically grants employee stock options to individual employees. There were no material grants of stock options or SARs in 2017, 2016 and 2015. SARs generally expire ten years after the grant date.

The Firm separately recognizes compensation expense for each tranche of each award, net of estimated forfeitures, as if it were a separate award with its own vesting date. Generally, for each tranche granted, compensation expense is recognized on a straight-line basis from the grant date until the vesting date of the respective tranche, provided that the employees will not become full-career eligible during the vesting period. For awards with full-career eligibility provisions and awards granted with no future substantive service requirement, the Firm accrues the estimated value of awards expected to be awarded to employees as of the grant date without giving consideration to the impact of post-employment restrictions. For each tranche granted to employees who will become full-career eligible during the vesting period, compensation expense is recognized on a straight-line basis from the grant date until the earlier of the employee’s full-career eligibility date or the vesting date of the respective tranche.

The Firm’s policy for issuing shares upon settlement of employee share-based incentive awards is to issue either new shares of common stock or treasury shares. During 2017, 2016 and 2015, the Firm settled all of its employee share-based awards by issuing treasury shares.

In January 2008, the Firm awarded to its Chairman and Chief Executive Officer up to 2 million SARs. The terms of this award are distinct from, and more restrictive than, other equity grants regularly awarded by the Firm. On July 15, 2014, the Compensation & Management Development Committee and Board of Directors determined that all requirements for the vesting of the 2 million SAR awards had been met and thus, the awards became exercisable. The SARs, which had an expiration date of January 2018, were exercised by Mr. Dimon in October 2017 at the exercise price of \$39.83 per share (the price of JPMorgan Chase common stock on the date of grant).

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RSUs, PSUs, employee stock options and SARs activity

Generally, compensation expense for RSUs and PSUs is measured based on the number of units granted multiplied by the stock price at the grant date, and for employee stock options and SARs, is measured at the grant date using the Black-Scholes valuation model. Compensation expense for these awards is recognized in net income as described previously. The following table summarizes JPMorgan Chase's RSUs, PSUs, employee stock options and SARs activity for 2017.

Year ended December 31, 2017 (in thousands, except weighted-average data, and where otherwise stated)	RSUs/PSUs		Options/SARs			
	Number of units	Weighted-average grant date fair value	Number of awards	Weighted-average exercise price	Weighted-average remaining contractual life (in years)	Aggregate intrinsic value
Outstanding, January 1	81,707	\$ 57.15	30,267	\$ 40.65		
Granted	26,017	84.30	109	90.94		
Exercised or vested	(32,961)	57.80	(12,816)	40.50		
Forfeited	(2,030)	63.34	(54)	55.82		
Canceled	NA	NA	(13)	405.47		
Outstanding, December 31	72,733	\$ 66.36	17,493	\$ 40.76	3.4	\$ 1,169,470
Exercisable, December 31	NA	NA	15,828	40.00	3.3	1,070,212

The total fair value of RSUs that vested during the years ended December 31, 2017, 2016 and 2015, was \$2.9 billion, \$2.2 billion and \$2.8 billion, respectively. The total intrinsic value of options exercised during the years ended December 31, 2017, 2016 and 2015, was \$651 million, \$338 million and \$335 million, respectively.

Compensation expense

The Firm recognized the following noncash compensation expense related to its various employee share-based incentive plans in its Consolidated statements of income.

Year ended December 31, (in millions)	2017	2016	2015
Cost of prior grants of RSUs, PSUs and SARs that are amortized over their applicable vesting periods	\$ 1,125	\$ 1,046	\$ 1,109
Accrual of estimated costs of share-based awards to be granted in future periods including those to full-career eligible employees	945	894	878
Total noncash compensation expense related to employee share-based incentive plans	\$ 2,070	\$ 1,940	\$ 1,987

At December 31, 2017, approximately \$704 million (pretax) of compensation expense related to unvested awards had not yet been charged to net income. That cost is expected to be amortized into compensation expense over a weighted-average period of 1 year. The Firm does not capitalize any compensation expense related to share-based compensation awards to employees.

Cash flows and tax benefits

Effective January 1, 2016, the Firm adopted new accounting guidance related to employee share-based payments. As a result of the adoption of this new guidance, all excess tax benefits (including tax benefits from dividends or dividend equivalents) on share-based payment awards are recognized within income tax expense in the Consolidated statements of income. In prior years these tax benefits were recorded as increases to additional paid-in capital. Income tax benefits related to share-based incentive arrangements recognized in the Firm's Consolidated statements of income for the years ended December 31, 2017, 2016 and 2015, were \$1.0 billion, \$916 million and \$746 million, respectively.

The following table sets forth the cash received from the exercise of stock options under all share-based incentive arrangements, and the actual income tax benefit related to tax deductions from the exercise of the stock options.

Year ended December 31, (in millions)	2017	2016	2015
Cash received for options exercised	\$ 18	\$ 26	\$ 20
Tax benefit	190	70	64

Note 10 – Securities

Securities are classified as trading, AFS or HTM. Securities classified as trading assets are discussed in Note 2. Predominantly all of the Firm's AFS and HTM securities are held by Treasury and CIO in connection with its asset-liability management activities. At December 31, 2017, the investment securities portfolio consisted of debt securities with an average credit rating of AA+ (based upon external ratings where available, and where not available, based primarily upon internal ratings which correspond to ratings as defined by S&P and Moody's). AFS securities are carried at fair value on the Consolidated balance sheets. Unrealized

gains and losses, after any applicable hedge accounting adjustments, are reported as net increases or decreases to AOCI. The specific identification method is used to determine realized gains and losses on AFS securities, which are included in securities gains/(losses) on the Consolidated statements of income. HTM debt securities, which management has the intent and ability to hold until maturity, are carried at amortized cost on the Consolidated balance sheets. For both AFS and HTM debt securities, purchase discounts or premiums are generally amortized into interest income over the contractual life of the security.

The amortized cost and estimated fair value of the investment securities portfolio were as follows for the dates indicated.

December 31, (in millions)	2017				2016			
	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
Available-for-sale debt securities								
Mortgage-backed securities:								
U.S. government agencies ^(a)	\$ 69,879	\$ 736	\$ 335	\$ 70,280	\$ 63,367	\$ 1,112	\$ 474	\$ 64,005
Residential:								
U.S. ^(b)	8,193	185	14	8,364	8,171	100	28	8,243
Non-U.S.	2,882	122	1	3,003	6,049	158	7	6,200
Commercial	4,932	98	5	5,025	9,002	122	20	9,104
Total mortgage-backed securities	85,886	1,141	355	86,672	86,589	1,492	529	87,552
U.S. Treasury and government agencies ^(a)	22,510	266	31	22,745	44,822	75	796	44,101
Obligations of U.S. states and municipalities	30,490	1,881	33	32,338	30,284	1,492	184	31,592
Certificates of deposit	59	—	—	59	106	—	—	106
Non-U.S. government debt securities	26,900	426	32	27,294	34,497	836	45	35,288
Corporate debt securities	2,657	101	1	2,757	4,916	64	22	4,958
Asset-backed securities:								
Collateralized loan obligations	20,928	69	1	20,996	27,352	75	26	27,401
Other	8,764	77	24	8,817	6,950	62	45	6,967
Total available-for-sale debt securities	198,194	3,961	477	201,678	235,516	4,096	1,647	237,965
Available-for-sale equity securities	547	—	—	547	914	12	—	926
Total available-for-sale securities	198,741	3,961	477	202,225	236,430	4,108	1,647	238,891
Held-to-maturity debt securities								
Mortgage-backed securities								
U.S. government agencies ^(c)	27,577	558	40	28,095	29,910	638	37	30,511
Commercial	5,783	1	74	5,710	5,783	—	129	5,654
Total mortgage-backed securities	33,360	559	114	33,805	35,693	638	166	36,165
Obligations of U.S. states and municipalities	14,373	554	80	14,847	14,475	374	125	14,724
Total held-to-maturity debt securities	47,733	1,113	194	48,652	50,168	1,012	291	50,889
Total securities	\$ 246,474	\$ 5,074	\$ 671	\$ 250,877	\$ 286,598	\$ 5,120	\$ 1,938	\$ 289,780

(a) Includes total U.S. government-sponsored enterprise obligations with a fair value of \$45.8 billion for the years ended December 31, 2017 and 2016, which were predominantly mortgage-related.

(b) Prior period amounts have been revised to conform with the current period presentation.

(c) Included total U.S. government-sponsored enterprise obligations with amortized cost of \$22.0 billion and \$25.6 billion at December 31, 2017 and 2016, respectively, which were mortgage-related.

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Securities impairment

The following tables present the fair value and gross unrealized losses for the investment securities portfolio by aging category at December 31, 2017 and 2016.

December 31, 2017 (in millions)	Securities with gross unrealized losses					
	Less than 12 months		12 months or more		Total fair value	Total gross unrealized losses
	Fair value	Gross unrealized losses	Fair value	Gross unrealized losses		
Available-for-sale debt securities						
Mortgage-backed securities:						
U.S. government agencies	\$ 36,037	\$ 139	\$ 7,711	\$ 196	\$ 43,748	\$ 335
Residential:						
U.S.	1,112	5	596	9	1,708	14
Non-U.S.	—	—	266	1	266	1
Commercial	528	4	335	1	863	5
Total mortgage-backed securities	37,677	148	8,908	207	46,585	355
U.S. Treasury and government agencies	1,834	11	373	20	2,207	31
Obligations of U.S. states and municipalities	949	7	1,652	26	2,601	33
Certificates of deposit	—	—	—	—	—	—
Non-U.S. government debt securities	6,500	15	811	17	7,311	32
Corporate debt securities	—	—	52	1	52	1
Asset-backed securities:						
Collateralized loan obligations	—	—	276	1	276	1
Other	3,521	20	720	4	4,241	24
Total available-for-sale debt securities	50,481	201	12,792	276	63,273	477
Available-for-sale equity securities	—	—	—	—	—	—
Held-to-maturity securities						
Mortgage-backed securities						
U.S. government securities	4,070	38	205	2	4,275	40
Commercial	3,706	41	1,882	33	5,588	74
Total mortgage-backed securities	7,776	79	2,087	35	9,863	114
Obligations of U.S. states and municipalities	584	9	2,131	71	2,715	80
Total held-to-maturity securities	8,360	88	4,218	106	12,578	194
Total securities with gross unrealized losses	\$ 58,841	\$ 289	\$ 17,010	\$ 382	\$ 75,851	\$ 671

December 31, 2016 (in millions)	Securities with gross unrealized losses					
	Less than 12 months		12 months or more		Total fair value	Total gross unrealized losses
	Fair value	Gross unrealized losses	Fair value	Gross unrealized losses		
Available-for-sale debt securities						
Mortgage-backed securities:						
U.S. government agencies	\$ 29,856	\$ 463	\$ 506	\$ 11	\$ 30,362	\$ 474
Residential:						
U.S. ^(a)	1,373	6	1,073	22	2,446	28
Non-U.S.	—	—	886	7	886	7
Commercial	2,328	17	1,078	3	3,406	20
Total mortgage-backed securities	33,557	486	3,543	43	37,100	529
U.S. Treasury and government agencies	23,543	796	—	—	23,543	796
Obligations of U.S. states and municipalities	7,215	181	55	3	7,270	184
Certificates of deposit	—	—	—	—	—	—
Non-U.S. government debt securities	4,436	36	421	9	4,857	45
Corporate debt securities	797	2	829	20	1,626	22
Asset-backed securities:						
Collateralized loan obligations	766	2	5,263	24	6,029	26
Other	739	6	1,992	39	2,731	45
Total available-for-sale debt securities	71,053	1,509	12,103	138	83,156	1,647
Available-for-sale equity securities	—	—	—	—	—	—
Held-to-maturity debt securities						
Mortgage-backed securities						
U.S. government agencies	3,129	37	—	—	3,129	37
Commercial	5,163	114	441	15	5,604	129
Total mortgage-backed securities	8,292	151	441	15	8,733	166
Obligations of U.S. states and municipalities	4,702	125	—	—	4,702	125
Total held-to-maturity securities	12,994	276	441	15	13,435	291
Total securities with gross unrealized losses	\$ 84,047	\$ 1,785	\$ 12,544	\$ 153	\$ 96,591	\$ 1,938

(a) Prior period amounts have been revised to conform with the current period presentation.

Gross unrealized losses

The Firm has recognized unrealized losses on securities that it intends to sell as OTTI. The Firm does not intend to sell any of the remaining securities with an unrealized loss in AOCI as of December 31, 2017, and it is not likely that the Firm will be required to sell these securities before recovery of their amortized cost basis. Except for the securities for which credit losses have been recognized in income, the Firm believes that the securities with an unrealized loss in AOCI are not other-than-temporarily impaired as of December 31, 2017.

Other-than-temporary impairment

AFS debt and equity securities and HTM debt securities in unrealized loss positions are analyzed as part of the Firm's ongoing assessment of OTTI. For most types of debt securities, the Firm considers a decline in fair value to be other-than-temporary when the Firm does not expect to recover the entire amortized cost basis of the security. For beneficial interests in securitizations that are rated below "AA" at their acquisition, or that can be contractually prepaid or otherwise settled in such a way that the Firm would not recover substantially all of its recorded investment, the Firm considers an impairment to be other-

than-temporary when there is an adverse change in expected cash flows. For AFS equity securities, the Firm considers a decline in fair value to be other-than-temporary if it is probable that the Firm will not recover its cost basis.

Potential OTTI is considered using a variety of factors, including the length of time and extent to which the market value has been less than cost; adverse conditions specifically related to the industry, geographic area or financial condition of the issuer or underlying collateral of a security; payment structure of the security; changes to the rating of the security by a rating agency; the volatility of the fair value changes; and the Firm's intent and ability to hold the security until recovery.

For AFS debt securities, the Firm recognizes OTTI losses in earnings if the Firm has the intent to sell the debt security, or if it is more likely than not that the Firm will be required to sell the debt security before recovery of its amortized cost basis. In these circumstances the impairment loss is equal to the full difference between the amortized cost basis and the fair value of the securities. For debt securities in an unrealized loss position that the Firm has the intent and ability to hold, the expected cash flows to be received

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from the securities are evaluated to determine if a credit loss exists. In the event of a credit loss, only the amount of impairment associated with the credit loss is recognized in income. Amounts relating to factors other than credit losses are recorded in OCI.

The Firm's cash flow evaluations take into account the factors noted above and expectations of relevant market and economic data as of the end of the reporting period. For securities issued in a securitization, the Firm estimates cash flows considering underlying loan-level data and structural features of the securitization, such as subordination, excess spread, overcollateralization or other forms of credit enhancement, and compares the losses projected for the underlying collateral ("pool losses") against the level of credit enhancement in the securitization structure to determine whether these features are sufficient to absorb the pool losses, or whether a credit loss exists. The Firm also performs other analyses to support its cash flow projections, such as first-loss analyses or stress scenarios.

For equity securities, OTTI losses are recognized in earnings if the Firm intends to sell the security. In other cases the Firm considers the relevant factors noted above, as well as the Firm's intent and ability to retain its investment for a period of time sufficient to allow for any anticipated recovery in market value, and whether evidence exists to support a realizable value equal to or greater than the cost basis. Any impairment loss on an equity security is equal to the full difference between the cost basis and the fair value of the security.

Securities gains and losses

The following table presents realized gains and losses and OTTI from AFS securities that were recognized in income.

Year ended December 31, (in millions)	2017	2016	2015
Realized gains	\$ 1,013	\$ 401	\$ 351
Realized losses	(1,072)	(232)	(127)
OTTI losses ^(a)	(7)	(28)	(22)
Net securities gains/(losses)	(66)	141	202
OTTI losses			
Credit losses recognized in income	—	(1)	(1)
Securities the Firm intends to sell ^(a)	(7)	(27)	(21)
Total OTTI losses recognized in income	\$ (7)	\$ (28)	\$ (22)

(a) Excludes realized losses on securities sold of \$6 million, \$24 million and \$5 million for the years ended December 31, 2017, 2016 and 2015, respectively that had been previously reported as an OTTI loss due to the intention to sell the securities.

Changes in the credit loss component of credit-impaired debt securities

The cumulative credit loss component, including any changes therein, of OTTI losses that have been recognized in income related to AFS debt securities was not material as of and during the years ended December 31, 2017, 2016 and 2015.

Contractual maturities and yields

The following table presents the amortized cost and estimated fair value at December 31, 2017, of JPMorgan Chase's investment securities portfolio by contractual maturity.

By remaining maturity December 31, 2017 (in millions)	Due in one year or less	Due after one year through five years	Due after five years through 10 years	Due after 10 years ^(c)	Total
Available-for-sale debt securities					
Mortgage-backed securities ^(a)					
Amortized cost	\$ 3	\$ 698	\$ 6,134	\$ 79,051	\$ 85,886
Fair value	3	708	6,294	79,667	86,672
Average yield ^(b)	4.76%	2.10%	3.10%	3.35%	3.32%
U.S. Treasury and government agencies					
Amortized cost	\$ 60	\$ —	\$ 17,437	\$ 5,013	\$ 22,510
Fair value	60	—	17,542	5,143	22,745
Average yield ^(b)	1.72%	—%	1.96%	1.76%	1.91%
Obligations of U.S. states and municipalities					
Amortized cost	\$ 73	\$ 750	\$ 1,265	\$ 28,402	\$ 30,490
Fair value	72	765	1,324	30,177	32,338
Average yield ^(b)	1.78%	3.28%	5.40%	5.50%	5.43%
Certificates of deposit					
Amortized cost	\$ 59	\$ —	\$ —	\$ —	\$ 59
Fair value	59	—	—	—	59
Average yield ^(b)	0.50%	—%	—%	—%	0.50%
Non-U.S. government debt securities					
Amortized cost	\$ 5,020	\$ 13,665	\$ 8,215	\$ —	\$ 26,900
Fair value	5,022	13,845	8,427	—	27,294
Average yield ^(b)	3.09%	1.55%	1.19%	—%	1.73%
Corporate debt securities					
Amortized cost	\$ 150	\$ 1,159	\$ 1,203	\$ 145	\$ 2,657
Fair value	151	1,197	1,255	154	2,757
Average yield ^(b)	3.07%	3.60%	3.58%	3.22%	3.54%
Asset-backed securities					
Amortized cost	\$ —	\$ 3,372	\$ 13,046	\$ 13,274	\$ 29,692
Fair value	—	3,353	13,080	13,380	29,813
Average yield ^(b)	—%	2.14%	2.58%	2.36%	2.43%
Total available-for-sale debt securities					
Amortized cost	\$ 5,365	\$ 19,644	\$ 47,300	\$ 125,885	\$ 198,194
Fair value	5,367	19,868	47,922	128,521	201,678
Average yield ^(b)	3.03%	1.86%	2.28%	3.66%	3.14%
Available-for-sale equity securities					
Amortized cost	\$ —	\$ —	\$ —	\$ 547	\$ 547
Fair value	—	—	—	547	547
Average yield ^(b)	—%	—%	—%	0.71%	0.71%
Total available-for-sale securities					
Amortized cost	\$ 5,365	\$ 19,644	\$ 47,300	\$ 126,432	\$ 198,741
Fair value	5,367	19,868	47,922	129,068	202,225
Average yield ^(b)	3.03%	1.86%	2.28%	3.65%	3.13%
Held-to-maturity debt securities					
Mortgage-backed securities ^(a)					
Amortized Cost	\$ —	\$ —	\$ 49	\$ 33,311	\$ 33,360
Fair value	—	—	49	33,756	33,805
Average yield ^(b)	—%	—%	2.88%	3.27%	3.27%
Obligations of U.S. states and municipalities					
Amortized cost	\$ —	\$ 66	\$ 2,019	\$ 12,288	\$ 14,373
Fair value	—	65	2,067	12,715	14,847
Average yield ^(b)	—%	4.74%	4.30%	4.72%	4.66%
Total held-to-maturity securities					
Amortized cost	\$ —	\$ 66	\$ 2,068	\$ 45,599	\$ 47,733
Fair value	—	65	2,116	46,471	48,652
Average yield ^(b)	—%	4.75%	4.26%	3.66%	3.69%

(a) As of December 31, 2017, mortgage-backed securities issued by Fannie Mae exceeded 10% of JPMorgan Chase's total stockholders' equity; the amortized cost and fair value of such securities was \$55.1 billion and \$56.0 billion, respectively.

(b) Average yield is computed using the effective yield of each security owned at the end of the period, weighted based on the amortized cost of each security. The effective yield considers the contractual coupon, amortization of premiums and accretion of discounts, and the effect of related hedging derivatives. Taxable-equivalent amounts are used

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where applicable and reflect the estimated impact of the enactment of the Tax Cuts and Jobs Act ("TCJA"). The effective yield excludes unscheduled principal prepayments; and accordingly, actual maturities of securities may differ from their contractual or expected maturities as certain securities may be prepaid.

- (c) Includes securities with no stated maturity. Substantially all of the Firm's U.S. residential MBS and collateralized mortgage obligations are due in 10 years or more, based on contractual maturity. The estimated weighted-average life, which reflects anticipated future prepayments, is approximately six years for agency residential MBS, three years for agency residential collateralized mortgage obligations and three years for nonagency residential collateralized mortgage obligations.

Note 11 – Securities financing activities

JPMorgan Chase enters into resale agreements, repurchase agreements, securities borrowed transactions and securities loaned transactions (collectively, "securities financing agreements") primarily to finance the Firm's inventory positions, acquire securities to cover short positions, accommodate customers' financing needs, and settle other securities obligations.

Securities financing agreements are treated as collateralized financings on the Firm's Consolidated balance sheets. Resale and repurchase agreements are generally carried at the amounts at which the securities will be subsequently sold or repurchased. Securities borrowed and securities loaned transactions are generally carried at the amount of cash collateral advanced or received. Where appropriate under applicable accounting guidance, resale and repurchase agreements with the same counterparty are reported on a net basis. For further discussion of the offsetting of assets and liabilities, see Note 1. Fees received and paid in connection with securities financing agreements are recorded in interest income and interest expense on the Consolidated statements of income.

The Firm has elected the fair value option for certain securities financing agreements. For further information regarding the fair value option, see Note 3. The securities financing agreements for which the fair value option has been elected are reported within securities purchased under resale agreements, securities loaned or sold under repurchase agreements, and securities borrowed on the Consolidated balance sheets. Generally, for agreements carried at fair value, current-period interest accruals are recorded within interest income and interest expense, with changes in fair value reported in principal transactions revenue. However, for financial instruments containing embedded derivatives that would be separately accounted for in accordance with accounting guidance for hybrid instruments, all changes in fair value, including any interest elements, are reported in principal transactions revenue.

Securities financing transactions expose the Firm primarily to credit and liquidity risk. To manage these risks, the Firm monitors the value of the underlying securities (predominantly high-quality securities collateral, including government-issued debt and agency MBS) that it has received from or provided to its counterparties compared to the value of cash proceeds and exchanged collateral, and either requests additional collateral or returns securities or collateral when appropriate. Margin levels are initially established based upon the counterparty, the type of underlying securities, and the permissible collateral, and are monitored on an ongoing basis.

In resale agreements and securities borrowed transactions, the Firm is exposed to credit risk to the extent that the value of the securities received is less than initial cash principal advanced and any collateral amounts exchanged. In repurchase agreements and securities loaned transactions, credit risk exposure arises to the extent that the value of underlying securities exceeds the value of the initial cash principal advanced, and any collateral amounts exchanged.

Additionally, the Firm typically enters into master netting agreements and other similar arrangements with its counterparties, which provide for the right to liquidate the underlying securities and any collateral amounts exchanged in the event of a counterparty default. It is also the Firm's policy to take possession, where possible, of the securities underlying resale agreements and securities borrowed transactions. For further information regarding assets pledged and collateral received in securities financing agreements, see Note 28.

As a result of the Firm's credit risk mitigation practices with respect to resale and securities borrowed agreements as described above, the Firm did not hold any reserves for credit impairment with respect to these agreements as of December 31, 2017 and 2016.

The table below summarizes the gross and net amounts of the Firm's securities financing agreements, as of December 31, 2017, and 2016. When the Firm has obtained an appropriate legal opinion with respect to the master netting agreement with a counterparty and where other relevant netting criteria under U.S. GAAP are met, the Firm nets, on the Consolidated balance sheets, the balances outstanding under its securities financing agreements with the same counterparty. In addition, the Firm exchanges securities and/or cash collateral with its counterparties; this collateral also reduces the economic exposure with the counterparty. Such collateral, along with securities financing balances that do not meet all these relevant netting criteria under U.S. GAAP, is presented as "Amounts not nettable on the Consolidated balance sheets," and reduces the "Net amounts" presented below, if the Firm has an appropriate legal opinion with respect to the master netting agreement with the counterparty. Where a legal opinion has not been either sought or obtained, the securities financing balances are presented gross in the "Net amounts" below, and related collateral does not reduce the amounts presented.

December 31, (in millions)	2017				
	Gross amounts	Amounts netted on the Consolidated balance sheets	Amounts presented on the Consolidated balance sheets ^(b)	Amounts not nettable on the Consolidated balance sheets ^(c)	Net amounts ^(d)
Assets					
Securities purchased under resale agreements	\$ 448,608	\$ (250,505)	\$ 198,103	\$ (188,502)	\$ 9,601
Securities borrowed	113,926	(8,814)	105,112	(76,805)	28,307
Liabilities					
Securities sold under repurchase agreements	\$ 398,218	\$ (250,505)	\$ 147,713	\$ (129,178)	\$ 18,535
Securities loaned and other ^(a)	27,228	(8,814)	18,414	(18,151)	263

December 31, (in millions)	2016				
	Gross amounts	Amounts netted on the Consolidated balance sheets	Amounts presented on the Consolidated balance sheets ^(b)	Amounts not nettable on the Consolidated balance sheets ^(c)	Net amounts ^(d)
Assets					
Securities purchased under resale agreements	\$ 480,735	\$ (250,832)	\$ 229,903	\$ (222,413)	\$ 7,490
Securities borrowed	96,409	—	96,409	(66,822)	29,587
Liabilities					
Securities sold under repurchase agreements	\$ 402,465	\$ (250,832)	\$ 151,633	\$ (133,300)	\$ 18,333
Securities loaned and other ^(a)	22,451	—	22,451	(22,177)	274

- (a) Includes securities-for-securities lending transactions of \$9.2 billion and \$9.1 billion at December 31, 2017 and 2016, respectively, accounted for at fair value, where the Firm is acting as lender. These amounts are presented within accounts payable and other liabilities in the Consolidated balance sheets.
- (b) Includes securities financing agreements accounted for at fair value. At December 31, 2017 and 2016, included securities purchased under resale agreements of \$14.7 billion and \$21.5 billion, respectively, and securities sold under agreements to repurchase of \$697 million and \$687 million, respectively. There were \$3.0 billion of securities borrowed at December 31, 2017 and there were no securities borrowed at December 31, 2016. There were no securities loaned accounted for at fair value in either period.
- (c) In some cases, collateral exchanged with a counterparty exceeds the net asset or liability balance with that counterparty. In such cases, the amounts reported in this column are limited to the related asset or liability with that counterparty.
- (d) Includes securities financing agreements that provide collateral rights, but where an appropriate legal opinion with respect to the master netting agreement has not been either sought or obtained. At December 31, 2017 and 2016, included \$7.5 billion and \$4.8 billion, respectively, of securities purchased under resale agreements; \$25.5 billion and \$27.1 billion, respectively, of securities borrowed; \$16.5 billion and \$15.9 billion, respectively, of securities sold under agreements to repurchase; and \$29 million and \$90 million, respectively, of securities loaned and other.

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The tables below present as of December 31, 2017 and 2016 the types of financial assets pledged in securities financing agreements and the remaining contractual maturity of the securities financing agreements.

December 31, (in millions)	Gross liability balance			
	2017		2016	
	Securities sold under repurchase agreements	Securities loaned and other ^(b)	Securities sold under repurchase agreements	Securities loaned and other ^(b)
Mortgage-backed securities:				
U.S. government agencies ^(a)	\$ 13,100	\$ —	\$ 14,034	\$ —
Residential - nonagency	2,972	—	6,224	—
Commercial - nonagency	1,594	—	4,173	—
U.S. Treasury and government agencies ^(a)	177,581	14	185,145	—
Obligations of U.S. states and municipalities	1,557	—	2,491	—
Non-U.S. government debt	170,196	2,485	149,008	1,279
Corporate debt securities	14,231	287	18,140	108
Asset-backed securities	3,508	—	7,721	—
Equity securities	13,479	24,442	15,529	21,064
Total	\$ 398,218	\$ 27,228	\$ 402,465	\$ 22,451

2017 (in millions)	Remaining contractual maturity of the agreements				
	Overnight and continuous	Up to 30 days	30 – 90 days	Greater than 90 days	Total
Total securities sold under repurchase agreements	\$ 166,425	\$ 156,434	\$ 41,611	\$ 33,748	\$ 398,218
Total securities loaned and other ^(b)	22,876	375	2,328	1,649	27,228

2016 (in millions)	Remaining contractual maturity of the agreements				
	Overnight and continuous	Up to 30 days	30 – 90 days	Greater than 90 days	Total
Total securities sold under repurchase agreements	\$ 140,318	\$ 157,860	\$ 55,621	\$ 48,666	\$ 402,465
Total securities loaned and other ^(b)	13,586	1,371	2,877	4,617	22,451

(a) Prior period amounts were revised to conform with the current period presentation.

(b) Includes securities-for-securities lending transactions of \$9.2 billion and \$9.1 billion at December 31, 2017 and 2016, respectively, accounted for at fair value, where the Firm is acting as lender. These amounts are presented within accounts payable and other liabilities on the Consolidated balance sheets.

Transfers not qualifying for sale accounting

At December 31, 2017 and 2016, the Firm held \$1.5 billion and \$5.9 billion, respectively, of financial assets for which the rights have been transferred to third parties; however, the transfers did not qualify as a sale in accordance with U.S. GAAP. These transfers have been recognized as collateralized financing transactions. The transferred assets are recorded in trading assets and loans, and the corresponding liabilities are recorded predominantly in short-term borrowings on the Consolidated balance sheets.

Note 12 – Loans

Loan accounting framework

The accounting for a loan depends on management's strategy for the loan, and on whether the loan was credit-impaired at the date of acquisition. The Firm accounts for loans based on the following categories:

- Originated or purchased loans held-for-investment (i.e., "retained"), other than PCI loans
- Loans held-for-sale
- Loans at fair value
- PCI loans held-for-investment

The following provides a detailed accounting discussion of these loan categories:

Loans held-for-investment (other than PCI loans)

Originated or purchased loans held-for-investment, other than PCI loans, are recorded at the principal amount outstanding, net of the following: charge-offs; interest applied to principal (for loans accounted for on the cost recovery method); unamortized discounts and premiums; and net deferred loan fees or costs. Credit card loans also include billed finance charges and fees net of an allowance for uncollectible amounts.

Interest income

Interest income on performing loans held-for-investment, other than PCI loans, is accrued and recognized as interest income at the contractual rate of interest. Purchase price discounts or premiums, as well as net deferred loan fees or costs, are amortized into interest income over the contractual life of the loan to produce a level rate of return.

Nonaccrual loans

Nonaccrual loans are those on which the accrual of interest has been suspended. Loans (other than credit card loans and certain consumer loans insured by U.S. government agencies) are placed on nonaccrual status and considered nonperforming when full payment of principal and interest is not expected, regardless of delinquency status, or when principal and interest has been in default for a period of 90 days or more, unless the loan is both well-secured and in the process of collection. A loan is determined to be past due when the minimum payment is not received from the borrower by the contractually specified due date or for certain loans (e.g., residential real estate loans), when a monthly payment is due and unpaid for 30 days or more. Finally, collateral-dependent loans are typically maintained on nonaccrual status.

On the date a loan is placed on nonaccrual status, all interest accrued but not collected is reversed against interest income. In addition, the amortization of deferred amounts is suspended. Interest income on nonaccrual loans may be recognized as cash interest payments are received (i.e., on a cash basis) if the recorded loan balance is deemed fully collectible; however, if there is doubt regarding the ultimate collectibility of the recorded loan balance, all interest cash receipts are applied to reduce the

carrying value of the loan (the cost recovery method). For consumer loans, application of this policy typically results in the Firm recognizing interest income on nonaccrual consumer loans on a cash basis.

A loan may be returned to accrual status when repayment is reasonably assured and there has been demonstrated performance under the terms of the loan or, if applicable, the terms of the restructured loan.

As permitted by regulatory guidance, credit card loans are generally exempt from being placed on nonaccrual status; accordingly, interest and fees related to credit card loans continue to accrue until the loan is charged off or paid in full. However, the Firm separately establishes an allowance, which is offset against loans and charged to interest income, for the estimated uncollectible portion of accrued and billed interest and fee income on credit card loans. The allowance is established with a charge to interest income and is reported as an offset to loans.

Allowance for loan losses

The allowance for loan losses represents the estimated probable credit losses inherent in the held-for-investment loan portfolio at the balance sheet date and is recognized on the balance sheet as a contra asset, which brings the recorded investment to the net carrying value. Changes in the allowance for loan losses are recorded in the provision for credit losses on the Firm's Consolidated statements of income. See Note 13 for further information on the Firm's accounting policies for the allowance for loan losses.

Charge-offs

Consumer loans, other than risk-rated business banking and auto loans, and PCI loans, are generally charged off or charged down to the net realizable value of the underlying collateral (i.e., fair value less costs to sell), with an offset to the allowance for loan losses, upon reaching specified stages of delinquency in accordance with standards established by the FFIEC. Residential real estate loans and non-modified credit card loans are generally charged off no later than 180 days past due. Scored auto, student and modified credit card loans are charged off no later than 120 days past due.

Certain consumer loans will be charged off or charged down to their net realizable value earlier than the FFIEC charge-off standards in certain circumstances as follows:

- Loans modified in a TDR that are determined to be collateral-dependent.
- Loans to borrowers who have experienced an event that suggests a loss is either known or highly certain are subject to accelerated charge-off standards (e.g., residential real estate and auto loans are charged off within 60 days of receiving notification of a bankruptcy filing).
- Auto loans upon repossession of the automobile.

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Other than in certain limited circumstances, the Firm typically does not recognize charge-offs on government-guaranteed loans.

Wholesale loans, risk-rated business banking loans and risk-rated auto loans are charged off when it is highly certain that a loss has been realized, including situations where a loan is determined to be both impaired and collateral-dependent. The determination of whether to recognize a charge-off includes many factors, including the prioritization of the Firm's claim in bankruptcy, expectations of the workout/restructuring of the loan and valuation of the borrower's equity or the loan collateral.

When a loan is charged down to the estimated net realizable value, the determination of the fair value of the collateral depends on the type of collateral (e.g., securities, real estate). In cases where the collateral is in the form of liquid securities, the fair value is based on quoted market prices or broker quotes. For illiquid securities or other financial assets, the fair value of the collateral is estimated using a discounted cash flow model.

For residential real estate loans, collateral values are based upon external valuation sources. When it becomes likely that a borrower is either unable or unwilling to pay, the Firm obtains a broker's price opinion of the home based on an exterior-only valuation ("exterior opinions"), which is then updated at least every six months thereafter. As soon as practicable after the Firm receives the property in satisfaction of a debt (e.g., by taking legal title or physical possession), the Firm generally obtains an appraisal based on an inspection that includes the interior of the home ("interior appraisals"). Exterior opinions and interior appraisals are discounted based upon the Firm's experience with actual liquidation values as compared with the estimated values provided by exterior opinions and interior appraisals, considering state-specific factors.

For commercial real estate loans, collateral values are generally based on appraisals from internal and external valuation sources. Collateral values are typically updated every six to twelve months, either by obtaining a new appraisal or by performing an internal analysis, in accordance with the Firm's policies. The Firm also considers both borrower- and market-specific factors, which may result in obtaining appraisal updates or broker price opinions at more frequent intervals.

Loans held-for-sale

Held-for-sale loans are measured at the lower of cost or fair value, with valuation changes recorded in noninterest revenue. For consumer loans, the valuation is performed on a portfolio basis. For wholesale loans, the valuation is performed on an individual loan basis.

Interest income on loans held-for-sale is accrued and recognized based on the contractual rate of interest.

Loan origination fees or costs and purchase price discounts or premiums are deferred in a contra loan account until the related loan is sold. The deferred fees or costs and discounts or premiums are an adjustment to the basis of the loan and therefore are included in the periodic determination of the lower of cost or fair value adjustments and/or the gain or loss recognized at the time of sale.

Held-for-sale loans are subject to the nonaccrual policies described above.

Because held-for-sale loans are recognized at the lower of cost or fair value, the Firm's allowance for loan losses and charge-off policies do not apply to these loans.

Loans at fair value

Loans used in a market-making strategy or risk managed on a fair value basis are measured at fair value, with changes in fair value recorded in noninterest revenue.

Interest income on these loans is accrued and recognized based on the contractual rate of interest. Changes in fair value are recognized in noninterest revenue. Loan origination fees are recognized upfront in noninterest revenue. Loan origination costs are recognized in the associated expense category as incurred.

Because these loans are recognized at fair value, the Firm's allowance for loan losses and charge-off policies do not apply to these loans.

See Note 3 for further information on the Firm's elections of fair value accounting under the fair value option. See Note 2 and Note 3 for further information on loans carried at fair value and classified as trading assets.

PCI loans

PCI loans held-for-investment are initially measured at fair value. PCI loans have evidence of credit deterioration since the loan's origination date and therefore it is probable, at acquisition, that all contractually required payments will not be collected. Because PCI loans are initially measured at fair value, which includes an estimate of future credit losses, no allowance for loan losses related to PCI loans is recorded at the acquisition date. See page 223 of this Note for information on accounting for PCI loans subsequent to their acquisition.

Loan classification changes

Loans in the held-for-investment portfolio that management decides to sell are transferred to the held-for-sale portfolio at the lower of cost or fair value on the date of transfer. Credit-related losses are charged against the allowance for loan losses; non-credit related losses such as those due to changes in interest rates or foreign currency exchange rates are recognized in noninterest revenue.

In the event that management decides to retain a loan in the held-for-sale portfolio, the loan is transferred to the held-for-investment portfolio at the lower of cost or fair value on the date of transfer. These loans are subsequently assessed for impairment based on the Firm's allowance methodology. For a further discussion of the methodologies used in establishing the Firm's allowance for loan losses, see Note 13.

Loan modifications

The Firm seeks to modify certain loans in conjunction with its loss-mitigation activities. Through the modification, JPMorgan Chase grants one or more concessions to a borrower who is experiencing financial difficulty in order to minimize the Firm's economic loss and avoid foreclosure or repossession of the collateral, and to ultimately maximize payments received by the Firm from the borrower. The concessions granted vary by program and by borrower-specific characteristics, and may include interest rate reductions, term extensions, payment deferrals, principal forgiveness, or the acceptance of equity or other assets in lieu of payments.

