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)	**2018**	2017	2016	2015	2014
Selected income statement data					
Total net revenue	**$ 109,029**	$ 100,705	$ 96,569	$ 94,440	$ 95,994
Total noninterest expense	**63,394**	59,515	56,672	59,911	62,156
Pre-provision profit	**45,635**	41,190	39,897	34,529	33,838
Provision for credit losses	**4,871**	5,290	5,361	3,827	3,139
Income before income tax expense	**40,764**	35,900	34,536	30,702	30,699
Income tax expense	**8,290**	11,459	9,803	6,260	8,954
Net income	**$ 32,474**	$ 24,441 [f]	$ 24,733	$ 24,442	$ 21,745
Earnings per share data					
Net income: Basic	**$ 9.04**	$ 6.35	$ 6.24	$ 6.05	$ 5.33
Diluted	**9.00**	6.31	6.19	6.00	5.29
Average shares: Basic	**3,396.4**	3,551.6	3,658.8	3,741.2	3,808.3
Diluted	**3,414.0**	3,576.8	3,690.0	3,773.6	3,842.3
Market and per common share data					
Market capitalization	**$ 319,780**	$ 366,301	$ 307,295	$ 241,899	$ 232,472
Common shares at period-end	**3,275.8**	3,425.3	3,561.2	3,663.5	3,714.8
Book value per share	**70.35**	67.04	64.06	60.46	56.98
Tangible book value per share ("TBVPS")[a]	**56.33**	53.56	51.44	48.13	44.60
Cash dividends declared per share	**2.72**	2.12	1.88	1.72	1.58
Selected ratios and metrics					
Return on common equity ("ROE")	**13%**	10%	10%	11%	10%
Return on tangible common equity ("ROTCE")[a]	**17**	12	13	13	13
Return on assets ("ROA")	**1.24**	0.96	1.00	0.99	0.89
Overhead ratio	**58**	59	59	63	65
Loans-to-deposits ratio	**67**	64	65	65	56
Liquidity coverage ratio ("LCR") (average)[b]	**113**	119	N/A	N/A	N/A
Common equity tier 1 ("CET1") capital ratio[c]	**12.0**	12.2	12.3	11.8	10.2
Tier 1 capital ratio[c]	**13.7**	13.9	14.0	13.5	11.6
Total capital ratio[c]	**15.5**	15.9	15.5	15.1	13.1
Tier 1 leverage ratio[c]	**8.1**	8.3	8.4	8.5	7.6
Supplementary leverage ratio ("SLR")[d]	**6.4%**	6.5%	6.5%	6.5%	N/A
Selected balance sheet data (period-end)					
Trading assets	**$ 413,714**	$ 381,844	$ 372,130	$ 343,839	$ 398,988
Investment securities	**261,828**	249,958	289,059	290,827	348,004
Loans	**984,554**	930,697	894,765	837,299	757,336
Core Loans	**931,856**	863,683	806,152	732,093	628,785
Average core loans	**885,221**	829,558	769,385	670,757	596,823
Total assets	**2,622,532**	2,533,600	2,490,972	2,351,698	2,572,274
Deposits	**1,470,666**	1,443,982	1,375,179	1,279,715	1,363,427
Long-term debt	**282,031**	284,080	295,245	288,651	276,379
Common stockholders' equity	**230,447**	229,625	228,122	221,505	211,664
Total stockholders' equity	**256,515**	255,693	254,190	247,573	231,727
Headcount	**256,105**	252,539	243,355	234,598	241,359
Credit quality metrics					
Allowance for credit losses	**$ 14,500**	$ 14,672	$ 14,854	$ 14,341	$ 14,807
Allowance for loan losses to total retained loans	**1.39%**	1.47%	1.55%	1.63%	1.90%
Allowance for loan losses to retained loans excluding purchased credit-impaired loans[e]	**1.23**	1.27	1.34	1.37	1.55
Nonperforming assets	**$ 5,190**	$ 6,426	$ 7,535	$ 7,034	$ 7,967
Net charge-offs	**4,856**	5,387	4,692	4,086	4,759
Net charge-off rate	**0.52%**	0.60% [g]	0.54%	0.52%	0.65%

Effective January 1, 2018, the Firm adopted several new accounting standards. Certain of the new accounting standards were applied retrospectively and, accordingly, prior period amounts were revised. For additional information, refer to Note 1.

(a) TBVPS and ROTCE are non-GAAP financial measures. For a further discussion of these measures, refer to Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 57-59.

(b) For the years ended December 31, 2018 and 2017, the percentage represents the Firm's reported average LCR for the three months ended December 31, 2018 and 2017, per the U.S. LCR public disclosure requirements which became effective April 1, 2017. Refer to Liquidity Risk Management on pages 95–100 for additional information on the Firm's LCR.

(c) Ratios presented are calculated under the Basel III Transitional capital rules and for the capital ratios represent the lower of the Standardized or Advanced approach. As of December 31, 2018, the Firm's capital ratios were equivalent whether calculated on a transitional or fully phased-in basis. Refer to Capital Risk Management on pages 85-94 for additional information on Basel III.

(d) Effective January 1, 2018, the SLR was fully phased-in under Basel III. The SLR is defined as Tier 1 capital divided by the Firm's total leverage exposure. Ratios prior to 2018 were calculated under the Basel III Transitional rules, per the SLR public disclosure requirements which became effective January 1, 2015.

(e) Excluded the impact of residential real estate purchased credit-impaired ("PCI") loans, a non-GAAP financial measure. For further discussion of these measures, refer to Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 57-59, and the Allowance for credit losses on pages 120–122.

(f) On December 22, 2017, the Tax Cuts and Jobs Act ("TCJA") was signed into law. The Firm's results for the year 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, refer to Note 24.

(g) 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%.

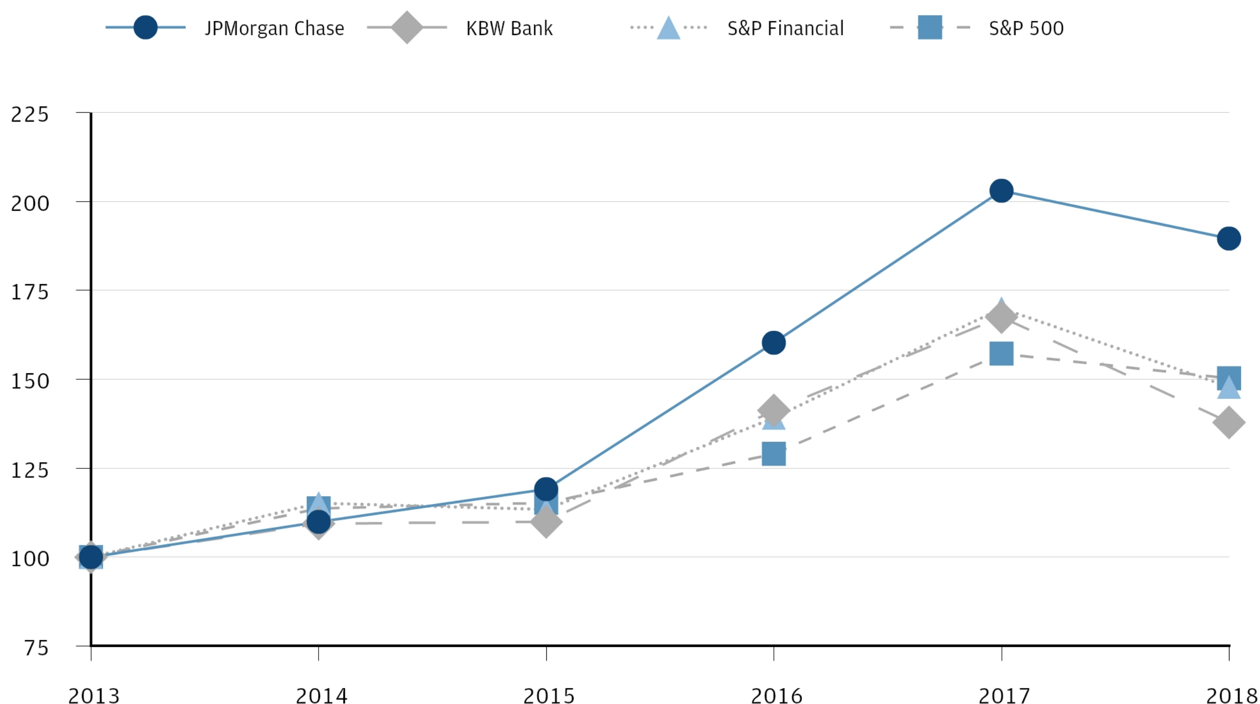
FIVE-YEAR STOCK PERFORMANCE

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, 2013, in JPMorgan Chase common stock and in each of the above indices. The comparison assumes that all dividends are reinvested.

December 31, (in dollars)	2013	2014	2015	2016	2017	**2018**
JPMorgan Chase	$ 100.00	$ 109.88	$ 119.07	$ 160.23	$ 203.07	**$ 189.57**
KBW Bank Index	100.00	109.36	109.90	141.23	167.49	**137.82**
S&P Financial Index	100.00	115.18	113.38	139.17	169.98	**147.82**
S&P 500 Index	100.00	113.68	115.24	129.02	157.17	**150.27**

December 31,
(in dollars)



The following is Management's discussion and analysis of the financial condition and results of operations ("MD&A") of JPMorgan Chase for the year ended December 31, 2018. The MD&A is included in both JPMorgan Chase's Annual Report for the year ended December 31, 2018 ("Annual Report") and its Annual Report on Form 10-K for the year ended December 31, 2018 ("2018 Form 10-K") filed with the Securities and Exchange Commission ("SEC"). Refer to the Glossary of terms and acronyms on pages 293–299 for definitions of terms and acronyms used throughout the Annual Report and the 2018 Form 10-K.