Such modifications are accounted for and reported as TDRs. A loan that has been modified in a TDR is generally considered to be impaired until it matures, is repaid, or is otherwise liquidated, regardless of whether the borrower performs under the modified terms. In certain limited cases, the effective interest rate applicable to the modified loan is at or above the current market rate at the time of the restructuring. In such circumstances, and assuming that the loan subsequently performs under its modified terms and the Firm expects to collect all contractual principal and interest cash flows, the loan is disclosed as impaired and as a TDR only during the year of the modification; in subsequent years, the loan is not disclosed as an impaired loan or as a TDR so long as repayment of the restructured loan under its modified terms is reasonably assured.

Loans, except for credit card loans, modified in a TDR are generally placed on nonaccrual status, although in many cases such loans were already on nonaccrual status prior to modification. These loans may be returned to performing status (the accrual of interest is resumed) if the following criteria are met: (i) the borrower has performed under the modified terms for a minimum of six months and/or six payments, and (ii) the Firm has an expectation that repayment of the modified loan is reasonably assured based on, for example, the borrower's debt capacity and level of future earnings, collateral values, LTV ratios, and other current market considerations. In certain limited and well-defined circumstances in which the loan is current at the modification date, such loans are not placed on nonaccrual status at the time of modification.

Because loans modified in TDRs are considered to be impaired, these loans are measured for impairment using the Firm's established asset-specific allowance methodology, which considers the expected re-default rates for the modified loans. A loan modified in a TDR generally remains subject to the asset-specific allowance methodology throughout its remaining life, regardless of whether the loan is performing and has been returned to accrual status and/or the loan has been removed from the impaired loans disclosures (i.e., loans restructured at market rates). For further discussion of the methodology used to estimate the Firm's asset-specific allowance, see Note 13.

Foreclosed property

The Firm acquires property from borrowers through loan restructurings, workouts, and foreclosures. Property acquired may include real property (e.g., residential real estate, land, and buildings) and commercial and personal property (e.g., automobiles, aircraft, railcars, and ships).

The Firm recognizes foreclosed property upon receiving assets in satisfaction of a loan (e.g., by taking legal title or physical possession). For loans collateralized by real property, the Firm generally recognizes the asset received at foreclosure sale or upon the execution of a deed in lieu of foreclosure transaction with the borrower. Foreclosed assets are reported in other assets on the Consolidated balance sheets and initially recognized at fair value less costs to sell. Each quarter the fair value of the acquired property is reviewed and adjusted, if necessary, to the lower of cost or fair value. Subsequent adjustments to fair value are charged/credited to noninterest revenue. Operating expense, such as real estate taxes and maintenance, are charged to other expense.

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Loan portfolio

The Firm's loan portfolio is divided into three portfolio segments, which are the same segments used by the Firm to determine the allowance for loan losses: Consumer, excluding credit card; Credit card; and Wholesale. Within each portfolio segment the Firm monitors and assesses the credit risk in the following classes of loans, based on the risk characteristics of each loan class.

Consumer, excluding credit card ^(a)	Credit card	Wholesale ^(f)
<u>Residential real estate - excluding PCI</u> - Residential mortgage^(b) - Home equity^(c) <u>Other consumer loans</u> - Auto^(d) - Consumer & Business Banking^{(d)(e)} - Student <u>Residential real estate - PCI</u> - Home equity - Prime mortgage - Subprime mortgage - Option ARMs	Credit card loans	- Commercial and industrial - Real estate - Financial institutions - Government agencies - Other^(g)

(a) Includes loans held in CCB, prime mortgage and home equity loans held in AWM and prime mortgage loans held in Corporate.

(b) Predominantly includes prime (including option ARMs) and subprime loans.

(c) Includes senior and junior lien home equity loans.

(d) Includes certain business banking and auto dealer risk-rated loans that apply the wholesale methodology for determining the allowance for loan losses; these loans are managed by CCB, and therefore, for consistency in presentation, are included with the other consumer loan classes.

(e) Predominantly includes Business Banking loans.

(f) Includes loans held in CIB, CB, AWM and Corporate. Excludes prime mortgage and home equity loans held in AWM and prime mortgage loans held in Corporate. Classes are internally defined and may not align with regulatory definitions.

(g) Includes loans to: individuals; SPEs; and private education and civic organizations. For more information on SPEs, see Note 14.

The following tables summarize the Firm's loan balances by portfolio segment.

December 31, 2017 (in millions)	Consumer, excluding credit card	Credit card ^(a)	Wholesale	Total
Retained	\$ 372,553	\$ 149,387	\$ 402,898	\$ 924,838 ^(b)
Held-for-sale	128	124	3,099	3,351
At fair value	—	—	2,508	2,508
Total	\$ 372,681	\$ 149,511	\$ 408,505	\$ 930,697

December 31, 2016 (in millions)	Consumer, excluding credit card	Credit card ^(a)	Wholesale	Total
Retained	\$ 364,406	\$ 141,711	\$ 383,790	\$ 889,907 ^(b)
Held-for-sale	238	105	2,285	2,628
At fair value	—	—	2,230	2,230
Total	\$ 364,644	\$ 141,816	\$ 388,305	\$ 894,765

(a) Includes accrued interest and fees net of an allowance for the uncollectible portion of accrued interest and fee income.

(b) Loans (other than PCI loans and those for which the fair value option has been elected) are presented net of unamortized discounts and premiums and net deferred loan fees or costs. These amounts were not material as of December 31, 2017 and 2016.

The following table provides information about the carrying value of retained loans purchased, sold and reclassified to held-for-sale during the periods indicated. This table excludes loans recorded at fair value. The Firm manages its exposure to credit risk on an ongoing basis. Selling loans is one way that the Firm reduces its credit exposures.

Year ended December 31, (in millions)	2017			
	Consumer, excluding credit card	Credit card	Wholesale	Total
Purchases	\$ 3,461 ^{(a)(b)}	\$ —	\$ 1,799	\$ 5,260
Sales	3,405	—	11,063	14,468
Retained loans reclassified to held-for-sale	6,340 ^(c)	—	1,229	7,569

Year ended December 31, (in millions)	2016			
	Consumer, excluding credit card	Credit card	Wholesale	Total
Purchases	\$ 4,116 ^{(a)(b)}	\$ —	\$ 1,448	\$ 5,564
Sales	6,368	—	8,739	15,107
Retained loans reclassified to held-for-sale	321	—	2,381	2,702

Year ended December 31, (in millions)	2015			
	Consumer, excluding credit card	Credit card	Wholesale	Total
Purchases	\$ 5,279 ^{(a)(b)}	\$ —	\$ 2,154	\$ 7,433
Sales	5,099	—	9,188	14,287
Retained loans reclassified to held-for-sale	1,514	79	642	2,235

- (a) Purchases predominantly represent the Firm's voluntary repurchase of certain delinquent loans from loan pools as permitted by Government National Mortgage Association ("Ginnie Mae") guidelines. The Firm typically elects to repurchase these delinquent loans as it continues to service them and/or manage the foreclosure process in accordance with applicable requirements of Ginnie Mae, FHA, RHS, and/or VA.
- (b) Excludes purchases of retained loans sourced through the correspondent origination channel and underwritten in accordance with the Firm's standards. Such purchases were \$23.5 billion, \$30.4 billion and \$50.3 billion for the years ended December 31, 2017, 2016 and 2015, respectively.
- (c) Includes the Firm's student loan portfolio which was sold in 2017.

The following table provides information about gains and losses on loan sales, including lower of cost or fair value adjustments, on loan sales by portfolio segment.

Year ended December 31, (in millions)	2017	2016	2015
Net gains/(losses) on sales of loans (including lower of cost or fair value adjustments)^(a)			
Consumer, excluding credit card ^(b)	\$ (126)	\$ 231	\$ 305
Credit card	(8)	(12)	1
Wholesale	41	26	34
Total net gains/(losses) on sales of loans (including lower of cost or fair value adjustments)	\$ (93)	\$ 245	\$ 340

- (a) Excludes sales related to loans accounted for at fair value.
- (b) Includes amounts related to the Firm's student loan portfolio which was sold in 2017.

Consumer, excluding credit card, loan portfolio

Consumer loans, excluding credit card loans, consist primarily of residential mortgages, home equity loans and lines of credit, auto loans, consumer and business banking loans and student loans, with a focus on serving the prime consumer credit market. The portfolio also includes home equity loans secured by junior liens, prime mortgage loans with an interest-only payment period, and certain payment-option loans that may result in negative amortization.

The table below provides information about retained consumer loans, excluding credit card, by class. In 2017, the Firm sold its student loan portfolio.

December 31, (in millions)	2017	2016
Residential real estate - excluding PCI		
Residential mortgage ^(a)	\$ 216,496	\$ 192,486
Home equity	33,450	39,063
Other consumer loans		
Auto	66,242	65,814
Consumer & Business Banking ^(a)	25,789	24,307
Student ^(a)	—	7,057
Residential real estate - PCI		
Home equity	10,799	12,902
Prime mortgage	6,479	7,602
Subprime mortgage	2,609	2,941
Option ARMs	10,689	12,234
Total retained loans	\$ 372,553	\$ 364,406

(a) Certain loan portfolios have been reclassified. The prior period amounts have been revised to conform with the current period presentation.

Delinquency rates are a primary credit quality indicator for consumer loans. Loans that are more than 30 days past due provide an early warning of borrowers who may be experiencing financial difficulties and/or who may be unable or unwilling to repay the loan. As the loan continues to age, it becomes more clear whether the borrower is likely either unable or unwilling to pay. In the case of residential real estate loans, late-stage delinquencies (greater than 150 days past due) are a strong indicator of loans that will ultimately result in a foreclosure or similar liquidation transaction. In addition to delinquency rates, other credit quality indicators for consumer loans vary based on the class of loan, as follows:

- For residential real estate loans, including both non-PCI and PCI portfolios, the current estimated LTV ratio, or the combined LTV ratio in the case of junior lien loans, is an indicator of the potential loss severity in the event of default. Additionally, LTV or combined LTV ratios can provide insight into a borrower's continued willingness to pay, as the delinquency rate of high-LTV loans tends to be greater than that for loans where the borrower has equity in the collateral. The geographic distribution of the loan collateral also provides insight as to the credit quality of the portfolio, as factors such as the regional economy, home price changes and specific events such as natural disasters, will affect credit quality. The borrower's current or "refreshed" FICO score is a secondary credit-quality indicator for certain loans, as FICO scores are an indication of the borrower's credit payment history. Thus, a loan to a borrower with a low FICO score (less than 660) is considered to be of higher risk than a loan to a borrower with a higher FICO score. Further, a loan to a borrower with a high LTV ratio and a low FICO score is at greater risk of default than a loan to a borrower that has both a high LTV ratio and a high FICO score.
- For scored auto and scored business banking loans, geographic distribution is an indicator of the credit performance of the portfolio. Similar to residential real estate loans, geographic distribution provides insights into the portfolio performance based on regional economic activity and events.
- Risk-rated business banking and auto loans are similar to wholesale loans in that the primary credit quality indicators are the risk rating that is assigned to the loan and whether the loans are considered to be criticized and/or nonaccrual. Risk ratings are reviewed on a regular and ongoing basis by Credit Risk Management and are adjusted as necessary for updated information about borrowers' ability to fulfill their obligations. For further information about risk-rated wholesale loan credit quality indicators, see page 228 of this Note.

Residential real estate – excluding PCI loans

The following table provides information by class for residential real estate – excluding retained PCI loans.

Residential real estate – excluding PCI loans

December 31, (in millions, except ratios)	Residential mortgage ^(a)		Home equity		Total residential real estate – excluding PCI	
	2017	2016	2017	2016	2017	2016
Loan delinquency^(a)						
Current	\$ 208,713	\$ 184,133	\$ 32,391	\$ 37,941	\$ 241,104	\$ 222,074
30-149 days past due	4,234	3,828	671	646	4,905	4,474
150 or more days past due	3,549	4,525	388	476	3,937	5,001
Total retained loans	\$ 216,496	\$ 192,486	\$ 33,450	\$ 39,063	\$ 249,946	\$ 231,549
% of 30+ days past due to total retained loans ^(b)	0.77%	0.75%	3.17%	2.87%	1.09%	1.11%
90 or more days past due and government guaranteed ^(c)	\$ 4,172	\$ 4,858	—	—	\$ 4,172	\$ 4,858
Nonaccrual loans	2,175	2,256	1,610	1,845	3,785	4,101
Current estimated LTV ratios^{(d)(e)}						
Greater than 125% and refreshed FICO scores:						
Equal to or greater than 660	\$ 37	\$ 30	\$ 10	\$ 70	\$ 47	\$ 100
Less than 660	19	48	3	15	22	63
101% to 125% and refreshed FICO scores:						
Equal to or greater than 660	36	135	296	668	332	803
Less than 660	88	177	95	221	183	398
80% to 100% and refreshed FICO scores:						
Equal to or greater than 660	4,369	4,026	1,676	2,961	6,045	6,987
Less than 660	483	718	569	945	1,052	1,663
Less than 80% and refreshed FICO scores:						
Equal to or greater than 660	194,758	169,579	25,262	27,317	220,020	196,896
Less than 660	6,952	6,759	3,850	4,380	10,802	11,139
No FICO/LTV available	1,259	1,650	1,689	2,486	2,948	4,136
U.S. government-guaranteed	8,495	9,364	—	—	8,495	9,364
Total retained loans	\$ 216,496	\$ 192,486	\$ 33,450	\$ 39,063	\$ 249,946	\$ 231,549
Geographic region						
California	\$ 68,855	\$ 59,802	\$ 6,582	\$ 7,644	\$ 75,437	\$ 67,446
New York	27,473	24,916	6,866	7,978	34,339	32,894
Illinois	14,501	13,126	2,521	2,947	17,022	16,073
Texas	12,508	10,772	2,021	2,225	14,529	12,997
Florida	9,598	8,395	1,847	2,133	11,445	10,528
New Jersey	7,142	6,374	1,957	2,253	9,099	8,627
Washington	6,962	5,451	1,026	1,229	7,988	6,680
Colorado	7,335	6,306	632	677	7,967	6,983
Massachusetts	6,323	5,834	295	371	6,618	6,205
Arizona	4,109	3,595	1,439	1,772	5,548	5,367
All other ^(f)	51,690	47,915	8,264	9,834	59,954	57,749
Total retained loans	\$ 216,496	\$ 192,486	\$ 33,450	\$ 39,063	\$ 249,946	\$ 231,549

(a) Individual delinquency classifications include mortgage loans insured by U.S. government agencies as follows: current included \$2.4 billion and \$2.5 billion; 30-149 days past due included \$3.2 billion and \$3.1 billion; and 150 or more days past due included \$2.9 billion and \$3.8 billion at December 31, 2017 and 2016, respectively.

(b) At December 31, 2017 and 2016, residential mortgage loans excluded mortgage loans insured by U.S. government agencies of \$6.1 billion and \$6.9 billion, respectively, that are 30 or more days past due. These amounts have been excluded based upon the government guarantee.

(c) These balances, which are 90 days or more past due, were excluded from nonaccrual loans as the loans are guaranteed by U.S. government agencies. Typically the principal balance of the loans is insured and interest is guaranteed at a specified reimbursement rate subject to meeting agreed-upon servicing guidelines. At December 31, 2017 and 2016, these balances included \$1.5 billion and \$2.2 billion, respectively, of loans that are no longer accruing interest based on the agreed-upon servicing guidelines. For the remaining balance, interest is being accrued at the guaranteed reimbursement rate. There were no loans that were not guaranteed by U.S. government agencies that are 90 or more days past due and still accruing interest at December 31, 2017 and 2016.

(d) Represents the aggregate unpaid principal balance of loans divided by the estimated current property value. Current property values are estimated, at a minimum, quarterly, based on home valuation models using nationally recognized home price index valuation estimates incorporating actual data to the extent available and forecasted data where actual data is not available. These property values do not represent actual appraised loan level collateral values; as such, the resulting ratios are necessarily imprecise and should be viewed as estimates. Current estimated combined LTV for junior lien home equity loans considers all available lien positions, as well as unused lines, related to the property.

(e) Refreshed FICO scores represent each borrower's most recent credit score, which is obtained by the Firm on at least a quarterly basis.

(f) At December 31, 2017 and 2016, included mortgage loans insured by U.S. government agencies of \$8.5 billion and \$9.4 billion, respectively.

(g) Certain loan portfolios have been reclassified. The prior period amounts have been revised to conform with the current period presentation.

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The following table represents the Firm's delinquency statistics for junior lien home equity loans and lines as of December 31, 2017 and 2016.

December 31, (in millions except ratios)	Total loans		Total 30+ day delinquency rate	
	2017	2016	2017	2016
HELOCs: ^(a)				
Within the revolving period ^(b)	\$ 6,363	\$ 10,304	0.50%	1.27%
Beyond the revolving period	13,532	13,272	3.56	3.05
HELOANS	1,371	1,861	3.50	2.85
Total	\$ 21,266	\$ 25,437	2.64%	2.32%

(a) These HELOCs are predominantly revolving loans for a 10-year period, after which time the HELOC converts to a loan with a 20-year amortization period, but also include HELOCs that allow interest-only payments beyond the revolving period.

(b) The Firm manages the risk of HELOCs during their revolving period by closing or reducing the undrawn line to the extent permitted by law when borrowers are experiencing financial difficulty.

HELOCs beyond the revolving period and HELOANS have higher delinquency rates than HELOCs within the revolving period. That is primarily because the fully-amortizing payment that is generally required for those products is higher than the minimum payment options available for HELOCs within the revolving period. The higher delinquency rates associated with amortizing HELOCs and HELOANS are factored into the Firm's allowance for loan losses.

Impaired loans

The table below sets forth information about the Firm's residential real estate impaired loans, excluding PCI loans. These loans are considered to be impaired as they have been modified in a TDR. All impaired loans are evaluated for an asset-specific allowance as described in Note 13.

December 31, (in millions)	Residential mortgage		Home equity		Total residential real estate - excluding PCI	
	2017	2016	2017	2016	2017	2016
Impaired loans						
With an allowance	\$ 4,407	\$ 4,689	\$ 1,236	\$ 1,266	\$ 5,643	\$ 5,955
Without an allowance ^(a)	1,213	1,343	882	998	2,095	2,341
Total impaired loans^{(b)(c)}	\$ 5,620	\$ 6,032	\$ 2,118	\$ 2,264	\$ 7,738	\$ 8,296
Allowance for loan losses related to impaired loans	\$ 62	\$ 68	\$ 111	\$ 121	\$ 173	\$ 189
Unpaid principal balance of impaired loans ^(d)	7,741	8,285	3,701	3,847	11,442	12,132
Impaired loans on nonaccrual status ^(e)	1,743	1,755	1,032	1,116	2,775	2,871

(a) Represents collateral-dependent residential real estate loans that are charged off to the fair value of the underlying collateral less costs to sell. The Firm reports, in accordance with regulatory guidance, residential real estate loans that have been discharged under Chapter 7 bankruptcy and not reaffirmed by the borrower ("Chapter 7 loans") as collateral-dependent nonaccrual TDRs, regardless of their delinquency status. At December 31, 2017, Chapter 7 residential real estate loans included approximately 12% of home equity and 15% of residential mortgages that were 30 days or more past due.

(b) At December 31, 2017 and 2016, \$3.8 billion and \$3.4 billion, respectively, of loans modified subsequent to repurchase from Ginnie Mae in accordance with the standards of the appropriate government agency (i.e., FHA, VA, RHS) are not included in the table above. When such loans perform subsequent to modification in accordance with Ginnie Mae guidelines, they are generally sold back into Ginnie Mae loan pools. Modified loans that do not re-perform become subject to foreclosure.

(c) Predominantly all residential real estate impaired loans, excluding PCI loans, are in the U.S.

(d) Represents the contractual amount of principal owed at December 31, 2017 and 2016. The unpaid principal balance differs from the impaired loan balances due to various factors including charge-offs, net deferred loan fees or costs, and unamortized discounts or premiums on purchased loans.

(e) As of December 31, 2017 and 2016, nonaccrual loans included \$2.2 billion and \$2.3 billion, respectively, of TDRs for which the borrowers were less than 90 days past due. For additional information about loans modified in a TDR that are on nonaccrual status refer to the Loan accounting framework on pages 211-213 of this Note.

The following table presents average impaired loans and the related interest income reported by the Firm.

Year ended December 31, (in millions)	Average impaired loans			Interest income on impaired loans ^(a)			Interest income on impaired loans on a cash basis ^(a)		
	2017	2016	2015	2017	2016	2015	2017	2016	2015
Residential mortgage	\$ 5,797	\$ 6,376	\$ 7,697	\$ 287	\$ 305	\$ 348	\$ 75	\$ 77	\$ 87
Home equity	2,189	2,311	2,369	127	125	128	80	80	85
Total residential real estate - excluding PCI	\$ 7,986	\$ 8,687	\$ 10,066	\$ 414	\$ 430	\$ 476	\$ 155	\$ 157	\$ 172

(a) Generally, interest income on loans modified in TDRs is recognized on a cash basis until such time as the borrower has made a minimum of six payments under the new terms, unless the loan is deemed to be collateral-dependent.

Loan modifications

Modifications of residential real estate loans, excluding PCI loans, are generally accounted for and reported as TDRs.

There were no additional commitments to lend to borrowers whose residential real estate loans, excluding PCI loans, have been modified in TDRs.

The following table presents new TDRs reported by the Firm.

Year ended December 31, (in millions)	2017	2016	2015
Residential mortgage	\$ 373	\$ 254	\$ 267
Home equity	321	385	401
Total residential real estate - excluding PCI	\$ 694	\$ 639	\$ 668

Nature and extent of modifications

The U.S. Treasury's Making Home Affordable programs, as well as the Firm's proprietary modification programs, generally provide various concessions to financially troubled borrowers including, but not limited to, interest rate reductions, term or payment extensions and deferral of principal and/or interest payments that would otherwise have been required under the terms of the original agreement.

The following table provides information about how residential real estate loans, excluding PCI loans, were modified under the Firm's loss mitigation programs described above during the periods presented. This table excludes Chapter 7 loans where the sole concession granted is the discharge of debt.

Year ended December 31,	Residential mortgage			Home equity			Total residential real estate - excluding PCI		
	2017	2016	2015	2017	2016	2015	2017	2016	2015
Number of loans approved for a trial modification	1,283	1,945	2,711	2,321	3,760	3,933	3,604	5,705	6,644
Number of loans permanently modified	2,628	3,338	3,145	5,624	4,824	4,296	8,252	8,162	7,441
Concession granted:^(a)									
Interest rate reduction	63%	76%	71%	59%	75%	66%	60%	76%	68%
Term or payment extension	72	90	81	69	83	89	70	86	86
Principal and/or interest deferred	15	16	27	10	19	23	12	18	24
Principal forgiveness	16	26	28	13	9	7	14	16	16
Other ^(b)	33	25	11	31	6	—	32	14	5

(a) Represents concessions granted in permanent modifications as a percentage of the number of loans permanently modified. The sum of the percentages exceeds 100% because predominantly all of the modifications include more than one type of concession. A significant portion of trial modifications include interest rate reductions and/or term or payment extensions.

(b) Predominantly represents variable interest rate to fixed interest rate modifications.

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Financial effects of modifications and redefaults

The following table provides information about the financial effects of the various concessions granted in modifications of residential real estate loans, excluding PCI, under the loss mitigation programs described above and about redefaults of certain loans modified in TDRs for the periods presented. The following table presents only the final financial effects of permanent modifications and does not include temporary concessions offered through trial modifications. This table also excludes Chapter 7 loans where the sole concession granted is the discharge of debt.

Year ended December 31, (in millions, except weighted-average data and number of loans)	Residential mortgage			Home equity			Total residential real estate - excluding PCI		
	2017	2016	2015	2017	2016	2015	2017	2016	2015
Weighted-average interest rate of loans with interest rate reductions - before TDR	5.15%	5.59%	5.67%	4.94%	4.99%	5.20%	5.06%	5.36%	5.51%
Weighted-average interest rate of loans with interest rate reductions - after TDR	2.99	2.93	2.79	2.64	2.34	2.35	2.83	2.70	2.64
Weighted-average remaining contractual term (in years) of loans with term or payment extensions - before TDR	24	24	25	21	18	18	23	22	22
Weighted-average remaining contractual term (in years) of loans with term or payment extensions - after TDR	38	38	37	39	38	35	38	38	36
Charge-offs recognized upon permanent modification	\$ 2	\$ 4	\$ 11	\$ 1	\$ 1	\$ 4	\$ 3	\$ 5	\$ 15
Principal deferred	12	30	58	10	23	27	22	53	85
Principal forgiven	20	44	66	13	7	6	33	51	72
Balance of loans that redefaulted within one year of permanent modification ^(a)	\$ 124	\$ 98	\$ 133	\$ 56	\$ 40	\$ 21	\$ 180	\$ 138	\$ 154

(a) Represents loans permanently modified in TDRs that experienced a payment default in the periods presented, and for which the payment default occurred within one year of the modification. The dollar amounts presented represent the balance of such loans at the end of the reporting period in which such loans defaulted. For residential real estate loans modified in TDRs, payment default is deemed to occur when the loan becomes two contractual payments past due. In the event that a modified loan redefaults, it is probable that the loan will ultimately be liquidated through foreclosure or another similar type of liquidation transaction. Redefauls of loans modified within the last 12 months may not be representative of ultimate redefault levels.

At December 31, 2017, the weighted-average estimated remaining lives of residential real estate loans, excluding PCI loans, permanently modified in TDRs were 14 years for residential mortgage and 10 years for home equity. The estimated remaining lives of these loans reflect estimated prepayments, both voluntary and involuntary (i.e., foreclosures and other forced liquidations).

Active and suspended foreclosure

At December 31, 2017 and 2016, the Firm had non-PCI residential real estate loans, excluding those insured by U.S. government agencies, with a carrying value of \$787 million and \$932 million, respectively, that were not included in REO, but were in the process of active or suspended foreclosure.

Other consumer loans

The table below provides information for other consumer retained loan classes, including auto and business banking loans. This table excludes student loans that were sold in 2017.

December 31, (in millions, except ratios)	Auto		Consumer & Business Banking ^(c)	
	2017	2016	2017	2016
Loan delinquency				
Current	\$ 65,651	\$ 65,029	\$ 25,454	\$ 23,920
30-119 days past due	584	773	213	247
120 or more days past due	7	12	122	140
Total retained loans	\$ 66,242	\$ 65,814	\$ 25,789	\$ 24,307
% of 30+ days past due to total retained loans	0.89%	1.19%	1.30%	1.59%
Nonaccrual loans ^(a)	141	214	283	287
Geographic region				
California	\$ 8,445	\$ 7,975	\$ 5,032	\$ 4,426
Texas	7,013	7,041	2,916	2,954
New York	4,023	4,078	4,195	3,979
Illinois	3,916	3,984	2,017	1,758
Florida	3,350	3,374	1,424	1,195
Arizona	2,221	2,209	1,383	1,307
Ohio	2,105	2,194	1,380	1,402
Michigan	1,418	1,567	1,357	1,343
New Jersey	2,044	2,031	721	623
Louisiana	1,656	1,814	849	979
All other	30,051	29,547	4,515	4,341
Total retained loans	\$ 66,242	\$ 65,814	\$ 25,789	\$ 24,307
Loans by risk ratings^(b)				
Noncriticized	\$ 15,604	\$ 13,899	\$ 17,938	\$ 16,858
Criticized performing	93	201	791	816
Criticized nonaccrual	9	94	213	217

(a) There were no loans that were 90 or more days past due and still accruing interest at December 31, 2017, and December 31, 2016.

(b) For risk-rated business banking and auto loans, the primary credit quality indicator is the risk rating of the loan, including whether the loans are considered to be criticized and/or nonaccrual.

(c) Certain loan portfolios have been reclassified. The prior period amounts have been revised to conform with the current period presentation.

Notes to consolidated financial statements

Other consumer impaired loans and loan modifications

The following table sets forth information about the Firm's other consumer impaired loans, including risk-rated business banking and auto loans that have been placed on nonaccrual status, and loans that have been modified in TDRs.

December 31, (in millions)	2017	2016
Impaired loans		
With an allowance	\$ 272	\$ 614
Without an allowance ^(a)	26	30
Total impaired loans^{(b)(c)}	\$ 298	\$ 644
Allowance for loan losses related to impaired loans	\$ 73	\$ 119
Unpaid principal balance of impaired loans ^(d)	402	753
Impaired loans on nonaccrual status	268	508

- (a) When discounted cash flows, collateral value or market price equals or exceeds the recorded investment in the loan, the loan does not require an allowance. This typically occurs when the impaired loans have been partially charged off and/or there have been interest payments received and applied to the loan balance.
- (b) Predominantly all other consumer impaired loans are in the U.S.
- (c) Other consumer average impaired loans were \$427 million, \$635 million and \$566 million for the years ended December 31, 2017, 2016 and 2015, respectively. The related interest income on impaired loans, including those on a cash basis, was not material for the years ended December 31, 2017, 2016 and 2015.
- (d) Represents the contractual amount of principal owed at December 31, 2017 and 2016. The unpaid principal balance differs from the impaired loan balances due to various factors, including charge-offs, interest payments received and applied to the principal balance, net deferred loan fees or costs and unamortized discounts or premiums on purchased loans.

Loan modifications

Certain other consumer loan modifications are considered to be TDRs as they provide various concessions to borrowers who are experiencing financial difficulty. All of these TDRs are reported as impaired loans. The following table provides information about the Firm's other consumer loans modified in TDRs. New TDRs were not material for the years ended December 31, 2017 and 2016.

December 31, (in millions)	2017	2016
Loans modified in TDRs ^{(a)(b)}	\$ 102	\$ 362
TDRs on nonaccrual status	72	226

- (a) The impact of these modifications was not material to the Firm for the years ended December 31, 2017 and 2016.
- (b) Additional commitments to lend to borrowers whose loans have been modified in TDRs as of December 31, 2017 and 2016 were immaterial.

Purchased credit-impaired loans

PCI loans are initially recorded at fair value at acquisition. PCI loans acquired in the same fiscal quarter may be aggregated into one or more pools, provided that the loans have common risk characteristics. A pool is then accounted for as a single asset with a single composite interest rate and an aggregate expectation of cash flows. With respect to the Washington Mutual transaction, all of the consumer PCI loans were aggregated into pools of loans with common risk characteristics.

On a quarterly basis, the Firm estimates the total cash flows (both principal and interest) expected to be collected over the remaining life of each pool. These estimates incorporate assumptions regarding default rates, loss severities, the amounts and timing of prepayments and other factors that reflect then-current market conditions. Probable decreases in expected cash flows (i.e., increased credit losses) trigger the recognition of impairment, which is then measured as the present value of the expected principal loss plus any related forgone interest cash flows, discounted at the pool's effective interest rate. Impairments are recognized through the provision for credit losses and an increase in the allowance for loan losses. Probable and significant increases in expected cash flows (e.g., decreased credit losses, the net benefit of modifications) would first reverse any previously recorded allowance for loan losses with any remaining increases recognized prospectively as a yield adjustment over the remaining estimated lives of the underlying loans. The impacts of (i) prepayments, (ii) changes in variable interest rates, and (iii) any other changes in the timing of expected cash flows are generally recognized prospectively as adjustments to interest income.

The Firm continues to modify certain PCI loans. The impact of these modifications is incorporated into the Firm's quarterly assessment of whether a probable and significant change in expected cash flows has occurred, and the loans continue to be accounted for and reported as PCI loans. In evaluating the effect of modifications on expected cash flows, the Firm incorporates the effect of any forgone interest and also considers the potential for redefault. The Firm develops product-specific probability of default estimates, which are used to compute expected credit losses. In developing these probabilities of default, the Firm considers the relationship between the credit quality characteristics of the underlying loans and certain assumptions about home prices and unemployment based upon industry-wide data. The Firm also considers its own historical loss experience to-date based on actual redefaulted modified PCI loans.

The excess of cash flows expected to be collected over the carrying value of the underlying loans is referred to as the accretable yield. This amount is not reported on the Firm's Consolidated balance sheets but is accreted into interest income at a level rate of return over the remaining estimated lives of the underlying pools of loans.

If the timing and/or amounts of expected cash flows on PCI loan pools were determined not to be reasonably estimable, no interest would be accreted and the loan pools would be reported as nonaccrual loans; however, since the timing and amounts of expected cash flows for the Firm's PCI consumer loan pools are reasonably estimable, interest is being accreted and the loan pools are being reported as performing loans.

The liquidation of PCI loans, which may include sales of loans, receipt of payment in full from the borrower, or foreclosure, results in removal of the loans from the underlying PCI pool. When the amount of the liquidation proceeds (e.g., cash, real estate), if any, is less than the unpaid principal balance of the loan, the difference is first applied against the PCI pool's nonaccretable difference for principal losses (i.e., the lifetime credit loss estimate established as a purchase accounting adjustment at the acquisition date). When the nonaccretable difference for a particular loan pool has been fully depleted, any excess of the unpaid principal balance of the loan over the liquidation proceeds is written off against the PCI pool's allowance for loan losses. Write-offs of PCI loans also include other adjustments, primarily related to interest forgiveness modifications. Because the Firm's PCI loans are accounted for at a pool level, the Firm does not recognize charge-offs of PCI loans when they reach specified stages of delinquency (i.e., unlike non-PCI consumer loans, these loans are not charged off based on FFIEC standards).

The PCI portfolio affects the Firm's results of operations primarily through: (i) contribution to net interest margin; (ii) expense related to defaults and servicing resulting from the liquidation of the loans; and (iii) any provision for loan losses. The PCI loans acquired in the Washington Mutual transaction were funded based on the interest rate characteristics of the loans. For example, variable-rate loans were funded with variable-rate liabilities and fixed-rate loans were funded with fixed-rate liabilities with a similar maturity profile. A net spread will be earned on the declining balance of the portfolio, which is estimated as of December 31, 2017, to have a remaining weighted-average life of 9 years.

Notes to consolidated financial statements

Residential real estate – PCI loans

The table below sets forth information about the Firm's consumer, excluding credit card, PCI loans.

December 31, (in millions, except ratios)	Home equity		Prime mortgage		Subprime mortgage		Option ARMs		Total PCI	
	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016
Carrying value ^(a)	\$10,799	\$12,902	\$ 6,479	\$ 7,602	\$ 2,609	\$ 2,941	\$10,689	\$12,234	\$30,576	\$35,679
Related allowance for loan losses ^(b)	1,133	1,433	863	829	150	–	79	49	2,225	2,311
Loan delinquency (based on unpaid principal balance)										
Current	\$10,272	\$12,423	\$ 5,839	\$ 6,840	\$ 2,640	\$ 3,005	\$ 9,662	\$11,074	\$28,413	\$33,342
30-149 days past due	356	291	336	336	381	361	547	555	1,620	1,543
150 or more days past due	392	478	327	451	176	240	689	917	1,584	2,086
Total loans	\$11,020	\$13,192	\$ 6,502	\$ 7,627	\$ 3,197	\$ 3,606	\$10,898	\$12,546	\$31,617	\$36,971
% of 30+ days past due to total loans	6.79%	5.83%	10.20%	10.32%	17.42%	16.67%	11.34%	11.73%	10.13%	9.82%
Current estimated LTV ratios (based on unpaid principal balance)^{(c)(d)}										
Greater than 125% and refreshed FICO scores:										
Equal to or greater than 660	\$ 33	\$ 69	\$ 4	\$ 6	\$ 2	\$ 7	\$ 6	\$ 12	\$ 45	\$ 94
Less than 660	21	39	16	17	20	31	9	18	66	105
101% to 125% and refreshed FICO scores:										
Equal to or greater than 660	274	555	16	52	20	39	43	83	353	729
Less than 660	132	256	42	84	75	135	71	144	320	619
80% to 100% and refreshed FICO scores:										
Equal to or greater than 660	1,195	1,860	221	442	119	214	316	558	1,851	3,074
Less than 660	559	804	230	381	309	439	371	609	1,469	2,233
Lower than 80% and refreshed FICO scores:										
Equal to or greater than 660	6,134	6,676	3,551	3,967	895	919	6,113	6,754	16,693	18,316
Less than 660	2,095	2,183	2,103	2,287	1,608	1,645	3,499	3,783	9,305	9,898
No FICO/LTV available	577	750	319	391	149	177	470	585	1,515	1,903
Total unpaid principal balance	\$11,020	\$13,192	\$ 6,502	\$ 7,627	\$ 3,197	\$ 3,606	\$10,898	\$12,546	\$31,617	\$36,971
Geographic region (based on unpaid principal balance)										
California	\$ 6,555	\$ 7,899	\$ 3,716	\$ 4,396	\$ 797	\$ 899	\$ 6,225	\$ 7,128	\$17,293	\$20,322
Florida	1,137	1,306	428	501	296	332	878	1,026	2,739	3,165
New York	607	697	457	515	330	363	628	711	2,022	2,286
Washington	532	673	135	167	61	68	238	290	966	1,198
Illinois	273	314	200	226	161	178	249	282	883	1,000
New Jersey	242	280	178	210	110	125	336	401	866	1,016
Massachusetts	79	94	149	173	98	110	307	346	633	723
Maryland	57	64	129	144	132	145	232	267	550	620
Arizona	203	241	106	124	60	68	156	181	525	614
Virginia	66	77	123	142	51	56	280	314	520	589
All other	1,269	1,547	881	1,029	1,101	1,262	1,369	1,600	4,620	5,438
Total unpaid principal balance	\$11,020	\$13,192	\$ 6,502	\$ 7,627	\$ 3,197	\$ 3,606	\$10,898	\$12,546	\$31,617	\$36,971

(a) Carrying value includes the effect of fair value adjustments that were applied to the consumer PCI portfolio at the date of acquisition.

(b) Management concluded, as part of the Firm's regular assessment of the PCI loan pools, that it was probable that higher expected credit losses would result in a decrease in expected cash flows. As a result, an allowance for loan losses for impairment of these pools has been recognized.

(c) Represents the aggregate unpaid principal balance of loans divided by the estimated current property value. Current property values are estimated, at a minimum, quarterly, based on home valuation models using nationally recognized home price index valuation estimates incorporating actual data to the extent available and forecasted data where actual data is not available. These property values do not represent actual appraised loan level collateral values; as such, the resulting ratios are necessarily imprecise and should be viewed as estimates. Current estimated combined LTV for junior lien home equity loans considers all available lien positions, as well as unused lines, related to the property.

(d) Refreshed FICO scores represent each borrower's most recent credit score, which is obtained by the Firm on at least a quarterly basis.

Approximately 25% of the PCI home equity portfolio are senior lien loans; the remaining balance are junior lien HELOANS or HELOCs. The following table sets forth delinquency statistics for PCI junior lien home equity loans and lines of credit based on the unpaid principal balance as of December 31, 2017 and 2016.

December 31, (in millions, except ratios)	Total loans		Total 30+ day delinquency rate	
	2017	2016	2017	2016
HELOCs: ^(a)				
Within the revolving period ^(b)	\$ 51	\$ 2,126	1.96%	3.67%
Beyond the revolving period ^(c)	7,875	7,452	4.63	4.03
HELOANS	360	465	5.28	5.38
Total	\$ 8,286	\$ 10,043	4.65%	4.01%

(a) In general, these HELOCs are revolving loans for a 10-year period, after which time the HELOC converts to an interest-only loan with a balloon payment at the end of the loan's term.

(b) Substantially all undrawn HELOCs within the revolving period have been closed.

(c) Includes loans modified into fixed rate amortizing loans.

The table below sets forth the accretable yield activity for the Firm's PCI consumer loans for the years ended December 31, 2017, 2016 and 2015, and represents the Firm's estimate of gross interest income expected to be earned over the remaining life of the PCI loan portfolios. The table excludes the cost to fund the PCI portfolios, and therefore the accretable yield does not represent net interest income expected to be earned on these portfolios.

Year ended December 31, (in millions, except ratios)	Total PCI		
	2017	2016	2015
Beginning balance	\$ 11,768	\$ 13,491	\$ 14,592
Accretion into interest income	(1,396)	(1,555)	(1,700)
Changes in interest rates on variable-rate loans	503	260	279
Other changes in expected cash flows ^(a)	284	(428)	230
Reclassification from nonaccretable difference ^(b)	—	—	90
Balance at December 31	\$ 11,159	\$ 11,768	\$ 13,491
Accretable yield percentage	4.53%	4.35%	4.20%

(a) Other changes in expected cash flows may vary from period to period as the Firm continues to refine its cash flow model, for example cash flows expected to be collected due to the impact of modifications and changes in prepayment assumptions.

(b) Reclassifications from the nonaccretable difference in the year ended December 31, 2015 were driven by continued improvement in home prices and delinquencies, as well as increased granularity in the impairment estimates.

Active and suspended foreclosure

At December 31, 2017 and 2016, the Firm had PCI residential real estate loans with an unpaid principal balance of \$1.3 billion and \$1.7 billion, respectively, that were not included in REO, but were in the process of active or suspended foreclosure.

Credit card loan portfolio

The credit card portfolio segment includes credit card loans originated and purchased by the Firm. Delinquency rates are the primary credit quality indicator for credit card loans as they provide an early warning that borrowers may be experiencing difficulties (30 days past due); information on those borrowers that have been delinquent for a longer period of time (90 days past due) is also considered. In addition to delinquency rates, the geographic distribution of the loans provides insight as to the credit quality of the portfolio based on the regional economy.

While the borrower's credit score is another general indicator of credit quality, the Firm does not view credit scores as a primary indicator of credit quality because the borrower's credit score tends to be a lagging indicator. The distribution of such scores provides a general indicator of credit quality trends within the portfolio; however, the score does not capture all factors that would be predictive of future credit performance. Refreshed FICO score information, which is obtained at least quarterly, for a statistically significant random sample of the credit card portfolio is indicated in the following table. FICO is considered to be the industry benchmark for credit scores.

The Firm generally originates new card accounts to prime consumer borrowers. However, certain cardholders' FICO scores may decrease over time, depending on the performance of the cardholder and changes in credit score calculation.

The table below sets forth information about the Firm's credit card loans.

As of or for the year ended December 31, (in millions, except ratios)	2017	2016
Net charge-offs	\$ 4,123	\$ 3,442
% of net charge-offs to retained loans	2.95%	2.63%
Loan delinquency		
Current and less than 30 days past due and still accruing	\$ 146,704	\$ 139,434
30-89 days past due and still accruing	1,305	1,134
90 or more days past due and still accruing	1,378	1,143
Total retained credit card loans	\$ 149,387	\$ 141,711
Loan delinquency ratios		
% of 30+ days past due to total retained loans	1.80%	1.61%
% of 90+ days past due to total retained loans	0.92	0.81
Credit card loans by geographic region		
California	\$ 22,245	\$ 20,571
Texas	14,200	13,220
New York	13,021	12,249
Florida	9,138	8,585
Illinois	8,585	8,189
New Jersey	6,506	6,271
Ohio	4,997	4,906
Pennsylvania	4,883	4,787
Colorado	4,006	3,699
Michigan	3,826	3,741
All other	57,980	55,493
Total retained credit card loans	\$ 149,387	\$ 141,711
Percentage of portfolio based on carrying value with estimated refreshed FICO scores		
Equal to or greater than 660	84.0%	84.4%
Less than 660	14.6	14.2
No FICO available	1.4	1.4

Credit card impaired loans and loan modifications

The table below sets forth information about the Firm's impaired credit card loans. All of these loans are considered to be impaired as they have been modified in TDRs.

December 31, (in millions)	2017	2016
Impaired credit card loans with an allowance^{(a)(b)}		
Credit card loans with modified payment terms ^(c)	\$ 1,135	\$ 1,098
Modified credit card loans that have reverted to pre-modification payment terms ^(d)	80	142
Total impaired credit card loans^(e)	\$ 1,215	\$ 1,240
Allowance for loan losses related to impaired credit card loans	\$ 383	\$ 358

(a) The carrying value and the unpaid principal balance are the same for credit card impaired loans.

(b) There were no impaired loans without an allowance.

(c) Represents credit card loans outstanding to borrowers enrolled in a credit card modification program as of the date presented.

(d) Represents credit card loans that were modified in TDRs but that have subsequently reverted back to the loans' pre-modification payment terms. At December 31, 2017 and 2016, \$43 million and \$94 million, respectively, of loans have reverted back to the pre-modification payment terms of the loans due to noncompliance with the terms of the modified loans. The remaining \$37 million and \$48 million at December 31, 2017 and 2016, respectively, of these loans are to borrowers who have successfully completed a short-term modification program. The Firm continues to report these loans as TDRs since the borrowers' credit lines remain closed.

(e) Predominantly all impaired credit card loans are in the U.S.

The following table presents average balances of impaired credit card loans and interest income recognized on those loans.

Year ended December 31, (in millions)	2017	2016	2015
Average impaired credit card loans	\$ 1,214	\$ 1,325	\$ 1,710
Interest income on impaired credit card loans	59	63	82

Loan modifications

JPMorgan Chase may offer one of a number of loan modification programs to credit card borrowers who are experiencing financial difficulty. Most of the credit card loans have been modified under long-term programs for borrowers who are experiencing financial difficulties. Modifications under long-term programs involve placing the customer on a fixed payment plan, generally for 60 months. The Firm may also offer short-term programs for borrowers who may be in need of temporary relief; however, none are currently being offered. Modifications under all short- and long-term programs typically include reducing the interest rate on the credit card. Substantially all modifications are considered to be TDRs.

If the cardholder does not comply with the modified payment terms, then the credit card loan continues to age and will ultimately be charged-off in accordance with the Firm's standard charge-off policy. In most cases, the Firm does not reinstate the borrower's line of credit.

New enrollments in these loan modification programs for the years ended December 31, 2017, 2016 and 2015, were \$756 million, \$636 million and \$638 million, respectively.

Financial effects of modifications and redefaults

The following table provides information about the financial effects of the concessions granted on credit card loans modified in TDRs and redefaults for the periods presented.

Year ended December 31, (in millions, except weighted-average data)	2017	2016	2015
Weighted-average interest rate of loans - before TDR	16.58%	15.56%	15.08%
Weighted-average interest rate of loans - after TDR	4.88	4.76	4.40
Loans that redefaulted within one year of modification ^(a)	\$ 75	\$ 79	\$ 85

(a) Represents loans modified in TDRs that experienced a payment default in the periods presented, and for which the payment default occurred within one year of the modification. The amounts presented represent the balance of such loans as of the end of the quarter in which they defaulted.

For credit card loans modified in TDRs, a substantial portion of these loans are expected to be charged-off in accordance with the Firm's standard charge-off policy. Based on historical experience, the estimated weighted-average default rate for modified credit card loans was expected to be 31.54%, 28.87% and 25.61% as of December 31, 2017, 2016 and 2015, respectively.

Wholesale loan portfolio

Wholesale loans include loans made to a variety of clients, ranging from large corporate and institutional clients to high-net-worth individuals.

The primary credit quality indicator for wholesale loans is the risk rating assigned to each loan. Risk ratings are used to identify the credit quality of loans and differentiate risk within the portfolio. Risk ratings on loans consider the PD and the LGD. The PD is the likelihood that a loan will default. The LGD is the estimated loss on the loan that would be realized upon the default of the borrower and takes into consideration collateral and structural support for each credit facility.

Management considers several factors to determine an appropriate risk rating, including the obligor's debt capacity and financial flexibility, the level of the obligor's earnings, the amount and sources for repayment, the level and nature of contingencies, management strength, and the industry and geography in which the obligor operates. The Firm's definition of criticized aligns with the banking regulatory definition of criticized exposures, which consist of special mention, substandard and doubtful categories. Risk ratings generally represent ratings profiles similar to those defined by S&P and Moody's. Investment-grade ratings range from "AAA/Aaa" to "BBB-/Baa3." Noninvestment-grade ratings are classified as noncriticized ("BB+/Ba1 and B-/B3") and criticized ("CCC+"/"Caa1 and below"), and the criticized portion is further subdivided into performing and nonaccrual loans, representing management's assessment of the collectibility of principal and interest. Criticized loans have a higher probability of default than noncriticized loans.

Risk ratings are reviewed on a regular and ongoing basis by Credit Risk Management and are adjusted as necessary for updated information affecting the obligor's ability to fulfill its obligations.

As noted above, the risk rating of a loan considers the industry in which the obligor conducts its operations. As part of the overall credit risk management framework, the Firm focuses on the management and diversification of its industry and client exposures, with particular attention paid to industries with actual or potential credit concern. See Note 4 for further detail on industry concentrations.

The table below provides information by class of receivable for the retained loans in the Wholesale portfolio segment.

In 2017 the Firm revised its methodology for the assignment of industry classifications, to better monitor and manage concentrations. This largely resulted in the re-assignment of holding companies from Other to the industry of risk category based on the primary business activity of the holding company's underlying entities. In the tables and industry discussions below, the prior period amounts have been revised to conform with the current period presentation.

Below are summaries of the Firm's exposures as of December 31, 2017 and 2016. For additional information on industry concentrations, see Note 4.

As of or for the year ended December 31, (in millions, except ratios)	Commercial and industrial		Real estate		Financial institutions		Government agencies		Other ^(d)		Total retained loans	
	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016
Loans by risk ratings												
Investment-grade	\$ 68,071	\$ 65,687	\$ 98,467	\$ 88,649	\$ 26,791	\$ 24,294	\$ 15,140	\$ 15,935	\$ 103,212	\$ 95,358	\$ 311,681	\$ 289,923
Noninvestment-grade:												
Noncriticized	46,558	47,531	14,335	16,155	13,071	11,075	369	439	9,988	9,360	84,321	84,560
Criticized performing	3,983	6,186	710	798	210	200	—	6	259	163	5,162	7,353
Criticized nonaccrual	1,357	1,491	136	200	2	9	—	—	239	254	1,734	1,954
Total noninvestment-grade	51,898	55,208	15,181	17,153	13,283	11,284	369	445	10,486	9,777	91,217	93,867
Total retained loans	\$119,969	\$120,895	\$ 113,648	\$105,802	\$ 40,074	\$35,578	\$ 15,509	\$ 16,380	\$113,698	\$105,135	\$402,898	\$383,790
% of total criticized to total retained loans	4.45%	6.35%	0.74%	0.94%	0.53%	0.59%	—%	0.04%	0.44%	0.40%	1.71%	2.43%
% of nonaccrual loans to total retained loans	1.13	1.23	0.12	0.19	—	0.03	—	—	0.21	0.24	0.43	0.51
Loans by geographic distribution^(a)												
Total non-U.S.	\$ 28,470	\$ 30,563	\$ 3,101	\$ 3,302	\$ 16,790	\$ 15,147	\$ 2,906	\$ 3,726	\$ 44,112	\$ 38,776	\$ 95,379	\$ 91,514
Total U.S.	91,499	90,332	110,547	102,500	23,284	20,431	12,603	12,654	69,586	66,359	307,519	292,276
Total retained loans	\$119,969	\$120,895	\$ 113,648	\$105,802	\$ 40,074	\$35,578	\$ 15,509	\$ 16,380	\$113,698	\$105,135	\$402,898	\$383,790
Net charge-offs/(recoveries)	\$ 117	\$ 345	\$ (4)	\$ (7)	\$ 6	\$ (1)	\$ 5	\$ (1)	\$ (5)	\$ 5	\$ 119	\$ 341
% of net charge-offs/(recoveries) to end-of-period retained loans	0.10%	0.28%	—%	(0.01)%	0.01%	(0.01)%	0.03%	(0.01)%	—%	0.01%	0.03%	0.09%
Loan delinquency^(b)												
Current and less than 30 days past due and still accruing	\$118,288	\$119,050	\$ 113,258	\$105,396	\$ 40,042	\$35,523	\$ 15,493	\$ 16,269	\$112,559	\$104,280	\$399,640	\$380,518
30-89 days past due and still accruing	216	268	242	204	15	25	12	107	898	582	1,383	1,186
90 or more days past due and still accruing ^(c)	108	86	12	2	15	21	4	4	2	19	141	132
Criticized nonaccrual	1,357	1,491	136	200	2	9	—	—	239	254	1,734	1,954
Total retained loans	\$119,969	\$120,895	\$ 113,648	\$105,802	\$ 40,074	\$35,578	\$ 15,509	\$ 16,380	\$113,698	\$105,135	\$402,898	\$383,790

(a) The U.S. and non-U.S. distribution is determined based predominantly on the domicile of the borrower.

(b) The credit quality of wholesale loans is assessed primarily through ongoing review and monitoring of an obligor's ability to meet contractual obligations rather than relying on the past due status, which is generally a lagging indicator of credit quality.

(c) Represents loans that are considered well-collateralized and therefore still accruing interest.

(d) Other includes individuals, SPEs, holding companies, and private education and civic organizations. For more information on exposures to SPEs, see Note 14.

Notes to consolidated financial statements

The following table presents additional information on the real estate class of loans within the Wholesale portfolio for the periods indicated. Exposure consists primarily of secured commercial loans, of which multifamily is the largest segment. Multifamily lending finances acquisition, leasing and construction of apartment buildings, and includes exposure to real estate investment trusts ("REITs"). Other commercial lending largely includes financing for acquisition, leasing and construction, largely for office, retail and industrial real estate, and includes exposure to REITs. Included in real estate loans is \$10.8 billion and \$9.2 billion as of December 31, 2017 and 2016, respectively, of construction and development exposure consisting of loans originally purposed for construction and development, general purpose loans for builders, as well as loans for land subdivision and pre-development.

December 31, (in millions, except ratios)	Multifamily		Other Commercial		Total real estate loans	
	2017	2016	2017	2016	2017	2016
Real estate retained loans	\$ 77,597	\$ 72,143	\$ 36,051	\$ 33,659	\$ 113,648	\$ 105,802
Criticized	491	539	355	459	846	998
% of criticized to total real estate retained loans	0.63%	0.75%	0.98%	1.36%	0.74%	0.94%
Criticized nonaccrual	\$ 44	\$ 57	\$ 92	\$ 143	\$ 136	\$ 200
% of criticized nonaccrual to total real estate retained loans	0.06%	0.08%	0.26%	0.42%	0.12%	0.19%

Wholesale impaired loans and loan modifications

Wholesale impaired loans consist of loans that have been placed on nonaccrual status and/or that have been modified in a TDR. All impaired loans are evaluated for an asset-specific allowance as described in Note 13.

The table below sets forth information about the Firm's wholesale impaired loans.

December 31, (in millions)	Commercial and industrial		Real estate		Financial institutions		Government agencies		Other		Total retained loans	
	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016
Impaired loans												
With an allowance	\$ 1,170	\$ 1,127	\$ 78	\$ 124	\$ 93	\$ 9	\$ —	\$ —	\$ 168	\$ 180	\$ 1,509	\$ 1,440
Without an allowance ^(a)	228	414	60	87	—	—	—	—	70	76	358	577
Total impaired loans	\$ 1,398	\$ 1,541	\$ 138	\$ 211	\$ 93	\$ 9	\$ —	\$ —	\$ 238	\$ 256	\$ 1,867^(c)	\$ 2,017^(c)
Allowance for loan losses related to impaired loans	\$ 404	\$ 258	\$ 11	\$ 18	\$ 4	\$ 3	\$ —	\$ —	\$ 42	\$ 63	\$ 461	\$ 342
Unpaid principal balance of impaired loans ^(b)	1,604	1,754	201	295	94	12	—	—	255	284	2,154	2,345

(a) When the discounted cash flows, collateral value or market price equals or exceeds the recorded investment in the loan, the loan does not require an allowance. This typically occurs when the impaired loans have been partially charged-off and/or there have been interest payments received and applied to the loan balance.

(b) Represents the contractual amount of principal owed at December 31, 2017 and 2016. The unpaid principal balance differs from the impaired loan balances due to various factors, including charge-offs; interest payments received and applied to the carrying value; net deferred loan fees or costs; and unamortized discount or premiums on purchased loans.

(c) Based upon the domicile of the borrower, largely consists of loans in the U.S.

The following table presents the Firm's average impaired loans for the years ended 2017, 2016 and 2015.

Year ended December 31, (in millions)	2017	2016	2015
Commercial and industrial	\$ 1,145	\$ 1,480	\$ 453
Real estate	164	217	250
Financial institutions	20	13	13
Government agencies	—	—	—
Other	231	213	129
Total^(a)	\$ 1,560	\$ 1,923	\$ 845

(a) The related interest income on accruing impaired loans and interest income recognized on a cash basis were not material for the years ended December 31, 2017, 2016 and 2015.

Certain loan modifications are considered to be TDRs as they provide various concessions to borrowers who are experiencing financial difficulty. All TDRs are reported as impaired loans in the tables above. TDRs were \$614 million and \$733 million as of December 31, 2017 and 2016.

Note 13 – Allowance for credit losses

JPMorgan Chase's allowance for loan losses represents management's estimate of probable credit losses inherent in the Firm's retained loan portfolio, which consists of the two consumer portfolio segments (primarily scored) and the wholesale portfolio segment (risk-rated). The allowance for loan losses includes a formula-based component, an asset-specific component, and a component related to PCI loans, as described below. Management also estimates an allowance for wholesale and certain consumer lending-related commitments using methodologies similar to those used to estimate the allowance on the underlying loans.

During the second quarter of 2017, the Firm refined its credit loss estimates relating to the wholesale portfolio by incorporating the use of internal historical data versus external credit rating agency default statistics to estimate PD. In addition, an adjustment to the statistical calculation for wholesale lending-related commitments was incorporated similar to the adjustment applied for wholesale loans. The impacts of these refinements were not material to the allowance for credit losses.

The Firm's policies used to determine its allowance for credit losses are described in the following paragraphs.

Determining the appropriateness of the allowance is complex and requires judgment by management about the effect of matters that are inherently uncertain. Subsequent evaluations of the loan portfolio, in light of the factors then prevailing, may result in significant changes in the allowances for loan losses and lending-related commitments in future periods. At least quarterly, the allowance for credit losses is reviewed by the CRO, the CFO and the Controller of the Firm and discussed with the DRPC and the Audit Committee. As of December 31, 2017, JPMorgan Chase deemed the allowance for credit losses to be appropriate (i.e., sufficient to absorb probable credit losses inherent in the portfolio).

Formula-based component

The formula-based component is based on a statistical calculation to provide for incurred credit losses in all consumer loans and performing risk-rated loans. All loans restructured in TDRs as well as any impaired risk-rated loans have an allowance assessed as part of the asset-specific component, while PCI loans have an allowance assessed as part of the PCI component. See Note 12 for more information on TDRs, Impaired loans and PCI loans.

Formula-based component - Consumer loans and certain lending-related commitments

The formula-based allowance for credit losses for the consumer portfolio segments is calculated by applying statistical credit loss factors (estimated PD and loss severities) to the recorded investment balances or loan-equivalent amounts of pools of loan exposures with similar risk characteristics over a loss emergence period to arrive at an estimate of incurred credit losses. Estimated loss emergence periods may vary by product and may change

over time; management applies judgment in estimating loss emergence periods, using available credit information and trends. In addition, management applies judgment to the statistical loss estimates for each loan portfolio category, using delinquency trends and other risk characteristics to estimate the total incurred credit losses in the portfolio. Management uses additional statistical methods and considers actual portfolio performance, including actual losses recognized on defaulted loans and collateral valuation trends, to review the appropriateness of the primary statistical loss estimate. The economic impact of potential modifications of residential real estate loans is not included in the statistical calculation because of the uncertainty regarding the type and results of such modifications.

The statistical calculation is then adjusted to take into consideration model imprecision, external factors and current economic events that have occurred but that are not yet reflected in the factors used to derive the statistical calculation; these adjustments are accomplished in part by analyzing the historical loss experience for each major product segment. However, it is difficult to predict whether historical loss experience is indicative of future loss levels. Management applies judgment in making this adjustment, taking into account uncertainties associated with current macroeconomic and political conditions, quality of underwriting standards, borrower behavior, and other relevant internal and external factors affecting the credit quality of the portfolio. In certain instances, the interrelationships between these factors create further uncertainties. The application of different inputs into the statistical calculation, and the assumptions used by management to adjust the statistical calculation, are subject to management judgment, and emphasizing one input or assumption over another, or considering other inputs or assumptions, could affect the estimate of the allowance for credit losses for the consumer credit portfolio.

Overall, the allowance for credit losses for consumer portfolios is sensitive to changes in the economic environment (e.g., unemployment rates), delinquency rates, the realizable value of collateral (e.g., housing prices), FICO scores, borrower behavior and other risk factors. While all of these factors are important determinants of overall allowance levels, changes in the various factors may not occur at the same time or at the same rate, or changes may be directionally inconsistent such that improvement in one factor may offset deterioration in another. In addition, changes in these factors would not necessarily be consistent across all geographies or product types. Finally, it is difficult to predict the extent to which changes in these factors would ultimately affect the frequency of losses, the severity of losses or both.

Notes to consolidated financial statements

Formula-based component - Wholesale loans and lending-related commitments

The Firm's methodology for determining the allowance for loan losses and the allowance for lending-related commitments involves the early identification of credits that are deteriorating. The formula-based component of the allowance for wholesale loans and lending-related commitments is calculated by applying statistical credit loss factors (estimated PD and LGD) to the recorded investment balances or loan-equivalent over a loss emergence period to arrive at an estimate of incurred credit losses in the portfolio. Estimated loss emergence periods may vary by funded versus unfunded status of the instrument and may change over time.

The Firm assesses the credit quality of its borrower or counterparty and assigns a risk rating. Risk ratings are assigned at origination or acquisition, and if necessary, adjusted for changes in credit quality over the life of the exposure. In assessing the risk rating of a particular loan or lending-related commitment, among the factors considered are the obligor's debt capacity and financial flexibility, the level of the obligor's earnings, the amount and sources for repayment, the level and nature of contingencies, management strength, and the industry and geography in which the obligor operates. These factors are based on an evaluation of historical and current information and involve subjective assessment and interpretation. Determining risk ratings involves significant judgment; emphasizing one factor over another or considering additional factors could affect the risk rating assigned by the Firm.

A PD estimate is determined based on the Firm's history of defaults over more than one credit cycle.

LGD estimate is a judgment-based estimate assigned to each loan or lending-related commitment. The estimate represents the amount of economic loss if the obligor were to default. The type of obligor, quality of collateral, and the seniority of the Firm's lending exposure in the obligor's capital structure affect LGD.

The Firm applies judgment in estimating PD, LGD, loss emergence period and loan-equivalent used in calculating the allowance for credit losses. Estimates of PD, LGD, loss emergence period and loan-equivalent used are subject to periodic refinement based on any changes to underlying external or Firm-specific historical data. Changes to the time period used for PD and LGD estimates could also affect the allowance for credit losses. The use of different inputs, estimates or methodologies could change the amount of the allowance for credit losses determined appropriate by the Firm.

In addition to the statistical credit loss estimates applied to the wholesale portfolio, management applies its judgment to adjust the statistical estimates for wholesale loans and lending-related commitments, taking into consideration model imprecision, external factors and economic events that have occurred but are not yet reflected in the loss factors. Historical experience of both LGD and PD are

considered when estimating these adjustments. Factors related to concentrated and deteriorating industries also are incorporated where relevant. These estimates are based on management's view of uncertainties that relate to current macroeconomic conditions, quality of underwriting standards and other relevant internal and external factors affecting the credit quality of the current portfolio.

Asset-specific component

The asset-specific component of the allowance relates to loans considered to be impaired, which includes loans that have been modified in TDRs as well as risk-rated loans that have been placed on nonaccrual status. To determine the asset-specific component of the allowance, larger risk-rated loans (primarily loans in the wholesale portfolio segment) are evaluated individually, while smaller loans (both risk-rated and scored) are evaluated as pools using historical loss experience for the respective class of assets.

The Firm generally measures the asset-specific allowance as the difference between the recorded investment in the loan and the present value of the cash flows expected to be collected, discounted at the loan's original effective interest rate. Subsequent changes in impairment are reported as an adjustment to the allowance for loan losses. In certain cases, the asset-specific allowance is determined using an observable market price, and the allowance is measured as the difference between the recorded investment in the loan and the loan's fair value. Collateral-dependent loans are charged down to the fair value of collateral less costs to sell. For any of these impaired loans, the amount of the asset-specific allowance required to be recorded, if any, is dependent upon the recorded investment in the loan (including prior charge-offs), and either the expected cash flows or fair value of collateral. See Note 12 for more information about charge-offs and collateral-dependent loans.

The asset-specific component of the allowance for impaired loans that have been modified in TDRs (including forgone interest, principal forgiveness, as well as other concessions) incorporates the effect of the modification on the loan's expected cash flows, which considers the potential for redefault. For residential real estate loans modified in TDRs, the Firm develops product-specific probability of default estimates, which are applied at a loan level to compute expected losses. In developing these probabilities of default, the Firm considers the relationship between the credit quality characteristics of the underlying loans and certain assumptions about home prices and unemployment, based upon industry-wide data. The Firm also considers its own historical loss experience to-date based on actual redefaulted modified loans. For credit card loans modified in TDRs, expected losses incorporate projected redefaults based on the Firm's historical experience by type of modification program. For wholesale loans modified in TDRs, expected losses incorporate management's expectation of the borrower's ability to repay under the modified terms.

Estimating the timing and amounts of future cash flows is highly judgmental as these cash flow projections rely upon estimates such as loss severities, asset valuations, default rates (including redefault rates on modified loans), the amounts and timing of interest or principal payments (including any expected prepayments) or other factors that are reflective of current and expected market conditions. These estimates are, in turn, dependent on factors such as the duration of current overall economic conditions, industry-, portfolio-, or borrower-specific factors, the expected outcome of insolvency proceedings as well as, in certain circumstances, other economic factors, including the level of future home prices. All of these estimates and assumptions require significant management judgment and certain assumptions are highly subjective.

PCI loans

In connection with the acquisition of certain PCI loans, which are accounted for as described in Note 12, the allowance for loan losses for the PCI portfolio is based on quarterly estimates of the amount of principal and interest cash flows expected to be collected over the estimated remaining lives of the loans.

These cash flow projections are based on estimates regarding default rates (including redefault rates on modified loans), loss severities, the amounts and timing of prepayments and other factors that are reflective of current and expected future market conditions. These estimates are dependent on assumptions regarding the level of future home prices, and the duration of current overall economic conditions, among other factors. These estimates and assumptions require significant management judgment and certain assumptions are highly subjective.

Notes to consolidated financial statements

Allowance for credit losses and related information

The table below summarizes information about the allowances for loan losses and lending-related commitments, and includes a breakdown of loans and lending-related commitments by impairment methodology.

Year ended December 31, (in millions)	2017			
	Consumer, excluding credit card	Credit card	Wholesale	Total
Allowance for loan losses				
Beginning balance at January 1,	\$ 5,198	\$ 4,034	\$ 4,544	\$ 13,776
Gross charge-offs	1,779	4,521	212	6,512
Gross recoveries	(634)	(398)	(93)	(1,125)
Net charge-offs	1,145	4,123	119	5,387
Write-offs of PCI loans ^(a)	86	—	—	86
Provision for loan losses	613	4,973	(286)	5,300
Other	(1)	—	2	1
Ending balance at December 31,	\$ 4,579	\$ 4,884	\$ 4,141	\$ 13,604
Allowance for loan losses by impairment methodology				
Asset-specific ^(b)	\$ 246	\$ 383 ^(c)	\$ 461	\$ 1,090
Formula-based	2,108	4,501	3,680	10,289
PCI	2,225	—	—	2,225
Total allowance for loan losses	\$ 4,579	\$ 4,884	\$ 4,141	\$ 13,604
Loans by impairment methodology				
Asset-specific	\$ 8,036	\$ 1,215	\$ 1,867	\$ 11,118
Formula-based	333,941	148,172	401,028	883,141
PCI	30,576	—	3	30,579
Total retained loans	\$ 372,553	\$ 149,387	\$ 402,898	\$ 924,838
Impaired collateral-dependent loans				
Net charge-offs	\$ 64	\$ —	\$ 31	\$ 95
Loans measured at fair value of collateral less cost to sell	2,133	—	233	2,366
Allowance for lending-related commitments				
Beginning balance at January 1,	\$ 26	\$ —	\$ 1,052	\$ 1,078
Provision for lending-related commitments	7	—	(17)	(10)
Other	—	—	—	—
Ending balance at December 31,	\$ 33	\$ —	\$ 1,035	\$ 1,068
Allowance for lending-related commitments by impairment methodology				
Asset-specific	\$ —	\$ —	\$ 187	\$ 187
Formula-based	33	—	848	881
Total allowance for lending-related commitments	\$ 33	\$ —	\$ 1,035	\$ 1,068
Lending-related commitments by impairment methodology				
Asset-specific	\$ —	\$ —	\$ 731	\$ 731
Formula-based	48,553	572,831	369,367	990,751
Total lending-related commitments	\$ 48,553	\$ 572,831	\$ 370,098	\$ 991,482

(a) Write-offs of PCI loans are recorded against the allowance for loan losses when actual losses for a pool exceed estimated losses that were recorded as purchase accounting adjustments at the time of acquisition. A write-off of a PCI loan is recognized when the underlying loan is removed from a pool.

(b) Includes risk-rated loans that have been placed on nonaccrual status and all loans that have been modified in a TDR.

(c) The asset-specific credit card allowance for loan losses is related to loans that have been modified in a TDR; such allowance is calculated based on the loans' original contractual interest rates and does not consider any incremental penalty rates.

(d) The prior period amounts have been revised to conform with the current period presentation.

(table continued from previous page)

2016				2015			
Consumer, excluding credit card	Credit card	Wholesale	Total	Consumer, excluding credit card	Credit card	Wholesale	Total
\$ 5,806	\$ 3,434	\$ 4,315	\$ 13,555	\$ 7,050	\$ 3,439	\$ 3,696	\$ 14,185
1,500	3,799	398	5,697	1,658	3,488	95	5,241
(591)	(357)	(57)	(1,005)	(704)	(366)	(85)	(1,155)
909	3,442	341	4,692	954	3,122	10	4,086
156	—	—	156	208	—	—	208
467	4,042	571	5,080	(82)	3,122	623	3,663
(10)	—	(1)	(11)	—	(5)	6	1
\$ 5,198	\$ 4,034	\$ 4,544	\$ 13,776	\$ 5,806	\$ 3,434	\$ 4,315	\$ 13,555
\$ 308	\$ 358 ^(c)	\$ 342	\$ 1,008	\$ 364	\$ 460 ^(c)	\$ 274	\$ 1,098
2,579	3,676	4,202	10,457	2,700	2,974	4,041	9,715
2,311	—	—	2,311	2,742	—	—	2,742
\$ 5,198	\$ 4,034	\$ 4,544	\$ 13,776	\$ 5,806	\$ 3,434	\$ 4,315	\$ 13,555
\$ 8,940	\$ 1,240	\$ 2,017	\$ 12,197	\$ 9,606	\$ 1,465	\$ 1,024	\$ 12,095
319,787	140,471	381,770	842,028	293,751	129,922	356,022	779,695
35,679	—	3	35,682	40,998	—	4	41,002
\$ 364,406	\$ 141,711	\$ 383,790	\$ 889,907	\$ 344,355	\$ 131,387	\$ 357,050	\$ 832,792
\$ 98	\$ —	\$ 7	\$ 105	\$ 104	\$ —	\$ 16	\$ 120
2,391	—	300	2,691	2,566	—	283	2,849
\$ 14	\$ —	\$ 772	\$ 786	\$ 13	\$ —	\$ 609	\$ 622
—	—	281	281	1	—	163	164
12	—	(1)	11	—	—	—	—
\$ 26	\$ —	\$ 1,052	\$ 1,078	\$ 14	\$ —	\$ 772	\$ 786
\$ —	\$ —	\$ 169	\$ 169	\$ —	\$ —	\$ 73	\$ 73
26	—	883	909	14	—	699	713
\$ 26	\$ —	\$ 1,052	\$ 1,078	\$ 14	\$ —	\$ 772	\$ 786
\$ —	\$ —	\$ 506	\$ 506	\$ —	\$ —	\$ 193	\$ 193
53,247 ^(d)	553,891	367,508	974,646 ^(d)	56,865 ^(d)	515,518	366,206	938,589 ^(d)
\$ 53,247 ^(d)	\$ 553,891	\$ 368,014	\$ 975,152 ^(d)	\$ 56,865 ^(d)	\$ 515,518	\$ 366,399	\$ 938,782 ^(d)

Note 14 – Variable interest entities

For a further description of JPMorgan Chase's accounting policies regarding consolidation of VIEs, see Note 1.

The following table summarizes the most significant types of Firm-sponsored VIEs by business segment. The Firm considers a "sponsored" VIE to include any entity where: (1) JPMorgan Chase is the primary beneficiary of the structure; (2) the VIE is used by JPMorgan Chase to securitize Firm assets; (3) the VIE issues financial instruments with the JPMorgan Chase name; or (4) the entity is a JPMorgan Chase-administered asset-backed commercial paper conduit.

Line of Business	Transaction Type	Activity	Annual Report page references
CCB	Credit card securitization trusts	Securitization of originated credit card receivables	236-237
	Mortgage securitization trusts	Servicing and securitization of both originated and purchased residential mortgages	237-239
	Mortgage and other securitization trusts	Securitization of both originated and purchased residential and commercial mortgages and other consumer loans	237-239
CIB	Multi-seller conduits	Assist clients in accessing the financial markets in a cost-efficient manner and structures transactions to meet investor needs	239
	Municipal bond vehicles	Financing of municipal bond investments	239-240

The Firm's other business segments are also involved with VIEs (both third-party and Firm-sponsored), but to a lesser extent, as follows:

- **Asset & Wealth Management:** AWM sponsors and manages certain funds that are deemed VIEs. As asset manager of the funds, AWM earns a fee based on assets managed; the fee varies with each fund's investment objective and is competitively priced. For fund entities that qualify as VIEs, AWM's interests are, in certain cases, considered to be significant variable interests that result in consolidation of the financial results of these entities.
- **Commercial Banking:** CB provides financing and lending-related services to a wide spectrum of clients, including certain third party-sponsored entities that may meet the definition of a VIE. CB does not control the activities of these entities and does not consolidate these entities. CB's maximum loss exposure, regardless of whether the entity is a VIE, is generally limited to loans and lending-related commitments which are reported and disclosed in the same manner as any other third-party transaction.
- **Corporate:** Corporate is involved with entities that may meet the definition of VIEs; however these entities are generally subject to specialized investment company accounting, which does not require the consolidation of investments, including VIEs. In addition, Treasury and CIO invest in securities generally issued by third parties which may meet the definition of VIEs (e.g., issuers of asset-backed securities). In general, the Firm does not have the power to direct the significant activities of these entities and therefore does not consolidate these entities. See Note 10 for further information on the Firm's investment securities portfolio.

In addition, CIB also invests in and provides financing and other services to VIEs sponsored by third parties. See pages 241-242 of this Note for more information on the VIEs sponsored by third parties.

Significant Firm-sponsored variable interest entities**Credit card securitizations**

CCB's Card business securitizes originated credit card loans, primarily through the Chase Issuance Trust (the "Trust"). The Firm's continuing involvement in credit card securitizations includes servicing the receivables, retaining an undivided seller's interest in the receivables, retaining certain senior and subordinated securities and maintaining escrow accounts.

The Firm is considered to be the primary beneficiary of these Firm-sponsored credit card securitization trusts based on the Firm's ability to direct the activities of these VIEs through its servicing responsibilities and other duties, including making decisions as to the receivables that are transferred into those trusts and as to any related modifications and workouts. Additionally, the nature and extent of the Firm's other continuing involvement with the trusts, as indicated above, obligates the Firm to absorb

losses and gives the Firm the right to receive certain benefits from these VIEs that could potentially be significant.

The underlying securitized credit card receivables and other assets of the securitization trusts are available only for payment of the beneficial interests issued by the securitization trusts; they are not available to pay the Firm's other obligations or the claims of the Firm's creditors.

The agreements with the credit card securitization trusts require the Firm to maintain a minimum undivided interest in the credit card trusts (generally 5%). As of December 31, 2017 and 2016, the Firm held undivided interests in Firm-sponsored credit card securitization trusts of \$15.8 billion and \$8.9 billion, respectively. The Firm maintained an average undivided interest in principal receivables owned by those trusts of approximately 26% and 16% for the years ended December 31, 2017 and 2016. As of both

December 31, 2017 and 2016, the Firm did not retain any senior securities and retained \$4.5 billion and \$5.3 billion of subordinated securities in certain of its credit card securitization trusts as of December 31, 2017 and 2016, respectively. The Firm's undivided interests in the credit card trusts and securities retained are eliminated in consolidation.

The Firm securitizes (or has securitized) originated and purchased residential mortgages, commercial mortgages and other consumer loans primarily in its CCB and CIB businesses. Depending on the particular transaction, as well as the respective business involved, the Firm may act as the servicer of the loans and/or retain certain beneficial interests in the securitization trusts.

Firm-sponsored mortgage and other securitization trusts

The following table presents the total unpaid principal amount of assets held in Firm-sponsored private-label securitization entities, including those in which the Firm has continuing involvement, and those that are consolidated by the Firm. Continuing involvement includes servicing the loans, holding senior interests or subordinated interests (including amounts required to be held pursuant to credit risk retention rules), recourse or guarantee arrangements, and derivative transactions. In certain instances, the Firm's only continuing involvement is servicing the loans. See Securitization activity on page 242 of this Note for further information regarding the Firm's cash flows with and interests retained in nonconsolidated VIEs, and page 243 of this Note for information on the Firm's loan sales to U.S. government agencies.