The MD&A contains statements that are forward-looking within the meaning of the Private Securities Litigation Reform Act of 1995. These statements are based on the current beliefs and expectations of JPMorgan Chase's management and are subject to significant risks and uncertainties. For a discussion of certain of those risks and uncertainties and the factors that could cause JPMorgan Chase's actual results to differ materially because of those risks and uncertainties, refer to Forward-looking Statements on page 147) and Part I, Item 1A: Risk factors in the 2018 Form 10-K.

INTRODUCTION

JPMorgan Chase & Co. (NYSE: JPM), 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; JPMorgan Chase had $2.6 trillion in assets and $256.5 billion in stockholders' equity as of December 31, 2018. 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 globally 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 27 states and the District of Columbia as of December 31, 2018, 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. In January 2019, the OCC approved an application of merger which was filed by JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. in December 2018 and which contemplates that Chase Bank USA, N.A. will merge with and into JPMorgan Chase Bank, N.A., with JPMorgan Chase Bank, N.A. as the surviving bank. For additional information refer to Supervision and Regulation on pages 1-6 in the 2018 Form 10-K. JPMorgan Chase's principal nonbank subsidiary is J.P. Morgan Securities LLC ("J.P. Morgan 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 60-78, and Note 31.

This executive overview of the MD&A highlights selected information and does not contain all of the information that is important to readers of this 2018 Form 10-K. 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 2018 Form 10-K should be read in its entirety.

Effective January 1, 2018, the Firm adopted several new accounting standards, of which the most significant to the Firm was the guidance related to revenue recognition, and recognition and measurement of financial assets. The revenue recognition guidance requires gross presentation of certain costs that were previously offset against revenue. This change was adopted retrospectively and, accordingly, prior period amounts were revised, resulting in both total net revenue and total noninterest expense increasing with no impact to net income. The adoption of the recognition and measurement guidance resulted in $505 million of fair value gains in the first quarter of 2018, recorded in total net revenue, on certain equity investments that were previously held at cost. For additional information, refer to Note 1.

Financial performance of JPMorgan Chase

Year ended December 31, (in millions, except per share data and ratios)	2018	2017	Change
Selected income statement data			
Total net revenue	**$109,029**	$100,705	8%
Total noninterest expense	**63,394**	59,515	7
Pre-provision profit	**45,635**	41,190	11
Provision for credit losses	**4,871**	5,290	(8)
Net income	**32,474**	24,441	33
Diluted earnings per share	**9.00**	6.31	43
Selected ratios and metrics			
Return on common equity	**13%**	10%	
Return on tangible common equity	**17**	12	
Book value per share	**$ 70.35**	$ 67.04	5
Tangible book value per share	**56.33**	53.56	5
Capital ratios[(a)]			
CET1	**12.0%**	12.2%	
Tier 1 capital	**13.7**	13.9	
Total capital	**15.5**	15.9	

(a) Ratios presented are calculated under the Basel III Transitional rules. As of December 31, 2018, the Firm's capital ratios were equivalent whether calculated on a transitional or fully phased-in basis. Refer to Capital Risk Management on pages 85-94 for additional information on Basel III.

Comparisons noted in the sections below are for the full year of 2018 versus the full year of 2017, unless otherwise specified.

Firmwide overview

JPMorgan Chase reported strong results for 2018, with record net income and EPS of $32.5 billion and $9.00 per share, respectively, on net revenue of $109.0 billion. Excluding the impact of the Tax Cuts & Jobs Acts ("TCJA"), net income and EPS were still records for a full year. The Firm reported ROE of 13% and ROTCE of 17%. For additional information related to the impact of the TCJA, refer to the Consolidated Results of Operations on pages 48–51 and Note 24.

- Net income increased 33%, reflecting higher net revenue and the impact of the lower U.S. federal statutory income tax rate as a result of the TCJA, partially offset by an increase in noninterest expense.
- Total net revenue increased 8%. Net interest income was $55.1 billion, up 10%, driven by the impact of higher rates, loan growth and Card margin expansion, partially offset by lower CIB Markets net interest income. Noninterest revenue was $54.0 billion, up 7%, largely driven by higher CIB Markets noninterest revenue and auto lease income, partially offset by markdowns on certain legacy private equity investments and the impact of higher funding spreads on derivatives.
- Noninterest expense was $63.4 billion, up 7%, predominantly driven by investments in the business, including technology, marketing, higher compensation expense on increased headcount, and real estate, as well as higher revenue-related costs, including auto lease depreciation and volume-related transaction costs.
- The provision for credit losses was $4.9 billion, down from $5.3 billion in the prior year, reflecting a decrease in the consumer provision driven by a lower addition to the credit card allowance for credit losses and lower net charge-offs. The lower net charge-offs were primarily driven by recoveries from loan sales in the residential real estate portfolio, predominantly offset by higher net charge-offs in the credit card portfolio, as anticipated. The prior year also included a net $218 million write-down recorded in connection with the sale of the student loan portfolio. The decrease in the consumer provision was partially offset by an increase in the wholesale provision, reflecting additions to the allowance for loan losses from select client downgrades.
- The total allowance for credit losses was $14.5 billion at December 31, 2018, and the Firm had a loan loss coverage ratio, excluding the PCI portfolio, of 1.23%, compared with 1.27% in the prior year. The Firm's nonperforming assets totaled $5.2 billion at December 31, 2018, a decrease from $6.4 billion in the prior year, reflecting improved credit performance in the consumer portfolio, and reductions in the wholesale portfolio including repayments and loan sales.
- Firmwide average core loans and core loans excluding CIB both increased 7%.

Selected capital-related metrics

- The Firm's Basel III Fully Phased-In CET1 capital was $183.5 billion, and the Standardized and Advanced CET1 ratios were 12.0% and 12.9%, respectively.
- The Firm's Fully Phased-In supplementary leverage ratio ("SLR") was 6.4%.
- The Firm continued to grow tangible book value per share ("TBVPS"), ending 2018 at $56.33, up 5%.

ROTCE and TBVPS are each non-GAAP financial measures. Core loans and each of the Fully Phased-In capital and certain leverage measures are all considered key performance measures. For a further discussion of each of these measures, refer to Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 57-59, and Capital Risk Management on pages 85-94.

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 2018.

Line of business	Highlights
CCB ROE 28%	• Revenue of $52.1 billion, up 12%; record net income of $14.9 billion, up 58% • Average core loans up 6%; average deposits of $670 billion, up 5% • Client investment assets of $282 billion, up 3% • Credit card sales volume up 11% and merchant processing volume up 15%
CIB ROE 16%	• Record revenue of $36.4 billion, up 5%; record net income of $11.8 billion, up 9% • Maintained #1 ranking for Global Investment Banking fees with 8.7% wallet share • Record Equity Markets revenue of $6.9 billion, up 21% • Investment Banking revenue up 2%; Treasury Services revenue up 13%; and Securities Services revenue up 8%
CB ROE 20%	• Record revenue of $9.1 billion, up 5%; record net income of $4.2 billion, up 20% • Average loan balances of $205.5 billion, up 4% • Strong credit quality with net charge-offs of 3 bps
AWM ROE 31%	• Record revenue of $14.1 billion, up 2%; record net income of $2.9 billion, up 22% • Average loan balances of $139 billion, up 12% • Assets under management ("AUM") of $2.0 trillion, down 2%

For a detailed discussion of results by line of business, refer to the Business Segment Results on pages 60–61.

Credit provided and capital raised

JPMorgan Chase continues to support consumers, businesses and communities around the globe. The Firm provided credit and raised capital for wholesale and consumer clients during 2018, consisting of:

Amount	Description
$2.5 trillion	Total credit provided and capital raised
$227 billion	Credit for consumers
$24 billion	Credit for U.S. small businesses
$937 billion	Credit for corporations
$1.3 trillion	Capital raised for corporate clients and non-U.S. government entities
$57 billion	Credit and capital raised for U.S. governments and nonprofit entities[a]

(a) Includes states, municipalities, hospitals and universities.

2019 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. For a further discussion of certain of those risks and uncertainties and the other factors that could cause JPMorgan Chase's actual results to differ materially because of those risks and uncertainties, refer to Forward-Looking Statements on page 147 *and the Risk Factors section on* pages 7–28 . *There is no assurance that actual results in 2019 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 2019 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 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

- Management expects full-year 2019 net interest income, on a managed basis, to be in excess of $58 billion, reflecting the annualized impact of 2018 interest rate increases, as well as expected loan and deposit growth.
- The Firm takes a disciplined approach to managing its expenses, while investing for growth and innovation. As a result, management expects Firmwide adjusted expense for the full-year 2019 to be less than $66 billion.
- The Firm continues to experience charge-off rates at very low levels, reflecting favorable credit trends across the consumer and wholesale portfolios. Management expects full-year 2019 net charge-offs to be less than $5.5 billion, higher than 2018, driven by growth.