	Principal amount outstanding			JPMorgan Chase interest in securitized assets in nonconsolidated VIEs ^{(c)(d)(e)}			
	Total assets held by securitization VIEs	Assets held in consolidated securitization VIEs	Assets held in nonconsolidated securitization VIEs with continuing involvement	Trading assets	Securities	Other financial assets	Total interests held by JPMorgan Chase
December 31, 2017 (in millions)							
Securitization-related^(a)							
Residential mortgage:							
Prime/Alt-A and option ARMs	\$ 68,874	\$ 3,615	\$ 52,280	\$ 410	\$ 943	\$ —	\$ 1,353
Subprime	18,984	7	17,612	93	—	—	93
Commercial and other ^(b)	94,905	63	63,411	745	1,133	157	2,035
Total	\$ 182,763	\$ 3,685	\$ 133,303	\$ 1,248	\$ 2,076	\$ 157	\$ 3,481

	Principal amount outstanding			JPMorgan Chase interest in securitized assets in nonconsolidated VIEs ^{(c)(d)(e)}			
	Total assets held by securitization VIEs	Assets held in consolidated securitization VIEs	Assets held in nonconsolidated securitization VIEs with continuing involvement	Trading assets	Securities	Other financial assets	Total interests held by JPMorgan Chase
December 31, 2016 (in millions)							
Securitization-related^(a)							
Residential mortgage:							
Prime/Alt-A and option ARMs	\$ 76,789	\$ 4,209	\$ 57,543	\$ 226	\$ 1,334	\$ —	\$ 1,560
Subprime	21,542	—	19,903	76	—	—	76
Commercial and other ^(b)	101,265	107	71,464	509	2,064	—	2,573
Total	\$ 199,596	\$ 4,316	\$ 148,910	\$ 811	\$ 3,398	\$ —	\$ 4,209

- (a) Excludes U.S. government agency securitizations and re-securitizations, which are not Firm-sponsored. See page 243 of this Note for information on the Firm's loan sales to U.S. government agencies.
- (b) Consists of securities backed by commercial loans (predominantly real estate) and non-mortgage-related consumer receivables purchased from third parties.
- (c) Excludes the following: retained servicing (see Note 15 for a discussion of MSRs); securities retained from loan sales to U.S. government agencies; interest rate and foreign exchange derivatives primarily used to manage interest rate and foreign exchange risks of securitization entities (See Note 5 for further information on derivatives); senior and subordinated securities of \$88 million and \$48 million, respectively, at December 31, 2017, and \$180 million and \$49 million, respectively, at December 31, 2016, which the Firm purchased in connection with CIB's secondary market-making activities.
- (d) Includes interests held in re-securitization transactions.
- (e) As of December 31, 2017 and 2016, 61% and 61%, respectively, of the Firm's retained securitization interests, which are predominantly carried at fair value and include amounts required to be held pursuant to credit risk retention rules, were risk-rated "A" or better, on an S&P-equivalent basis. The retained interests in prime residential mortgages consisted of \$1.3 billion and \$1.5 billion of investment-grade and \$48 million and \$77 million of noninvestment-grade retained interests at December 31, 2017 and 2016, respectively. The retained interests in commercial and other securitizations trusts consisted of \$1.6 billion and \$2.4 billion of investment-grade and \$412 million and \$210 million of noninvestment-grade retained interests at December 31, 2017 and 2016, respectively.

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Residential mortgage

The Firm securitizes residential mortgage loans originated by CCB, as well as residential mortgage loans purchased from third parties by either CCB or CIB. CCB generally retains servicing for all residential mortgage loans it originated or purchased, and for certain mortgage loans purchased by CIB. For securitizations of loans serviced by CCB, the Firm has the power to direct the significant activities of the VIE because it is responsible for decisions related to loan modifications and workouts. CCB may also retain an interest upon securitization.

In addition, CIB engages in underwriting and trading activities involving securities issued by Firm-sponsored securitization trusts. As a result, CIB at times retains senior and/or subordinated interests (including residual interests and amounts required to be held pursuant to credit risk retention rules) in residential mortgage securitizations at the time of securitization, and/or reacquires positions in the secondary market in the normal course of business. In certain instances, as a result of the positions retained or reacquired by CIB or held by CCB, when considered together with the servicing arrangements entered into by CCB, the Firm is deemed to be the primary beneficiary of certain securitization trusts. See the table on page 241 of this Note for more information on consolidated residential mortgage securitizations.

The Firm does not consolidate a residential mortgage securitization (Firm-sponsored or third-party-sponsored) when it is not the servicer (and therefore does not have the power to direct the most significant activities of the trust) or does not hold a beneficial interest in the trust that could potentially be significant to the trust. See the table on page 241 of this Note for more information on the consolidated residential mortgage securitizations, and the table on the previous page of this Note for further information on interests held in nonconsolidated residential mortgage securitizations.

Commercial mortgages and other consumer securitizations
CIB originates and securitizes commercial mortgage loans, and engages in underwriting and trading activities involving the securities issued by securitization trusts. CIB may retain unsold senior and/or subordinated interests (including amounts required to be held pursuant to credit risk retention rules) in commercial mortgage securitizations at the time of securitization but, generally, the Firm does not service commercial loan securitizations. For commercial mortgage securitizations the power to direct the significant activities of the VIE generally is held by the servicer or investors in a specified class of securities (“controlling class”). The Firm generally does not retain an interest in the controlling class in its sponsored commercial mortgage securitization transactions. See the table on page 241 of this Note for more information on the consolidated commercial mortgage securitizations, and the table on the previous page of this Note for further information on interests held in nonconsolidated securitizations.

Re-securitizations

The Firm engages in certain re-securitization transactions in which debt securities are transferred to a VIE in exchange for new beneficial interests. These transfers occur in connection with both agency (Federal National Mortgage Association (“Fannie Mae”), Federal Home Loan Mortgage Corporation (“Freddie Mac”) and Government National Mortgage Association (“Ginnie Mae”)) and nonagency (private-label) sponsored VIEs, which may be backed by either residential or commercial mortgages. The Firm’s consolidation analysis is largely dependent on the Firm’s role and interest in the re-securitization trusts.

The following table presents the principal amount of securities transferred to re-securitization VIEs.

Year ended December 31, (in millions)	2017	2016	2015
Transfers of securities to VIEs			
Firm-sponsored private-label	\$ —	\$ 647	\$ 777
Agency	\$ 12,617	\$ 11,241	\$ 21,908

Most re-securitizations with which the Firm is involved are client-driven transactions in which a specific client or group of clients is seeking a specific return or risk profile. For these transactions, the Firm has concluded that the decision-making power of the entity is shared between the Firm and its clients, considering the joint effort and decisions in establishing the re-securitization trust and its assets, as well as the significant economic interest the client holds in the re-securitization trust; therefore the Firm does not consolidate the re-securitization VIE.

In more limited circumstances, the Firm creates a nonagency re-securitization trust independently and not in conjunction with specific clients. In these circumstances, the Firm is deemed to have the unilateral ability to direct the most significant activities of the re-securitization trust because of the decisions made during the establishment and design of the trust; therefore, the Firm consolidates the re-securitization VIE if the Firm holds an interest that could potentially be significant.

Additionally, the Firm may invest in beneficial interests of third-party re-securitizations and generally purchases these interests in the secondary market. In these circumstances, the Firm does not have the unilateral ability to direct the most significant activities of the re-securitization trust, either because it was not involved in the initial design of the trust, or the Firm is involved with an independent third-party sponsor and demonstrates shared power over the creation of the trust; therefore, the Firm does not consolidate the re-securitization VIE.

The following table presents information on nonconsolidated re-securitization VIEs.

Year ended December 31, (in millions)	2017	2016
Firm-sponsored private-label		
Assets held in VIEs with continuing involvement ^(a)	783	875
Interest in VIEs	29	43
Agency		
Interest in VIEs	2,250	1,986

(a) Represents the principal amount and includes the notional amount of interest-only securities.

As of December 31, 2017 and 2016, the Firm did not consolidate any agency re-securitizations or any Firm-sponsored private-label re-securitizations.

Multi-seller conduits

Multi-seller conduit entities are separate bankruptcy remote entities that provide secured financing, collateralized by pools of receivables and other financial assets, to customers of the Firm. The conduits fund their financing facilities through the issuance of highly rated commercial paper. The primary source of repayment of the commercial paper is the cash flows from the pools of assets. In most instances, the assets are structured with deal-specific credit enhancements provided to the conduits by the customers (i.e., sellers) or other third parties. Deal-specific credit enhancements are generally structured to cover a multiple of historical losses expected on the pool of assets, and are typically in the form of overcollateralization provided by the seller. The deal-specific credit enhancements mitigate the Firm's potential losses on its agreements with the conduits.

To ensure timely repayment of the commercial paper, and to provide the conduits with funding to provide financing to customers in the event that the conduits do not obtain funding in the commercial paper market, each asset pool financed by the conduits has a minimum 100% deal-specific liquidity facility associated with it provided by JPMorgan Chase Bank, N.A. JPMorgan Chase Bank, N.A. also provides the multi-seller conduit vehicles with uncommitted program-wide liquidity facilities and program-wide credit enhancement in the form of standby letters of credit. The amount of program-wide credit enhancement required is based upon commercial paper issuance and approximates 10% of the outstanding balance of commercial paper.

The Firm consolidates its Firm-administered multi-seller conduits, as the Firm has both the power to direct the significant activities of the conduits and a potentially significant economic interest in the conduits. As administrative agent and in its role in structuring transactions, the Firm makes decisions regarding asset types and credit quality, and manages the commercial paper funding needs of the conduits. The Firm's interests that could potentially be significant to the VIEs include the fees received as administrative agent and liquidity and program-wide credit enhancement provider, as well as the potential exposure created by the liquidity and credit

enhancement facilities provided to the conduits. See page 241 of this Note for further information on consolidated VIE assets and liabilities.

In the normal course of business, JPMorgan Chase makes markets in and invests in commercial paper issued by the Firm-administered multi-seller conduits. The Firm held \$20.4 billion and \$21.2 billion of the commercial paper issued by the Firm-administered multi-seller conduits at December 31, 2017 and 2016, respectively, which have been eliminated in consolidation. The Firm's investments reflect the Firm's funding needs and capacity and were not driven by market illiquidity. Other than the amounts required to be held pursuant to credit risk retention rules, the Firm is not obligated under any agreement to purchase the commercial paper issued by the Firm-administered multi-seller conduits.

Deal-specific liquidity facilities, program-wide liquidity and credit enhancement provided by the Firm have been eliminated in consolidation. The Firm or the Firm-administered multi-seller conduits provide lending-related commitments to certain clients of the Firm-administered multi-seller conduits. The unfunded commitments were \$8.8 billion and \$7.4 billion at December 31, 2017 and 2016, respectively, and are reported as off-balance sheet lending-related commitments. For more information on off-balance sheet lending-related commitments, see Note 27.

Municipal bond vehicles

Municipal bond vehicles or tender option bond ("TOB") trusts allow institutions to finance their municipal bond investments at short-term rates. In a typical TOB transaction, the trust purchases highly rated municipal bond(s) of a single issuer and funds the purchase by issuing two types of securities: (1) puttable floating-rate certificates ("Floaters") and (2) inverse floating-rate residual interests ("Residuals"). The Floaters are typically purchased by money market funds or other short-term investors and may be tendered, with requisite notice, to the TOB trust. The Residuals are retained by the investor seeking to finance its municipal bond investment. TOB transactions where the Residual is held by a third party investor are typically known as Customer TOB trusts, and Non-Customer TOB trusts are transactions where the Residual is retained by the Firm. Customer TOB trusts are sponsored by a third party; see page 242 on this Note for further information. The Firm serves as sponsor for all Non-Customer TOB transactions. The Firm may provide various services to a TOB trust, including remarketing agent, liquidity or tender option provider, and/or sponsor.

J.P. Morgan Securities LLC may serve as a remarketing agent on the Floaters for TOB trusts. The remarketing agent is responsible for establishing the periodic variable rate on the Floaters, conducting the initial placement and remarketing tendered Floaters. The remarketing agent may, but is not obligated to, make markets in Floaters. The Firm held an insignificant amount of Floaters during 2017 and 2016.

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JPMorgan Chase Bank, N.A. or J.P. Morgan Securities LLC often serves as the sole liquidity or tender option provider for the TOB trusts. The liquidity provider's obligation to perform is conditional and is limited by certain events ("Termination Events"), which include bankruptcy or failure to pay by the municipal bond issuer or credit enhancement provider, an event of taxability on the municipal bonds or the immediate downgrade of the municipal bond to below investment grade. In addition, the liquidity provider's exposure is typically further limited by the high credit quality of the underlying municipal bonds, the excess collateralization in the vehicle, or, in certain transactions, the reimbursement agreements with the Residual holders.

Holders of the Floaters may "put," or tender, their Floaters to the TOB trust. If the remarketing agent cannot successfully remarket the Floaters to another investor, the liquidity provider either provides a loan to the TOB trust for the TOB trust's purchase of the Floaters, or it directly purchases the tendered Floaters.

TOB trusts are considered to be variable interest entities. The Firm consolidates Non-Customer TOB trusts because as the Residual holder, the Firm has the right to make decisions that significantly impact the economic performance of the municipal bond vehicle, and it has the right to receive benefits and bear losses that could potentially be significant to the municipal bond vehicle. See page 241 of this Note for further information on consolidated municipal bond vehicles.

Consolidated VIE assets and liabilities

The following table presents information on assets and liabilities related to VIEs consolidated by the Firm as of December 31, 2017 and 2016.

December 31, 2017 (in millions)	Assets				Liabilities		
	Trading assets	Loans	Other ^(d)	Total assets ^(e)	Beneficial interests in VIE assets ^(f)	Other ^(g)	Total liabilities
VIE program type^(a)							
Firm-sponsored credit card trusts	\$ —	\$ 41,923	\$ 652	\$ 42,575	\$ 21,278	\$ 16	\$ 21,294
Firm-administered multi-seller conduits	—	23,411	48	23,459	3,045	28	3,073
Municipal bond vehicles	1,278	—	3	1,281	1,265	2	1,267
Mortgage securitization entities ^(b)	66	3,661	55	3,782	359	199	558
Student loan securitization entities ^(c)	—	—	—	—	—	—	—
Other	105	—	1,916	2,021	134	104	238
Total	\$ 1,449	\$ 68,995	\$ 2,674	\$ 73,118	\$ 26,081	\$ 349	\$ 26,430

December 31, 2016 (in millions)	Assets				Liabilities		
	Trading assets	Loans	Other ^(d)	Total assets ^(e)	Beneficial interests in VIE assets ^(f)	Other ^(g)	Total liabilities
VIE program type^(a)							
Firm-sponsored credit card trusts	\$ —	\$ 45,919	\$ 790	\$ 46,709	\$ 31,181	\$ 18	\$ 31,199
Firm-administered multi-seller conduits	—	23,760	43	23,803	2,719	33	2,752
Municipal bond vehicles	2,897	—	8	2,905	2,969	2	2,971
Mortgage securitization entities ^(b)	143	4,246	103	4,492	468	313	781
Student loan securitization entities ^(c)	—	1,689	59	1,748	1,527	4	1,531
Other	145	—	2,318	2,463	183	120	303
Total	\$ 3,185	\$ 75,614	\$ 3,321	\$ 82,120	\$ 39,047	\$ 490	\$ 39,537

(a) Excludes intercompany transactions, which are eliminated in consolidation.

(b) Includes residential and commercial mortgage securitizations.

(c) The Firm deconsolidated the student loan securitization entities in the second quarter of 2017 as it no longer had a controlling financial interest in these entities as a result of the sale of the student loan portfolio.

(d) Includes assets classified as cash and other assets on the Consolidated balance sheets.

(e) The assets of the consolidated VIEs included in the program types above are used to settle the liabilities of those entities. The difference between total assets and total liabilities recognized for consolidated VIEs represents the Firm's interest in the consolidated VIEs for each program type.

(f) The interest-bearing beneficial interest liabilities issued by consolidated VIEs are classified in the line item on the Consolidated balance sheets titled, "Beneficial interests issued by consolidated variable interest entities." The holders of these beneficial interests do not have recourse to the general credit of JPMorgan Chase. Included in beneficial interests in VIE assets are long-term beneficial interests of \$21.8 billion and \$33.4 billion at December 31, 2017 and 2016, respectively. For additional information on interest bearing long-term beneficial interest, see Note 19.

(g) Includes liabilities classified as accounts payable and other liabilities on the Consolidated balance sheets.

VIEs sponsored by third parties

The Firm enters into transactions with VIEs structured by other parties. These include, for example, acting as a derivative counterparty, liquidity provider, investor, underwriter, placement agent, remarketing agent, trustee or custodian. These transactions are conducted at arm's-length, and individual credit decisions are based on the analysis of the specific VIE, taking into consideration the quality of the underlying assets. Where the Firm does not have the power to direct the activities of the VIE that most significantly impact the VIE's economic performance, or a variable interest that could potentially be significant, the Firm generally does not consolidate the VIE, but it records and reports these positions on its Consolidated balance sheets in the same manner it would record and report positions in respect of any other third-party transaction.

Tax credit vehicles

The Firm holds investments in unconsolidated tax credit vehicles, which are limited partnerships and similar entities that construct, own and operate affordable housing, wind, solar and other alternative energy projects. These entities are primarily considered VIEs. A third party is typically the general partner or managing member and has control over the significant activities of the tax credit vehicles, and accordingly the Firm does not consolidate tax credit vehicles. The Firm generally invests in these partnerships as a limited partner and earns a return primarily through the receipt of tax credits allocated to the projects. The maximum loss exposure, represented by equity investments and funding commitments, was \$13.4 billion and \$14.8 billion, of which \$3.2 billion and \$3.8 billion was unfunded at December 31, 2017 and 2016 respectively. In order to reduce the risk of loss, the Firm assesses each project and withholds varying amounts of its capital investment until qualification of the project for tax credits. See Note 24 for

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further information on affordable housing tax credits. For more information on off-balance sheet lending-related commitments, see Note 27.

Customer municipal bond vehicles (TOB trusts)

The Firm may provide various services to Customer TOB trusts, including remarketing agent, liquidity or tender option provider. In certain Customer TOB transactions, the Firm, as liquidity provider, has entered into a reimbursement agreement with the Residual holder. In those transactions, upon the termination of the vehicle, the Firm has recourse to the third party Residual holders for any shortfall. The Firm does not have any intent to protect Residual holders from potential losses on any of the underlying municipal bonds. The Firm does not consolidate Customer TOB trusts, since the Firm does not have the power to make decisions that significantly impact the economic performance of the municipal bond vehicle. The Firm's maximum exposure as a liquidity provider to Customer TOB trusts at December 31, 2017 and 2016, was \$5.3 billion and \$5.0 billion, respectively. The fair value of assets held by such VIEs at December 31, 2017 and 2016 was \$9.2 billion and \$8.9 billion, respectively. For more information on off-balance sheet lending-related commitments, see Note 27.

Loan securitizations

The Firm has securitized and sold a variety of loans, including residential mortgage, credit card, student and commercial (primarily related to real estate) loans, as well as debt securities. The purposes of these securitization transactions were to satisfy investor demand and to generate liquidity for the Firm.

For loan securitizations in which the Firm is not required to consolidate the trust, the Firm records the transfer of the loan receivable to the trust as a sale when all of the following accounting criteria for a sale are met: (1) the transferred financial assets are legally isolated from the Firm's creditors; (2) the transferee or beneficial interest holder can pledge or exchange the transferred financial assets; and (3) the Firm does not maintain effective control over the transferred financial assets (e.g., the Firm cannot repurchase the transferred assets before their maturity and it does not have the ability to unilaterally cause the holder to return the transferred assets).

For loan securitizations accounted for as a sale, the Firm recognizes a gain or loss based on the difference between the value of proceeds received (including cash, beneficial interests, or servicing assets received) and the carrying value of the assets sold. Gains and losses on securitizations are reported in noninterest revenue.

Securitization activity

The following table provides information related to the Firm's securitization activities for the years ended December 31, 2017, 2016 and 2015, related to assets held in Firm-sponsored securitization entities that were not consolidated by the Firm, and where sale accounting was achieved at the time of the securitization.

Year ended December 31, (in millions, except rates)	2017		2016		2015	
	Residential mortgage ^(d)	Commercial and other ^(e)	Residential mortgage ^(d)	Commercial and other ^(e)	Residential mortgage ^(d)	Commercial and other ^(e)
Principal securitized	\$ 5,532	\$ 10,252	\$ 1,817	\$ 8,964	\$ 3,008	\$ 11,933
All cash flows during the period:^(a)						
Proceeds received from loan sales as financial instruments ^(b)	\$ 5,661	\$ 10,340	\$ 1,831	\$ 9,094	\$ 3,022	\$ 12,011
Servicing fees collected	525	3	477	3	528	3
Purchases of previously transferred financial assets (or the underlying collateral) ^(c)	1	—	37	—	3	—
Cash flows received on interests	463	918	482	1,441	407	597

(a) Excludes re-securitization transactions.

(b) Predominantly includes Level 2 assets.

(c) Includes cash paid by the Firm to reacquire assets from off-balance sheet, nonconsolidated entities - for example, loan repurchases due to representation and warranties and servicer "clean-up" calls.

(d) Includes prime/Alt-A, subprime, and option ARMs. Excludes certain loan securitization transactions entered into with Ginnie Mae, Fannie Mae and Freddie Mac.

(e) Includes commercial mortgage and other consumer loans.

Key assumptions used to value retained interests originated during the year are shown in the table below.

Year ended December 31,	2017	2016	2015
Residential mortgage retained interest:			
Weighted-average life (in years)	4.8	4.5	4.2
Weighted-average discount rate	2.9%	4.2%	2.9%
Commercial mortgage retained interest:			
Weighted-average life (in years)	7.1	6.2	6.2
Weighted-average discount rate	4.4%	5.8%	4.1%

Loans and excess MSR sold to U.S. government-sponsored enterprises, loans in securitization transactions pursuant to Ginnie Mae guidelines, and other third-party-sponsored securitization entities

In addition to the amounts reported in the securitization activity tables above, the Firm, in the normal course of business, sells originated and purchased mortgage loans and certain originated excess MSRs on a nonrecourse basis, predominantly to U.S. government sponsored enterprises ("U.S. GSEs"). These loans and excess MSRs are sold primarily for the purpose of securitization by the U.S. GSEs, who provide certain guarantee provisions (e.g., credit enhancement of the loans). The Firm also sells loans into securitization transactions pursuant to Ginnie Mae guidelines; these loans are typically insured or guaranteed by another U.S. government agency. The Firm does not consolidate the securitization vehicles underlying these transactions as it is not the primary beneficiary. For a limited number of loan sales, the Firm is obligated to share a portion of the credit risk associated with the sold loans with the purchaser. See Note 27 for additional information about the Firm's loan sales- and securitization-related indemnifications.

See Note 15 for additional information about the impact of the Firm's sale of certain excess MSRs.

The following table summarizes the activities related to loans sold to the U.S. GSEs, loans in securitization transactions pursuant to Ginnie Mae guidelines, and other third-party-sponsored securitization entities.

Year ended December 31, (in millions)	2017	2016	2015
Carrying value of loans sold	\$ 64,542	\$ 52,869	\$ 42,161
Proceeds received from loan sales as cash	\$ 117	\$ 592	\$ 313
Proceeds from loans sales as securities ^(a)	63,542	51,852	41,615
Total proceeds received from loan sales^(b)	\$ 63,659	\$ 52,444	\$ 41,928
Gains on loan sales ^{(c)(d)}	\$ 163	\$ 222	\$ 299

(a) Predominantly includes securities from U.S. GSEs and Ginnie Mae that are generally sold shortly after receipt.

- (b) Excludes the value of MSRs retained upon the sale of loans.
- (c) Gains on loan sales include the value of MSRs.
- (d) The carrying value of the loans accounted for at fair value approximated the proceeds received upon loan sale.

Options to repurchase delinquent loans

In addition to the Firm's obligation to repurchase certain loans due to material breaches of representations and warranties as discussed in Note 27, the Firm also has the option to repurchase delinquent loans that it services for Ginnie Mae loan pools, as well as for other U.S. government agencies under certain arrangements. The Firm typically elects to repurchase delinquent loans from Ginnie Mae loan pools as it continues to service them and/or manage the foreclosure process in accordance with the applicable requirements, and such loans continue to be insured or guaranteed. When the Firm's repurchase option becomes exercisable, such loans must be reported on the Consolidated balance sheets as a loan with a corresponding liability.

The following table presents loans the Firm repurchased or had an option to repurchase, real estate owned, and foreclosed government-guaranteed residential mortgage loans recognized on the Firm's Consolidated balance sheets as of December 31, 2017 and 2016. Substantially all of these loans and real estate are insured or guaranteed by U.S. government agencies. For additional information, refer to Note 12.

December 31, (in millions)	2017	2016
Loans repurchased or option to repurchase ^(a)	\$ 8,629	\$ 9,556
Real estate owned	95	142
Foreclosed government-guaranteed residential mortgage loans ^(b)	527	1,007

- (a) Predominantly all of these amounts relate to loans that have been repurchased from Ginnie Mae loan pools.
- (b) Relates to voluntary repurchases of loans, which are included in accrued interest and accounts receivable.

Loan delinquencies and liquidation losses

The table below includes information about components of nonconsolidated securitized financial assets held in Firm-sponsored private-label securitization entities, in which the Firm has continuing involvement, and delinquencies as of December 31, 2017 and 2016.

As of or for the year ended December 31, (in millions)	Securitized assets		90 days past due		Liquidation losses	
	2017	2016	2017	2016	2017	2016
Securitized loans						
Residential mortgage:						
Prime/ Alt-A & option ARMs	\$ 52,280	\$ 57,543	\$ 4,870	\$ 6,169	\$ 790	\$ 1,160
Subprime	17,612	19,903	3,276	4,186	719	1,087
Commercial and other	63,411	71,464	957	1,755	114	643
Total loans securitized	\$ 133,303	\$ 148,910	\$ 9,103	\$ 12,110	\$ 1,623	\$ 2,890

Note 15 – Goodwill and Mortgage servicing rights**Goodwill**

Goodwill is recorded upon completion of a business combination as the difference between the purchase price and the fair value of the net assets acquired. Subsequent to initial recognition, goodwill is not amortized but is tested for impairment during the fourth quarter of each fiscal year, or more often if events or circumstances, such as adverse changes in the business climate, indicate there may be impairment.

The goodwill associated with each business combination is allocated to the related reporting units, which are determined based on how the Firm's businesses are managed and how they are reviewed by the Firm's Operating Committee. The following table presents goodwill attributed to the business segments.

December 31, (in millions)	2017	2016	2015
Consumer & Community Banking	\$ 31,013	\$ 30,797	\$ 30,769
Corporate & Investment Bank	6,776	6,772	6,772
Commercial Banking	2,860	2,861	2,861
Asset & Wealth Management	6,858	6,858	6,923
Total goodwill	\$ 47,507	\$ 47,288	\$ 47,325

The following table presents changes in the carrying amount of goodwill.

Year ended December 31, (in millions)	2017	2016	2015
Balance at beginning of period	\$ 47,288	\$ 47,325	\$ 47,647
Changes during the period from:			
Business combinations ^(a)	199	—	28
Dispositions ^(b)	—	(72)	(160)
Other ^(c)	20	35	(190)
Balance at December 31,	\$ 47,507	\$ 47,288	\$ 47,325

(a) For 2017, represents CCB goodwill in connection with an acquisition.

(b) For 2016, represents AWM goodwill, which was disposed of as part of an AWM sales transaction. For 2015 includes \$101 million of Private Equity goodwill, which was disposed of as part of the Private Equity sale.

(c) Includes foreign currency translation adjustments and other tax-related adjustments.

Impairment testing

The Firm's goodwill was not impaired at December 31, 2017, 2016, and 2015.

The goodwill impairment test is performed in two steps. In the first step, the current fair value of each reporting unit is compared with its carrying value, including goodwill and other intangible assets. If the fair value is in excess of the carrying value, then the reporting unit's goodwill is considered to be not impaired. If the fair value is less than the carrying value, then a second step is performed. In the second step, the implied current fair value of the reporting unit's goodwill is determined by comparing the fair value of the reporting unit (as determined in step one) to the fair value of the net assets of the reporting unit, as if the reporting unit were being acquired in a business combination. The resulting implied current fair value of goodwill is then compared with the carrying value of the reporting unit's goodwill. If the carrying value of the goodwill exceeds its implied current fair value, then an impairment charge is recognized for the excess. If the carrying value of goodwill is less than its implied current fair value, then no goodwill impairment is recognized.

The Firm uses the reporting units' allocated capital plus goodwill and other intangible assets capital as a proxy for the carrying values of equity for the reporting units in the goodwill impairment testing. Reporting unit equity is determined on a similar basis as the allocation of capital to the Firm's lines of business, which takes into consideration the capital the business segment would require if it were operating independently, incorporating sufficient capital to address regulatory capital requirements (including Basel III) and capital levels for similarly rated peers. Proposed line of business equity levels are incorporated into the Firm's annual budget process, which is reviewed by the Firm's Board of Directors. Allocated capital is further reviewed on a periodic basis and updated as needed.

The primary method the Firm uses to estimate the fair value of its reporting units is the income approach. This approach projects cash flows for the forecast period and uses the perpetuity growth method to calculate terminal values. These cash flows and terminal values are then discounted using an appropriate discount rate. Projections of cash flows are based on the reporting units' earnings forecasts which are reviewed with senior management of the Firm. The discount rate used for each reporting unit represents an estimate of the cost of equity for that reporting unit and is determined considering the Firm's overall estimated cost of equity (estimated using the Capital Asset Pricing Model), as adjusted for the risk characteristics specific to each reporting unit (for example, for higher levels of risk or uncertainty associated with the business or management's forecasts and assumptions). To assess the reasonableness of the discount rates used for each reporting unit management compares the discount rate to the estimated cost of equity for publicly traded institutions with similar businesses and risk characteristics. In addition, the weighted average cost of equity (aggregating the various reporting units) is compared with the Firm's overall estimated cost of equity to ensure reasonableness.

The valuations derived from the discounted cash flow analysis are then compared with market-based trading and transaction multiples for relevant competitors. Trading and transaction comparables are used as general indicators to assess the general reasonableness of the estimated fair values, although precise conclusions generally cannot be drawn due to the differences that naturally exist between the Firm's businesses and competitor institutions.

Management also takes into consideration a comparison between the aggregate fair values of the Firm's reporting units and JPMorgan Chase's market capitalization. In evaluating this comparison, management considers several factors, including (i) a control premium that would exist in a market transaction, (ii) factors related to the level of execution risk that would exist at the firmwide level that do not exist at the reporting unit level and (iii) short-term market volatility and other factors that do not directly affect the value of individual reporting units.

Declines in business performance, increases in credit losses, increases in capital requirements, as well as deterioration in economic or market conditions, estimates of adverse regulatory or legislative changes or increases in the estimated market cost of equity, could cause the estimated fair values of the Firm's reporting units or their associated goodwill to decline in the future, which could result in a material impairment charge to earnings in a future period related to some portion of the associated goodwill.

Mortgage servicing rights

MSRs represent the fair value of expected future cash flows for performing servicing activities for others. The fair value considers estimated future servicing fees and ancillary revenue, offset by estimated costs to service the loans, and generally declines over time as net servicing cash flows are received, effectively amortizing the MSR asset against contractual servicing and ancillary fee income. MSRs are either purchased from third parties or recognized upon sale or securitization of mortgage loans if servicing is retained.

As permitted by U.S. GAAP, the Firm has elected to account for its MSRs at fair value. The Firm treats its MSRs as a single class of servicing assets based on the availability of market inputs used to measure the fair value of its MSR asset and its treatment of MSRs as one aggregate pool for risk management purposes. The Firm estimates the fair value of MSRs using an option-adjusted spread ("OAS") model, which projects MSR cash flows over multiple interest rate scenarios in conjunction with the Firm's prepayment model, and then discounts these cash flows at risk-adjusted rates. The model considers portfolio characteristics, contractually specified servicing fees, prepayment assumptions, delinquency rates, costs to service, late charges and other ancillary revenue, and other economic factors. The Firm compares fair value estimates and assumptions to observable market data where available, and also considers recent market activity and actual portfolio experience.

Notes to consolidated financial statements

The fair value of MSRs is sensitive to changes in interest rates, including their effect on prepayment speeds. MSRs typically decrease in value when interest rates decline because declining interest rates tend to increase prepayments and therefore reduce the expected life of the net servicing cash flows that comprise the MSR asset. Conversely, securities (e.g., mortgage-backed securities), principal-only certificates and certain derivatives (i.e.,

those for which the Firm receives fixed-rate interest payments) increase in value when interest rates decline. JPMorgan Chase uses combinations of derivatives and securities to manage the risk of changes in the fair value of MSRs. The intent is to offset any interest-rate related changes in the fair value of MSRs with changes in the fair value of the related risk management instruments.

The following table summarizes MSR activity for the years ended December 31, 2017, 2016 and 2015.

As of or for the year ended December 31, (in millions, except where otherwise noted)	2017	2016	2015
Fair value at beginning of period	\$ 6,096	\$ 6,608	\$ 7,436
MSR activity:			
Originations of MSRs	1,103	679	550
Purchase of MSRs	—	—	435
Disposition of MSRs ^(a)	(140)	(109)	(486)
Net additions	963	570	499
Changes due to collection/realization of expected cash flows	(797)	(919)	(922)
Changes in valuation due to inputs and assumptions:			
Changes due to market interest rates and other ^(b)	(202)	(72)	(160)
Changes in valuation due to other inputs and assumptions:			
Projected cash flows (e.g., cost to service)	(102)	(35)	(112)
Discount rates	(19)	7	(10)
Prepayment model changes and other ^(c)	91	(63)	(123)
Total changes in valuation due to other inputs and assumptions	(30)	(91)	(245)
Total changes in valuation due to inputs and assumptions	(232)	(163)	(405)
Fair value at December 31,	\$ 6,030	\$ 6,096	\$ 6,608
Change in unrealized gains/(losses) included in income related to MSRs held at December 31,	\$ (232)	\$ (163)	\$ (405)
Contractual service fees, late fees and other ancillary fees included in income	1,886	2,124	2,533
Third-party mortgage loans serviced at December 31, (in billions)	555.0	593.3	677.0
Servicer advances, net of an allowance for uncollectible amounts, at December 31, (in billions) ^(d)	4.0	4.7	6.5

(a) Includes excess MSRs transferred to agency-sponsored trusts in exchange for stripped mortgage backed securities ("SMBS"). In each transaction, a portion of the SMBS was acquired by third parties at the transaction date; the Firm acquired the remaining balance of those SMBS as trading securities.

(b) Represents both the impact of changes in estimated future prepayments due to changes in market interest rates, and the difference between actual and expected prepayments.

(c) Represents changes in prepayments other than those attributable to changes in market interest rates.

(d) Represents amounts the Firm pays as the servicer (e.g., scheduled principal and interest, taxes and insurance), which will generally be reimbursed within a short period of time after the advance from future cash flows from the trust or the underlying loans. The Firm's credit risk associated with these servicer advances is minimal because reimbursement of the advances is typically senior to all cash payments to investors. In addition, the Firm maintains the right to stop payment to investors if the collateral is insufficient to cover the advance. However, certain of these servicer advances may not be recoverable if they were not made in accordance with applicable rules and agreements.

The following table presents the components of mortgage fees and related income (including the impact of MSR risk management activities) for the years ended December 31, 2017, 2016 and 2015.

Year ended December 31, (in millions)	2017	2016	2015
CCB mortgage fees and related income			
Net production revenue	\$ 636	\$ 853	\$ 769
Net mortgage servicing revenue:			
Operating revenue:			
Loan servicing revenue	2,014	2,336	2,776
Changes in MSR asset fair value due to collection/realization of expected cash flows	(795)	(916)	(917)
Total operating revenue	1,219	1,420	1,859
Risk management:			
Changes in MSR asset fair value due to market interest rates and other ^(a)	(202)	(72)	(160)
Other changes in MSR asset fair value due to other inputs and assumptions in model ^(b)	(30)	(91)	(245)
Change in derivative fair value and other	(10)	380	288
Total risk management	(242)	217	(117)
Total net mortgage servicing revenue	977	1,637	1,742
Total CCB mortgage fees and related income	1,613	2,490	2,511
All other	3	1	2
Mortgage fees and related income	\$ 1,616	\$ 2,491	\$ 2,513

(a) Represents both the impact of changes in estimated future prepayments due to changes in market interest rates, and the difference between actual and expected prepayments.

(b) Represents the aggregate impact of changes in model inputs and assumptions such as projected cash flows (e.g., cost to service), discount rates and changes in prepayments other than those attributable to changes in market interest rates (e.g., changes in prepayments due to changes in home prices).

The table below outlines the key economic assumptions used to determine the fair value of the Firm's MSRs at December 31, 2017 and 2016, and outlines the sensitivities of those fair values to immediate adverse changes in those assumptions, as defined below.

December 31, (in millions, except rates)	2017	2016
Weighted-average prepayment speed assumption ("CPR")	9.35%	9.41%
Impact on fair value of 10% adverse change	\$ (221)	\$ (231)
Impact on fair value of 20% adverse change	(427)	(445)
Weighted-average option adjusted spread	9.04%	8.55%
Impact on fair value of 100 basis points adverse change	\$ (250)	\$ (248)
Impact on fair value of 200 basis points adverse change	(481)	(477)

CPR: Constant prepayment rate.

Changes in fair value based on variation in assumptions generally cannot be easily extrapolated, because the relationship of the change in the assumptions to the change in fair value are often highly interrelated and may not be linear. In this table, the effect that a change in a particular assumption may have on the fair value is calculated without changing any other assumption. In reality, changes in one factor may result in changes in another, which would either magnify or counteract the impact of the initial change.

Notes to consolidated financial statements

Note 16 – Premises and equipment

Premises and equipment, including leasehold improvements, are carried at cost less accumulated depreciation and amortization. JPMorgan Chase computes depreciation using the straight-line method over the estimated useful life of an asset. For leasehold improvements, the Firm uses the straight-line method computed over the lesser of the remaining term of the leased facility or the estimated useful life of the leased asset.

JPMorgan Chase capitalizes certain costs associated with the acquisition or development of internal-use software. Once the software is ready for its intended use, these costs are amortized on a straight-line basis over the software's expected useful life and reviewed for impairment on an ongoing basis.

Note 17 – Deposits

At December 31, 2017 and 2016, noninterest-bearing and interest-bearing deposits were as follows.

December 31, (in millions)	2017	2016
U.S. offices		
Noninterest-bearing	\$ 393,645	\$ 400,831
Interest-bearing (included \$14,947, and \$12,245 at fair value) ^(a)	793,618	737,949
Total deposits in U.S. offices	1,187,263	1,138,780
Non-U.S. offices		
Noninterest-bearing	15,576	14,764
Interest-bearing (included \$6,374 and \$1,667 at fair value) ^(a)	241,143	221,635
Total deposits in non-U.S. offices	256,719	236,399
Total deposits	\$ 1,443,982	\$ 1,375,179

(a) Includes structured notes classified as deposits for which the fair value option has been elected. For further discussion, see Note 3.

At December 31, 2017 and 2016, time deposits in denominations of \$250,000 or more were as follows.

December 31, (in millions)	2017	2016
U.S. offices	\$ 30,671	\$ 26,180
Non-U.S. offices ^(a)	29,049	29,652
Total^(a)	\$ 59,720	\$ 55,832

(a) The prior period amounts have been revised to conform with the current period presentation.

At December 31, 2017, the maturities of interest-bearing time deposits were as follows.

December 31, 2017 (in millions)	U.S.	Non-U.S.	Total
2018	\$ 37,645	\$ 27,621	\$ 65,266
2019	3,487	349	3,836
2020	2,332	22	2,354
2021	4,275	26	4,301
2022	2,297	443	2,740
After 5 years	3,391	1,697	5,088
Total	\$ 53,427	\$ 30,158	\$ 83,585

Note 18 – Accounts payable and other liabilities

Accounts payable and other liabilities consist of brokerage payables, which includes payables to customers, dealers and clearing organizations, and payables from security purchases that did not settle; accrued expenses, including income tax payables and credit card rewards liability; and all other liabilities, including obligations to return securities received as collateral and litigation reserves.

The following table details the components of accounts payable and other liabilities.

December 31, (in millions)	2017	2016
Brokerage payables	\$ 102,727	\$ 109,842
Other payables and liabilities ^(a)	86,656	80,701
Total accounts payable and other liabilities	\$ 189,383	\$ 190,543

(a) Includes credit card rewards liability of \$4.9 billion and \$3.8 billion at December 31, 2017 and 2016, respectively.

Note 19 – Long-term debt

JPMorgan Chase issues long-term debt denominated in various currencies, predominantly U.S. dollars, with both fixed and variable interest rates. Included in senior and subordinated debt below are various equity-linked or other indexed instruments, which the Firm has elected to measure at fair value. Changes in fair value are recorded in principal transactions revenue in the Consolidated statements of income, except for unrealized gains/(losses) due to DVA which are recorded in OCI. The following table is a summary of long-term debt carrying values (including unamortized premiums and discounts, issuance costs, valuation adjustments and fair value adjustments, where applicable) by remaining contractual maturity as of December 31, 2017.

By remaining maturity at December 31, (in millions, except rates)		2017				2016
		Under 1 year	1-5 years	After 5 years	Total	Total
Parent company						
Senior debt:	Fixed rate	\$ 15,084	\$ 53,939	\$ 72,528	\$ 141,551	\$ 128,967
	Variable rate	5,547	12,802	8,112	26,461	34,766
	Interest rates ^(a)	0.38-7.25%	0.16-6.30%	0.45-6.40%	0.16-7.25%	0.09-7.25%
Subordinated debt:	Fixed rate	\$ —	\$ 149	\$ 14,497	\$ 14,646	\$ 16,811
	Variable rate	—	—	9	9	1,245
	Interest rates ^(a)	—%	8.53%	3.38-8.00%	3.38-8.53%	0.82-8.53%
Subtotal		\$ 20,631	\$ 66,890	\$ 95,146	\$ 182,667	\$ 181,789
Subsidiaries						
Federal Home Loan Banks advances:	Fixed rate	\$ 4	\$ 34	\$ 129	\$ 167	\$ 179
	Variable rate	12,450	37,000	11,000	60,450	79,340
	Interest rates ^(a)	1.58-1.75%	1.46-2.00%	1.18-1.47%	1.18-2.00%	0.41-1.21%
Senior debt:	Fixed rate	\$ 1,122	\$ 3,970	\$ 6,898	\$ 11,990	\$ 8,329
	Variable rate	8,967	13,287	3,964	26,218	19,379
	Interest rates ^(a)	0.22-7.50%	1.65-7.50%	1.00-7.50%	0.22-7.50%	0.00-7.50%
Subordinated debt:	Fixed rate	\$ —	\$ —	\$ 313	\$ 313	\$ 3,884
	Variable rate	—	—	—	—	—
	Interest rates ^(a)	—%	—%	8.25%	8.25%	6.00-8.25%
Subtotal		\$ 22,543	\$ 54,291	\$ 22,304	\$ 99,138	\$ 111,111
Junior subordinated debt^(b):	Fixed rate	\$ —	\$ —	\$ 690	\$ 690	\$ 706
	Variable rate	—	—	1,585	1,585	1,639
	Interest rates ^(a)	—%	—%	1.88-8.75%	1.88-8.75%	1.39-8.75%
Subtotal		\$ —	\$ —	\$ 2,275	\$ 2,275	\$ 2,345
Total long-term debt^{(c)(d)(e)}		\$ 43,174	\$ 121,181	\$ 119,725	\$ 284,080	\$ 295,245^{(g)(h)}
Long-term beneficial interests:	Fixed rate	\$ 5,927	\$ 7,652	\$ —	\$ 13,579	\$ 18,678
	Variable rate	3,399	4,472	321	8,192	14,681
	Interest rates	1.10-2.50%	1.27-6.54%	0.00-3.75%	0.00-6.54%	0.39-7.87%
Total long-term beneficial interests^(f)		\$ 9,326	\$ 12,124	\$ 321	\$ 21,771	\$ 33,359

(a) The interest rates shown are the range of contractual rates in effect at December 31, 2017 and 2016, respectively, including non-U.S. dollar fixed- and variable-rate issuances, which excludes the effects of the associated derivative instruments used in hedge accounting relationships, if applicable. The use of these derivative instruments modifies the Firm's exposure to the contractual interest rates disclosed in the table above. Including the effects of the hedge accounting derivatives, the range of modified rates in effect at December 31, 2017, for total long-term debt was (0.19)% to 8.88%, versus the contractual range of 0.16% to 8.75% presented in the table above. The interest rate ranges shown exclude structured notes accounted for at fair value.

(b) As of December 31, 2017, includes \$0.7 billion of fixed rate junior subordinated debentures issued to an issuer trust and \$1.6 billion of variable rate junior subordinated debentures distributed pro rata to the holders of the \$1.6 billion of trust preferred securities which were cancelled on December 18, 2017.

(c) Included long-term debt of \$63.5 billion and \$82.2 billion secured by assets totaling \$208.4 billion and \$205.6 billion at December 31, 2017 and 2016, respectively. The amount of long-term debt secured by assets does not include amounts related to hybrid instruments.

(d) Included \$47.5 billion and \$37.7 billion of long-term debt accounted for at fair value at December 31, 2017 and 2016, respectively.

(e) Included \$10.3 billion and \$7.5 billion of outstanding zero-coupon notes at December 31, 2017 and 2016, respectively. The aggregate principal amount of these notes at their respective maturities is \$33.5 billion and \$25.1 billion, respectively. The aggregate principal amount reflects the contractual principal payment at maturity, which may exceed the contractual principal payment at the Firm's next call date, if applicable.

(f) Included on the Consolidated balance sheets in beneficial interests issued by consolidated VIEs. Also included \$45 million and \$120 million accounted for at fair value at December 31, 2017 and 2016, respectively. Excluded short-term commercial paper and other short-term beneficial interests of \$4.3 billion and \$5.7 billion at December 31, 2017 and 2016, respectively.

(g) At December 31, 2017, long-term debt in the aggregate of \$111.2 billion was redeemable at the option of JPMorgan Chase, in whole or in part, prior to maturity, based on the terms specified in the respective instruments.

(h) The aggregate carrying values of debt that matures in each of the five years subsequent to 2017 is \$43.2 billion in 2018, \$34.7 billion in 2019, \$39.3 billion in 2020, \$33.8 billion in 2021 and \$13.4 billion in 2022.

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The weighted-average contractual interest rates for total long-term debt excluding structured notes accounted for at fair value were 2.87% and 2.49% as of December 31, 2017 and 2016, respectively. In order to modify exposure to interest rate and currency exchange rate movements, JPMorgan Chase utilizes derivative instruments, primarily interest rate and cross-currency interest rate swaps, in conjunction with some of its debt issuances. The use of these instruments modifies the Firm's interest expense on the associated debt. The modified weighted-average interest rates for total long-term debt, including the effects of related derivative instruments, were 2.56% and 2.01% as of December 31, 2017 and 2016, respectively.

JPMorgan Chase & Co. has guaranteed certain long-term debt of its subsidiaries, including both long-term debt and structured notes. These guarantees rank on parity with the Firm's other unsecured and unsubordinated indebtedness. The amount of such guaranteed long-term debt and structured notes was \$7.9 billion and \$3.9 billion at December 31, 2017 and 2016, respectively.

The Firm's unsecured debt does not contain requirements that would call for an acceleration of payments, maturities or changes in the structure of the existing debt, provide any limitations on future borrowings or require additional collateral, based on unfavorable changes in the Firm's credit ratings, financial ratios, earnings or stock price.

Junior subordinated deferrable interest debentures

At December 31, 2016, the Firm had outstanding eight wholly-owned Delaware statutory business trusts ("issuer trusts") that had issued trust preferred securities. On December 18, 2017, seven of the eight issuer trusts were liquidated, \$1.6 billion of trust preferred and \$56 million of common securities originally issued by those trusts were cancelled, and the junior subordinated debentures previously held by each trust issuer were distributed pro rata to the holders of the corresponding series of trust preferred and common securities.

Beginning in 2014, the junior subordinated debentures issued to the issuer trusts by the Firm, less the common capital securities of the issuer trusts, began being phased out from inclusion as Tier 1 capital under Basel III and they were fully phased out as of December 31, 2016. As of December 31, 2017 and 2016, \$300 million and \$1.4 billion, respectively, qualified as Tier 2 capital.

The Firm redeemed \$1.6 billion of trust preferred securities in the year ended December 31, 2016.

Note 20 – Preferred stock

At December 31, 2017 and 2016, JPMorgan Chase was authorized to issue 200 million shares of preferred stock, in one or more series, with a par value of \$1 per share.

In the event of a liquidation or dissolution of the Firm, JPMorgan Chase's preferred stock then outstanding takes precedence over the Firm's common stock with respect to the payment of dividends and the distribution of assets.

The following is a summary of JPMorgan Chase's non-cumulative preferred stock outstanding as of December 31, 2017 and 2016.

	Shares at December 31, ^(a)		Carrying value (in millions) at December 31,		Issue date	Contractual rate in effect at December 31, 2017	Earliest redemption date	Date at which dividend rate becomes floating	Floating annual rate of three-month LIBOR plus:
	2017	2016	2017	2016					
Fixed-rate:									
Series O	—	125,750	\$ —	\$ 1,258	8/27/2012	N/A	9/1/2017	NA	NA
Series P	90,000	90,000	900	900	2/5/2013	5.450%	3/1/2018	NA	NA
Series T	92,500	92,500	925	925	1/30/2014	6.700	3/1/2019	NA	NA
Series W	88,000	88,000	880	880	6/23/2014	6.300	9/1/2019	NA	NA
Series Y	143,000	143,000	1,430	1,430	2/12/2015	6.125	3/1/2020	NA	NA
Series AA	142,500	142,500	1,425	1,425	6/4/2015	6.100	9/1/2020	NA	NA
Series BB	115,000	115,000	1,150	1,150	7/29/2015	6.150	9/1/2020	NA	NA
Fixed-to-floating-rate:									
Series I	600,000	600,000	6,000	6,000	4/23/2008	7.900%	4/30/2018	4/30/2018	LIBOR + 3.47%
Series Q	150,000	150,000	1,500	1,500	4/23/2013	5.150	5/1/2023	5/1/2023	LIBOR + 3.25
Series R	150,000	150,000	1,500	1,500	7/29/2013	6.000	8/1/2023	8/1/2023	LIBOR + 3.30
Series S	200,000	200,000	2,000	2,000	1/22/2014	6.750	2/1/2024	2/1/2024	LIBOR + 3.78
Series U	100,000	100,000	1,000	1,000	3/10/2014	6.125	4/30/2024	4/30/2024	LIBOR + 3.33
Series V	250,000	250,000	2,500	2,500	6/9/2014	5.000	7/1/2019	7/1/2019	LIBOR + 3.32
Series X	160,000	160,000	1,600	1,600	9/23/2014	6.100	10/1/2024	10/1/2024	LIBOR + 3.33
Series Z	200,000	200,000	2,000	2,000	4/21/2015	5.300	5/1/2020	5/1/2020	LIBOR + 3.80
Series CC	125,750	—	1,258	—	10/20/2017	4.625	11/1/2022	11/1/2022	LIBOR + 2.58
Total preferred stock	2,606,750	2,606,750	\$ 26,068	\$ 26,068					

(a) Represented by depositary shares.

Each series of preferred stock has a liquidation value and redemption price per share of \$10,000, plus accrued but unpaid dividends.

Dividends on fixed-rate preferred stock are payable quarterly. Dividends on fixed-to-floating-rate preferred stock are payable semiannually while at a fixed rate, and become payable quarterly after converting to a floating rate.

On October 20, 2017, the Firm issued \$1.3 billion of fixed-to-floating rate non-cumulative preferred stock, Series CC, with an initial dividend rate of 4.625%. On December 1, 2017, The Firm redeemed all \$1.3 billion of its outstanding 5.50% non-cumulative preferred stock, Series O.

Redemption rights

Each series of the Firm's preferred stock may be redeemed on any dividend payment date on or after the earliest redemption date for that series. All outstanding preferred stock series except Series I may also be redeemed following a "capital treatment event," as described in the terms of each series. Any redemption of the Firm's preferred stock is subject to non-objection from the Board of Governors of the Federal Reserve System (the "Federal Reserve").

Note 21 – Common stock

At December 31, 2017 and 2016, JPMorgan Chase was authorized to issue 9.0 billion shares of common stock with a par value of \$1 per share.

Common shares issued (newly issued or reissuance from treasury) by JPMorgan Chase during the years ended December 31, 2017, 2016 and 2015 were as follows.

Year ended December 31, (in millions)	2017	2016	2015
Total issued – balance at January 1	4,104.9	4,104.9	4,104.9
Treasury – balance at January 1	(543.7)	(441.4)	(390.1)
Repurchase	(166.6)	(140.4)	(89.8)
Reissuance:			
Employee benefits and compensation plans	24.5	26.0	32.8
Warrant exercise	5.4	11.1	4.7
Employee stock purchase plans	0.8	1.0	1.0
Total reissuance	30.7	38.1	38.5
Total treasury – balance at December 31	(679.6)	(543.7)	(441.4)
Outstanding at December 31	3,425.3	3,561.2	3,663.5

At December 31, 2017, 2016, and 2015, respectively, the Firm had 15.0 million, 24.9 million and 47.4 million warrants outstanding to purchase shares of common stock (the “Warrants”). The Warrants are currently traded on the New York Stock Exchange, and they are exercisable, in whole or in part, at any time and from time to time until October 28, 2018. The original warrant exercise price was \$42.42 per share. The number of shares issuable upon the exercise of each warrant and the warrant exercise price is subject to adjustment upon the occurrence of certain events, including, but not limited to, the extent to which regular quarterly cash dividends exceed \$0.38 per share. As of December 31, 2017 the exercise price was \$41.834 and the Warrant share number was 1.01.

On June 28, 2017, in conjunction with the Federal Reserve’s release of its 2017 CCAR results, the Firm’s Board of Directors authorized a \$19.4 billion common equity (i.e., common stock and warrants) repurchase program. As of December 31, 2017, \$9.8 billion of authorized repurchase capacity remained under the program. This authorization includes shares repurchased to offset issuances under the Firm’s share-based compensation plans.

The following table sets forth the Firm’s repurchases of common equity for the years ended December 31, 2017, 2016 and 2015. There were no warrants repurchased during the years ended December 31, 2017, 2016 and 2015.

Year ended December 31, (in millions)	2017	2016	2015
Total number of shares of common stock repurchased	166.6	140.4	89.8
Aggregate purchase price of common stock repurchases	\$15,410	\$ 9,082	\$ 5,616

The Firm may, from time to time, enter into written trading plans under Rule 10b5-1 of the Securities Exchange Act of 1934 to facilitate repurchases in accordance with the common equity repurchase program. A Rule 10b5-1 repurchase plan allows the Firm to repurchase its equity during periods when it would not otherwise be repurchasing common equity – for example, during internal trading “blackout periods.” All purchases under a Rule 10b5-1 plan must be made according to a predefined plan established when the Firm is not aware of material nonpublic information. For additional information regarding repurchases of the Firm’s equity securities, see Part II, Item 5: Market for registrant’s common equity, related stockholder matters and issuer purchases of equity securities, on page 28.

As of December 31, 2017, approximately 120 million shares of common stock were reserved for issuance under various employee incentive, compensation, option and stock purchase plans, director compensation plans, and the Warrants.

Note 22 – Earnings per share

Earnings per share (“EPS”) is calculated under the two-class method under which all earnings (distributed and undistributed) are allocated to each class of common stock and participating securities based on their respective rights to receive dividends. JPMorgan Chase grants RSUs to certain employees under its share-based compensation programs, which entitle recipients to receive nonforfeitable dividends during the vesting period on a basis equivalent to the dividends paid to holders of common stock; these unvested awards meet the definition of participating securities.

The following table presents the calculation of basic and diluted EPS for the years ended December 31, 2017, 2016 and 2015.

Year ended December 31, (in millions, except per share amounts)	2017	2016	2015
Basic earnings per share			
Net income	\$ 24,441	\$ 24,733	\$ 24,442
Less: Preferred stock dividends	1,663	1,647	1,515
Net income applicable to common equity	22,778	23,086	22,927
Less: Dividends and undistributed earnings allocated to participating securities ^(a)	211	252	276
Net income applicable to common stockholders^(a)	\$ 22,567	\$ 22,834	\$ 22,651
Total weighted-average basic shares outstanding^(a)	3,551.6	3,658.8	3,741.2
Net income per share	\$ 6.35	\$ 6.24	\$ 6.05
Diluted earnings per share			
Net income applicable to common stockholders^(a)	\$ 22,567	\$ 22,834	\$ 22,651
Total weighted-average basic shares outstanding ^(a)	3,551.6	3,658.8	3,741.2
Add: Employee stock options, SARs, warrants and PSUs ^(a)	25.2	31.2	32.4
Total weighted-average diluted shares outstanding^{(a)(b)}	3,576.8	3,690.0	3,773.6
Net income per share	\$ 6.31	\$ 6.19	\$ 6.00

(a) The prior period amounts have been revised to conform with the current period presentation. The revision had no impact on the Firm's reported earnings per share.

(b) Participating securities were included in the calculation of diluted EPS using the two-class method, as this computation was more dilutive than the calculation using the treasury stock method.

Note 23 – Accumulated other comprehensive income/(loss)

AOCI includes the after-tax change in unrealized gains and losses on investment securities, foreign currency translation adjustments (including the impact of related derivatives), cash flow hedging activities, and net loss and prior service costs/(credit) related to the Firm's defined benefit pension and OPEB plans.

Year ended December 31, (in millions)	Unrealized gains/(losses) on investment securities ^(b)	Translation adjustments, net of hedges	Cash flow hedges	Defined benefit pension and OPEB plans	DVA on fair value option elected liabilities	Accumulated other comprehensive income/(loss)
Balance at December 31, 2014	\$ 4,773	\$ (147)	\$ (95)	\$ (2,342)	\$ —	\$ 2,189
Net change	(2,144)	(15)	51	111	—	(1,997)
Balance at December 31, 2015	\$ 2,629	\$ (162)	\$ (44)	\$ (2,231)	\$ —	\$ 192
Cumulative effect of change in accounting principle ^(a)	—	—	—	—	154	154
Net change	(1,105)	(2)	(56)	(28)	(330)	(1,521)
Balance at December 31, 2016	\$ 1,524	\$ (164)	\$ (100)	\$ (2,259)	\$ (176)	\$ (1,175)
Net change	640	(306)	176	738	(192)	1,056
Balance at December 31, 2017	\$ 2,164	\$ (470)	\$ 76	\$ (1,521)	(368)	\$ (119)

- (a) Effective January 1, 2016, the Firm adopted new accounting guidance related to the recognition and measurement of financial liabilities where the fair value option has been elected. This guidance requires the portion of the total change in fair value caused by changes in the Firm's own credit risk (DVA) to be presented separately in OCI; previously these amounts were recognized in net income.
- (b) Represents the after-tax difference between the fair value and amortized cost of securities accounted for as AFS, including net unamortized unrealized gains and losses related to AFS securities transferred to HTM.

The following table presents the pre-tax and after-tax changes in the components of OCI.

Year ended December 31, (in millions)	2017			2016			2015		
	Pre-tax	Tax effect	After-tax	Pre-tax	Tax effect	After-tax	Pre-tax	Tax effect	After-tax
Unrealized gains/(losses) on investment securities:									
Net unrealized gains/(losses) arising during the period	\$ 944	\$ (346)	\$ 598	\$ (1,628)	\$ 611	\$ (1,017)	\$ (3,315)	\$ 1,297	\$ (2,018)
Reclassification adjustment for realized (gains)/losses included in net income ^(a)	66	(24)	42	(141)	53	(88)	(202)	76	(126)
Net change	1,010	(370)	640	(1,769)	664	(1,105)	(3,517)	1,373	(2,144)
Translation adjustments^(b):									
Translation	1,313	(801)	512	(261)	99	(162)	(1,876)	682	(1,194)
Hedges	(1,294)	476	(818)	262	(102)	160	1,885	(706)	1,179
Net change	19	(325)	(306)	1	(3)	(2)	9	(24)	(15)
Cash flow hedges:									
Net unrealized gains/(losses) arising during the period	147	(55)	92	(450)	168	(282)	(97)	35	(62)
Reclassification adjustment for realized (gains)/losses included in net income ^{(c)(d)}	134	(50)	84	360	(134)	226	180	(67)	113
Net change	281	(105)	176	(90)	34	(56)	83	(32)	51
Defined benefit pension and OPEB plans:									
Net gains/(losses) arising during the period	802	(160)	642	(366)	145	(221)	29	(47)	(18)
Reclassification adjustments included in net income ^(e) :									
Amortization of net loss	250	(90)	160	257	(97)	160	282	(106)	176
Prior service costs/(credits)	(36)	13	(23)	(36)	14	(22)	(36)	14	(22)
Settlement loss/(gain)	2	(1)	1	4	(1)	3	—	—	—
Foreign exchange and other	(54)	12	(42)	77	(25)	52	33	(58)	(25)
Net change	964	(226)	738	(64)	36	(28)	308	(197)	111
DVA on fair value option elected liabilities, net change:	\$ (303)	\$ 111	\$ (192)	\$ (529)	\$ 199	\$ (330)	\$ —	\$ —	\$ —
Total other comprehensive income/(loss)	\$ 1,971	\$ (915)	\$ 1,056	\$ (2,451)	\$ 930	\$ (1,521)	\$ (3,117)	\$ 1,120	\$ (1,997)

- (a) The pre-tax amount is reported in securities gains/(losses) in the Consolidated statements of income.
- (b) Reclassifications of pre-tax realized gains/(losses) on translation adjustments and related hedges are reported in other income/expense in the Consolidated statements of income. The amounts were not material for the periods presented.
- (c) The pre-tax amounts are primarily recorded in noninterest revenue, net interest income and compensation expense in the Consolidated statements of income.
- (d) In 2015, the Firm reclassified approximately \$150 million of net losses from AOCI to other income because the Firm determined that it is probable that the forecasted interest payment cash flows would not occur. For additional information, see Note 5.
- (e) The pre-tax amount is reported in compensation expense in the Consolidated statements of income.

Note 24 – Income taxes

JPMorgan Chase and its eligible subsidiaries file a consolidated U.S. federal income tax return. JPMorgan Chase uses the asset and liability method to provide income taxes on all transactions recorded in the Consolidated Financial Statements. This method requires that income taxes reflect the expected future tax consequences of temporary differences between the carrying amounts of assets or liabilities for book and tax purposes. Accordingly, a deferred tax asset or liability for each temporary difference is determined based on the tax rates that the Firm expects to be in effect when the underlying items of income and expense are realized. JPMorgan Chase's expense for income taxes includes the current and deferred portions of that expense. A valuation allowance is established to reduce deferred tax assets to the amount the Firm expects to realize.

Due to the inherent complexities arising from the nature of the Firm's businesses, and from conducting business and being taxed in a substantial number of jurisdictions, significant judgments and estimates are required to be made. Agreement of tax liabilities between JPMorgan Chase and the many tax jurisdictions in which the Firm files tax returns may not be finalized for several years. Thus, the Firm's final tax-related assets and liabilities may ultimately be different from those currently reported.

Effective tax rate and expense

A reconciliation of the applicable statutory U.S. federal income tax rate to the effective tax rate for each of the years ended December 31, 2017, 2016 and 2015, is presented in the following table.

Effective tax rate

Year ended December 31,	2017	2016	2015
Statutory U.S. federal tax rate	35.0%	35.0%	35.0%
Increase/(decrease) in tax rate resulting from:			
U.S. state and local income taxes, net of U.S. federal income tax benefit	2.2	2.4	1.5
Tax-exempt income	(3.3)	(3.1)	(3.3)
Non-U.S. subsidiary earnings ^(a)	(3.1)	(1.7)	(3.9)
Business tax credits	(4.2)	(3.9)	(3.7)
Nondeductible legal expense	—	0.3	0.8
Tax audit resolutions	—	—	(5.7)
Impact of the TCJA	5.4	—	—
Other, net	(0.1)	(0.6)	(0.3)
Effective tax rate	31.9%	28.4%	20.4%

(a) Predominantly includes earnings of U.K. subsidiaries that were deemed to be reinvested indefinitely through December 31, 2017.

Impact of the TCJA

On December 22, 2017, the TCJA was signed into law. The Firm's effective tax rate increased in 2017 driven by a \$1.9 billion income tax expense representing the estimated impact of the enactment of the TCJA. The \$1.9 billion tax expense was predominantly driven by a deemed repatriation of the Firm's unremitted non-U.S. earnings and adjustments to the value of certain tax-oriented investments partially offset by a benefit from the revaluation of the Firm's net deferred tax liability.

The deemed repatriation of the Firm's unremitted non-U.S. earnings is based on the post-1986 earnings and profits of each controlled foreign corporation. The calculation resulted in an estimated income tax expense of \$3.7 billion. Furthermore, accounting for income taxes requires the remeasurement of certain deferred tax assets and liabilities based on the rates at which they are expected to reverse in the future. The Firm remeasured its deferred tax asset and liability balances in the fourth quarter of 2017 to the new statutory U.S. federal income tax rate of 21% as well as any federal benefit associated with state and local deferred income taxes. The remeasurement resulted in an estimated income tax benefit of \$2.1 billion.

The deemed repatriation and remeasurement of deferred taxes were calculated based on all available information and published legislative guidance. These amounts are considered to be estimates under SEC Staff Accounting Bulletin No. 118 as the Firm anticipates refinements to both calculations. Anticipated refinements will result from the issuance of future legislative and accounting guidance as well as those in the normal course of business, including true-ups to the tax liability on the tax return as filed and the resolution of tax audits.

Adjustments were also recorded to income tax expense for certain tax-oriented investments. These adjustments were driven by changes to affordable housing proportional amortization resulting from the reduction of the federal income tax rate under the TCJA. SEC Staff Accounting Bulletin No. 118 does not apply to these adjustments.

The components of income tax expense/(benefit) included in the Consolidated statements of income were as follows for each of the years ended December 31, 2017, 2016, and 2015.

Income tax expense/(benefit)

Year ended December 31, (in millions)	2017	2016	2015
Current income tax expense/(benefit)			
U.S. federal	\$ 5,718	\$ 2,488	\$ 3,160
Non-U.S.	2,400	1,760	1,220
U.S. state and local	1,029	904	547
Total current income tax expense/ (benefit)	9,147	5,152	4,927
Deferred income tax expense/(benefit)			
U.S. federal	2,174	4,364	1,213
Non-U.S.	(144)	(73)	(95)
U.S. state and local	282	360	215
Total deferred income tax expense/(benefit)	2,312	4,651	1,333
Total income tax expense	\$ 11,459	\$ 9,803	\$ 6,260

Total income tax expense includes \$252 million, \$55 million and \$2.4 billion of tax benefits recorded in 2017, 2016, and 2015, respectively, as a result of tax audit resolutions.

Tax effect of items recorded in stockholders' equity

The preceding table does not reflect the tax effect of certain items that are recorded each period directly in stockholders' equity. The tax effect of all items recorded directly to stockholders' equity resulted in a decrease of \$915 million in 2017, an increase of \$925 million in 2016, and an increase of \$1.5 billion in 2015. Effective January 1, 2016, the Firm adopted new accounting guidance related to employee share-based payments. As a result of the adoption of this new guidance, all excess tax benefits (including tax benefits from dividends or dividend equivalents) on share-based payment awards are recognized within income tax expense in the Consolidated statements of income. In prior years these tax benefits were recorded as increases to additional paid-in capital.

Results from Non-U.S. earnings

The following table presents the U.S. and non-U.S. components of income before income tax expense for the years ended December 31, 2017, 2016 and 2015.

Year ended December 31, (in millions)	2017	2016	2015
U.S.	\$ 27,103	\$ 26,651	\$ 23,191
Non-U.S. ^(a)	8,797	7,885	7,511
Income before income tax expense	\$ 35,900	\$ 34,536	\$ 30,702

(a) For purposes of this table, non-U.S. income is defined as income generated from operations located outside the U.S.

Prior to December 31, 2017, U.S. federal income taxes had not been provided on the undistributed earnings of certain non-U.S. subsidiaries, to the extent that such earnings had been reinvested abroad for an indefinite period of time. The Firm will no longer maintain the indefinite reinvestment assertion on the undistributed earnings of those non-U.S. subsidiaries in light of the enactment of the TCJA. The U.S. federal and state and local income taxes associated with the undistributed and previously untaxed earnings of those non-U.S. subsidiaries was included in the deemed repatriation charge recorded as of December 31, 2017.

JPMC will treat any tax it may incur on global intangible low tax income as a period cost to tax expense when the tax is incurred.

Affordable housing tax credits

The Firm recognized \$1.7 billion, \$1.7 billion and \$1.6 billion of tax credits and other tax benefits associated with investments in affordable housing projects within income tax expense for the years 2017, 2016 and 2015, respectively. The amount of amortization of such investments reported in income tax expense under the current period presentation during these years was \$1.7 billion, \$1.2 billion and \$1.1 billion, respectively. The carrying value of these investments, which are reported in other assets on the Firm's Consolidated balance sheets, was \$7.8 billion and \$8.8 billion at December 31, 2017 and 2016, respectively. The amount of commitments related to these investments, which are reported in accounts payable and other liabilities on the Firm's Consolidated balance sheets, was \$2.4 billion and \$2.8 billion at December 31, 2017 and 2016, respectively. The results are inclusive of any impacts from the TCJA.

Deferred taxes

Deferred income tax expense/(benefit) results from differences between assets and liabilities measured for financial reporting purposes versus income tax return purposes. Deferred tax assets are recognized if, in management's judgment, their realizability is determined to be more likely than not. If a deferred tax asset is determined to be unrealizable, a valuation allowance is established. The significant components of deferred tax assets and liabilities are reflected in the following table as of December 31, 2017 and 2016.

December 31, (in millions)	2017	2016
Deferred tax assets		
Allowance for loan losses	\$ 3,395	\$ 5,534
Employee benefits	688	2,911
Accrued expenses and other	3,528	6,831
Non-U.S. operations	327	5,368
Tax attribute carryforwards	219	2,155
Gross deferred tax assets	8,157	22,799
Valuation allowance	(46)	(785)
Deferred tax assets, net of valuation allowance	\$ 8,111	\$ 22,014
Deferred tax liabilities		
Depreciation and amortization	\$ 2,299	\$ 3,294
Mortgage servicing rights, net of hedges	2,757	4,807
Leasing transactions	3,483	4,053
Non-U.S. operations	200	4,572
Other, net	3,502	5,493
Gross deferred tax liabilities	12,241	22,219
Net deferred tax (liabilities)/assets	\$ (4,130)	\$ (205)

JPMorgan Chase has recorded deferred tax assets of \$219 million at December 31, 2017, in connection with U.S. federal and non-U.S. net operating loss ("NOL") carryforwards and state and local capital loss carryforwards. At December 31, 2017, total U.S. federal NOL carryforwards were approximately \$769 million, non-U.S. NOL carryforwards were approximately \$142 million and state and local capital loss carryforwards were \$660 million. If not utilized, the U.S. federal NOL carryforwards will expire between 2025 and 2036 and the state and local capital loss carryforwards will expire between 2020 and 2021. Certain non-U.S. NOL carryforwards will expire between 2028 and 2034 whereas others have an unlimited carryforward period.

The valuation allowance at December 31, 2017, was due to the state and local capital loss carryforwards and certain non-U.S. NOL carryforwards.

Unrecognized tax benefits

At December 31, 2017, 2016 and 2015, JPMorgan Chase's unrecognized tax benefits, excluding related interest expense and penalties, were \$4.7 billion, \$3.5 billion and \$3.5 billion, respectively, of which \$3.5 billion, \$2.6 billion and \$2.1 billion, respectively, if recognized, would reduce the annual effective tax rate. Included in the amount of unrecognized tax benefits are certain items that would not affect the effective tax rate if they were recognized in the Consolidated statements of income. These unrecognized items include the tax effect of certain temporary differences, the portion of gross state and local unrecognized tax benefits that would be offset by the benefit from associated U.S. federal income tax deductions, and the portion of gross non-U.S. unrecognized tax benefits that would have offsets in other jurisdictions. JPMorgan Chase is presently under audit by a number of taxing authorities, most notably by the Internal Revenue Service as summarized in the Tax examination status table below. As JPMorgan Chase is presently under audit by a number of taxing authorities, it is reasonably possible that over the next 12 months the resolution of these examinations may increase or decrease the gross balance of unrecognized tax benefits by as much as \$1.3 billion. Upon settlement of an audit, the change in the unrecognized tax benefit would result from payment or income statement recognition.

The following table presents a reconciliation of the beginning and ending amount of unrecognized tax benefits for the years ended December 31, 2017, 2016 and 2015.

Year ended December 31, (in millions)	2017	2016	2015
Balance at January 1,	\$ 3,450	\$ 3,497	\$ 4,911
Increases based on tax positions related to the current period	1,355	262	408
Increases based on tax positions related to prior periods	626	583	1,028
Decreases based on tax positions related to prior periods	(350)	(785)	(2,646)
Decreases related to cash settlements with taxing authorities	(334)	(56)	(204)
Decreases related to a lapse of applicable statute of limitations	—	(51)	—
Balance at December 31,	\$ 4,747	\$ 3,450	\$ 3,497

After-tax interest expense/(benefit) and penalties related to income tax liabilities recognized in income tax expense were \$102 million, \$86 million and \$(156) million in 2017, 2016 and 2015, respectively.

At December 31, 2017 and 2016, in addition to the liability for unrecognized tax benefits, the Firm had accrued \$639 million and \$687 million, respectively, for income tax-related interest and penalties.

Tax examination status

JPMorgan Chase is continually under examination by the Internal Revenue Service, by taxing authorities throughout the world, and by many state and local jurisdictions throughout the U.S. The following table summarizes the status of significant income tax examinations of JPMorgan Chase and its consolidated subsidiaries as of December 31, 2017.

December 31, 2017	Periods under examination	Status
JPMorgan Chase – U.S.	2003 – 2005	At Appellate level
JPMorgan Chase – U.S.	2006 – 2010	Field examination of amended returns; certain matters at Appellate level
JPMorgan Chase – U.S.	2011 – 2013	Field Examination
JPMorgan Chase – California	2011 – 2012	Field Examination
JPMorgan Chase – U.K.	2006 – 2015	Field examination of certain select entities

Note 25 – Restrictions on cash and intercompany funds transfers

The business of JPMorgan Chase Bank, National Association (“JPMorgan Chase Bank, N.A.”) is subject to examination and regulation by the OCC. The Bank is a member of the U.S. Federal Reserve System, and its deposits in the U.S. are insured by the FDIC, subject to applicable limits.

The Federal Reserve requires depository institutions to maintain cash reserves with a Federal Reserve Bank. The average required amount of reserve balances deposited by the Firm’s bank subsidiaries with various Federal Reserve Banks was approximately \$24.9 billion and \$19.3 billion in 2017 and 2016, respectively.

Restrictions imposed by U.S. federal law prohibit JPMorgan Chase & Co. (“Parent Company”) and certain of its affiliates from borrowing from banking subsidiaries unless the loans are secured in specified amounts. Such secured loans provided by any banking subsidiary to the Parent Company or to any particular affiliate, together with certain other transactions with such affiliate (collectively referred to as “covered transactions”), are generally limited to 10% of the banking subsidiary’s total capital, as determined by the risk-based capital guidelines; the aggregate amount of covered transactions between any banking subsidiary and all of its affiliates is limited to 20% of the banking subsidiary’s total capital.

The Parent Company’s two principal subsidiaries are JPMorgan Chase Bank, N.A. and JPMorgan Chase Holdings LLC, an intermediate holding company (the “IHC”). The IHC holds the stock of substantially all of JPMorgan Chase’s subsidiaries other than JPMorgan Chase Bank, N.A. and its subsidiaries. The IHC also owns other assets and intercompany indebtedness owing to the holding company. The Parent Company is obligated to contribute to the IHC substantially all the net proceeds received from securities issuances (including issuances of senior and subordinated debt securities and of preferred and common stock).

The principal sources of income and funding for the Parent Company are dividends from JPMorgan Chase Bank, N.A. and dividends and extensions of credit from the IHC. In addition to dividend restrictions set forth in statutes and regulations, the Federal Reserve, the OCC and the FDIC have authority under the Financial Institutions Supervisory Act to prohibit or to limit the payment of dividends by the banking organizations they supervise, including JPMorgan Chase and its subsidiaries that are banks or bank holding companies, if, in the banking regulator’s opinion, payment of a dividend would constitute an unsafe or unsound practice in light of the financial condition of the banking organization. The IHC is prohibited from paying dividends or extending credit to the Parent Company if certain capital or liquidity “thresholds” are breached or if limits are otherwise imposed by JPMorgan Chase’s management or Board of Directors.

At January 1, 2018, JPMorgan Chase’s banking subsidiaries could pay, in the aggregate, approximately \$17 billion in dividends to their respective bank holding companies without the prior approval of their relevant banking regulators. The capacity to pay dividends in 2018 will be supplemented by the banking subsidiaries’ earnings during the year.

In compliance with rules and regulations established by U.S. and non-U.S. regulators, as of December 31, 2017 and 2016, cash in the amount of \$16.8 billion and \$13.4 billion, respectively, were segregated in special bank accounts for the benefit of securities and futures brokerage customers. Also, as of December 31, 2017 and 2016, the Firm had:

- Receivables and securities of \$18.0 billion and \$18.2 billion, respectively, consisting of cash and securities pledged with clearing organizations for the benefit of customers.
- Securities with a fair value of \$3.5 billion and \$19.3 billion, respectively, were also restricted in relation to customer activity.

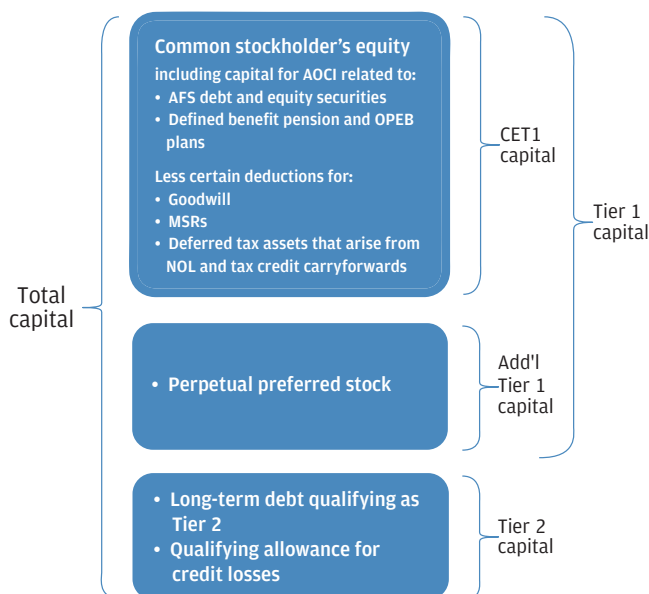
In addition, as of December 31, 2017 and 2016, the Firm had other restricted cash of \$3.3 billion and \$3.6 billion, respectively, primarily representing cash reserves held at non-U.S. central banks and held for other general purposes.