First-quarter 2019

- Management expects the first-quarter 2019 net interest income, on a managed basis, to be approximately flat compared with the fourth-quarter of 2018.
- Firmwide adjusted expense for the first-quarter 2019 is expected to be up mid-single digits compared with the first quarter of 2018.
- Markets revenue for the first-quarter 2019 is expected to be lower when compared with the prior-year quarter by high-teens percentage points on a reported basis, and by low double-digit percentage points excluding the impact of the recognition and measurement accounting standard in the first quarter of 2018, depending on market conditions.

Business Developments

Expected departure of the U.K. from the EU

In 2016, the U.K. voted to withdraw from the European Union ("EU"), and in March 2017, the U.K. invoked Article 50 of the Lisbon Treaty, which commenced withdrawal negotiations with the EU. As a result, the U.K. is scheduled to depart from the EU on March 29, 2019. Negotiations regarding the terms of the U.K.'s withdrawal continue between the U.K. and the EU, although the situation remains highly uncertain.

The Firm has a long-standing presence in the U.K., which currently serves as the regional headquarters of the Firm's operations in over 30 countries across Europe, the Middle East, and Africa ("EMEA"). In the region, the Firm serves clients and customers across its business segments. The Firm has approximately 16,000 employees in the U.K., of which approximately two-thirds are in London, with operational and technology support centers in locations such as Bournemouth, Glasgow and Edinburgh.

The Firm has been preparing for and continues to make significant progress in its readiness for the U.K.'s expected withdrawal from the EU, which is commonly referred to as "Brexit." JPMorgan Chase established a Firmwide Brexit Implementation program in 2017. The program covers strategic implementation across all impacted businesses and functions. The program's objective is to deliver the Firm's capabilities on "day one" of the U.K.'s withdrawal across all impacted legal entities. The program includes an ongoing assessment of implementation risks including political, legal and regulatory risks and plans for addressing and mitigating those risks. The Firm is also monitoring the expected macroeconomic developments associated with a no-deal scenario and has undertaken stress testing covering credit and market risk to assess potential impacts.

Significant uncertainty remains around the U.K.'s expected departure from the EU, including the possibility that the U.K. departs without any agreement being reached on how U.K. financial services firms will conduct business within the EU (i.e., "a no-deal scenario").

The Firm is planning for a U.K. withdrawal in the event that an agreement is reached, as well as for a no-deal scenario. Significant uncertainties exist under either potential outcome. For example, in planning for the U.K. withdrawal from the EU under a no-deal scenario, the Firm is focused on the following key areas to ensure continuation of service to its EU clients: regulatory and legal entity readiness; client readiness; and business and operational readiness.

Regulatory and legal entity readiness

The Firm intends to leverage its existing EU legal entities, in Germany, Luxembourg and Ireland to conduct broader financial service activities. These legal entities are in advanced stages of readiness, including governance, infrastructure, capital, local regulatory licenses and branch authorizations, as needed. The Firm anticipates that its EU legal entities will be ready to service its EU clients in March 2019, if required. There are some dependencies on final authorizations from the European Central Bank and jurisdictional National Competent Authorities to carry out new activity in the EU legal entities.

Client readiness

Where required, agreements with the Firm's EU clients are being re-documented from current U.K. legal entities to existing EU legal entities to ensure continuation of service. This process involves establishing new agreements such as ISDA master agreements between clients and the relevant EU legal entity. There is a risk that not all clients will have the appropriate legal and operational arrangements in place upon the U.K.'s withdrawal from the EU. The Firm continues to actively engage with its clients to ensure preparedness and, to the extent possible, minimize operational disruption.

Business and operational readiness

The Firm is expecting to add several hundred employee positions in its various EU locations, including individuals who the Firm expects to relocate from the U.K. The Firm is preparing to be operational in the EU across all in-scope businesses and functions, including the build-out of technology, processes and controls, and the necessary resourcing in the EU locations across first, second and third line of defense functions.

The Firm and its EU legal entities' access to market infrastructures such as trading venues, central counterparties ("CCPs") and central settlement systems ("CSDs") will need to be adjusted to comply with the evolving regulatory framework. Some uncertainty remains with respect to the readiness of the overall market ecosystem and connectivity between participants. The Firm continues to monitor the regulatory landscape and is preparing to take mitigating action, as needed, specifically in areas such as "contract continuity" that would allow U.K. entities to continue servicing trade lifecycle events.

In the event that the U.K.'s withdrawal from the EU is delayed through a transition deal or another mechanism, the Firm would have the required operational capabilities to conduct business from its EU legal entities, but the timing of any changes would be re-assessed to ensure that a strategic approach is taken. The Firm continues to closely monitor all negotiations and legislative developments and has developed an implementation plan that allows for flexibility given the continued uncertainty.

LIBOR transition

The Financial Stability Board ("FSB") and the Financial Stability Oversight Council ("FSOC") have observed that the secular decline in interbank short-term funding poses structural risks for unsecured benchmark interest rates such as Interbank Offered Rates ("IBORs"), and therefore regulators and market participants in various jurisdictions have been working to identify alternative reference rates that are compliant with the International Organization of Securities Commission's standards for transaction-based benchmarks. In the U.S., the Alternative Reference Rates Committee (the "ARRC"), a group of market and official sector participants, identified the Secured Overnight Financing Rate ("SOFR") as its recommended alternative benchmark rate. Other alternative reference rates have been recommended in other jurisdictions.

IBORs are referenced in approximately $370 trillion of wholesale and consumer transactions globally spanning a broad range of financial products and contracts. Without advance transition planning for alternative benchmarks, sudden cessation of those broadly referenced rates could cause significant disruptions to gross flows of floating-rate payments and receipts. An abrupt cessation could also impair the normal functioning of a variety of markets, including commercial and consumer lending.

JPMorgan Chase established a Firmwide LIBOR Transition program in early 2018. The Firmwide CFO and the CEO of the CIB oversee the program as senior sponsors. When assessing risks associated with IBOR transition, the program considers three possible scenarios: disorderly transition, measured/regulated transition, and IBOR in continuity. These risks will continue to be monitored, along with any new risks that emerge as the program progresses. Plans to mitigate the risks associated with IBOR transition have been identified, with some already in the early stages of implementation. Model risk, for example, will be mitigated by the identification and migration of swap curves based on IBORs to new alternative reference rates.

Market participants are working closely with public sector representation as part of National Working Groups ("NWGs") towards the common goal of facilitating an orderly transition from IBORs. Current NWG efforts include the development of cash and derivative markets referencing alternative reference rates, as well as the development of industry consensus for fallback language that would determine the rates to use in various IBOR-indexed contracts when a particular IBOR ceases to be produced. The Firm is encouraging its clients to actively participate in industry consultations on fallback language in order to ensure the broadest possible industry engagement in and understanding of IBOR transition. The Firm continues to monitor the transition by clients from the current IBOR-referencing products to products referencing the new alternative reference rates.

NWGs are also working with accounting standard setters to manage the accounting implications of amending existing contracts to add fallback language and to change reference rates. Current efforts include the identification of potential accounting impacts and potential alternatives to mitigate those impacts through interpretation of existing accounting rules, or through transition relief from FASB and IASB standard setting.

The Firm continues to develop and implement plans to appropriately mitigate the risks associated with IBOR discontinuation as identified alternative reference rates develop, and liquidity in the markets referencing them increases. The Firm will continue to engage with regulators as the transition progresses.

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, 2018, 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, refer to pages 141-143.

Effective January 1, 2018, the Firm adopted several new accounting standards. Certain of the new accounting standards were applied retrospectively and, accordingly, prior period amounts were revised. For additional information, refer to Note 1.

Revenue

Year ended December 31, (in millions)	2018	2017	2016
Investment banking fees	$ 7,550	$ 7,412	$ 6,572
Principal transactions	12,059	11,347	11,566
Lending- and deposit-related fees	6,052	5,933	5,774
Asset management, administration and commissions	17,118	16,287	15,364
Investment securities gains/(losses)	(395)	(66)	141
Mortgage fees and related income	1,254	1,616	2,491
Card income	4,989	4,433	4,779
Other income[(a)]	5,343	3,646	3,799
Noninterest revenue	53,970	50,608	50,486
Net interest income	55,059	50,097	46,083
Total net revenue	$ 109,029	$ 100,705	$ 96,569

(a) Included operating lease income of $4.5 billion, $3.6 billion and $2.7 billion for the years ended December 31, 2018, 2017 and 2016, respectively.

2018 compared with 2017

Investment banking fees increased from a strong prior year, with overall share gains, reflecting:

- higher advisory fees driven by a higher number of large completed transactions, and
- higher equity underwriting fees driven by a higher share of fees, reflecting strong performance across products

predominantly offset by

- lower debt underwriting fees primarily driven by declines in industry-wide fee levels.

For additional information, refer to CIB segment results on pages 66-70 and Note 6.

Principal transactions revenue increased primarily reflecting higher revenue in CIB driven by:

- Equity Markets with strength across products, primarily in derivatives and prime brokerage, reflecting strong client activity, and
- Fixed Income Markets reflecting strong performance in Currencies & Emerging Markets, and higher revenue in Commodities compared to a challenging prior year, largely offset by lower revenue in Credit,
- the results also reflect a loss in Credit Adjustments & Other, largely driven by higher funding spreads on derivatives.

The increase in CIB was partially offset by private equity losses reflecting markdowns on certain legacy private equity investments compared with gains in the prior year in Corporate.

For additional information, refer to CIB and Corporate segment results on pages 66-70 and pages 77-78, respectively, and Note 6.

Asset management, administration and commissions revenue increased reflecting:

- higher asset management fees in AWM and CCB driven by higher average market levels and the cumulative impact of net inflows. For AWM, these were partially offset by fee compression and lower performance fees
- higher brokerage commissions driven by higher volumes in CIB and AWM, and higher asset-based fees in CIB.

For additional information, refer to AWM, CCB and CIB segment results on pages 74-76, pages 62-65 and pages 66-70, respectively, and Note 6.

For information on lending- and deposit-related fees, refer to the segment results for CCB on pages 62-65, CIB on pages 66-70, and CB on pages 71-73 and Note 6; on securities gains, refer to the Corporate segment discussion on pages 77-78.

Investment securities losses increased due to sales related to repositioning the investment securities portfolio.

Mortgage fees and related income decreased driven by:

- lower net production revenue reflecting lower production margins and volumes, as well as the impact of a loan sale,

partially offset by

- higher net mortgage servicing revenue reflecting higher MSR risk management results, predominantly offset by lower servicing revenue on a lower level of third-party loans serviced.

For further information, refer to CCB segment results on pages 62-65, Note 6 and 15.

Card income increased driven by:

- lower new account origination costs, and higher merchant processing fees on higher volumes,

largely offset by

- lower net interchange income reflecting higher rewards costs and partner payments, largely offset by higher card sales volumes. The rewards costs included an adjustment to the credit card rewards liability of approximately $330 million, recorded in the second quarter of 2018, driven by an increase in redemption rate assumptions.

For further information, refer to CCB segment results on pages 62-65 and Note 6.

Other income increased reflecting:

- higher operating lease income from growth in auto operating lease volume in CCB
- fair value gains of $505 million recognized in the first quarter of 2018 related to the adoption of the new recognition and measurement accounting guidance for certain equity investments previously held at cost
- the absence of the impact related to the enactment of the TCJA, which reduced the value of certain of CIB's tax-oriented investments by $520 million in the prior year

partially offset by

- lower investment valuations in AWM, and
- the absence of a legal benefit of $645 million that was recorded in the prior year 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, refer to Note 6.

Net interest income increased driven by the impact of higher rates, loan growth across the businesses, and Card margin expansion, partially offset by lower CIB Markets net interest income. The Firm's average interest-earning assets were $2.2 trillion, up $49 billion from the prior year, and the net interest yield on these assets, on an FTE basis, was 2.50%, an increase of 14 basis points from the prior year. The net interest yield excluding CIB Markets was 3.25%, an increase of 40 basis points. Net interest yield excluding CIB markets is a non-GAAP financial measure. For a further discussion of this measure, refer to Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 57-59.

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.

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.

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

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.

Card income decreased predominantly driven by higher credit card new account origination costs, largely offset by higher card-related fees, primarily annual fees.

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.

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. The net interest yield excluding CIB Markets was 2.85%, an increase of 26 basis points from the prior year.

Provision for credit losses

Year ended December 31, (in millions)	2018	2017	2016
Consumer, excluding credit card	$ (63)	$ 620	$ 467
Credit card	4,818	4,973	4,042
Total consumer	4,755	5,593	4,509
Wholesale	116	(303)	852
Total provision for credit losses	$ 4,871	$ 5,290	$ 5,361

2018 compared with 2017

The **provision for credit losses** decreased as a result of a decline in the consumer provision, partially offset by an increase in the wholesale provision

- the decrease in the **consumer, excluding credit card** portfolio in CCB was due to
  - lower net charge-offs in the residential real estate portfolio, largely driven by recoveries from loan sales, and
  - lower net charge-offs in the auto portfolio

  partially offset by
  - a $250 million reduction in the allowance for loan losses in the residential real estate portfolio – PCI, reflecting continued improvement in home prices and lower delinquencies; the reduction was $75 million lower than the prior year for the residential real estate portfolio – non credit-impaired
- the prior year also included a net $218 million write-down recorded in connection with the sale of the student loan portfolio, and
- the decrease in the **credit card** portfolio was due to
  - a $300 million addition to the allowance for loan losses, reflecting loan growth and higher loss rates, as anticipated; the addition was $550 million lower than the prior year,

  largely offset by
  - higher net charge-offs due to seasoning of more recent vintages, as anticipated, and
- in **wholesale**, the current period expense of $116 million reflected additions to the allowance for loan losses from select client downgrades,

  largely offset by
  - other net portfolio activity, including a reduction in the allowance for loan losses related to a single name in the Oil & Gas portfolio in the first quarter of 2018, compared to a net benefit of $303 million in the prior year. The prior year benefit reflected a reduction in the allowance for loan losses on credit quality improvements in the Oil & Gas, Natural Gas Pipelines, and Metals and Mining portfolios.

For a more detailed discussion of the credit portfolio and the allowance for credit losses, refer to the segment discussions of CCB on pages 62–65, CIB on pages 66-70, CB on pages 71-73, the Allowance for Credit Losses on pages 120–122 and Note 13.

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 net $218 million write-down recorded in connection with the sale of the student loan portfolio.

Noninterest expense

Year ended December 31, (in millions)	2018	2017	2016
Compensation expense	**$33,117**	$31,208	$30,203
Noncompensation expense:			
Occupancy	**3,952**	3,723	3,638
Technology, communications and equipment	**8,802**	7,715	6,853
Professional and outside services	**8,502**	7,890	7,526
Marketing	**3,290**	2,900	2,897
Other[(a)(b)]	**5,731**	6,079	5,555
Total noncompensation expense	**30,277**	28,307	26,469
Total noninterest expense	**$63,394**	$59,515	$56,672

(a) Included Firmwide legal expense/(benefit) of $72 million, $(35) million and $(317) million for the years ended December 31, 2018, 2017 and 2016, respectively.
(b) Included FDIC-related expense of $1.2 billion, $1.5 billion and $1.3 billion for the years ended December 31, 2018, 2017 and 2016, respectively.

2018 compared with 2017

Compensation expense increased driven by investments in headcount across the businesses, including bankers and advisors, as well as technology and other support staff, and higher revenue-related compensation expense largely in CIB.

Noncompensation expense increased as a result of:

- higher depreciation expense due to growth in auto operating lease volume in CCB
- higher outside services expense primarily due to higher volume-related transaction costs in CIB and higher external fees on revenue growth in AWM
- higher investments in technology in the businesses and marketing in CCB
- a loss of $174 million on the liquidation of a legal entity, recorded in other expense in Corporate, in the second quarter of 2018, and
- higher legal expense, with a net benefit in the prior year

partially offset by

- lower FDIC-related expense as a result of the elimination of the surcharge at the end of the third quarter of 2018, and
- the absence of an impairment in CB on certain leased equipment

For additional information on the liquidation of a legal entity, refer to Note 23.

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, refer to Note 29.

Income tax expense

Year ended December 31, (in millions, except rate)	2018	2017	2016
Income before income tax expense	**$40,764**	$35,900	$34,536
Income tax expense	**8,290**	11,459	9,803
Effective tax rate	**20.3%**	31.9%	28.4%

2018 compared with 2017

The **effective tax rate** decreased in 2018 driven by

- the impact of the TCJA, including the reduction in the U.S. federal statutory income tax rate, a $302 million net tax benefit resulting from changes in the prior year estimates related to the remeasurement of certain deferred taxes and the deemed repatriation tax on non-U.S. earnings, and the absence of the initial $1.9 billion impact from the TCJA's enactment in December 2017

the reduction in the effective tax rate was partially offset by

- the impact of higher pre-tax income, and the change in mix of income and expense subject to U.S. federal, state and local taxes. For further information, refer to Note 24.

2017 compared with 2016

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

- a $1.9 billion increase to income tax expense representing the initial 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 in 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.

CONSOLIDATED BALANCE SHEETS AND CASH FLOWS ANALYSIS

Effective January 1, 2018, the Firm adopted several new accounting standards. Certain of the new accounting standards were applied retrospectively and, accordingly, prior period amounts were revised. For additional information, refer to Note 1.

Consolidated balance sheets analysis

The following is a discussion of the significant changes between December 31, 2018 and 2017.

Selected Consolidated balance sheets data

December 31, (in millions)	2018	2017	Change
Assets			
Cash and due from banks	$ 22,324	$ 25,898	(14)%
Deposits with banks	256,469	405,406	(37)
Federal funds sold and securities purchased under resale agreements	321,588	198,422	62
Securities borrowed	111,995	105,112	7
Trading assets	413,714	381,844	8
Investment securities	261,828	249,958	5
Loans	984,554	930,697	6
Allowance for loan losses	(13,445)	(13,604)	(1)
Loans, net of allowance for loan losses	971,109	917,093	6
Accrued interest and accounts receivable	73,200	67,729	8
Premises and equipment	14,934	14,159	5
Goodwill, MSRs and other intangible assets	54,349	54,392	–
Other assets	121,022	113,587	7
Total assets	$ 2,622,532	$ 2,533,600	4 %

Cash and due from banks and deposits with banks decreased primarily as a result of a shift in the deployment of excess cash in Treasury and Chief Investment Office ("CIO") from deposits with Federal Reserve Banks to other short-term instruments (as noted below), based on market opportunities. Deposits with banks reflect the Firm's placements of its excess cash with various central banks, including the Federal Reserve Banks.