Note 26 – Regulatory capital

The Federal Reserve establishes capital requirements, including well-capitalized standards, for the consolidated financial holding company. The OCC establishes similar minimum capital requirements and standards for the Firm's IDI, including JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A.

Capital rules under Basel III establish minimum capital ratios and overall capital adequacy standards for large and internationally active U.S. bank holding companies and banks, including the Firm and its IDI subsidiaries. Basel III set forth two comprehensive approaches for calculating RWA: a standardized approach ("Basel III Standardized") and an advanced approach ("Basel III Advanced"). Certain of the requirements of Basel III are subject to phase-in periods that began on January 1, 2014 and continue through the end of 2018 ("transitional period").

The three categories of risk-based capital and their predominant components under the Basel III Transitional rules are illustrated below:



The following tables present the regulatory capital, assets and risk-based capital ratios for JPMorgan Chase and its significant IDI subsidiaries under both Basel III Standardized Transitional and Basel III Advanced Transitional at December 31, 2017 and 2016.

JPMorgan Chase & Co.				
	Basel III Standardized Transitional		Basel III Advanced Transitional	
(in millions, except ratios)	Dec 31, 2017	Dec 31, 2016	Dec 31, 2017	Dec 31, 2016
Regulatory capital				
CET1 capital	\$ 183,300	\$ 182,967	\$ 183,300	\$ 182,967
Tier 1 capital ^(a)	208,644	208,112	208,644	208,112
Total capital	238,395	239,553	227,933	228,592
Assets				
Risk-weighted	1,499,506	1,483,132 ^(e)	1,435,825	1,476,915
Adjusted average ^(b)	2,514,270	2,484,631	2,514,270	2,484,631
Capital ratios^(c)				
CET1	12.2%	12.3% ^(e)	12.8%	12.4%
Tier 1 ^(a)	13.9	14.0 ^(e)	14.5	14.1
Total	15.9	16.2 ^(e)	15.9	15.5
Tier 1 leverage ^(d)	8.3	8.4	8.3	8.4

JPMorgan Chase Bank, N.A.				
	Basel III Standardized Transitional		Basel III Advanced Transitional	
(in millions, except ratios)	Dec 31, 2017	Dec 31, 2016	Dec 31, 2017	Dec 31, 2016
Regulatory capital				
CET1 capital	\$ 184,375	\$ 179,319	\$ 184,375	\$ 179,319
Tier 1 capital ^(a)	184,375	179,341	184,375	179,341
Total capital	195,839	191,662	189,419	184,637
Assets				
Risk-weighted	1,335,809	1,311,240 ^(e)	1,226,534	1,262,613
Adjusted average ^(b)	2,116,031	2,088,851	2,116,031	2,088,851
Capital ratios^(c)				
CET1	13.8%	13.7% ^(e)	15.0%	14.2%
Tier 1 ^(a)	13.8	13.7 ^(e)	15.0	14.2
Total	14.7	14.6 ^(e)	15.4	14.6
Tier 1 leverage ^(d)	8.7	8.6	8.7	8.6

Notes to consolidated financial statements

Chase Bank USA, N.A.				
	Basel III Standardized Transitional		Basel III Advanced Transitional	
(in millions, except ratios)	Dec 31, 2017	Dec 31, 2016	Dec 31, 2017	Dec 31, 2016
Regulatory capital				
CET1 capital	\$ 21,600	\$ 16,784	\$ 21,600	\$ 16,784
Tier 1 capital	21,600	16,784	21,600	16,784
Total capital	27,691	22,862	26,250	21,434
Assets				
Risk-weighted	113,108	112,297	190,523	186,378
Adjusted average ^(b)	126,517	120,304	126,517	120,304
Capital ratios^(c)				
CET1	19.1%	14.9%	11.3%	9.0%
Tier 1	19.1	14.9	11.3	9.0
Total	24.5	20.4	13.8	11.5
Tier 1 leverage ^(d)	17.1	14.0	17.1	14.0

- (a) Includes the deduction associated with the permissible holdings of covered funds (as defined by the Volcker Rule). The deduction was not material as of December 31, 2017 and 2016.
- (b) Adjusted average assets, for purposes of calculating the Tier 1 leverage ratio, includes total quarterly average assets adjusted for unrealized gains/(losses) on AFS securities, less deductions for goodwill and other intangible assets, defined benefit pension plan assets, and deferred tax assets related to tax attributes, including NOLs.
- (c) For each of the risk-based capital ratios, the capital adequacy of the Firm and its IDI subsidiaries is evaluated against the lower of the two ratios as calculated under Basel III approaches (Standardized or Advanced) as required by the Collins Amendment of the Dodd-Frank Act (the "Collins Floor")
- (d) The Tier 1 leverage ratio is not a risk-based measure of capital. This ratio is calculated by dividing Tier 1 capital by adjusted average assets.
- (e) The prior period amounts have been revised to conform with the current period presentation.

Under the risk-based capital guidelines of the Federal Reserve, JPMorgan Chase is required to maintain minimum ratios of CET1, Tier 1 and Total capital to RWA, as well as a minimum leverage ratio (which is defined as Tier 1 capital divided by adjusted quarterly average assets). Failure to meet these minimum requirements could cause the Federal Reserve to take action. IDI subsidiaries also are subject to these capital requirements by their respective primary regulators.

The following table presents the minimum ratios to which the Firm and its IDI subsidiaries are subject as of December 31, 2017.

	Minimum capital ratios		Well-capitalized ratios	
	BHC ^{(a)(e)}	IDI ^{(b)(e)}	BHC ^(c)	IDI ^(d)
Capital ratios				
CET1	7.50%	5.75%	—%	6.50%
Tier 1	9.00	7.25	6.00	8.00
Total	11.00	9.25	10.00	10.00
Tier 1 leverage	4.00	4.00	—	5.00

Note: The table above is as defined by the regulations issued by the Federal Reserve, OCC and FDIC and to which the Firm and its IDI subsidiaries are subject.

- (a) Represents the Transitional minimum capital ratios applicable to the Firm under Basel III at December 31, 2017. At December 31, 2017, the CET1 minimum capital ratio includes 1.25% resulting from the phase-in of the Firm's 2.5% capital conservation buffer, and 1.75% resulting from the phase-in of the Firm's 3.5% GSIB surcharge.
- (b) Represents requirements for JPMorgan Chase's IDI subsidiaries. The CET1 minimum capital ratio includes 1.25% resulting from the phase-in of the 2.5% capital conservation buffer that is applicable to the IDI subsidiaries. The IDI subsidiaries are not subject to the GSIB surcharge.
- (c) Represents requirements for bank holding companies pursuant to regulations issued by the Federal Reserve.
- (d) Represents requirements for IDI subsidiaries pursuant to regulations issued under the FDIC Improvement Act.
- (e) For the period ended December 31, 2016 the CET1, Tier 1, Total and Tier 1 leverage minimum capital ratios applicable to the Firm were 6.25%, 7.75%, 9.75% and 4.0% and the CET1, Tier 1, Total and Tier 1 leverage minimum capital ratios applicable to the Firm's IDI subsidiaries were 5.125%, 6.625%, 8.625% and 4.0% respectively.

As of December 31, 2017 and 2016, JPMorgan Chase and all of its IDI subsidiaries were well-capitalized and met all capital requirements to which each was subject.

Note 27 – Off-balance sheet lending-related financial instruments, guarantees, and other commitments

JPMorgan Chase provides lending-related financial instruments (e.g., commitments and guarantees) to meet the financing needs of its clients or customers. The contractual amount of these financial instruments represents the maximum possible credit risk to the Firm should the counterparty draw upon the commitment or the Firm be required to fulfill its obligation under the guarantee, and should the counterparty subsequently fail to perform according to the terms of the contract. Most of these commitments and guarantees are refinanced, extended, cancelled, or expire without being drawn or a default occurring. As a result, the total contractual amount of these instruments is not, in the Firm's view, representative of its expected future credit exposure or funding requirements.

To provide for probable credit losses inherent in wholesale and certain consumer lending-commitments, an allowance for credit losses on lending-related commitments is maintained. See Note 13 for further information regarding the allowance for credit losses on lending-related commitments. The following table summarizes the contractual amounts and carrying values of off-balance sheet lending-related financial instruments, guarantees and other commitments at December 31, 2017 and 2016. The amounts in the table below for credit card and home equity lending-related commitments represent the total available credit for these products. The Firm has not experienced, and does not anticipate, that all available lines of credit for these products will be utilized at the same time. The Firm can reduce or cancel credit card lines of credit by providing the borrower notice or, in some cases as permitted by law, without notice. In addition, the Firm typically closes credit card lines when the borrower is 60 days or more past due. The Firm may reduce or close HELOCs when there are significant decreases in the value of the underlying property, or when there has been a demonstrable decline in the creditworthiness of the borrower.

Notes to consolidated financial statements

Off-balance sheet lending-related financial instruments, guarantees and other commitments

	Contractual amount						Carrying value ⁽ⁱ⁾	
	2017					2016	2017	2016
	Expires in 1 year or less	Expires after 1 year through 3 years	Expires after 3 years through 5 years	Expires after 5 years	Total	Total		
By remaining maturity at December 31, (in millions)								
Lending-related								
Consumer, excluding credit card:								
Home equity	\$ 2,165	\$ 1,370	\$ 1,379	\$ 15,446	\$ 20,360	\$ 21,714	\$ 12	\$ 12
Residential mortgage ^{(a)(b)}	5,723	—	—	13	5,736	10,332	—	—
Auto	8,007	872	292	84	9,255	8,468	2	2
Consumer & Business Banking ^(b)	11,642	926	112	522	13,202	12,733	19	12
Total consumer, excluding credit card	27,537	3,168	1,783	16,065	48,553	53,247 ^(h)	33	26
Credit card	572,831	—	—	—	572,831	553,891	—	—
Total consumer^(c)	600,368	3,168	1,783	16,065	621,384	607,138 ^(h)	33	26
Wholesale:								
Other unfunded commitments to extend credit ^(d)	61,536	118,907	138,289	12,428	331,160	328,497	840	905
Standby letters of credit and other financial guarantees ^(d)	15,278	9,905	7,963	2,080	35,226	35,947	636	586
Other letters of credit ^(d)	3,459	114	139	—	3,712	3,570	3	2
Total wholesale^(e)	80,273	128,926	146,391	14,508	370,098	368,014	1,479	1,493
Total lending-related	\$ 680,641	\$ 132,094	\$ 148,174	\$ 30,573	\$ 991,482	\$ 975,152 ^(h)	\$ 1,512	\$ 1,519
Other guarantees and commitments								
Securities lending indemnification agreements and guarantees ^(f)	\$ 179,490	\$ —	\$ —	\$ —	\$ 179,490	\$ 137,209	\$ —	\$ —
Derivatives qualifying as guarantees	4,529	101	12,479	40,065	57,174	51,966	304	80
Unsettled reverse repurchase and securities borrowing agreements	76,859	—	—	—	76,859	50,722	—	—
Unsettled repurchase and securities lending agreements	44,205	—	—	—	44,205	26,948	—	—
Loan sale and securitization-related indemnifications:								
Mortgage repurchase liability	NA	NA	NA	NA	NA	NA	111	133
Loans sold with recourse	NA	NA	NA	NA	1,169	2,730	38	64
Other guarantees and commitments^(g)	7,668	1,084	434	2,681	11,867	5,715	(76)	(118)

(a) Includes certain commitments to purchase loans from correspondents.

(b) Certain loan portfolios have been reclassified. The prior period amounts have been revised to conform with the current period presentation.

(c) Predominantly all consumer lending-related commitments are in the U.S.

(d) At December 31, 2017 and 2016, reflected the contractual amount net of risk participations totaling \$334 million and \$328 million, respectively, for other unfunded commitments to extend credit; \$10.4 billion and \$11.1 billion, respectively, for standby letters of credit and other financial guarantees; and \$405 million and \$265 million, respectively, for other letters of credit. In regulatory filings with the Federal Reserve these commitments are shown gross of risk participations.

(e) At December 31, 2017 and 2016, the U.S. portion of the contractual amount of total wholesale lending-related commitments was 77% and 79%, respectively.

(f) At December 31, 2017 and 2016, collateral held by the Firm in support of securities lending indemnification agreements was \$188.7 billion and \$143.2 billion, respectively. Securities lending collateral consist of primarily cash and securities issued by governments that are members of G7 and U.S. government agencies.

(g) At December 31, 2017, primarily includes letters of credit hedged by derivative transactions and managed on a market risk basis, unfunded commitments related to institutional lending and commitments associated with the Firm's membership in certain clearing houses. Additionally, includes unfunded commitments predominantly related to certain tax-oriented equity investments.

(h) The prior period amounts have been revised to conform with the current period presentation.

(i) For lending-related products, the carrying value represents the allowance for lending-related commitments and the guarantee liability; for derivative-related products, the carrying value represents the fair value.

Other unfunded commitments to extend credit

Other unfunded commitments to extend credit generally consist of commitments for working capital and general corporate purposes, extensions of credit to support commercial paper facilities and bond financings in the event that those obligations cannot be remarketed to new investors, as well as committed liquidity facilities to clearing organizations. The Firm also issues commitments under multipurpose facilities which could be drawn upon in several forms, including the issuance of a standby letter of credit.

The Firm acts as a settlement and custody bank in the U.S. tri-party repurchase transaction market. In its role as settlement and custody bank, the Firm is exposed to the intra-day credit risk of its cash borrower clients, usually broker-dealers. This exposure arises under secured clearance advance facilities that the Firm extends to its clients (i.e. cash borrowers); these facilities contractually limit the Firm's intra-day credit risk to the facility amount and must be repaid by the end of the day. As of December 31, 2017 and 2016, the secured clearance advance facility maximum outstanding commitment amount was \$1.5 billion and \$2.4 billion, respectively.

Guarantees

U.S. GAAP requires that a guarantor recognize, at the inception of a guarantee, a liability in an amount equal to the fair value of the obligation undertaken in issuing the guarantee. U.S. GAAP defines a guarantee as a contract that contingently requires the guarantor to pay a guaranteed party based upon: (a) changes in an underlying asset, liability or equity security of the guaranteed party; or (b) a third party's failure to perform under a specified agreement. The Firm considers the following off-balance sheet lending-related arrangements to be guarantees under U.S. GAAP: standby letters of credit and other financial guarantees, securities lending indemnifications, certain indemnification agreements included within third-party contractual arrangements and certain derivative contracts.

As required by U.S. GAAP, the Firm initially records guarantees at the inception date fair value of the obligation assumed (e.g., the amount of consideration received or the

net present value of the premium receivable). For certain types of guarantees, the Firm records this fair value amount in other liabilities with an offsetting entry recorded in cash (for premiums received), or other assets (for premiums receivable). Any premium receivable recorded in other assets is reduced as cash is received under the contract, and the fair value of the liability recorded at inception is amortized into income as lending and deposit-related fees over the life of the guarantee contract. For indemnifications provided in sales agreements, a portion of the sale proceeds is allocated to the guarantee, which adjusts the gain or loss that would otherwise result from the transaction. For these indemnifications, the initial liability is amortized to income as the Firm's risk is reduced (i.e., over time or when the indemnification expires). Any contingent liability that exists as a result of issuing the guarantee or indemnification is recognized when it becomes probable and reasonably estimable. The contingent portion of the liability is not recognized if the estimated amount is less than the carrying amount of the liability recognized at inception (adjusted for any amortization). The recorded amounts of the liabilities related to guarantees and indemnifications at December 31, 2017 and 2016, excluding the allowance for credit losses on lending-related commitments, are discussed below.

Standby letters of credit and other financial guarantees

Standby letters of credit and other financial guarantees are conditional lending commitments issued by the Firm to guarantee the performance of a client or customer to a third party under certain arrangements, such as commercial paper facilities, bond financings, acquisition financings, trade and similar transactions. The carrying values of standby and other letters of credit were \$639 million and \$588 million at December 31, 2017 and 2016, respectively, which were classified in accounts payable and other liabilities on the Consolidated balance sheets; these carrying values included \$195 million and \$147 million, respectively, for the allowance for lending-related commitments, and \$444 million and \$441 million, respectively, for the guarantee liability and corresponding asset.

The following table summarizes the types of facilities under which standby letters of credit and other letters of credit arrangements are outstanding by the ratings profiles of the Firm's clients, as of December 31, 2017 and 2016.

Standby letters of credit, other financial guarantees and other letters of credit

December 31, (in millions)	2017		2016	
	Standby letters of credit and other financial guarantees	Other letters of credit	Standby letters of credit and other financial guarantees	Other letters of credit
Investment-grade ^(a)	\$ 28,492	\$ 2,646	\$ 28,245	\$ 2,781
Noninvestment-grade ^(a)	6,734	1,066	7,702	789
Total contractual amount	\$ 35,226	\$ 3,712	\$ 35,947	\$ 3,570
Allowance for lending-related commitments	\$ 192	\$ 3	\$ 145	\$ 2
Guarantee liability	444	—	441	—
Total carrying value	\$ 636	\$ 3	\$ 586	\$ 2
Commitments with collateral	\$ 17,421	\$ 878	\$ 19,346	\$ 940

(a) The ratings scale is based on the Firm's internal ratings, which generally correspond to ratings as defined by S&P and Moody's.

Notes to consolidated financial statements

Securities lending indemnifications

Through the Firm's securities lending program, counterparties' securities, via custodial and non-custodial arrangements, may be lent to third parties. As part of this program, the Firm provides an indemnification in the lending agreements which protects the lender against the failure of the borrower to return the lent securities. To minimize its liability under these indemnification agreements, the Firm obtains cash or other highly liquid collateral with a market value exceeding 100% of the value of the securities on loan from the borrower. Collateral is marked to market daily to help assure that collateralization is adequate. Additional collateral is called from the borrower if a shortfall exists, or collateral may be released to the borrower in the event of overcollateralization. If a borrower defaults, the Firm would use the collateral held to purchase replacement securities in the market or to credit the lending client or counterparty with the cash equivalent thereof.

Derivatives qualifying as guarantees

The Firm transacts certain derivative contracts that have the characteristics of a guarantee under U.S. GAAP. These contracts include written put options that require the Firm to purchase assets upon exercise by the option holder at a specified price by a specified date in the future. The Firm may enter into written put option contracts in order to meet client needs, or for other trading purposes. The terms of written put options are typically five years or less.

Derivatives deemed to be guarantees also includes stable value contracts, commonly referred to as "stable value products", that require the Firm to make a payment of the difference between the market value and the book value of a counterparty's reference portfolio of assets in the event that market value is less than book value and certain other conditions have been met. Stable value products are transacted in order to allow investors to realize investment returns with less volatility than an unprotected portfolio. These contracts are typically longer-term or may have no stated maturity, but allow the Firm to elect to terminate the contract under certain conditions.

The notional value of derivatives guarantees generally represents the Firm's maximum exposure. However, exposure to certain stable value products is contractually limited to a substantially lower percentage of the notional amount.

The fair value of derivative guarantees reflects the probability, in the Firm's view, of whether the Firm will be required to perform under the contract. The Firm reduces exposures to these contracts by entering into offsetting transactions, or by entering into contracts that hedge the market risk related to the derivative guarantees.

The following table summarizes the derivatives qualifying as guarantees as of December 31, 2017, and 2016.

(in millions)	December 31, 2017	December 31, 2016
Notional amounts		
Derivative guarantees	57,174	51,966
Stable value contracts with contractually limited exposure	29,104	28,665
Maximum exposure of stable value contracts with contractually limited exposure	3,053	3,012
Fair value		
Derivative payables	304	96
Derivative receivables	—	16

In addition to derivative contracts that meet the characteristics of a guarantee, the Firm is both a purchaser and seller of credit protection in the credit derivatives market. For a further discussion of credit derivatives, see Note 5.

Unsettled reverse repurchase and securities borrowing agreements, and unsettled repurchase and securities lending agreements

In the normal course of business, the Firm enters into reverse repurchase agreements and securities borrowing agreements, which are secured financing agreements. Such agreements settle at a future date. At settlement, these commitments result in the Firm advancing cash to and receiving securities collateral from the counterparty. The Firm also enters into repurchase agreements and securities lending agreements. At settlement, these commitments result in the Firm receiving cash from and providing securities collateral to the counterparty. These agreements generally do not meet the definition of a derivative, and therefore, are not recorded on the Consolidated balance sheets until settlement date. These agreements predominantly consist of agreements with regular-way settlement periods. For a further discussion of securities purchased under resale agreements and securities borrowed, and securities sold under repurchase agreements and securities loaned, see Note 11.

Loan sales- and securitization-related indemnifications

Mortgage repurchase liability

In connection with the Firm's mortgage loan sale and securitization activities with GSEs, as described in Note 14, the Firm has made representations and warranties that the loans sold meet certain requirements that may require the Firm to repurchase mortgage loans and/or indemnify the loan purchaser. Further, although the Firm's securitizations are predominantly nonrecourse, the Firm does provide recourse servicing in certain limited cases where it agrees to share credit risk with the owner of the mortgage loans. To the extent that repurchase demands that are received relate to loans that the Firm purchased from third parties that remain viable, the Firm typically will have the right to seek a recovery of related repurchase losses from the third party. Generally, the maximum amount of future payments the Firm would be required to make for breaches of these representations and warranties would be equal to the unpaid principal balance of such loans that are deemed to have defects that were sold to purchasers (including securitization-related SPEs) plus, in certain circumstances, accrued interest on such loans and certain expenses.

Private label securitizations

The liability related to repurchase demands associated with private label securitizations is separately evaluated by the Firm in establishing its litigation reserves.

For additional information regarding litigation, see Note 29.

Loans sold with recourse

The Firm provides servicing for mortgages and certain commercial lending products on both a recourse and nonrecourse basis. In nonrecourse servicing, the principal credit risk to the Firm is the cost of temporary servicing advances of funds (i.e., normal servicing advances). In recourse servicing, the servicer agrees to share credit risk with the owner of the mortgage loans, such as Fannie Mae or Freddie Mac or a private investor, insurer or guarantor. Losses on recourse servicing predominantly occur when foreclosure sales proceeds of the property underlying a defaulted loan are less than the sum of the outstanding principal balance, plus accrued interest on the loan and the cost of holding and disposing of the underlying property. The Firm's securitizations are predominantly nonrecourse, thereby effectively transferring the risk of future credit losses to the purchaser of the mortgage-backed securities issued by the trust. At December 31, 2017 and 2016, the unpaid principal balance of loans sold with recourse totaled \$1.2 billion and \$2.7 billion, respectively. The carrying value of the related liability that the Firm has recorded, which is representative of the Firm's view of the likelihood it will have to perform under its recourse obligations, was \$38 million and \$64 million at December 31, 2017 and 2016, respectively.

Other off-balance sheet arrangements

Indemnification agreements - general

In connection with issuing securities to investors outside the U.S., the Firm may agree to pay additional amounts to the holders of the securities in the event that, due to a change in tax law, certain types of withholding taxes are imposed

on payments on the securities. The terms of the securities may also give the Firm the right to redeem the securities if such additional amounts are payable. The enactment of the TCJA will not cause the Firm to become obligated to pay any such additional amounts. The Firm may also enter into indemnification clauses in connection with the licensing of software to clients ("software licensees") or when it sells a business or assets to a third party ("third-party purchasers"), pursuant to which it indemnifies software licensees for claims of liability or damages that may occur subsequent to the licensing of the software, or third-party purchasers for losses they may incur due to actions taken by the Firm prior to the sale of the business or assets. It is difficult to estimate the Firm's maximum exposure under these indemnification arrangements, since this would require an assessment of future changes in tax law and future claims that may be made against the Firm that have not yet occurred. However, based on historical experience, management expects the risk of loss to be remote.

Card charge-backs

Under the rules of Visa USA, Inc., and MasterCard International, JPMorgan Chase Bank, N.A., is primarily liable for the amount of each processed card sales transaction that is the subject of a dispute between a cardmember and a merchant. If a dispute is resolved in the cardmember's favor, Merchant Services will (through the cardmember's issuing bank) credit or refund the amount to the cardmember and will charge back the transaction to the merchant. If Merchant Services is unable to collect the amount from the merchant, Merchant Services will bear the loss for the amount credited or refunded to the cardmember. Merchant Services mitigates this risk by withholding future settlements, retaining cash reserve accounts or by obtaining other security. However, in the unlikely event that: (1) a merchant ceases operations and is unable to deliver products, services or a refund; (2) Merchant Services does not have sufficient collateral from the merchant to provide cardmember refunds; and (3) Merchant Services does not have sufficient financial resources to provide cardmember refunds, JPMorgan Chase Bank, N.A., would recognize the loss.

Merchant Services incurred aggregate losses of \$28 million, \$85 million, and \$12 million on \$1,191.7 billion, \$1,063.4 billion, and \$949.3 billion of aggregate volume processed for the years ended December 31, 2017, 2016 and 2015, respectively. Incurred losses from merchant charge-backs are charged to other expense, with the offset recorded in a valuation allowance against accrued interest and accounts receivable on the Consolidated balance sheets. The carrying value of the valuation allowance was \$7 million and \$45 million at December 31, 2017 and 2016, respectively, which the Firm believes, based on historical experience and the collateral held by Merchant Services of \$141 million and \$125 million at December 31, 2017 and 2016, respectively, is representative of the payment or performance risk to the Firm related to charge-backs.

Clearing Services – Client Credit Risk

The Firm provides clearing services for clients by entering into securities purchases and sales and derivative transactions with CCPs, including ETDs such as futures and options, as well as OTC-cleared derivative contracts. As a clearing member, the Firm stands behind the performance of its clients, collects cash and securities collateral (margin) as well as any settlement amounts due from or to clients, and remits them to the relevant CCP or client in whole or part. There are two types of margin: variation margin is posted on a daily basis based on the value of clients' derivative contracts and initial margin is posted at inception of a derivative contract, generally on the basis of the potential changes in the variation margin requirement for the contract.

As a clearing member, the Firm is exposed to the risk of nonperformance by its clients, but is not liable to clients for the performance of the CCPs. Where possible, the Firm seeks to mitigate its risk to the client through the collection of appropriate amounts of margin at inception and throughout the life of the transactions. The Firm can also cease providing clearing services if clients do not adhere to their obligations under the clearing agreement. In the event of nonperformance by a client, the Firm would close out the client's positions and access available margin. The CCP would utilize any margin it holds to make itself whole, with any remaining shortfalls required to be paid by the Firm as a clearing member.

The Firm reflects its exposure to nonperformance risk of the client through the recognition of margin receivables from clients and margin payables to CCPs; the clients' underlying securities or derivative contracts are not reflected in the Firm's Consolidated Financial Statements.

It is difficult to estimate the Firm's maximum possible exposure through its role as a clearing member, as this would require an assessment of transactions that clients may execute in the future. However, based upon historical experience, and the credit risk mitigants available to the Firm, management believes it is unlikely that the Firm will have to make any material payments under these arrangements and the risk of loss is expected to be remote.

For information on the derivatives that the Firm executes for its own account and records in its Consolidated Financial Statements, see Note 5.

Exchange & Clearing House Memberships

The Firm is a member of several securities and derivative exchanges and clearing houses, both in the U.S. and other countries, and it provides clearing services. Membership in some of these organizations requires the Firm to pay a pro rata share of the losses incurred by the organization as a result of the default of another member. Such obligations vary with different organizations. These obligations may be limited to members who dealt with the defaulting member or to the amount (or a multiple of the amount) of the Firm's contribution to the guarantee fund maintained by a clearing house or exchange as part of the resources available to cover any losses in the event of a member default. Alternatively, these obligations may include a pro rata share

of the residual losses after applying the guarantee fund. Additionally, certain clearing houses require the Firm as a member to pay a pro rata share of losses that may result from the clearing house's investment of guarantee fund contributions and initial margin, unrelated to and independent of the default of another member. Generally a payment would only be required should such losses exceed the resources of the clearing house or exchange that are contractually required to absorb the losses in the first instance. It is difficult to estimate the Firm's maximum possible exposure under these membership agreements, since this would require an assessment of future claims that may be made against the Firm that have not yet occurred. However, based on historical experience, management expects the risk of loss to be remote.

Guarantees of subsidiaries

In the normal course of business, the Parent Company may provide counterparties with guarantees of certain of the trading and other obligations of its subsidiaries on a contract-by-contract basis, as negotiated with the Firm's counterparties. The obligations of the subsidiaries are included on the Firm's Consolidated balance sheets or are reflected as off-balance sheet commitments; therefore, the Parent Company has not recognized a separate liability for these guarantees. The Firm believes that the occurrence of any event that would trigger payments by the Parent Company under these guarantees is remote.

The Parent Company has guaranteed certain long-term debt and structured notes of its subsidiaries, including JPMorgan Chase Financial Company LLC ("JPMFC"), a 100%-owned finance subsidiary. All securities issued by JPMFC are fully and unconditionally guaranteed by the Parent Company. These guarantees, which rank on a parity with the Firm's unsecured and unsubordinated indebtedness, are not included in the table on page 262 of this Note. For additional information, see Note 19.

Note 28 – Commitments, pledged assets and collateral

Lease commitments

At December 31, 2017, JPMorgan Chase and its subsidiaries were obligated under a number of noncancelable operating leases for premises and equipment used primarily for banking purposes. Certain leases contain renewal options or escalation clauses providing for increased rental payments based on maintenance, utility and tax increases, or they require the Firm to perform restoration work on leased premises. No lease agreement imposes restrictions on the Firm's ability to pay dividends, engage in debt or equity financing transactions or enter into further lease agreements.

The following table presents required future minimum rental payments under operating leases with noncancelable lease terms that expire after December 31, 2017.

Year ended December 31, (in millions)	
2018	1,526
2019	1,450
2020	1,300
2021	1,029
2022	815
After 2022	3,757
Total minimum payments required	9,877
Less: Sublease rentals under noncancelable subleases	(1,034)
Net minimum payment required	\$ 8,843

Total rental expense was as follows.

Year ended December 31, (in millions)	2017	2016	2015
Gross rental expense	\$ 1,853	\$ 1,860	\$ 2,015
Sublease rental income	(251)	(241)	(411)
Net rental expense	\$ 1,602	\$ 1,619	\$ 1,604

Pledged assets

The Firm may pledge financial assets that it owns to maintain potential borrowing capacity with central banks and for other purposes, including to secure borrowings and public deposits, collateralize repurchase and other securities financing agreements, and cover customer short sales. Certain of these pledged assets may be sold or repledged or otherwise used by the secured parties and are identified as financial instruments owned (pledged to various parties) on the Consolidated balance sheets.

The following table presents the Firm's pledged assets.

December 31, (in billions)	2017	2016
Assets that may be sold or repledged or otherwise used by secured parties	\$ 129.6	\$ 133.6
Assets that may not be sold or repledged or otherwise used by secured parties	67.9	53.5
Assets pledged at Federal Reserve banks and FHLBs	493.7	441.9
Total assets pledged	\$ 691.2	\$ 629.0

Total assets pledged do not include assets of consolidated VIEs; these assets are used to settle the liabilities of those entities. See Note 14 for additional information on assets and liabilities of consolidated VIEs. For additional information on the Firm's securities financing activities, see Note 11. For additional information on the Firm's long-term debt, see Note 19. The significant components of the Firm's pledged assets were as follows.

December 31, (in billions)	2017	2016
Securities	\$ 86.2	\$ 101.1
Loans	437.7	374.9
Trading assets and other	167.3	153.0
Total assets pledged	\$ 691.2	\$ 629.0

Collateral

The Firm accepts financial assets as collateral that it is permitted to sell or repledge, deliver or otherwise use. This collateral is generally obtained under resale agreements, securities borrowing agreements, customer margin loans and derivative agreements. Collateral is generally used under repurchase agreements, securities lending agreements or to cover customer short sales and to collateralize deposits and derivative agreements.

The following table presents the fair value of collateral accepted.

December 31, (in billions)	2017	2016
Collateral permitted to be sold or repledged, delivered, or otherwise used	\$ 968.8	\$ 914.1
Collateral sold, repledged, delivered or otherwise used	775.3	746.6

Note 29 – Litigation

Contingencies

As of December 31, 2017, the Firm and its subsidiaries and affiliates are defendants or putative defendants in numerous legal proceedings, including private, civil litigations and regulatory/government investigations. The litigations range from individual actions involving a single plaintiff to class action lawsuits with potentially millions of class members. Investigations involve both formal and informal proceedings, by both governmental agencies and self-regulatory organizations. These legal proceedings are at varying stages of adjudication, arbitration or investigation, and involve each of the Firm's lines of business and geographies and a wide variety of claims (including common law tort and contract claims and statutory antitrust, securities and consumer protection claims), some of which present novel legal theories.

The Firm believes the estimate of the aggregate range of reasonably possible losses, in excess of reserves established, for its legal proceedings is from \$0 to approximately \$1.7 billion at December 31, 2017. This estimated aggregate range of reasonably possible losses was based upon currently available information for those proceedings in which the Firm believes that an estimate of reasonably possible loss can be made. For certain matters, the Firm does not believe that such an estimate can be made, as of that date. The Firm's estimate of the aggregate range of reasonably possible losses involves significant judgment, given the number, variety and varying stages of the proceedings (including the fact that many are in preliminary stages), the existence in many such proceedings of multiple defendants (including the Firm) whose share of liability has yet to be determined, the numerous yet-unresolved issues in many of the proceedings (including issues regarding class certification and the scope of many of the claims) and the attendant uncertainty of the various potential outcomes of such proceedings, including where the Firm has made assumptions concerning future rulings by the court or other adjudicator, or about the behavior or incentives of adverse parties or regulatory authorities, and those assumptions prove to be incorrect. In addition, the outcome of a particular proceeding may be a result which the Firm did not take into account in its estimate because the Firm had deemed the likelihood of that outcome to be remote. Accordingly, the Firm's estimate of the aggregate range of reasonably possible losses will change from time to time, and actual losses may vary significantly.

Set forth below are descriptions of the Firm's material legal proceedings.

Foreign Exchange Investigations and Litigation. The Firm previously reported settlements with certain government authorities relating to its foreign exchange ("FX") sales and trading activities and controls related to those activities. FX-related investigations and inquiries by government authorities, including competition authorities, are ongoing,

and the Firm is cooperating with and working to resolve those matters. In May 2015, the Firm pleaded guilty to a single violation of federal antitrust law. In January 2017, the Firm was sentenced, with judgment entered thereafter. The Department of Labor has granted the Firm a five-year exemption of disqualification, effective upon expiration of a temporary one-year exemption previously granted, that allows the Firm and its affiliates to continue to rely on the Qualified Professional Asset Manager exemption under the Employee Retirement Income Security Act ("ERISA"). The Firm will need to reapply in due course for a further exemption to cover the remainder of the ten-year disqualification period. Separately, in February 2017 the South Africa Competition Commission referred its FX investigation of the Firm and other banks to the South Africa Competition Tribunal, which is conducting civil proceedings concerning that matter.

The Firm is also one of a number of foreign exchange dealers defending a class action filed in the United States District Court for the Southern District of New York by U.S.-based plaintiffs, principally alleging violations of federal antitrust laws based on an alleged conspiracy to manipulate foreign exchange rates (the "U.S. class action"). In January 2015, the Firm entered into a settlement agreement in the U.S. class action. Following this settlement, a number of additional putative class actions were filed seeking damages for persons who transacted FX futures and options on futures (the "exchanged-based actions"), consumers who purchased foreign currencies at allegedly inflated rates (the "consumer action"), participants or beneficiaries of qualified ERISA plans (the "ERISA actions"), and purported indirect purchasers of FX instruments (the "indirect purchaser action"). Since then, the Firm has entered into a revised settlement agreement to resolve the consolidated U.S. class action, including the exchange-based actions, and that agreement has been preliminarily approved by the Court. The District Court has dismissed one of the ERISA actions, and the plaintiffs have filed an appeal. The consumer action, a second ERISA action and the indirect purchaser action remain pending in the District Court.

General Motors Litigation. JPMorgan Chase Bank, N.A. participated in, and was the Administrative Agent on behalf of a syndicate of lenders on, a \$1.5 billion syndicated Term Loan facility ("Term Loan") for General Motors Corporation ("GM"). In July 2009, in connection with the GM bankruptcy proceedings, the Official Committee of Unsecured Creditors of Motors Liquidation Company ("Creditors Committee") filed a lawsuit against JPMorgan Chase Bank, N.A., in its individual capacity and as Administrative Agent for other lenders on the Term Loan, seeking to hold the underlying lien invalid based on the filing of a UCC-3 termination statement relating to the Term Loan. In January 2015, following several court proceedings, the United States Court of Appeals for the Second Circuit reversed the Bankruptcy Court's dismissal of the Creditors Committee's claim and

remanded the case to the Bankruptcy Court with instructions to enter partial summary judgment for the Creditors Committee as to the termination statement. The proceedings in the Bankruptcy Court continue with respect to, among other things, additional defenses asserted by JPMorgan Chase Bank, N.A. and the value of additional collateral on the Term Loan that was unaffected by the filing of the termination statement at issue. In connection with that additional collateral, a trial in the Bankruptcy Court regarding the value of certain representative assets concluded in May 2017, and a ruling was issued in September 2017. The Bankruptcy Court found that 33 of the 40 representative assets are fixtures and that these fixtures generally should be valued on a “going concern” basis. The Creditors Committee is seeking leave to appeal the Bankruptcy Court’s ruling that the fixtures should be valued on a “going concern” basis rather than on a liquidation basis. In addition, certain Term Loan lenders filed cross-claims in the Bankruptcy Court against JPMorgan Chase Bank, N.A. seeking indemnification and asserting various claims. The parties are engaged in mediation concerning, among other things, the characterization and value of the remaining additional collateral, in light of the Bankruptcy Court’s ruling regarding the representative assets, as well as other issues, including the cross-claims.

Hopper Estate Litigation. The Firm is a defendant in an action in connection with its role as an independent administrator of an estate. The plaintiffs sought in excess of \$7 million in compensatory damages, primarily relating to attorneys’ fees incurred by the plaintiffs. After a trial in probate court in Dallas, Texas that ended in September 2017, the jury returned a verdict against the Firm, awarding plaintiffs their full compensatory damages and multiple billions in punitive damages. Notwithstanding the jury verdict, in light of legal limitations on the availability of damages, certain of the plaintiffs moved for entry of judgment in the total amount of approximately \$71 million, including punitive damages, while another plaintiff has not yet moved for judgment. The court has not yet entered a judgment in this matter. The parties are engaged in post-trial briefing.

Interchange Litigation. A group of merchants and retail associations filed a series of class action complaints alleging that Visa and MasterCard, as well as certain banks, conspired to set the price of credit and debit card interchange fees and enacted respective rules in violation of antitrust laws. The parties settled the cases for a cash payment of \$6.1 billion to the class plaintiffs (of which the Firm’s share is approximately 20%) and an amount equal to ten basis points of credit card interchange for a period of 8 months to be measured from a date within 60 days of the end of the opt-out period. The settlement also provided for modifications to each credit card network’s rules, including those that prohibit surcharging credit card transactions. In December 2013, the District Court granted final approval of the settlement.