Federal funds sold and securities purchased under resale agreements increased primarily due to a shift in the deployment of excess cash in Treasury and CIO from deposits with banks to securities purchased under resale agreements, and higher client-driven market-making activities in CIB. For additional information on the Firm's Liquidity Risk Management, refer to pages 95–100.

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

Trading assets increased as a result of a shift in the deployment of excess cash in Treasury and CIO from deposits with banks into short-term instruments as well as client-driven market-making activities in CIB. For additional information, refer to Derivative contracts on pages 117–118, and Notes 2 and 5.

Investment securities increased primarily due to purchases of U.S. Treasury Bills, reflecting a shift in the deployment of excess cash in Treasury and CIO from deposits with banks. The increase was partially offset by net sales, paydowns and maturities largely of obligations of U.S. states and municipalities, commercial MBS and non-U.S. government debt securities. For additional information on investment securities, refer to Corporate segment results on pages 77–78, Investment Portfolio Risk Management on page 123 and Notes 2 and 10.

Loans increased reflecting:

- higher loans across the wholesale businesses, primarily driven by commercial and industrial and financial institution clients in CIB and Wealth Management clients globally in AWM, and
- higher consumer loans driven by retention of originated high-quality prime mortgages in CCB and AWM, and growth in credit card loans. These were predominantly offset by mortgage paydowns and loan sales, lower home equity loans, run-off of PCI loans, and lower auto loans.

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

- a reduction in the consumer allowance due to a $250 million reduction in the CCB allowance for loan losses in the residential real estate PCI portfolio, reflecting continued improvement in home prices and lower delinquencies, as well as a $187 million reduction in the allowance for write-offs of PCI loans partially due to loan sales. These reductions were largely offset by a $300 million addition to the allowance in the credit card portfolio, due to loan growth and higher loss rates, as anticipated.

For a more detailed discussion of loans and the allowance for loan losses, refer to Credit and Investment Risk Management on pages 102-123, and Notes 2, 3, 12 and 13.

Accrued interest and accounts receivable increased primarily reflecting higher client receivables related to client-driven activities in CIB.

Other assets increased reflecting higher auto operating lease assets from growth in business volume in CCB and higher alternative energy investments in CIB.

For information on Goodwill and MSRs, refer to Note 15.

Selected Consolidated balance sheets data

December 31, (in millions)	2018	2017	Change
Liabilities			
Deposits	**$ 1,470,666**	$ 1,443,982	2
Federal funds purchased and securities loaned or sold under repurchase agreements	**182,320**	158,916	15
Short-term borrowings	**69,276**	51,802	34
Trading liabilities	**144,773**	123,663	17
Accounts payable and other liabilities	**196,710**	189,383	4
Beneficial interests issued by consolidated variable interest entities ("VIEs")	**20,241**	26,081	(22)
Long-term debt	**282,031**	284,080	(1)
Total liabilities	**2,366,017**	2,277,907	4
Stockholders' equity	**256,515**	255,693	–
Total liabilities and stockholders' equity	**$ 2,622,532**	$ 2,533,600	4%

Deposits increased in CIB and CCB, largely offset by decreases in AWM and CB.

- The increase in CIB was predominantly driven by growth in operating deposits related to client activity in CIB's Treasury Services business, and in CCB reflecting the continuation of growth from new accounts.
- The decrease in AWM was driven by balance migration predominantly into the Firm's higher-yielding investment-related products. The decrease in CB was driven by a reduction in non-operating deposits.

For more information, refer to the Liquidity Risk Management discussion on pages 95–100; and Notes 2 and 17.

Federal funds purchased and securities loaned or sold under repurchase agreements increased reflecting higher client-driven market-making activities and higher secured financing of trading assets-debt and equity instruments in CIB.

Short-term borrowings increased reflecting short-term advances from Federal Home Loan Banks ("FHLBs") and the net issuance of commercial paper in Treasury and CIO primarily for short-term liquidity management. For additional information, refer to Liquidity Risk Management on pages 95–100.

Trading liabilities increased predominantly as a result of client-driven market-making activities in CIB, which resulted in higher levels of short positions in equity instruments in Equity Markets, including prime brokerage. For additional information, refer to Derivative contracts on pages 117–118, and Notes 2 and 5.

Accounts payable and other liabilities increased partly as a result of higher client payables related to prime brokerage activities in CIB.

Beneficial interests issued by consolidated VIEs decreased due to net maturities of credit card securitizations. For further information on Firm-sponsored VIEs and loan securitization trusts, refer to Off-Balance Sheet Arrangements on pages 55–56 and Note 14 and 27.

Long-term debt decreased primarily driven by lower FHLB advances, predominantly offset by net issuance of structured notes in CIB, as well as net issuance of senior debt in Treasury and CIO. For additional information on the Firm's long-term debt activities, refer to Liquidity Risk Management on pages 95–100 and Note 19.

For information on changes in stockholders' equity, refer to page 153, and on the Firm's capital actions, refer to Capital actions on pages 91-92.

Consolidated cash flows analysis

The following is a discussion of cash flow activities during the years ended December 31, 2018, 2017 and 2016.

	Year ended December 31,		
(in millions)	**2018**	2017	2016
Net cash provided by/(used in)			
Operating activities	**$ 14,187**	$ (10,827)	$ 21,884
Investing activities	**(197,993)**	28,249	(89,202)
Financing activities	**34,158**	14,642	98,271
Effect of exchange rate changes on cash	**(2,863)**	8,086	(1,482)
Net increase/(decrease) in cash and due from banks	**$(152,511)**	$ 40,150	$ 29,471

Operating activities

JPMorgan Chase's operating assets and liabilities primarily 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 its operating liquidity needs.

- In 2018, cash provided primarily reflected net income excluding noncash adjustments, increased trading liabilities and accounts payable and other liabilities, partially offset by an increase in trading assets, net originations of loans held-for-sale, and higher securities borrowed and other assets.
- In 2017, cash used primarily reflected a decrease in trading liabilities and accounts payable and other liabilities, and an increase in accrued interest and accounts receivable, partially offset by net income excluding noncash adjustments and a decrease in trading assets.
- In 2016, cash provided primarily reflected net income excluding noncash adjustments, partially offset by an increase in trading assets.

Investing activities

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

- In 2018, cash used reflected an increase in securities purchased under resale agreements, higher net originations of loans and net purchases of investment securities.
- In 2017, cash provided reflected net proceeds from paydowns, maturities, sales and purchases of investment securities and a decrease in securities purchased under resale agreements, partially offset by net originations of loans.
- In 2016, cash used reflected net originations of loans, and an increase in securities purchased under resale agreements.

Financing activities

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

- In 2018, cash provided reflected higher deposits, short-term borrowings, and securities loaned or sold under repurchase agreements.
- In 2017, cash provided reflected higher deposits and short-term borrowings, partially offset by a net decrease in long-term borrowings.
- In 2016, cash provided reflected higher deposits, net proceeds from long-term borrowings, and an increase 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, refer to Consolidated Balance Sheets Analysis on pages 52–53 , Capital Risk Management on pages 85-94, and Liquidity Risk Management on pages 95–100.

OFF-BALANCE SHEET ARRANGEMENTS AND CONTRACTUAL CASH OBLIGATIONS

In the normal course of business, the Firm enters into various off-balance sheet arrangements and 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”).

Special-purpose entities

The Firm is involved with several types of off–balance sheet arrangements, including through nonconsolidated special-purpose entities (“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 contracts 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 2018 Form 10-K a discussion of the Firm’s various off-balance sheet arrangements can be found. In addition, refer to 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	Refer to Note 14	244–251
Off-balance sheet lending-related financial instruments, guarantees, and other commitments	Refer to Note 27	271–276

Contractual cash obligations

The accompanying table summarizes, by remaining maturity, JPMorgan Chase's significant contractual cash obligations at December 31, 2018. 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, refer to Note 27.

Contractual cash obligations

By remaining maturity at December 31,	2018					2017
(in millions)	2019	2020-2021	2022-2023	After 2023	**Total**	Total
On-balance sheet obligations						
Deposits[a]	**$ 1,447,407**	**$ 8,958**	**$ 6,227**	**$ 5,439**	**$ 1,468,031**	$ 1,437,464
Federal funds purchased and securities loaned or sold under repurchase agreements	**181,491**	**458**	**–**	**371**	**182,320**	158,916
Short-term borrowings[a]	**62,393**	**–**	**–**	**–**	**62,393**	42,664
Beneficial interests issued by consolidated VIEs	**13,502**	**5,075**	**1,400**	**281**	**20,258**	26,036
Long-term debt[a]	**26,889**	**75,816**	**37,171**	**118,782**	**258,658**	260,895
Other[b][c]	**5,592**	**1,687**	**1,669**	**2,846**	**11,794**	13,613
Total on-balance sheet obligations	**1,737,274**	**91,994**	**46,467**	**127,719**	**2,003,454**	1,939,588
Off-balance sheet obligations						
Unsettled resale and securities borrowed agreements[d]	**102,008**	**–**	**–**	**–**	**102,008**	76,859
Contractual interest payments[e]	**10,960**	**11,501**	**8,295**	**27,496**	**58,252**	54,103
Operating leases[f]	**1,561**	**2,840**	**2,111**	**4,480**	**10,992**	9,877
Equity investment commitments[c][g]	**262**	**2**	**–**	**7**	**271**	117
Contractual purchases and capital expenditures[c]	**1,948**	**1,048**	**543**	**60**	**3,599**	3,743
Obligations under co-brand programs	**356**	**728**	**566**	**287**	**1,937**	1,434
Total off-balance sheet obligations	**117,095**	**16,119**	**11,515**	**32,330**	**177,059**	146,133
Total contractual cash obligations	**$ 1,854,369**	**$ 108,113**	**$ 57,982**	**$ 160,049**	**$ 2,180,513**	$ 2,085,721

(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) The prior period amounts have been revised to conform with the current period presentation.
(d) For further information, refer to unsettled resale and securities borrowed agreements in Note 27.
(e) 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.
(f) Includes noncancelable operating leases for premises and equipment used primarily for banking purposes. Excludes the benefit of noncancelable sublease rentals of $825 million and $1.0 billion at December 31, 2018 and 2017, respectively. Refer to Note 28 for more information on lease commitments.
(g) Included unfunded commitments of $40 million at both December 31, 2018 and 2017, to third-party private equity funds, and $231 million and $77 million of unfunded commitments at December 31, 2018 and 2017, respectively, to other equity investments.

Non-GAAP financial measures

The Firm prepares its Consolidated Financial Statements in accordance with U.S. GAAP; these financial statements appear on pages 150-154. 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 an 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, refer to Business Segment Results on pages 60-78. 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)	2018 Reported Results	2018 Fully taxable-equivalent adjustments[a]	2018 Managed basis	2017 Reported Results	2017 Fully taxable-equivalent adjustments[a]	2017 Managed basis	2016 Reported Results	2016 Fully taxable-equivalent adjustments[a]	2016 Managed basis
Other income	**$ 5,343**	**$ 1,877** [b]	**$ 7,220**	$ 3,646	$ 2,704	$ 6,350	$ 3,799	$ 2,265	$ 6,064
Total noninterest revenue	**53,970**	**1,877**	**55,847**	50,608	2,704	53,312	50,486	2,265	52,751
Net interest income	**55,059**	**628** [b]	**55,687**	50,097	1,313	51,410	46,083	1,209	47,292
Total net revenue	**109,029**	**2,505**	**111,534**	100,705	4,017	104,722	96,569	3,474	100,043
Pre-provision profit	**45,635**	**2,505**	**48,140**	41,190	4,017	45,207	39,897	3,474	43,371
Income before income tax expense	**40,764**	**2,505**	**43,269**	35,900	4,017	39,917	34,536	3,474	38,010
Income tax expense	**8,290**	**2,505** [b]	**10,795**	11,459	4,017	15,476	9,803	3,474	13,277
Overhead ratio	**58%**	**NM**	**57%**	59%	NM	57%	59%	NM	57%

Effective January 1, 2018, the Firm adopted several new accounting standards. Certain of the new accounting standards were applied retrospectively and, accordingly, prior period amounts were revised. For additional information, refer to Note 1.

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

(b) The decrease in fully taxable-equivalent adjustments for the year ended December 31, 2018, reflects the impact of the TCJA.

Net interest income and net yield excluding CIB's Markets businesses

In addition to reviewing net interest income and the net interest yield on a managed basis, management also reviews these metrics excluding CIB's Markets businesses, as shown below; these metrics, which exclude CIB's Markets businesses, are non-GAAP financial measures. Management reviews these metrics to assess the performance of the Firm's lending, investing (including asset-liability management) and deposit-raising activities. The resulting metrics that exclude CIB's Markets businesses are referred to as non-markets-related net interest income and net yield. CIB's Markets businesses are Fixed Income Markets and Equity Markets. Management believes that disclosure of non-markets-related net interest income and net yield provides investors and analysts with other measures 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.

Year ended December 31, (in millions, except rates)	2018	2017	2016
Net interest income – managed basis[a][b]	**$ 55,687**	$ 51,410	$ 47,292
Less: CIB Markets net interest income[c]	**3,087**	4,630	6,334
Net interest income excluding CIB Markets[a]	**$ 52,600**	$ 46,780	$ 40,958
Average interest-earning assets	**$2,229,188**	$2,180,592	$ 2,101,604
Less: Average CIB Markets interest-earning assets[c]	**609,635**	540,835	520,307
Average interest-earning assets excluding CIB Markets	**$1,619,553**	$1,639,757	$ 1,581,297
Net interest yield on average interest-earning assets – managed basis	2.50%	2.36%	2.25%
Net interest yield on average CIB Markets interest-earning assets[c]	0.51	0.86	1.22
Net interest yield on average interest-earning assets excluding CIB Markets	3.25%	2.85%	2.59%

(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, refer to reconciliation from the Firm's reported U.S. GAAP results to managed basis on page 57.
(c) For further information on CIB's Markets businesses, refer to page 69.

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

The Firm also reviews adjusted expense, which is noninterest expense excluding Firmwide legal expense and is therefore a non-GAAP financial measure. Additionally, certain credit metrics and ratios disclosed by the Firm exclude PCI loans, and are therefore non-GAAP measures. Management believes these measures help investors understand the effect of these items on reported results and provide an alternate presentation of the Firm's performance. For additional information on credit metrics and ratios excluding PCI loans, refer to Credit and Investment Risk Management on pages 102-123.

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.

	Period-end		Average		
			Year ended December 31,		
(in millions, except per share and ratio data)	**Dec 31, 2018**	Dec 31, 2017	**2018**	2017	2016
Common stockholders' equity	**$ 230,447**	$ 229,625	**$ 229,222**	$ 230,350	$ 224,631
Less: Goodwill	**47,471**	47,507	**47,491**	47,317	47,310
Less: Other intangible assets	**748**	855	**807**	832	922
Add: Certain deferred tax liabilities[(a)(b)]	**2,280**	2,204	**2,231**	3,116	3,212
Tangible common equity	**$ 184,508**	$ 183,467	**$ 183,155**	$ 185,317	$ 179,611
Return on tangible common equity	**NA**	NA	**17%**	12%	13%
Tangible book value per share	**$ 56.33**	$ 53.56	**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) Amounts presented for December 31, 2017 and later periods include the effect from revaluation of the Firm's net deferred tax liability as a result 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, refer to Capital Risk Management on pages 85-94.

Core loans is also considered a key performance measure. Core loans represents loans considered central to the Firm's ongoing businesses, and excludes 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 the Firm's Operating Committee. Segment results are presented on a managed basis. For a definition of managed basis, refer to Explanation and Reconciliation of the Firm's use of Non-GAAP Financial Measures and Key Performance Measures, on pages 57-59.

JPMorgan Chase

Consumer Businesses			Wholesale Businesses			
Consumer & Community Banking			**Corporate & Investment Bank**		**Commercial Banking**	**Asset & Wealth Management**
Consumer & Business Banking	Home Lending	Card, Merchant Services & Auto	Banking	Markets & Investor Services	• Middle Market Banking	• Asset Management
• 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	• Corporate Client Banking • Commercial Term Lending • Real Estate Banking	• Wealth Management

Description of business segment reporting methodology

Results of the business segments are intended to present 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 may agree to share revenue from those transactions. Revenue is recognized in the segment responsible for the related product or service on a gross basis, with an allocation to the other segment(s) involved in the transaction. The segment results reflect these revenue-sharing agreements.

Funds transfer pricing

Funds transfer pricing is the process by which the Firm allocates interest income and expense to each business segment and transfers 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 Treasurer Committee.

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 assumptions and methodologies used in capital allocation are assessed and as a result, the capital allocated to lines of business may change. For additional information on business segment capital allocation, refer to Line of business equity on page 91.

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

Effective January 1, 2018, the Firm adopted several new accounting standards. Certain of the new accounting standards were applied retrospectively and, accordingly, prior period amounts were revised. For additional information, refer to Note 1.

Net income in 2018 for each of the business segments reflects the favorable impact of the reduction in the U.S. federal statutory income tax rate as a result of the TCJA.

The following tables summarize the Firm's results by segment for the periods indicated.

Year ended December 31,	Consumer & Community Banking			Corporate & Investment Bank			Commercial Banking		
(in millions, except ratios)	**2018**	2017	2016	**2018**	2017	2016	**2018**	2017	2016
Total net revenue	**$ 52,079**	$ 46,485	$ 44,915	**$ 36,448**	$ 34,657	$ 35,340	**$ 9,059**	$ 8,605	$ 7,453
Total noninterest expense	**27,835**	26,062	24,905	**20,918**	19,407	19,116	**3,386**	3,327	2,934
Pre-provision profit/(loss)	**24,244**	20,423	20,010	**15,530**	15,250	16,224	**5,673**	5,278	4,519
Provision for credit losses	**4,753**	5,572	4,494	**(60)**	(45)	563	**129**	(276)	282
Net income/(loss)	**14,852**	9,395	9,714	**11,773**	10,813	10,815	**4,237**	3,539	2,657
Return on equity ("ROE")	**28%**	17%	18%	**16%**	14%	16%	**20%**	17%	16%

Year ended December 31,	Asset & Wealth Management			Corporate			Total		
(in millions, except ratios)	**2018**	2017	2016	**2018**	2017	2016	**2018**	2017	2016
Total net revenue	**$ 14,076**	$ 13,835	$ 12,822	**$ (128)**	$ 1,140	$ (487)	**$111,534**	$104,722	$100,043
Total noninterest expense	**10,353**	10,218	9,255	**902**	501	462	**63,394**	59,515	56,672
Pre-provision profit/(loss)	**3,723**	3,617	3,567	**(1,030)**	639	(949)	**48,140**	45,207	43,371
Provision for credit losses	**53**	39	26	**(4)**	–	(4)	**4,871**	5,290	5,361
Net income/(loss)	**2,853**	2,337	2,251	**(1,241)**	(1,643)	(704)	**32,474**	24,441	24,733
Return on equity ("ROE")	**31%**	25%	24%	**NM**	NM	NM	**13%**	10%	10%

The following sections provide a comparative discussion of the Firms results by segment as of or for the years ended December 31, 2018, 2017 and 2016.