A number of merchants appealed to the United States Court of Appeals for the Second Circuit, which, in June 2016, vacated the District Court’s certification of the class action and reversed the approval of the class settlement. In March 2017, the U.S. Supreme Court declined petitions seeking review of the decision of the Court of Appeals. The case has been remanded to the District Court for further proceedings consistent with the appellate decision.

In addition, certain merchants have filed individual actions raising similar allegations against Visa and MasterCard, as well as against the Firm and other banks, and those actions are proceeding.

LIBOR and Other Benchmark Rate Investigations and Litigation. JPMorgan Chase has received subpoenas and requests for documents and, in some cases, interviews, from federal and state agencies and entities, including the U.S. Commodity Futures Trading Commission (“CFTC”) and various state attorneys general, as well as the European Commission (“EC”), the Swiss Competition Commission (“ComCo”) and other regulatory authorities and banking associations around the world relating primarily to the process by which interest rates were submitted to the British Bankers Association (“BBA”) in connection with the setting of the BBA’s London Interbank Offered Rate (“LIBOR”) for various currencies, principally in 2007 and 2008. Some of the inquiries also relate to similar processes by which information on rates was submitted to the European Banking Federation (“EBF”) in connection with the setting of the EBF’s Euro Interbank Offered Rates (“EURIBOR”) and to the Japanese Bankers’ Association for the setting of Tokyo Interbank Offered Rates (“TIBOR”) during similar time periods, as well as processes for the setting of U.S. dollar ISDAFIX rates and other reference rates in various parts of the world during similar time periods, including through 2012. The Firm continues to cooperate with these ongoing investigations, and is currently engaged in discussions with the CFTC about resolving its U.S. dollar ISDAFIX-related investigation with respect to the Firm. There is no assurance that such discussions will result in a settlement. As previously reported, the Firm has resolved EC inquiries relating to Yen LIBOR and Swiss Franc LIBOR. In December 2016, the Firm resolved ComCo inquiries relating to these same rates. ComCo’s investigation relating to EURIBOR, to which the Firm and other banks are subject, continues. In December 2016, the EC issued a decision against the Firm and other banks finding an infringement of European antitrust rules relating to EURIBOR. The Firm has filed an appeal with the European General Court.

In addition, the Firm has been named as a defendant along with other banks in a series of individual and putative class actions filed in various United States District Courts. These actions have been filed, or consolidated for pre-trial purposes, in the United States District Court for the Southern District of New York. In these actions, plaintiffs make varying allegations that in various periods, starting in 2000 or later, defendants either individually or collectively

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manipulated various benchmark rates by submitting rates that were artificially low or high. Plaintiffs allege that they transacted in loans, derivatives or other financial instruments whose values are affected by changes in these rates and assert a variety of claims including antitrust claims seeking treble damages. These matters are in various stages of litigation.

The Firm has agreed to settle a putative class action related to Swiss franc LIBOR, and that settlement remains subject to final court approval.

In an action related to EURIBOR, the District Court dismissed all claims except a single antitrust claim and two common law claims, and dismissed all defendants except the Firm and Citibank.

In actions related to U.S. dollar LIBOR, the District Court dismissed certain claims, including antitrust claims brought by some plaintiffs whom the District Court found did not have standing to assert such claims, and permitted antitrust claims, claims under the Commodity Exchange Act and common law claims to proceed. The plaintiffs whose antitrust claims were dismissed for lack of standing have filed an appeal. In May 2017, plaintiffs in three putative class actions moved in the District Court for class certification, and the Firm and other defendants have opposed that motion. In January 2018, the District Court heard oral arguments on the class certification motions and reserved decision.

In an action related to the Singapore Interbank Offered Rate and the Singapore Swap Offer Rate, the District Court dismissed without prejudice all claims except a single antitrust claim, and dismissed without prejudice all defendants except the Firm, Bank of America and Citibank. The plaintiffs filed an amended complaint in September 2017, which the Firm and other defendants have moved to dismiss.

The Firm is one of the defendants in a number of putative class actions alleging that defendant banks and ICAP conspired to manipulate the U.S. dollar ISDAFIX rates. In April 2016, the Firm settled this litigation, along with certain other banks. Those settlements have been preliminarily approved by the Court.

Mortgage-Backed Securities and Repurchase Litigation and Related Regulatory Investigations. The Firm and affiliates (together, "JPMC"), Bear Stearns and affiliates (together, "Bear Stearns") and certain Washington Mutual affiliates (together, "Washington Mutual") have been named as defendants in a number of cases in their various roles in offerings of MBS. The remaining civil cases include one investor action and actions for repurchase of mortgage loans. The Firm and certain of its current and former officers and Board members have also been sued in a shareholder derivative action relating to the Firm's MBS activities, which remains pending.

Issuer Litigation – Individual Purchaser Actions. With the exception of one remaining action, the Firm has resolved all of the individual actions brought against JPMC, Bear Stearns and Washington Mutual as MBS issuers (and, in some cases, also as underwriters of their own MBS offerings).

Repurchase Litigation. The Firm is defending a few actions brought by trustees and/or securities administrators of various MBS trusts on behalf of purchasers of securities issued by those trusts. These cases generally allege breaches of various representations and warranties regarding securitized loans and seek repurchase of those loans or equivalent monetary relief, as well as indemnification of attorneys' fees and costs and other remedies. The trustees and/or securities administrators have accepted settlement offers on these MBS transactions, and these settlements are subject to court approval.

In addition, the Firm and a group of 21 institutional MBS investors made a binding offer to the trustees of MBS issued by JPMC and Bear Stearns providing for the payment of \$4.5 billion and the implementation of certain servicing changes by JPMC, to resolve all repurchase and servicing claims that have been asserted or could have been asserted with respect to 330 MBS trusts created between 2005 and 2008. The offer does not resolve claims relating to Washington Mutual MBS. The trustees (or separate and successor trustees) for this group of 330 trusts have accepted the settlement for 319 trusts in whole or in part and excluded from the settlement 16 trusts in whole or in part. The trustees' acceptance received final approval from the court and the Firm paid the settlement in December 2017.

Additional actions have been filed against third-party trustees that relate to loan repurchase and servicing claims involving trusts sponsored by JPMC, Bear Stearns and Washington Mutual.

In actions against the Firm involving offerings of MBS issued by the Firm, the Firm has contractual rights to indemnification from sellers of mortgage loans that were securitized in such offerings. However, certain of those indemnity rights may prove effectively unenforceable in various situations, such as where the loan sellers are now defunct.

The Firm has entered into agreements with a number of MBS trustees or entities that purchased MBS that toll applicable statute of limitations periods with respect to their claims, and has settled, and in the future may settle, tolled claims. There is no assurance that the Firm will not be named as a defendant in additional MBS-related litigation.

Derivative Action. A shareholder derivative action against the Firm, as nominal defendant, and certain of its current and former officers and members of its Board of Directors relating to the Firm's MBS activities was filed in California federal court in 2013. In June 2017, the court granted defendants' motion to dismiss the cause of action that alleged material misrepresentations and omissions in the

Firm's proxy statement, found that the court did not have personal jurisdiction over the individual defendants with respect to the remaining causes of action, and transferred that remaining portion of the case to the United States District Court for the Southern District of New York without ruling on the merits. The motion by the defendants to dismiss is pending.

Municipal Derivatives Litigation. Several civil actions were commenced in New York and Alabama courts against the Firm relating to certain Jefferson County, Alabama (the "County") warrant underwritings and swap transactions. The claims in the civil actions generally alleged that the Firm made payments to certain third parties in exchange for being chosen to underwrite more than \$3.0 billion in warrants issued by the County and to act as the counterparty for certain swaps executed by the County. The County filed for bankruptcy in November 2011. In June 2013, the County filed a Chapter 9 Plan of Adjustment, as amended (the "Plan of Adjustment"), which provided that all the above-described actions against the Firm would be released and dismissed with prejudice. In November 2013, the Bankruptcy Court confirmed the Plan of Adjustment, and in December 2013, certain sewer rate payers filed an appeal challenging the confirmation of the Plan of Adjustment. All conditions to the Plan of Adjustment's effectiveness, including the dismissal of the actions against the Firm, were satisfied or waived and the transactions contemplated by the Plan of Adjustment occurred in December 2013. Accordingly, all the above-described actions against the Firm have been dismissed pursuant to the terms of the Plan of Adjustment. The appeal of the Bankruptcy Court's order confirming the Plan of Adjustment remains pending.

Petters Bankruptcy and Related Matters. JPMorgan Chase and certain of its affiliates, including One Equity Partners ("OEP"), were named as defendants in several actions filed in connection with the receivership and bankruptcy proceedings pertaining to Thomas J. Petters and certain affiliated entities (collectively, "Petters") and the Polaroid Corporation. The principal actions against JPMorgan Chase and its affiliates were brought by a court-appointed receiver for Petters and the trustees in bankruptcy proceedings for three Petters entities. These actions generally sought to avoid certain putative transfers in connection with (i) the 2005 acquisition by Petters of Polaroid, which at the time was majority-owned by OEP; (ii) two credit facilities that JPMorgan Chase and other financial institutions entered into with Polaroid; and (iii) a credit line and investment accounts held by Petters. In January 2017, the Court substantially denied the defendants' motion to dismiss an amended complaint filed by the plaintiffs. In October 2017, JPMorgan Chase and its affiliates reached an agreement in principle to settle the litigation brought by the Petters bankruptcy trustees, or their successors, and the receiver for Thomas J. Petters. The settlement is subject to final documentation and Court approval.

Wendel. Since 2012, the French criminal authorities have been investigating a series of transactions entered into by senior managers of Wendel Investissement ("Wendel") during the period from 2004 through 2007 to restructure their shareholdings in Wendel. JPMorgan Chase Bank, N.A., Paris branch provided financing for the transactions to a number of managers of Wendel in 2007. JPMorgan Chase has cooperated with the investigation. The investigating judges issued an *ordonnance de renvoi* in November 2016, referring JPMorgan Chase Bank, N.A. to the French *tribunal correctionnel* for alleged complicity in tax fraud. No date for trial has been set by the court. The Firm has been successful in legal challenges made to the Court of Cassation, France's highest court, with respect to the criminal proceedings. In January 2018, the Paris Court of Appeal issued a decision cancelling the *mise en examen* of JPMorgan Chase Bank, N.A. The Firm is requesting clarification from the Court of Cassation concerning the Court of Appeal's decision before seeking direction on next steps in the criminal proceedings. In addition, a number of the managers have commenced civil proceedings against JPMorgan Chase Bank, N.A. The claims are separate, involve different allegations and are at various stages of proceedings.

* * *

In addition to the various legal proceedings discussed above, JPMorgan Chase and its subsidiaries are named as defendants or are otherwise involved in a substantial number of other legal proceedings. The Firm believes it has meritorious defenses to the claims asserted against it in its currently outstanding legal proceedings and it intends to defend itself vigorously. Additional legal proceedings may be initiated from time to time in the future.

The Firm has established reserves for several hundred of its currently outstanding legal proceedings. In accordance with the provisions of U.S. GAAP for contingencies, the Firm accrues for a litigation-related liability when it is probable that such a liability has been incurred and the amount of the loss can be reasonably estimated. The Firm evaluates its outstanding legal proceedings each quarter to assess its litigation reserves, and makes adjustments in such reserves, upwards or downward, as appropriate, based on management's best judgment after consultation with counsel. During the years ended December 31, 2017, 2016 and 2015, the Firm's legal expense was a benefit of \$(35) million, a benefit of \$(317) million, and an expense of \$3.0 billion, respectively. There is no assurance that the Firm's litigation reserves will not need to be adjusted in the future.

In view of the inherent difficulty of predicting the outcome of legal proceedings, particularly where the claimants seek very large or indeterminate damages, or where the matters present novel legal theories, involve a large number of parties or are in early stages of discovery, the Firm cannot state with confidence what will be the eventual outcomes of the currently pending matters, the timing of their ultimate resolution or the eventual losses, fines, penalties or

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consequences related to those matters. JPMorgan Chase believes, based upon its current knowledge, after consultation with counsel and after taking into account its current litigation reserves, that the legal proceedings currently pending against it should not have a material adverse effect on the Firm's consolidated financial condition. The Firm notes, however, that in light of the uncertainties involved in such proceedings, there is no assurance that the ultimate resolution of these matters will not significantly exceed the reserves it has currently accrued or that a matter will not have material reputational consequences. As a result, the outcome of a particular matter may be material to JPMorgan Chase's operating results for a particular period, depending on, among other factors, the size of the loss or liability imposed and the level of JPMorgan Chase's income for that period.

Note 30 – International operations

The following table presents income statement- and balance sheet-related information for JPMorgan Chase by major international geographic area. The Firm defines international activities for purposes of this footnote presentation as business transactions that involve clients residing outside of the U.S., and the information presented below is based predominantly on the domicile of the client, the location from which the client relationship is managed, or the location of the trading desk. However, many of the Firm's U.S. operations serve international businesses.

As the Firm's operations are highly integrated, estimates and subjective assumptions have been made to apportion revenue and expense between U.S. and international operations. These estimates and assumptions are consistent with the allocations used for the Firm's segment reporting as set forth in Note 31.

The Firm's long-lived assets for the periods presented are not considered by management to be significant in relation to total assets. The majority of the Firm's long-lived assets are located in the U.S.

As of or for the year ended December 31, (in millions)	Revenue ^(b)	Expense ^(c)	Income before income tax expense	Net income	Total assets
2017					
Europe/Middle East/Africa	\$ 14,426	\$ 8,653	\$ 5,773	\$ 4,007	\$ 407,145 ^(d)
Asia/Pacific	5,805	4,277	1,528	852	163,718
Latin America/Caribbean	1,994	1,523	471	299	44,569
Total international	22,225	14,453	7,772	5,158	615,432
North America ^(a)	77,399	49,271	28,128	19,283	1,918,168
Total	\$ 99,624	\$ 63,724	\$ 35,900	\$ 24,441	\$ 2,533,600
2016					
Europe/Middle East/Africa	\$ 13,842	\$ 8,550	\$ 5,292	\$ 3,783	\$ 394,134 ^(d)
Asia/Pacific	6,112	4,213	1,899	1,212	156,946
Latin America/Caribbean	1,959	1,632	327	208	42,971
Total international	21,913	14,395	7,518	5,203	594,051
North America ^(a)	73,755	46,737	27,018	19,530	1,896,921
Total	\$ 95,668	\$ 61,132	\$ 34,536	\$ 24,733	\$ 2,490,972
2015					
Europe/Middle East/Africa	\$ 14,206	\$ 8,871	\$ 5,335	\$ 4,158	\$ 347,647 ^(d)
Asia/Pacific	6,151	4,241	1,910	1,285	138,747
Latin America/Caribbean	1,923	1,508	415	253	48,185
Total international	22,280	14,620	7,660	5,696	534,579
North America ^(a)	71,263	48,221	23,042	18,746	1,817,119
Total	\$ 93,543	\$ 62,841	\$ 30,702	\$ 24,442	\$ 2,351,698

(a) Substantially reflects the U.S.

(b) Revenue is composed of net interest income and noninterest revenue.

(c) Expense is composed of noninterest expense and the provision for credit losses.

(d) Total assets for the U.K. were approximately \$310 billion, \$310 billion, and \$306 billion at December 31, 2017, 2016 and 2015, respectively.

Note 31 – Business segments

The Firm is managed on a line of business basis. There are four major reportable business segments – Consumer & Community Banking, Corporate & Investment Bank, Commercial Banking and Asset & Wealth Management. In addition, there is a Corporate segment. The business segments are determined based on the products and services provided, or the type of customer served, and they reflect the manner in which financial information is currently evaluated by management. Results of these lines of business are presented on a managed basis. For a further discussion concerning JPMorgan Chase's business segments, see Segment results of this footnote.

The following is a description of each of the Firm's business segments, and the products and services they provide to their respective client bases.

Consumer & Community Banking

CCB offers services to consumers and businesses through bank branches, ATMs, online, mobile and telephone banking. CCB is organized into Consumer & Business Banking (including Consumer Banking/Chase Wealth Management and Business Banking), Home Lending (including Home Lending Production, Home Lending Servicing and Real Estate Portfolios) and Card, Merchant Services & Auto. Consumer & Business Banking offers deposit and investment products and services to consumers, and lending, deposit, and cash management and payment solutions to small businesses. Home Lending includes mortgage origination and servicing activities, as well as portfolios consisting of residential mortgages and home equity loans. Card, Merchant Services & Auto issues credit cards to consumers and small businesses, offers payment processing services to merchants, and originates and services auto loans and leases.

Corporate & Investment Bank

The CIB, which consists of Banking and Markets & Investor Services, offers a broad suite of investment banking, market-making, prime brokerage, and treasury and securities products and services to a global client base of corporations, investors, financial institutions, government and municipal entities. Banking offers a full range of investment banking products and services in all major capital markets, including advising on corporate strategy and structure, capital-raising in equity and debt markets, as well as loan origination and syndication. Banking also includes Treasury Services, which provides transaction services, consisting of cash management and liquidity solutions. Markets & Investor Services is a global market-

maker in cash securities and derivative instruments, and also offers sophisticated risk management solutions, prime brokerage, and research. Markets & Investor Services also includes Securities Services, a leading global custodian which provides custody, fund accounting and administration, and securities lending products principally for asset managers, insurance companies and public and private investment funds.

Commercial Banking

CB delivers extensive industry knowledge, local expertise and dedicated service to U.S. and U.S. multinational clients, including corporations, municipalities, financial institutions and nonprofit entities with annual revenue generally ranging from \$20 million to \$2 billion. In addition, CB provides financing to real estate investors and owners. Partnering with the Firm's other businesses, CB provides comprehensive financial solutions, including lending, treasury services, investment banking and asset management to meet its clients' domestic and international financial needs.

Asset & Wealth Management

AWM, with client assets of \$2.8 trillion, is a global leader in investment and wealth management. AWM clients include institutions, high-net-worth individuals and retail investors in many major markets throughout the world. AWM offers investment management across most major asset classes including equities, fixed income, alternatives and money market funds. AWM also offers multi-asset investment management, providing solutions for a broad range of clients' investment needs. For Wealth Management clients, AWM also provides retirement products and services, brokerage and banking services including trusts and estates, loans, mortgages and deposits. The majority of AWM's client assets are in actively managed portfolios.

Corporate

The Corporate segment consists of Treasury and CIO and Other Corporate, which includes corporate staff units and expense that is centrally managed. Treasury and CIO are predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding and structural interest rate and foreign exchange risks, as well as executing the Firm's capital plan. The major Other Corporate units include Real Estate, Enterprise Technology, Legal, Compliance, Finance, Human Resources, Internal Audit, Risk Management, Oversight & Control, Corporate Responsibility and various Other Corporate groups.

Segment results

The following tables provide a summary of the Firm's segment results as of or for the years ended December 31, 2017, 2016 and 2015 on a managed basis. The Firm's definition of managed basis starts with the reported U.S. GAAP results and includes certain reclassifications to present total net revenue (noninterest revenue and net interest income) for each of the reportable business segments on a FTE basis. Accordingly, revenue from investments receiving tax credits and tax-exempt securities is presented in the managed results on a basis comparable to taxable investments and securities. This allows management to assess the comparability of revenue from year-to-year arising from both taxable and tax-exempt

sources. The corresponding income tax impact related to tax-exempt items is recorded within income tax expense/(benefit).

Effective January 1, 2017, the Firm's methodology used to allocate capital to the Firm's business segments was updated. The new methodology incorporates Basel III Standardized Fully Phased-In RWA (as well as Basel III Advanced Fully Phased-In RWA), leverage, the GSIB surcharge, and a simulation of capital in a severe stress environment. The methodology will continue to be weighted towards Basel III Advanced Fully Phased-In RWA because the Firm believes it to be the best proxy for economic risk.

Segment results and reconciliation

As of or for the year ended December 31, (in millions, except ratios)	Consumer & Community Banking			Corporate & Investment Bank			Commercial Banking			Asset & Wealth Management		
	2017	2016	2015	2017	2016	2015	2017	2016	2015	2017	2016	2015
Noninterest revenue	\$ 14,710	\$ 15,255	\$ 15,592	\$ 24,375	\$ 24,325	\$ 23,693	\$ 2,522	\$ 2,320	\$ 2,365	\$ 9,539	\$ 9,012	\$ 9,563
Net interest income	31,775	29,660	28,228	10,118	10,891	9,849	6,083	5,133	4,520	3,379	3,033	2,556
Total net revenue	46,485	44,915	43,820	34,493	35,216	33,542	8,605	7,453	6,885	12,918	12,045	12,119
Provision for credit losses	5,572	4,494	3,059	(45)	563	332	(276)	282	442	39	26	4
Noninterest expense	26,062	24,905	24,909	19,243	18,992	21,361	3,327	2,934	2,881	9,301	8,478	8,886
Income/(loss) before income tax expense/(benefit)	14,851	15,516	15,852	15,295	15,661	11,849	5,554	4,237	3,562	3,578	3,541	3,229
Income tax expense/(benefit)	5,456	5,802	6,063	4,482	4,846	3,759	2,015	1,580	1,371	1,241	1,290	1,294
Net income/(loss)	\$ 9,395	\$ 9,714	\$ 9,789	\$ 10,813	\$ 10,815	\$ 8,090	\$ 3,539	\$ 2,657	\$ 2,191	\$ 2,337	\$ 2,251	\$ 1,935
Average equity	\$ 51,000	\$ 51,000	\$ 51,000	\$ 70,000	\$ 64,000	\$ 62,000	\$ 20,000	\$ 16,000	\$ 14,000	\$ 9,000	\$ 9,000	\$ 9,000
Total assets	552,601	535,310	502,652	826,384	803,511	748,691	221,228	214,341	200,700	151,909	138,384	131,451
Return on equity	17%	18%	18%	14%	16%	12%	17%	16%	15%	25%	24%	21%
Overhead ratio	56	55	57	56	54	64	39	39	42	72	70	73

(table continued from above)

As of or for the year ended December 31, (in millions, except ratios)	Corporate			Reconciling Items ^(a)			Total		
	2017	2016	2015	2017	2016	2015	2017	2016	2015
Noninterest revenue	\$ 1,085	\$ 938	\$ 800	\$ (2,704) ^(b)	\$ (2,265)	\$ (1,980)	\$ 49,527	\$ 49,585	\$ 50,033
Net interest income	55	(1,425)	(533)	(1,313)	(1,209)	(1,110)	50,097	46,083	43,510
Total net revenue	1,140	(487)	267	(4,017)	(3,474)	(3,090)	99,624	95,668	93,543
Provision for credit losses	—	(4)	(10)	—	—	—	5,290	5,361	3,827
Noninterest expense	501	462	977	—	—	—	58,434	55,771	59,014
Income/(loss) before income tax expense/(benefit)	639	(945)	(700)	(4,017)	(3,474)	(3,090)	35,900	34,536	30,702
Income tax expense/(benefit)	2,282	(241)	(3,137)	(4,017) ^(b)	(3,474)	(3,090)	11,459	9,803	6,260
Net income/(loss)	\$ (1,643)	\$ (704)	\$ 2,437	\$ —	\$ —	\$ —	\$ 24,441	\$ 24,733	\$ 24,442
Average equity	\$ 80,350	\$ 84,631	\$ 79,690	\$ —	\$ —	\$ —	\$ 230,350	\$ 224,631	\$ 215,690
Total assets	781,478	799,426	768,204	NA	NA	NA	2,533,600	2,490,972	2,351,698
Return on equity	NM	NM	NM	NM	NM	NM	10%	10%	11%
Overhead ratio	NM	NM	NM	NM	NM	NM	59	58	63

(a) Segment results on a managed basis reflect revenue on a FTE basis with the corresponding income tax impact recorded within income tax expense/(benefit). These adjustments are eliminated in reconciling items to arrive at the Firm's reported U.S. GAAP results.

(b) Included \$375 million related to tax-oriented investments as a result of the enactment of the TCJA.

Note 32 – Parent Company

The following tables present Parent Company-only financial statements.

Statements of income and comprehensive income^(a)

Year ended December 31, (in millions)	2017	2016	2015
Income			
Dividends from subsidiaries and affiliates:			
Bank and bank holding company	\$ 13,000	\$ 10,000	\$ 10,653
Non-bank ^(b)	540	3,873	8,172
Interest income from subsidiaries	72	794	443
Other interest income	41	207	234
Other income from subsidiaries, primarily fees:			
Bank and bank holding company	1,553	852	1,438
Non-bank	(88)	1,165	(1,402)
Other income	(623)	(846)	1,773
Total income	14,495	16,045	21,311
Expense			
Interest expense to subsidiaries and affiliates ^(b)	400	105	98
Other interest expense	5,202	4,413	3,720
Noninterest expense	(1,897)	1,643	2,611
Total expense	3,705	6,161	6,429
Income before income tax benefit and undistributed net income of subsidiaries	10,790	9,884	14,882
Income tax benefit	1,007	876	1,640
Equity in undistributed net income of subsidiaries	12,644	13,973	7,920
Net income	\$ 24,441	\$ 24,733	\$ 24,442
Other comprehensive income, net	1,056	(1,521)	(1,997)
Comprehensive income	\$ 25,497	\$ 23,212	\$ 22,445

Balance sheets^(a)

December 31, (in millions)	2017	2016
Assets		
Cash and due from banks	\$ 163	\$ 113
Deposits with banking subsidiaries	5,306	5,450
Trading assets	4,773	10,326
Available-for-sale securities	—	2,694
Loans	—	77
Advances to, and receivables from, subsidiaries:		
Bank and bank holding company	2,106	524
Non-bank	82	46
Investments (at equity) in subsidiaries and affiliates:		
Bank and bank holding company	451,713	422,028
Non-bank ^(b)	422	13,103
Other assets	10,458	10,257
Total assets	\$ 475,023	\$ 464,618
Liabilities and stockholders' equity		
Borrowings from, and payables to, subsidiaries and affiliates ^(b)	\$ 23,426	\$ 13,584
Short-term borrowings	3,350	3,831
Other liabilities	8,302	11,224
Long-term debt ^{(c)(d)}	184,252	181,789
Total liabilities^(d)	219,330	210,428
Total stockholders' equity	255,693	254,190
Total liabilities and stockholders' equity	\$ 475,023	\$ 464,618

Statements of cash flows^(a)

Year ended December 31, (in millions)	2017	2016	2015
Operating activities			
Net income	\$ 24,441	\$ 24,733	\$ 24,442
Less: Net income of subsidiaries and affiliates ^(b)	26,185	27,846	26,745
Parent company net loss	(1,744)	(3,113)	(2,303)
Cash dividends from subsidiaries and affiliates ^(b)	13,540	13,873	17,023
Other operating adjustments	4,635	(18,166)	2,483
Net cash provided by/(used in) operating activities	16,431	(7,406)	17,203
Investing activities			
Net change in:			
Deposits with banking subsidiaries	144	60,349	30,085
Available-for-sale securities:			
Proceeds from paydowns and maturities	—	353	120
Other changes in loans, net	78	1,793	321
Advances to and investments in subsidiaries and affiliates, net	(280)	(51,967)	(81)
All other investing activities, net	17	114	153
Net cash provided by/(used in) investing activities	(41)	10,642	30,598
Financing activities			
Net change in:			
Borrowings from subsidiaries and affiliates ^(b)	13,862	2,957	(4,062)
Short-term borrowings	(481)	109	(47,483)
Proceeds from long-term borrowings	25,855	41,498	42,121
Payments of long-term borrowings	(29,812)	(29,298)	(30,077)
Proceeds from issuance of preferred stock	1,258	—	5,893
Redemption of preferred stock	(1,258)	—	—
Treasury stock repurchased	(15,410)	(9,082)	(5,616)
Dividends paid	(8,993)	(8,476)	(7,873)
All other financing activities, net	(1,361)	(905)	(840)
Net cash used in financing activities	(16,340)	(3,197)	(47,937)
Net increase/(decrease) in cash and due from banks	50	39	(137)
Cash and due from banks at the beginning of the year	113	74	211
Cash and due from banks at the end of the year	\$ 163	\$ 113	\$ 74
Cash interest paid	\$ 5,426	\$ 4,550	\$ 3,873
Cash income taxes paid, net	1,775	1,053	8,251

(a) In 2016, in connection with the Firm's 2016 Resolution Submission, the Parent Company established the IHC, and contributed substantially all of its direct subsidiaries (totaling \$55.4 billion) other than JPMorgan Chase Bank, N.A., as well as most of its other assets (totaling \$160.5 billion) and intercompany indebtedness to the IHC. Total noncash assets contributed were \$62.3 billion. In 2017, the Parent Company transferred \$16.2 billion of noncash assets to the IHC to complete the contributions to the IHC.

(b) Affiliates include trusts that issued guaranteed capital debt securities ("issuer trusts"). For further discussion on these issuer trusts, see Note 19.

(c) At December 31, 2017, long-term debt that contractually matures in 2018 through 2022 totaled \$20.6 billion, \$13.3 billion, \$22.4 billion, \$20.6 billion and \$10.5 billion, respectively.

(d) For information regarding the Parent Company's guarantees of its subsidiaries' obligations, see Notes 19 and 27.

Selected quarterly financial data (unaudited)

As of or for the period ended (in millions, except per share, ratio, headcount data and where otherwise)	2017				2016			
	4th quarter	3rd quarter	2nd quarter	1st quarter	4th quarter	3rd quarter	2nd quarter	1st quarter
Selected income statement data								
Total net revenue	\$ 24,153	\$ 25,326	\$ 25,470	\$ 24,675	\$ 23,376	\$ 24,673	\$ 24,380	\$ 23,239
Total noninterest expense	14,591	14,318	14,506	15,019	13,833	14,463	13,638	13,837
Pre-provision profit	9,562	11,008	10,964	9,656	9,543	10,210	10,742	9,402
Provision for credit losses	1,308	1,452	1,215	1,315	864	1,271	1,402	1,824
Income before income tax expense	8,254	9,556	9,749	8,341	8,679	8,939	9,340	7,578
Income tax expense	4,022	2,824	2,720	1,893	1,952	2,653	3,140	2,058
Net income^(a)	\$ 4,232	\$ 6,732	\$ 7,029	\$ 6,448	\$ 6,727	\$ 6,286	\$ 6,200	\$ 5,520
Per common share data								
Net income: Basic	\$ 1.08	\$ 1.77	\$ 1.83	\$ 1.66	\$ 1.73	\$ 1.60	\$ 1.56	\$ 1.36
Diluted	1.07	1.76	1.82	1.65	1.71	1.58	1.55	1.35
Average shares: Basic	3,489.7	3,534.7	3,574.1	3,601.7	3,611.3	3,637.7	3,675.5	3,710.6
Diluted	3,512.2	3,559.6	3,599.0	3,630.4	3,646.6	3,669.8	3,706.2	3,737.6
Market and per common share data								
Market capitalization	\$ 366,301	\$ 331,393	\$ 321,633	\$ 312,078	\$ 307,295	\$ 238,277	\$ 224,449	\$ 216,547
Common shares at period-end	3,425.3	3,469.7	3,519.0	3,552.8	3,561.2	3,578.3	3,612.0	3,656.7
Share price:^(b)								
High	\$ 108.46	\$ 95.88	\$ 92.65	\$ 93.98	\$ 87.39	\$ 67.90	\$ 66.20	\$ 64.13
Low	94.96	88.08	81.64	83.03	66.10	58.76	57.05	52.50
Close	106.94	95.51	91.40	87.84	86.29	66.59	62.14	59.22
Book value per share	67.04	66.95	66.05	64.68	64.06	63.79	62.67	61.28
TBVPS ^(c)	53.56	54.03	53.29	52.04	51.44	51.23	50.21	48.96
Cash dividends declared per share	0.56	0.56	0.50	0.50	0.48	0.48	0.48	0.44
Selected ratios and metrics								
ROE	7%	11%	12%	11%	11%	10%	10%	9%
ROTCE ^(c)	8	13	14	13	14	13	13	12
ROA	0.66	1.04	1.10	1.03	1.06	1.01	1.02	0.93
Overhead ratio	60	57	57	61	59	59	56	60
Loans-to-deposits ratio	64	63	63	63	65	65	66	64
HQLA (in billions) ^(d)	\$ 560	\$ 568	\$ 541	\$ 528	\$ 524	\$ 539	\$ 516	\$ 505
LCR (average)	119%	120%	115%	NA%	NA%	NA%	NA%	NA%
CET1 capital ratio ^(e)	12.2	12.5	12.5	12.4	12.3	12.0	12.0	11.9
Tier 1 capital ratio ^(e)	13.9	14.1	14.2	14.1	14.0	13.6	13.6	13.5
Total capital ratio ^(e)	15.9	16.1	16.0	15.6	15.5	15.1	15.2	15.1
Tier 1 leverage ratio ^(e)	8.3	8.4	8.5	8.4	8.4	8.5	8.5	8.6
Selected balance sheet data (period-end)								
Trading assets	\$ 381,844	\$ 420,418	\$ 407,064	\$ 402,513	\$ 372,130	\$ 374,837	\$ 380,793	\$ 366,153
Securities	249,958	263,288	263,458	281,850	289,059	272,401	278,610	285,323
Loans	930,697	913,761	908,767	895,974	894,765	888,054	872,804	847,313
Core loans	863,683	843,432	834,935	812,119	806,152	795,077	775,813	746,196
Average core loans	850,166	837,522	824,583	805,382	799,698	779,383	760,721	737,297
Total assets	2,533,600	2,563,074	2,563,174	2,546,290	2,490,972	2,521,029	2,466,096	2,423,808
Deposits	1,443,982	1,439,027	1,439,473	1,422,999	1,375,179	1,376,138	1,330,958	1,321,816
Long-term debt ^(f)	284,080	288,582	292,973	289,492	295,245	309,418	295,627	290,754
Common stockholders' equity	229,625	232,314	232,415	229,795	228,122	228,263	226,355	224,089
Total stockholders' equity	255,693	258,382	258,483	255,863	254,190	254,331	252,423	250,157
Headcount	252,539	251,503	249,257	246,345	243,355	242,315	240,046	237,420
Credit quality metrics								
Allowance for credit losses	\$ 14,672	\$ 14,648	\$ 14,480	\$ 14,490	\$ 14,854	\$ 15,304	\$ 15,187	\$ 15,008
Allowance for loan losses to total retained loans	1.47%	1.49%	1.49%	1.52%	1.55%	1.61%	1.64%	1.66%
Allowance for loan losses to retained loans excluding purchased credit-impaired loans ^(g)	1.27	1.29	1.28	1.31	1.34	1.37	1.40	1.40
Nonperforming assets	\$ 6,426	\$ 6,154	\$ 6,432	\$ 6,826	\$ 7,535	\$ 7,779	\$ 7,757	\$ 8,023
Net charge-offs ^(h)	1,264	1,265	1,204	1,654	1,280	1,121	1,181	1,110
Net charge-off rate ^(h)	0.55%	0.56%	0.54%	0.76%	0.58%	0.51%	0.56%	0.53%

- (a) The Firm's results for the three months ended December 31, 2017, included a \$2.4 billion decrease to net income as a result of the enactment of the TCJA. For additional information related to the impact of the TCJA, see Note 24.
- (b) Based on daily prices reported by the New York Stock Exchange.
- (c) TBVPS and ROTCE are non-GAAP financial measures. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Financial Performance Measures on pages 52-54.
- (d) HQLA represents the amount of assets that qualify for inclusion in the liquidity coverage ratio. For December 31, 2017, September 30, 2017 and June 30, 2017 the balance represents the average of quarterly reported results per the U.S. LCR public disclosure requirements effective April 1, 2017 and period-end balances for the remaining periods. For additional information, see HQLA on page 93.
- (e) Ratios presented are calculated under the Basel III Transitional rules and for the capital ratios represent the Collins Floor. See Capital Risk Management on pages 82-91 for additional information on Basel III.
- (f) Included unsecured long-term debt of \$218.8 billion, \$221.7 billion, \$221.0 billion, \$212.0 billion, \$226.8 billion, \$220.6 billion, \$216.1 billion respectively, for the periods presented.
- (g) Excludes the impact of residential real estate PCI loans, a non-GAAP financial measure. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 52-54, and the Allowance for credit losses on pages 117-119.
- (h) Excluding net charge-offs of \$467 million related to the student loan portfolio sale, the net charge-off rates for the three months ended March 31, 2017 would have been 0.54%.
- (i) The prior period ratios have been revised to conform with the current period presentation.

Distribution of assets, liabilities and stockholders' equity; interest rates and interest differentials

Consolidated average balance sheet, interest and rates

Provided below is a summary of JPMorgan Chase's consolidated average balances, interest rates and interest differentials on a taxable-equivalent basis for the years 2015 through 2017. Income computed on a taxable-equivalent basis is the income reported in the Consolidated

statements of income, adjusted to present interest income and average rates earned on assets exempt from income taxes (i.e. federal taxes) on a basis comparable with other taxable investments. The incremental tax rate used for calculating the taxable-equivalent adjustment was approximately 37% in 2017, and 38% in 2016 and 2015.

(Table continued on next page)

Year ended December 31, (Taxable-equivalent interest and rates; in millions, except rates)	2017		
	Average balance	Interest ^(g)	Average rate
Assets			
Deposits with banks	\$ 438,240	\$ 4,219	0.96%
Federal funds sold and securities purchased under resale agreements	191,819	2,327	1.21
Securities borrowed	95,324	(37) ^(h)	(0.04)
Trading assets - debt instruments	237,206	7,714	3.25
Taxable securities	223,592	5,534	2.48
Non-taxable securities ^(a)	45,086	2,769	6.14
Total securities	268,678	8,303	3.09 ^(j)
Loans	906,397	41,296 ⁽ⁱ⁾	4.56
All other interest-earning assets ^(b)	42,928	1,863	4.34
Total interest-earning assets	2,180,592	65,685	3.01
Allowance for loan losses	(13,453)		
Cash and due from banks	20,364		
Trading assets - equity instruments	115,913		
Trading assets - derivative receivables	59,588		
Goodwill, MSRs and other intangible assets	53,999		
Other assets	139,059		
Total assets	\$ 2,556,062		
Liabilities			
Interest-bearing deposits	\$ 1,013,221	\$ 2,857	0.28%
Federal funds purchased and securities loaned or sold under repurchase agreements	187,386	1,611	0.86
Short-term borrowings ^(c)	46,532	481	1.03
Trading liabilities - debt and other interest-bearing liabilities ^{(d)(e)}	171,814	2,070	1.21
Beneficial interests issued by consolidated VIEs	32,457	503	1.55
Long-term debt	291,489	6,753	2.32
Total interest-bearing liabilities	1,742,899	14,275	0.82
Noninterest-bearing deposits	404,165		
Trading liabilities - equity instruments ^(e)	21,022		
Trading liabilities - derivative payables	44,122		
All other liabilities, including the allowance for lending-related commitments	87,292		
Total liabilities	2,299,500		
Stockholders' equity			
Preferred stock	26,212		
Common stockholders' equity	230,350		
Total stockholders' equity	256,562^(f)		
Total liabilities and stockholders' equity	\$ 2,556,062		
Interest rate spread			2.19%
Net interest income and net yield on interest-earning assets		\$ 51,410	2.36

(a) Represents securities that are tax-exempt for U.S. federal income tax purposes.