CONSUMER & COMMUNITY BANKING

Consumer & Community Banking offers services to consumers and businesses through bank branches, ATMs, digital (including online and 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)	2018	2017	2016
Revenue			
Lending- and deposit-related fees	**$ 3,624**	$ 3,431	$ 3,231
Asset management, administration and commissions	**2,402**	2,212	2,093
Mortgage fees and related income	**1,252**	1,613	2,490
Card income	**4,554**	4,024	4,364
All other income	**4,428**	3,430	3,077
Noninterest revenue	**16,260**	14,710	15,255
Net interest income	**35,819**	31,775	29,660
Total net revenue	**52,079**	46,485	44,915
Provision for credit losses	**4,753**	5,572	4,494
Noninterest expense			
Compensation expense[a]	**10,534**	10,133	9,697
Noncompensation expense[a][b]	**17,301**	15,929	15,208
Total noninterest expense	**27,835**	26,062	24,905
Income before income tax expense	**19,491**	14,851	15,516
Income tax expense	**4,639**	5,456	5,802
Net income	**$ 14,852**	$ 9,395	$ 9,714
Revenue by line of business			
Consumer & Business Banking	**$ 24,805**	$ 21,104	$ 18,659
Home Lending	**5,484**	5,955	7,361
Card, Merchant Services & Auto	**21,790**	19,426	18,895
Mortgage fees and related income details:			
Net production revenue	**268**	636	853
Net mortgage servicing revenue[c]	**984**	977	1,637
Mortgage fees and related income	**$ 1,252**	$ 1,613	$ 2,490
Financial ratios			
Return on equity	**28%**	17%	18%
Overhead ratio	**53**	56	55

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) Effective in the first quarter of 2018, certain operations staff were transferred from CCB to CB. The prior period amounts have been revised to conform with the current period presentation. For a further discussion of this transfer, refer to CB segment results on page 71.

(b) Included operating lease depreciation expense of $3.4 billion, $2.7 billion and $1.9 billion for the years ended December 31, 2018, 2017 and 2016, respectively.

(c) Included MSR risk management results of $(111) million, $(242) million and $217 million for the years ended December 31, 2018, 2017 and 2016, respectively.

2018 compared with 2017

Net income was $14.9 billion, an increase of 58%.

Net revenue was $52.1 billion, an increase of 12%.

Net interest income was $35.8 billion, up 13%, driven by:

- higher deposit margins and growth in deposit balances in CBB, as well as margin expansion and higher loan balances in Card,

partially offset by

- higher rates driving loan spread compression in Home Lending and Auto.

Noninterest revenue was $16.3 billion, up 11%, driven by:

- higher auto lease volume,
- higher card income due to
  - lower new account origination costs, and higher merchant processing fees on higher volumes,

  largely offset by

  - lower net interchange income reflecting higher rewards costs and partner payments, largely offset by higher card sales volumes. The rewards costs included an adjustment to the credit card rewards liability of approximately $330 million in the second quarter of 2018, driven by an increase in redemption rate assumptions
- higher deposit-related fees, as well as higher asset management fees reflecting an increase in client investment assets,

partially offset by

- lower net production revenue reflecting lower mortgage production margins and volumes, as well as the impact of a loan sale.

Refer to 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 $27.8 billion, up 7%, driven by:

- investments in technology and marketing, and
- higher auto lease depreciation.

The provision for credit losses was $4.8 billion, a decrease of 15%, reflecting:

- a decrease in the consumer, excluding credit card portfolio due to
  - lower net charge-offs in the residential real estate portfolio, largely driven by recoveries from loan sales, and
  - lower net charge-offs in the auto portfolio

  partially offset by

  - a $250 million reduction in the allowance for loan losses in the residential real estate portfolio – PCI, reflecting continued improvement in home prices and lower delinquencies; the reduction was $75 million lower than the prior year for the residential real estate portfolio – non credit-impaired
- the prior year included a net $218 million write-down recorded in connection with the sale of the student loan portfolio, and
- a decrease in the credit card portfolio due to
  - a $300 million addition to the allowance for loan losses, reflecting loan growth and higher loss rates, as anticipated; the addition was $550 million lower than the prior year,

  largely offset by

  - higher net charge-offs due to seasoning of more recent vintages, as anticipated.

2017 compared with 2016

Net income was $9.4 billion, a decrease of 3%.

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

Net interest income was $31.8 billion, up 7%, driven by:

- growth in deposit balances and higher deposit margins in CBB, as well as 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.

Noninterest expense was $26.1 billion, up 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 net $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.

Selected metrics

As of or for the year ended December 31, (in millions, except headcount)	2018	2017	2016
Selected balance sheet data (period-end)			
Total assets	**$ 557,441**	$ 552,601	$ 535,310
Loans:			
Consumer & Business Banking	**26,612**	25,789	24,307
Home equity	**36,013**	42,751	50,296
Residential mortgage	**203,859**	197,339	181,196
Home Lending	**239,872**	240,090	231,492
Card	**156,632**	149,511	141,816
Auto	**63,573**	66,242	65,814
Student	**–**	–	7,057
Total loans	**486,689**	481,632	470,486
Core loans	**434,466**	415,167	382,608
Deposits	**678,854**	659,885	618,337
Equity	**51,000**	51,000	51,000
Selected balance sheet data (average)			
Total assets	**$ 547,368**	$ 532,756	$ 516,354
Loans:			
Consumer & Business Banking	**26,197**	24,875	23,431
Home equity	**39,133**	46,398	54,545
Residential mortgage	**202,624**	190,242	177,010
Home Lending	**241,757**	236,640	231,555
Card	**145,652**	140,024	131,165
Auto	**64,675**	65,395	63,573
Student	**–**	2,880	7,623
Total loans	**478,281**	469,814	457,347
Core loans	**419,066**	393,598	361,316
Deposits	**670,388**	640,219	586,637
Equity	**51,000**	51,000	51,000
Headcount[(a)(b)]	**129,518**	133,721	132,384

(a) Effective in the first quarter of 2018, certain operations staff were transferred from CCB to CB. The prior period amounts have been revised to conform with the current period presentation. For a further discussion of this transfer, refer to CB segment results on page 71.
(b) During the third quarter of 2018, approximately 1,200 employees transferred from CCB to CIB as part of the reorganization of the Commercial Card business.

Selected metrics

As of or for the year ended December 31, (in millions, except ratio data)	2018	2017		2016	
Credit data and quality statistics					
Nonaccrual loans[(a)(b)]	**$ 3,339**	$ 4,084		$ 4,708	
Net charge-offs/(recoveries)[(c)]					
Consumer & Business Banking	**236**	257		257	
Home equity	**(7)**	63		184	
Residential mortgage	**(287)**	(16)		14	
Home Lending	**(294)**	47		198	
Card	**4,518**	4,123		3,442	
Auto	**243**	331		285	
Student	**–**	498	(g)	162	
Total net charge-offs/ (recoveries)	**$ 4,703**	$ 5,256	(g)	$ 4,344	
Net charge-off/(recovery) rate[(c)]					
Consumer & Business Banking	**0.90%**	1.03 %		1.10%	
Home equity[(d)]	**(0.02)**	0.18		0.45	
Residential mortgage[(d)]	**(0.16)**	(0.01)		0.01	
Home Lending[(d)]	**(0.14)**	0.02		0.10	
Card	**3.10**	2.95		2.63	
Auto	**0.38**	0.51		0.45	
Student	**–**	NM		2.13	
Total net charge-offs/ (recovery) rate[(d)]	**1.04**	1.21	(g)	1.04	
30+ day delinquency rate					
Home Lending[(e)(f)]	**0.77%**	1.19%		1.23%	
Card	**1.83**	1.80		1.61	
Auto	**0.93**	0.89		1.19	
Student	**–**	–		1.60	(h)
90+ day delinquency rate - Card	**0.92**	0.92		0.81	
Allowance for loan losses					
Consumer & Business Banking	**$ 796**	$ 796		$ 753	
Home Lending, excluding PCI loans	**1,003**	1,003		1,328	
Home Lending – PCI loans[(c)]	**1,788**	2,225		2,311	
Card	**5,184**	4,884		4,034	
Auto	**464**	464		474	
Student	**–**	–		249	
Total allowance for loan losses[(c)]	**$ 9,235**	$ 9,372		$ 9,149	

(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, 2018, 2017 and 2016, nonaccrual loans excluded mortgage loans 90 or more days past due and insured by U.S. government agencies of $2.6 billion, $4.3 billion and $5.0 billion, respectively. At December 31, 2016, nonaccrual loans also excluded student loans insured by U.S. government agencies under the Federal Family Education Loan Program ("FFELP") of $263 million. These amounts have been excluded based upon the government guarantee.
(c) Net charge-offs/(recoveries) and the net charge-off/(recovery) rates for the years ended December 31, 2018, 2017 and 2016, excluded $187 million, $86 million and $156 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, refer to Summary of changes in the allowance for credit losses on page 121.