(b) Includes held-for-investment margin loans, which are classified in accrued interest and accounts receivable, and all other interest-earning assets included in other assets.

(c) Includes commercial paper.

(d) Other interest-bearing liabilities include brokerage customer payables.

(e) Included trading liabilities - debt and equity instruments of \$90.7 billion, \$92.8 billion and \$81.4 billion for the twelve months ended December 31, 2017, 2016 and 2015, respectively.

(f) The ratio of average stockholders' equity to average assets was 10.0% for 2017, 10.2% for 2016, and 9.7% for 2015. The return on average stockholders' equity, based on net income, was 9.5% for 2017, 9.9% for 2016, and 10.2% for 2015.

(g) Interest includes the effect of related hedging derivatives. Taxable-equivalent amounts are used where applicable.

(h) Negative interest income and yield is related to client-driven demand for certain securities combined with the impact of low interest rates; this is matched book activity and the negative interest expense on the corresponding securities loaned is recognized in interest expense and reported within trading liabilities - debt, short-term and other liabilities.

(i) Fees and commissions on loans included in loan interest amounted to \$1.0 billion in 2017, \$808 million in 2016, and \$936 million in 2015.

(j) The annualized rate for securities based on amortized cost was 3.13% in 2017, 2.99% in 2016, and 2.94% in 2015, and does not give effect to changes in fair value that are reflected in AOCI.

Within the Consolidated average balance sheets, interest and rates summary, the principal amounts of nonaccrual loans have been included in the average loan balances used to determine the average interest rate earned on loans. For additional information on nonaccrual loans, including interest accrued, see Note 12.

(Table continued from previous page)

2016			2015		
Average balance	Interest ^(a)	Average rate	Average balance	Interest ^(a)	Average rate
\$ 392,160	\$ 1,863	0.48%	\$ 427,963	\$ 1,250	0.29%
205,368	2,265	1.10	206,637	1,592	0.77
102,964	(332) ^(h)	(0.32)	105,273	(532) ^(h)	(0.50)
215,565	7,373	3.42	206,385	6,694	3.24
235,211	5,538	2.35	273,730	6,550	2.39
44,176	2,662	6.03	42,125	2,556	6.07
279,387	8,200	2.94 ⁽ⁱ⁾	315,855	9,106	2.88 ⁽ⁱ⁾
866,378	36,866 ⁽ⁱ⁾	4.26	787,318	33,321 ⁽ⁱ⁾	4.23
39,782	875	2.20	38,811	652	1.68
2,101,604	57,110	2.72	2,088,242	52,083	2.49
(13,965)			(13,885)		
18,660			22,042		
95,528			105,489		
70,897			73,290		
53,752			55,439		
135,143			138,792		
\$ 2,461,619			\$ 2,469,409		
\$ 925,270	\$ 1,356	0.15%	\$ 876,840	\$ 1,252	0.14%
178,720	1,089	0.61	192,510	609	0.32
36,140	203	0.56	66,956	175	0.26
177,765	1,102	0.62	178,994	557	0.31
40,180	504	1.25	49,200	435	0.88
295,573	5,564	1.88	284,940	4,435	1.56
1,653,648	9,818	0.59	1,649,440	7,463	0.45
402,698			418,948		
20,737			17,282		
55,927			64,716		
77,910			79,293		
2,210,920			2,229,679		
26,068			24,040		
224,631			215,690		
250,699 ⁽ⁿ⁾			239,730 ⁽ⁿ⁾		
\$ 2,461,619			\$ 2,469,409		
		2.13%			2.04%
\$ 47,292		2.25	\$ 44,620		2.14

Interest rates and interest differential analysis of net interest income – U.S. and non-U.S.

Presented below is a summary of interest rates and interest differentials segregated between U.S. and non-U.S. operations for the years 2015 through 2017. The segregation of U.S. and non-U.S. components is based on

the location of the office recording the transaction. Intercompany funding generally consists of dollar-denominated deposits originated in various locations that are centrally managed by Treasury and CIO.

(Table continued on next page)

Year ended December 31, (Taxable-equivalent interest and rates; in millions, except rates)	2017		
	Average balance	Interest	Average rate
Interest-earning assets			
Deposits with banks:			
U.S.	\$ 366,177	\$ 4,091	1.12%
Non-U.S.	72,063	128	0.18
Federal funds sold and securities purchased under resale agreements:			
U.S.	90,878	1,360	1.50
Non-U.S.	100,941	967	0.96
Securities borrowed:			
U.S.	68,110	(66) ^(c)	(0.10)
Non-U.S.	27,214	29	0.11
Trading assets – debt instruments:			
U.S.	128,293	4,186	3.26
Non-U.S.	108,913	3,528	3.24
Securities:			
U.S.	223,140	7,490	3.36
Non-U.S.	45,538	813	1.79
Loans:			
U.S.	832,608	39,439	4.74
Non-U.S.	73,789	1,857	2.52
All other interest-earning assets, predominantly U.S.	42,928	1,863	4.34
Total interest-earning assets	2,180,592	65,685	3.01
Interest-bearing liabilities			
Interest-bearing deposits:			
U.S.	776,049	2,223	0.29
Non-U.S.	237,172	634	0.27
Federal funds purchased and securities loaned or sold under repurchase agreements:			
U.S.	115,574	1,349	1.17
Non-U.S.	71,812	262	0.37
Trading liabilities – debt, short-term and all other interest-bearing liabilities: ^(a)			
U.S.	138,470	1,271	0.92
Non-U.S.	79,876	1,280	1.60
Beneficial interests issued by consolidated VIEs, predominantly U.S.	32,457	503	1.55
Long-term debt:			
U.S.	276,750	6,745	2.44
Non-U.S.	14,739	8	0.05
Intercompany funding:			
U.S.	(2,874)	(25)	–
Non-U.S.	2,874	25	–
Total interest-bearing liabilities	1,742,899	14,275	0.82
Noninterest-bearing liabilities^(b)	437,693		
Total investable funds	\$ 2,180,592	\$ 14,275	0.65%
Net interest income and net yield:			
U.S.		\$ 51,410	2.36%
Non-U.S.		46,059	2.68
Percentage of total assets and liabilities attributable to non-U.S. operations:			
Assets			22.5
Liabilities			21.1

(a) Includes commercial paper.

(b) Represents the amount of noninterest-bearing liabilities funding interest-earning assets.

(c) Negative interest income and yield is related to client-driven demand for certain securities combined with the impact of low interest rates; this is matched book activity and the negative interest expense on the corresponding securities loaned is recognized in interest expense and reported within trading liabilities – debt, short-term and other liabilities.

For further information, see the “Net interest income” discussion in Consolidated Results of Operations on pages 44-46.

(Table continued from previous page)

2016				2015		
Average balance	Interest	Average rate		Average balance	Interest	Average rate
\$ 328,831	\$ 1,708	0.52%		\$ 388,833	\$ 1,021	0.26%
63,329	155	0.25		39,130	229	0.59
112,902	1,166	1.03		118,945	900	0.76
92,466	1,099	1.19		87,692	692	0.79
73,297	(341) ^(c)	(0.46)		78,815	(562) ^(c)	(0.71)
29,667	9	0.03		26,458	30	0.11
116,211	3,825	3.29		106,465	3,572	3.35
99,354	3,548	3.57		99,920	3,122	3.12
216,726	6,971	3.22		200,240	6,676	3.33
62,661	1,229	1.97		115,615	2,430	2.10
788,213	35,110	4.45		699,664	31,468	4.50
78,165	1,756	2.25		87,654	1,853	2.11
39,782	875	2.20		38,811	652	1.68
2,101,604	57,110	2.72		2,088,242	52,083	2.49
703,738	1,029	0.15		638,756	761	0.12
221,532	327	0.15		238,084	491	0.21
121,945	773	0.63		140,609	366	0.26
56,775	316	0.56		51,901	243	0.47
133,788	86	0.06		166,838	(394) ^(c)	(0.24)
80,117	1,219	1.52		79,112	1,126	1.42
40,180	504	1.25		49,200	435	0.88
283,169	5,533	1.95		273,033	4,386	1.61
12,404	31	0.25		11,907	49	0.41
(20,405)	10	—		(50,517)	7	—
20,405	(10)	—		50,517	(7)	—
1,653,648	9,818	0.59		1,649,440	7,463	0.45
447,956				438,802		
\$ 2,101,604	\$ 9,818	0.47%		\$ 2,088,242	\$ 7,463	0.36%
	\$ 47,292	2.25%			\$ 44,620	2.14%
	40,705	2.49			38,033	2.34
	6,587	1.42			6,587	1.42
		23.1				24.7
		20.7				21.1

Changes in net interest income, volume and rate analysis

The table below presents an attribution of net interest income between volume and rate. The attribution between volume and rate is calculated using annual average balances for each category of assets and liabilities shown in the table and the corresponding annual average rates (see pages 278-282 for more information on average balances and rates). In this analysis, when the change cannot be isolated to either volume or rate, it has been allocated to volume. The average annual rates include the impact of changes in market rates as well as the impact of any change in composition of the various products within each category of asset or liability. This analysis is calculated separately for each category without consideration of the relationship between categories (for example, the net spread between the rates earned on assets and the rates paid on liabilities that fund those assets). As a result, changes in the granularity or groupings considered in this analysis would produce a different attribution result, and due to the complexities involved, precise allocation of changes in interest rates between volume and rates is inherently complex and judgmental.

Year ended December 31, (On a taxable-equivalent basis; in millions)	2017 versus 2016			2016 versus 2015		
	Increase/(decrease) due to change in:		Net change	Increase/(decrease) due to change in:		Net change
	Volume	Rate		Volume	Rate	
Interest-earning assets						
Deposits with banks:						
U.S.	\$ 410	\$ 1,973	\$ 2,383	\$ (324)	\$ 1,011	\$ 687
Non-U.S.	17	(44)	(27)	59	(133)	(74)
Federal funds sold and securities purchased under resale agreements:						
U.S.	(337)	531	194	(55)	321	266
Non-U.S.	81	(213)	(132)	56	351	407
Securities borrowed:						
U.S.	11	264	275	24	197	221
Non-U.S.	(4)	24	20	—	(21)	(21)
Trading assets - debt instruments:						
U.S.	396	(35)	361	317	(64)	253
Non-U.S.	308	(328)	(20)	(24)	450	426
Securities:						
U.S.	216	303	519	515	(220)	295
Non-U.S.	(303)	(113)	(416)	(1,051)	(150)	(1,201)
Loans:						
U.S.	2,043	2,286	4,329	3,992	(350)	3,642
Non-U.S.	(110)	211	101	(220)	123	(97)
All other interest-earning assets, predominantly U.S.	137	851	988	21	202	223
Change in interest income	2,865	5,710	8,575	3,310	1,717	5,027
Interest-bearing liabilities						
Interest-bearing deposits:						
U.S.	209	985	1,194	76	192	268
Non-U.S.	41	266	307	(21)	(143)	(164)
Federal funds purchased and securities loaned or sold under repurchase agreements:						
U.S.	(83)	659	576	(113)	520	407
Non-U.S.	54	(108)	(54)	26	47	73
Trading liabilities - debt, short-term and other interest-bearing liabilities: ^(a)						
U.S.	45	1,140	1,185	(24)	504	480
Non-U.S.	(3)	64	61	14	79	93
Beneficial interests issued by consolidated VIEs, predominantly U.S.	(122)	121	(1)	(113)	182	69
Long-term debt:						
U.S.	(176)	1,388	1,212	219	928	1,147
Non-U.S.	2	(25)	(23)	1	(19)	(18)
Intercompany funding:						
U.S.	151	(186)	(35)	(17)	20	3
Non-U.S.	(151)	186	35	17	(20)	(3)
Change in interest expense	(33)	4,490	4,457	65	2,290	2,355
Change in net interest income	\$ 2,898	\$ 1,220	\$ 4,118	\$ 3,245	\$ (573)	\$ 2,672

(a) Includes commercial paper.

Glossary of Terms and Acronyms

2017 Annual Report or 2017 Form 10-K: Annual report on Form 10-K for year ended December 31, 2017, filed with the U.S. Securities and Exchange Commission.

ABS: Asset-backed securities

Active foreclosures: Loans referred to foreclosure where formal foreclosure proceedings are ongoing. Includes both judicial and non-judicial states.

AFS: Available-for-sale

ALCO: Asset Liability Committee

Allowance for loan losses to total loans: Represents period-end allowance for loan losses divided by retained loans.

Alternative assets: The following types of assets constitute alternative investments – hedge funds, currency, real estate, private equity and other investment funds designed to focus on nontraditional strategies.

AWM: Asset & Wealth Management

AOI: Accumulated other comprehensive income/(loss)

ARM: Adjustable rate mortgage(s)

AUC: Assets under custody

AUM: “Assets under management”: Represent assets managed by AWM on behalf of its Private Banking, Institutional and Retail clients. Includes “Committed capital not Called.”

Auto loan and lease origination volume: Dollar amount of auto loans and leases originated.

Beneficial interests issued by consolidated VIEs: Represents the interest of third-party holders of debt, equity securities, or other obligations, issued by VIEs that JPMorgan Chase consolidates.

Benefit obligation: Refers to the projected benefit obligation for pension plans and the accumulated postretirement benefit obligation for OPEB plans.

BHC: Bank holding company

Card Services includes the Credit Card and Merchant Services businesses.

CB: Commercial Banking

CBB: Consumer & Business Banking

CCAR: Comprehensive Capital Analysis and Review

CCB: Consumer & Community Banking

CCO: Chief Compliance Officer

CCP: “Central counterparty” is a clearing house that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the future performance of open contracts. A CCP becomes counterparty to trades with market participants

through novation, an open offer system, or another legally binding arrangement.

CDS: Credit default swaps

CEO: Chief Executive Officer

CET1 Capital: Common equity Tier 1 Capital

CFTC: Commodity Futures Trading Commission

CFO: Chief Financial Officer

Chase Bank USA, N.A.: Chase Bank USA, National Association

CIB: Corporate & Investment Bank

CIO: Chief Investment Office

Client assets: Represent assets under management as well as custody, brokerage, administration and deposit accounts.

Client deposits and other third-party liabilities: Deposits, as well as deposits that are swept to on-balance sheet liabilities (e.g., commercial paper, federal funds purchased and securities loaned or sold under repurchase agreements) as part of client cash management programs.

CLO: Collateralized loan obligations

CLTV: Combined loan-to-value

Collateral-dependent: A loan is considered to be collateral-dependent when repayment of the loan is expected to be provided solely by the underlying collateral, rather than by cash flows from the borrower’s operations, income or other resources.

Merchant Services: is a business that primarily processes transactions for merchants.

Commercial Card: provides a wide range of payment services to corporate and public sector clients worldwide through the commercial card products. Services include procurement, corporate travel and entertainment, expense management services, and business-to-business payment solutions.

COO: Chief Operating Officer

Core loans: Represents loans considered central to the Firm’s ongoing businesses; core loans exclude loans classified as trading assets, runoff portfolios, discontinued portfolios and portfolios the Firm has an intent to exit.

Credit cycle: A period of time over which credit quality improves, deteriorates and then improves again (or vice versa). The duration of a credit cycle can vary from a couple of years to several years.

Credit derivatives: Financial instruments whose value is derived from the credit risk associated with the debt of a third-party issuer (the reference entity) which allow one party (the protection purchaser) to transfer that risk to another party (the protection seller). Upon the occurrence of a credit event by the reference entity, which may include, among other events, the bankruptcy or failure to pay its

Glossary of Terms and Acronyms

obligations, or certain restructurings of the debt of the reference entity, neither party has recourse to the reference entity. The protection purchaser has recourse to the protection seller for the difference between the face value of the CDS contract and the fair value at the time of settling the credit derivative contract. The determination as to whether a credit event has occurred is generally made by the relevant International Swaps and Derivatives Association (“ISDA”) Determinations Committee.

Criticized: Criticized loans, lending-related commitments and derivative receivables that are classified as special mention, substandard and doubtful categories for regulatory purposes and are generally consistent with a rating of CCC+/Caa1 and below, as defined by S&P and Moody’s.

CRO: Chief Risk Officer

CTC: CIO, Treasury and Corporate

CVA: Credit valuation adjustments

Debit and credit card sales volume: Dollar amount of card member purchases, net of returns.

Deposit margin/deposit spread: Represents net interest income expressed as a percentage of average deposits.

Distributed denial-of-service attack: The use of a large number of remote computer systems to electronically send a high volume of traffic to a target website to create a service outage at the target. This is a form of cyberattack.

DFAST: Dodd-Frank Act Stress Test

Dodd-Frank Act: Wall Street Reform and Consumer Protection Act

DOJ: U.S. Department of Justice

DOL: U.S. Department of Labor

DRPC: Board of Directors’ Risk Policy Committee

DVA: Debit valuation adjustment

E&P: Exploration & Production

EC: European Commission

Eligible LTD: Long-term debt satisfying certain eligibility criteria

Embedded derivatives: are implicit or explicit terms or features of a financial instrument that affect some or all of the cash flows or the value of the instrument in a manner similar to a derivative. An instrument containing such terms or features is referred to as a “hybrid.” The component of the hybrid that is the non-derivative instrument is referred to as the “host.” For example, callable debt is a hybrid instrument that contains a plain vanilla debt instrument (i.e., the host) and an embedded option that allows the issuer to redeem the debt issue at a specified date for a specified amount (i.e., the embedded derivative). However, a floating rate instrument is not a hybrid composed of a fixed-rate instrument and an interest rate swap.

ERISA: Employee Retirement Income Security Act of 1974

EPS: Earnings per share

ETD: “Exchange-traded derivatives”: Derivative contracts that are executed on an exchange and settled via a central clearing house.

EU: European Union

Fannie Mae: Federal National Mortgage Association

FASB: Financial Accounting Standards Board

FCA: Financial Conduct Authority

FCC: Firmwide Control Committee

FDIA: Federal Depository Insurance Act

FDIC: Federal Deposit Insurance Corporation

Federal Reserve: The Board of the Governors of the Federal Reserve System

Fee share: Proportion of fee revenue based on estimates of investment banking fees generated across the industry from investment banking transactions in M&A, equity and debt underwriting, and loan syndications. Source: Dealogic, a third-party provider of investment banking fee competitive analysis and volume-based league tables for the above noted industry products.

FFELP: Federal Family Education Loan Program

FFIEC: Federal Financial Institutions Examination Council

FHA: Federal Housing Administration

FHLB: Federal Home Loan Bank

FICO score: A measure of consumer credit risk provided by credit bureaus, typically produced from statistical models by Fair Isaac Corporation utilizing data collected by the credit bureaus.

Firm: JPMorgan Chase & Co.

Forward points: Represents the interest rate differential between two currencies, which is either added to or subtracted from the current exchange rate (i.e., “spot rate”) to determine the forward exchange rate.

FRC: Firmwide Risk Committee

Freddie Mac: Federal Home Loan Mortgage Corporation

Free standing derivatives: a derivative contract entered into either separate and apart from any of the Firm’s other financial instruments or equity transactions. Or, in conjunction with some other transaction and is legally detachable and separately exercisable.

FSB: Financial Stability Board

FTE: Fully taxable equivalent

FVA: Funding valuation adjustment

FX: Foreign exchange

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G7: Group of Seven nations: Countries in the G7 are Canada, France, Germany, Italy, Japan, the U.K. and the U.S.

G7 government bonds: Bonds issued by the government of one of the G7 nations.

Ginnie Mae: Government National Mortgage Association

GSE: Fannie Mae and Freddie Mac

GSIB: Global systemically important banks

HAMP: Home affordable modification program

Headcount-related expense: Includes salary and benefits (excluding performance-based incentives), and other noncompensation costs related to employees.

HELOAN: Home equity loan

HELOC: Home equity line of credit

Home equity – senior lien: Represents loans and commitments where JPMorgan Chase holds the first security interest on the property.

Home equity – junior lien: Represents loans and commitments where JPMorgan Chase holds a security interest that is subordinate in rank to other liens.

Households: A household is a collection of individuals or entities aggregated together by name, address, tax identifier and phone. Reported on a one-month lag.

HQLA: High quality liquid assets

HTM: Held-to-maturity

ICAAP: Internal capital adequacy assessment process

IDI: Insured depository institutions

IHC: JPMorgan Chase Holdings LLC, an intermediate holding company

Impaired loan: Impaired loans are loans measured at amortized cost, for which it is probable that the Firm will be unable to collect all amounts due, including principal and interest, according to the contractual terms of the agreement. Impaired loans include the following:

- All wholesale nonaccrual loans
- All TDRs (both wholesale and consumer), including ones that have returned to accrual status

Interchange income: A fee paid to a credit card issuer in the clearing and settlement of a sales or cash advance transaction.

Investment-grade: An indication of credit quality based on JPMorgan Chase's internal risk assessment system. "Investment grade" generally represents a risk profile similar to a rating of a "BBB-"/"Baa3" or better, as defined by independent rating agencies.

ISDA: International Swaps and Derivatives Association

JPMorgan Chase: JPMorgan Chase & Co.

JPMorgan Chase Bank, N.A.: JPMorgan Chase Bank, National Association

JPMorgan Clearing: J.P. Morgan Clearing Corp.

JPMorgan Securities: J.P. Morgan Securities LLC

Loan-equivalent: Represents the portion of the unused commitment or other contingent exposure that is expected, based on historical portfolio experience, to become drawn prior to an event of a default by an obligor.

LCR: Liquidity coverage ratio

LDA: Loss Distribution Approach

LGD: Loss given default

LIBOR: London Interbank Offered Rate

LLC: Limited Liability Company

LOB: Line of business

Loss emergence period: Represents the time period between the date at which the loss is estimated to have been incurred and the ultimate realization of that loss.

LTIP: Long-term incentive plan

LTV: "Loan-to-value": For residential real estate loans, the relationship, expressed as a percentage, between the principal amount of a loan and the appraised value of the collateral (i.e., residential real estate) securing the loan.

Origination date LTV ratio

The LTV ratio at the origination date of the loan. Origination date LTV ratios are calculated based on the actual appraised values of collateral (i.e., loan-level data) at the origination date.

Current estimated LTV ratio

An estimate of the LTV as of a certain date. The current estimated LTV ratios are calculated using estimated collateral values derived from a nationally recognized home price index measured at the metropolitan statistical area ("MSA") level. These MSA-level home price indices consist of actual data to the extent available and forecasted data where actual data is not available. As a result, the estimated collateral values used to calculate these ratios do not represent actual appraised loan-level collateral values; as such, the resulting LTV ratios are necessarily imprecise and should therefore be viewed as estimates.

Combined LTV ratio

The LTV ratio considering all available lien positions, as well as unused lines, related to the property. Combined LTV ratios are used for junior lien home equity products.

Managed basis: A non-GAAP presentation of financial results that includes reclassifications to present revenue on a fully taxable-equivalent basis. Management uses this non-GAAP financial measure at the segment level, because it believes this provides information to enable investors to understand the underlying operational performance and

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trends of the particular business segment and facilitates a comparison of the business segment with the performance of competitors.

Master netting agreement: A single agreement with a counterparty that permits multiple transactions governed by that agreement to be terminated or accelerated and settled through a single payment in a single currency in the event of a default (e.g., bankruptcy, failure to make a required payment or securities transfer or deliver collateral or margin when due).

MBS: Mortgage-backed securities

MD&A: Management's discussion and analysis

MMDA: Money Market Deposit Accounts

Moody's: Moody's Investor Services

Mortgage origination channels:

Retail – Borrowers who buy or refinance a home through direct contact with a mortgage banker employed by the Firm using a branch office, the Internet or by phone. Borrowers are frequently referred to a mortgage banker by a banker in a Chase branch, real estate brokers, home builders or other third parties.

Correspondent – Banks, thrifts, other mortgage banks and other financial institutions that sell closed loans to the Firm.

Mortgage product types:

Alt-A

Alt-A loans are generally higher in credit quality than subprime loans but have characteristics that would disqualify the borrower from a traditional prime loan. Alt-A lending characteristics may include one or more of the following: (i) limited documentation; (ii) a high CLTV ratio; (iii) loans secured by non-owner occupied properties; or (iv) a debt-to-income ratio above normal limits. A substantial proportion of the Firm's Alt-A loans are those where a borrower does not provide complete documentation of his or her assets or the amount or source of his or her income.

Option ARMs

The option ARM real estate loan product is an adjustable-rate mortgage loan that provides the borrower with the option each month to make a fully amortizing, interest-only or minimum payment. The minimum payment on an option ARM loan is based on the interest rate charged during the introductory period. This introductory rate is usually significantly below the fully indexed rate. The fully indexed rate is calculated using an index rate plus a margin. Once the introductory period ends, the contractual interest rate charged on the loan increases to the fully indexed rate and adjusts monthly to reflect movements in the index. The minimum payment is typically insufficient to cover interest accrued in the prior month, and any unpaid interest is deferred and added to the principal balance of the loan. Option ARM loans are subject to payment recast, which converts the loan to a variable-rate fully amortizing loan

upon meeting specified loan balance and anniversary date triggers.

Prime

Prime mortgage loans are made to borrowers with good credit records who meet specific underwriting requirements, including prescriptive requirements related to income and overall debt levels. New prime mortgage borrowers provide full documentation and generally have reliable payment histories.

Subprime

Subprime loans are loans that, prior to mid-2008, were offered to certain customers with one or more high risk characteristics, including but not limited to: (i) unreliable or poor payment histories; (ii) a high LTV ratio of greater than 80% (without borrower-paid mortgage insurance); (iii) a high debt-to-income ratio; (iv) an occupancy type for the loan is other than the borrower's primary residence; or (v) a history of delinquencies or late payments on the loan.

MSA: Metropolitan statistical areas

MSR: Mortgage servicing rights

Multi-asset: Any fund or account that allocates assets under management to more than one asset class.

NA: Data is not applicable or available for the period presented.

NAV: Net Asset Value

Net Capital Rule: Rule 15c3-1 under the Securities Exchange Act of 1934.

Net charge-off/(recovery) rate: Represents net charge-offs/(recoveries) (annualized) divided by average retained loans for the reporting period.

Net mortgage servicing revenue includes the following components:

Operating revenue predominantly represents the return on Home Lending Servicing's MSR asset and includes:

- Actual gross income earned from servicing third-party mortgage loans, such as contractually specified servicing fees and ancillary income; and
- The change in the fair value of the MSR asset due to the collection or realization of expected cash flows.

Risk management represents the components of

Home Lending Servicing's MSR asset that are subject to ongoing risk management activities, together with derivatives and other instruments used in those risk management activities.

Net production revenue: Includes net gains or losses on originations and sales of mortgage loans, other production-related fees and losses related to the repurchase of previously sold loans.

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Net revenue rate: Represents Card Services net revenue (annualized) expressed as a percentage of average loans for the period.

Net yield on interest-earning assets: The average rate for interest-earning assets less the average rate paid for all sources of funds.

NM: Not meaningful

NOL: Net operating loss

Nonaccrual loans: Loans for which interest income is not recognized on an accrual basis. Loans (other than credit card loans and certain consumer loans insured by U.S. government agencies) are placed on nonaccrual status when full payment of principal and interest is not expected, regardless of delinquency status, or when principal and interest have been in default for a period of 90 days or more unless the loan is both well-secured and in the process of collection. Collateral-dependent loans are typically maintained on nonaccrual status.

Nonperforming assets: Nonperforming assets include nonaccrual loans, nonperforming derivatives and certain assets acquired in loan satisfaction, predominantly real estate owned and other commercial and personal property.

NOW: Negotiable Order of Withdrawal

NSFR: Net stable funding ratio

OAS: Option-adjusted spread

OCC: Office of the Comptroller of the Currency

OCI: Other comprehensive income/(loss)

OEP: One Equity Partners

OIS: Overnight index swap

OPEB: Other postretirement employee benefit

ORMF: Operational Risk Management Framework

OTTI: Other-than-temporary impairment

Over-the-counter (“OTC”) derivatives: Derivative contracts that are negotiated, executed and settled bilaterally between two derivative counterparties, where one or both counterparties is a derivatives dealer.

Over-the-counter cleared (“OTC-cleared”) derivatives: Derivative contracts that are negotiated and executed bilaterally, but subsequently settled via a central clearing house, such that each derivative counterparty is only exposed to the default of that clearing house.

Overhead ratio: Noninterest expense as a percentage of total net revenue.

Parent Company: JPMorgan Chase & Co.

Participating securities: Represents unvested share-based compensation awards containing nonforfeitable rights to dividends or dividend equivalents (collectively, “dividends”), which are included in the earnings per share calculation

using the two-class method. JPMorgan Chase grants RSUs to certain employees under its share-based compensation programs, which entitle the recipients to receive nonforfeitable dividends during the vesting period on a basis equivalent to the dividends paid to holders of common stock. These unvested awards meet the definition of participating securities. Under the two-class method, all earnings (distributed and undistributed) are allocated to each class of common stock and participating securities, based on their respective rights to receive dividends.

PCA: Prompt corrective action

PCI: “Purchased credit-impaired” loans represents certain loans that were acquired and deemed to be credit-impaired on the acquisition date in accordance with the guidance of the FASB. The guidance allows purchasers to aggregate credit-impaired loans acquired in the same fiscal quarter into one or more pools, provided that the loans have common risk characteristics (e.g., product type, LTV ratios, FICO scores, past due status, geographic location). A pool is then accounted for as a single asset with a single composite interest rate and an aggregate expectation of cash flows.

PD: Probability of default

PRA: Prudential Regulatory Authority

Pre-provision profit/(loss): Represents total net revenue less noninterest expense. The Firm believes that this financial measure is useful in assessing the ability of a lending institution to generate income in excess of its provision for credit losses.

Pretax margin: Represents income before income tax expense divided by total net revenue, which is, in management’s view, a comprehensive measure of pretax performance derived by measuring earnings after all costs are taken into consideration. It is one basis upon which management evaluates the performance of AWM against the performance of their respective competitors.

Principal transactions revenue: Principal transactions revenue is driven by many factors, including the bid-offer spread, which is the difference between the price at which the Firm is willing to buy a financial or other instrument and the price at which the Firm is willing to sell that instrument. It also consists of realized (as a result of closing out or termination of transactions, or interim cash payments) and unrealized (as a result of changes in valuation) gains and losses on financial and other instruments (including those accounted for under the fair value option) primarily used in client-driven market-making activities and on private equity investments. In connection with its client-driven market-making activities, the Firm transacts in debt and equity instruments, derivatives and commodities (including physical commodities inventories and financial instruments that reference commodities).

Principal transactions revenue also includes certain realized and unrealized gains and losses related to hedge accounting and specified risk-management activities, including: (a)

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certain derivatives designated in qualifying hedge accounting relationships (primarily fair value hedges of commodity and foreign exchange risk), (b) certain derivatives used for specific risk management purposes, primarily to mitigate credit risk, foreign exchange risk and commodity risk, and (c) other derivatives.

PSU(s): Performance share units

RCSA: Risk and Control Self-Assessment

Real assets: Real assets include investments in productive assets such as agriculture, energy rights, mining and timber properties and exclude raw land to be developed for real estate purposes.

REIT: “Real estate investment trust”: A special purpose investment vehicle that provides investors with the ability to participate directly in the ownership or financing of real-estate related assets by pooling their capital to purchase and manage income property (i.e., equity REIT) and/or mortgage loans (i.e., mortgage REIT). REITs can be publicly or privately held and they also qualify for certain favorable tax considerations.

Receivables from customers: Primarily represents margin loans to brokerage customers that are collateralized through assets maintained in the clients’ brokerage accounts, as such no allowance is held against these receivables. These receivables are reported within accrued interest and accounts receivable on the Firm’s Consolidated balance sheets.

Regulatory VaR: Daily aggregated VaR calculated in accordance with regulatory rules.

REO: Real estate owned

Reported basis: Financial statements prepared under U.S. GAAP, which excludes the impact of taxable-equivalent adjustments.

Retained loans: Loans that are held-for-investment (i.e., excludes loans held-for-sale and loans at fair value).

Revenue wallet: Proportion of fee revenue based on estimates of investment banking fees generated across the industry (i.e., the revenue wallet) from investment banking transactions in M&A, equity and debt underwriting, and loan syndications. Source: Dealogic, a third-party provider of investment banking competitive analysis and volume-based league tables for the above noted industry products.

RHS: Rural Housing Service of the U.S. Department of Agriculture

Risk-rated portfolio: Credit loss estimates are based on estimates of the probability of default (“PD”) and loss severity given a default. The probability of default is the likelihood that a borrower will default on its obligation; the loss given default (“LGD”) is the estimated loss on the loan that would be realized upon the default and takes into consideration collateral and structural support for each credit facility.

ROA: Return on assets

ROE: Return on equity

ROTCE: Return on tangible common equity

RSU(s): Restricted stock units

RWA: “Risk-weighted assets”: Basel III establishes two comprehensive methodologies for calculating RWA (a Standardized approach and an Advanced approach) which include capital requirements for credit risk, market risk, and in the case of Basel III Advanced, also operational risk. Key differences in the calculation of credit risk RWA between the Standardized and Advanced approaches are that for Basel III Advanced, credit risk RWA is based on risk-sensitive approaches which largely rely on the use of internal credit models and parameters, whereas for Basel III Standardized, credit risk RWA is generally based on supervisory risk-weightings which vary primarily by counterparty type and asset class. Market risk RWA is calculated on a generally consistent basis between Basel III Standardized and Basel III Advanced.

S&P: Standard and Poor’s 500 Index

SAR(s): Stock appreciation rights

SCCL: single-counterparty credit limits

Scored portfolio: The scored portfolio predominantly includes residential real estate loans, credit card loans and certain auto and business banking loans where credit loss estimates are based on statistical analysis of credit losses over discrete periods of time. The statistical analysis uses portfolio modeling, credit scoring and decision-support tools.

SEC: Securities and Exchange Commission

Seed capital: Initial JPMorgan capital invested in products, such as mutual funds, with the intention of ensuring the fund is of sufficient size to represent a viable offering to clients, enabling pricing of its shares, and allowing the manager to develop a track record. After these goals are achieved, the intent is to remove the Firm’s capital from the investment.

Short sale: A short sale is a sale of real estate in which proceeds from selling the underlying property are less than the amount owed the Firm under the terms of the related mortgage, and the related lien is released upon receipt of such proceeds.

Single-name: Single reference-entities

SLR: Supplementary leverage ratio

SMBS: Stripped mortgage-backed securities

SOA: Society of Actuaries

SPES: Special purpose entities

Structural interest rate risk: Represents interest rate risk of the non-trading assets and liabilities of the Firm.

Glossary of Terms and Acronyms

Structured notes: Structured notes are predominantly financial instruments containing embedded derivatives.

Suspended foreclosures: Loans referred to foreclosure where formal foreclosure proceedings have started but are currently on hold, which could be due to bankruptcy or loss mitigation. Includes both judicial and non-judicial states.

Taxable-equivalent basis: In presenting results on a managed basis, the total net revenue for each of the business segments and the Firm is presented on a tax-equivalent basis. Accordingly, revenue from investments that receive tax credits and tax-exempt securities is presented in managed basis results on a level comparable to taxable investments and securities; the corresponding income tax impact related to tax-exempt items is recorded within income tax expense.

TBVPS: Tangible book value per share

TCE: Tangible common equity

TDR: “Troubled debt restructuring” is deemed to occur when the Firm modifies the original terms of a loan agreement by granting a concession to a borrower that is experiencing financial difficulty.

TLAC: Total Loss Absorbing Capacity

U.K.: United Kingdom

Unaudited: Financial statements and information that have not been subjected to auditing procedures sufficient to permit an independent certified public accountant to express an opinion.

U.S.: United States of America

U.S. GAAP: Accounting principles generally accepted in the U.S.

U.S. government-sponsored enterprises (“U.S. GSEs”) and

U.S. GSE obligations: In the U.S., GSEs are quasi-governmental, privately held entities established by Congress to improve the flow of credit to specific sectors of the economy and provide certain essential services to the public. U.S. GSEs include Fannie Mae and Freddie Mac, but do not include Ginnie Mae, which is directly owned by the U.S. Department of Housing and Urban Development. U.S. GSE obligations are not explicitly guaranteed as to the timely payment of principal and interest by the full faith and credit of the U.S. government.

U.S. LCR: Liquidity coverage ratio under the final U.S. rule.

U.S. Treasury: U.S. Department of the Treasury

VA: U.S. Department of Veterans Affairs

VaR: “Value-at-risk” is a measure of the dollar amount of potential loss from adverse market moves in an ordinary market environment.

VCG: Valuation Control Group

VGF: Valuation Governance Forum

VIEs: Variable interest entities

Warehouse loans: Consist of prime mortgages originated with the intent to sell that are accounted for at fair value and classified as trading assets.

Washington Mutual transaction: On September 25, 2008, JPMorgan Chase acquired certain of the assets of the banking operations of Washington Mutual Bank (“Washington Mutual”) from the FDIC.

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* Ex-officio

Corporate headquarters

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Telephone: 212-270-6000
jpmorganchase.com

Principal subsidiaries

JPMorgan Chase Bank,
National Association
Chase Bank USA,
National Association
JPMorgan Chase Holdings LLC
J.P. Morgan Securities LLC
J.P. Morgan Securities plc

Annual Report on Form 10-K

The Annual Report on Form 10-K of JPMorgan Chase & Co. as filed with the U.S. Securities and Exchange Commission will be made available without charge upon request to:

Office of the Secretary
JPMorgan Chase & Co.
270 Park Avenue
New York, NY 10017-2070

Stock listing

New York Stock Exchange

The New York Stock Exchange ticker symbol for the common stock of JPMorgan Chase & Co. is JPM.

Financial information about JPMorgan Chase & Co. can be accessed by visiting the Investor Relations website at jpmorganchase.com. Additional questions should be addressed to:

Investor Relations
JPMorgan Chase & Co.
270 Park Avenue
New York, NY 10017-2070
Telephone: 212-270-7325

Directors

To contact any of the Board members or committee chairs, the Lead Independent Director or the non-management directors as a group, please mail correspondence to:

JPMorgan Chase & Co.
Attention (Board member(s))
Office of the Secretary
270 Park Avenue
New York, NY 10017-2070

The Corporate Governance Principles of the Board, the charters of the principal Board committees, the Code of Conduct, the Code of Ethics for Finance Professionals and other governance information can be accessed by visiting our website at jpmorganchase.com and clicking on "Governance" under the "About us" tab.

Transfer agent and registrar

Computershare
480 Washington Boulevard
Jersey City, NJ 07310-2053
Telephone: 800-758-4651
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JPMorgan Chase & Co.'s Investor Services Program offers a variety of convenient, low-cost services to make it easier to reinvest dividends and buy and sell shares of JPMorgan Chase & Co. common stock. A brochure and enrollment materials may be obtained by contacting the Program Administrator, Computershare, by calling 800-758-4651, by writing to the address indicated above or by visiting its website at www-us.computershare.com/investor.

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Contact Computershare:

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New York, NY 10017

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