(d) Excludes the impact of PCI loans. For the years ended December 31, 2018, 2017 and 2016, the net charge-off/(recovery) rates including the impact of PCI loans were as follows: (1) home equity of (0.02)%, 0.14% and 0.34%, respectively; (2) residential mortgage of (0.14)%, (0.01)% and 0.01%, respectively; (3) Home Lending of (0.12)%, 0.02% and 0.09%, respectively; and (4) total CCB of 0.98%, 1.12% and 0.95%, respectively.

(e) At December 31, 2018, 2017 and 2016, excluded mortgage loans insured by U.S. government agencies of $4.1 billion, $6.2 billion and $7.0 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 9.16%, 10.13% and 9.82% at December 31, 2018, 2017 and 2016, respectively.

(g) Excluding net charge-offs of $467 million related to the student loan portfolio transfer, the total net charge-off rates for the full year 2017 would have been 1.10%.

(h) Excluded student loans insured by U.S. government agencies under FFELP of $468 million at December 31, 2016 that are 30 or more days past due. This amount has 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)	2018	2017	2016
Business Metrics			
CCB households (in millions)[a]	**61.7**	61.1	60.5
Number of branches	**5,036**	5,130	5,258
Active digital customers (in thousands)[b]	**49,254**	46,694	43,836
Active mobile customers (in thousands)[c]	**33,260**	30,056	26,536
Debit and credit card sales volume	**$ 1,016.9**	$ 916.9	$ 821.6
Consumer & Business Banking			
Average deposits	**$ 656.5**	$ 625.6	$ 570.8
Deposit margin	**2.38%**	1.98%	1.81%
Business banking origination volume	**$ 6.7**	$ 7.3	$ 7.3
Client investment assets	**282.5**	273.3	234.5
Home Lending			
Mortgage origination volume by channel			
Retail	**$ 38.3**	$ 40.3	$ 44.3
Correspondent	**41.1**	57.3	59.3
Total mortgage origination volume[d]	**$ 79.4**	$ 97.6	$ 103.6
Total loans serviced (period-end)	**$ 789.8**	$ 816.1	$ 846.6
Third-party mortgage loans serviced (period-end)	**519.6**	553.5	591.5
MSR carrying value (period-end)	**6.1**	6.0	6.1
Ratio of MSR carrying value (period-end) to third-party mortgage loans serviced (period-end)	**1.17%**	1.08%	1.03%
MSR revenue multiple[e]	**3.34x**	3.09x	2.94x
Card, excluding Commercial Card			
Credit card sales volume	**$ 692.4**	$ 622.2	$ 545.4
New accounts opened (in millions)	**7.8**	8.4	10.4
Card Services			
Net revenue rate	**11.27%**	10.57%	11.29%
Merchant Services			
Merchant processing volume	**$ 1,366.1**	$ 1,191.7	$ 1,063.4
Auto			
Loan and lease origination volume	**$ 31.8**	$ 33.3	$ 35.4
Average Auto operating lease assets	**18.8**	15.2	11.0

(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 $86.9 billion, $107.6 billion and $117.4 billion for the years ended December 31, 2018, 2017 and 2016, 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).

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.

Effective January 1, 2018, the Firm adopted several new accounting standards; the guidance which had the most significant impact on the CIB segment results was revenue recognition, and recognition and measurement of financial assets. The revenue recognition guidance was applied retrospectively and, accordingly, prior period amounts were revised. For additional information, refer to Note 1.

Selected income statement data

Year ended December 31, (in millions)	2018	2017	2016
Revenue			
Investment banking fees	**$ 7,473**	$ 7,356	$ 6,548
Principal transactions	**12,271**	10,873	11,089
Lending- and deposit-related fees	**1,497**	1,531	1,581
Asset management, administration and commissions	**4,488**	4,207	4,062
All other income	**1,239**	572	1,169
Noninterest revenue	**26,968**	24,539	24,449
Net interest income	**9,480**	10,118	10,891
Total net revenue[(a)(b)]	**36,448**	34,657	35,340
Provision for credit losses	**(60)**	(45)	563
Noninterest expense			
Compensation expense	**10,215**	9,531	9,540
Noncompensation expense	**10,703**	9,876	9,576
Total noninterest expense	**20,918**	19,407	19,116
Income before income tax expense	**15,590**	15,295	15,661
Income tax expense	**3,817**	4,482	4,846
Net income[(a)]	**$ 11,773**	$ 10,813	$ 10,815

(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, refer to 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 $1.7 billion, $2.4 billion and $2.0 billion for the years ended December 31, 2018, 2017 and 2016, respectively.

Selected income statement data

Year ended December 31, (in millions, except ratios)	2018	2017	2016
Financial ratios			
Return on equity	**16%**	14%	16%
Overhead ratio	**57**	56	54
Compensation expense as percentage of total net revenue	**28**	28	27
Revenue by business			
Investment Banking	**$ 6,987**	$ 6,852	$ 6,074
Treasury Services	**4,697**	4,172	3,643
Lending	**1,298**	1,429	1,208
Total Banking	**12,982**	12,453	10,925
Fixed Income Markets	**12,706**	12,812	15,259
Equity Markets	**6,888**	5,703	5,740
Securities Services	**4,245**	3,917	3,591
Credit Adjustments & Other[(a)]	**(373)**	(228)	(175)
Total Markets & Investor Services	**23,466**	22,204	24,415
Total net revenue	**$36,448**	$34,657	$35,340

(a) Consists primarily of credit valuation adjustments ("CVA") managed centrally within CIB and funding valuation adjustments ("FVA") 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, refer to Notes 2, 3 and 23.

2018 compared with 2017

Net income was $11.8 billion, up 9%.

Net revenue was $36.4 billion, up 5%.

Banking revenue was $13.0 billion, up 4%. Investment Banking revenue was $7.0 billion, up 2% compared to a strong prior year, predominantly driven by higher advisory and equity underwriting fees, predominantly offset by lower debt underwriting fees. The Firm maintained its #1 ranking for Global Investment Banking fees with overall share gains, according to Dealogic. Advisory fees were $2.5 billion, up 17%, driven by a higher number of large completed transactions. Equity underwriting fees were $1.7 billion, up 15% driven by a higher share of fees reflecting strong performance across products. Debt underwriting fees were $3.3 billion, down 12%, compared to a strong prior year, primarily driven by declines in industry-wide fee levels. Treasury Services revenue was $4.7 billion, up 13%, driven by the impact of higher interest rates and growth in operating deposits as well as higher fees on increased payments volume. Lending revenue was $1.3 billion, down

9%, driven by lower net interest income primarily reflecting a change in the portfolio mix and overall spread compression, and higher gains in the prior year on securities received from restructurings.

Markets & Investor Services revenue was $23.5 billion, up 6%. The results included a reduction of approximately $620 million in tax-equivalent adjustments as a result of the TCJA, and approximately $500 million of fair value gains in the first quarter of 2018 related to the adoption of the new recognition and measurement accounting guidance for certain equity investments previously held at cost. Prior year results included a reduction of $259 million resulting from the enactment of the TCJA. Fixed Income Markets revenue was $12.7 billion, down 1%. Excluding the impact of the TCJA and fair value gains mentioned above, Fixed Income Markets revenue was down 2%. Rates and Credit revenue declined reflecting challenging market conditions in the fourth quarter of 2018 while lower revenue in Fixed Income Financing was driven by compressed margins. This decline was predominantly offset by strong performance including higher client activity in Currencies & Emerging Markets, and higher Commodities revenue compared to a challenging prior year. Equity Markets revenue was $6.9 billion, up 21%, or up 18% excluding the fair value loss of $143 million on a margin loan to a single client in the prior year, driven by strength across derivatives, prime brokerage and cash equities, reflecting strong client activity. Securities Services revenue was $4.2 billion, up 8%, driven by fee growth, higher interest rates and operating deposit growth partially offset by the impact of a business exit. Credit Adjustments & Other was a loss of $373 million, largely driven by higher funding spreads on derivatives.

The provision for credit losses was a benefit of $60 million, driven by a reduction in the allowance for credit losses in the first quarter of 2018 related to a single name in the Oil & Gas portfolio, predominantly offset by other net portfolio activity, which includes additions to the allowance for credit losses from select client downgrades. The prior year was a benefit of $45 million primarily driven by a net reduction in the allowance for credit losses in the Oil & Gas and Metals & Mining portfolios partially offset by a net increase in the allowance for credit losses for a single client.

Noninterest expense was $20.9 billion, up 8%, predominantly driven by investments in technology and bankers, higher performance-related compensation expense, volume-related transaction costs, and legal expense.

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 $34.7 billion, down 2%.

Banking revenue was $12.5 billion, up 14% compared with the prior year. Investment banking revenue was $6.9 billion, up 13% 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 $3.7 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 $1.5 billion, up 21% 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 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 $19.4 billion, up 2% compared with the prior year.

Selected metrics

As of or for the year ended December 31, (in millions, except headcount)	2018	2017	2016
Selected balance sheet data (period-end)			
Assets	**$ 903,051**	$ 826,384	$ 803,511
Loans:			
Loans retained[a]	**129,389**	108,765	111,872
Loans held-for-sale and loans at fair value	**13,050**	4,321	3,781
Total loans	**142,439**	113,086	115,653
Core loans	**142,122**	112,754	115,243
Equity	**70,000**	70,000	64,000
Selected balance sheet data (average)			
Assets	**$ 922,758**	$ 857,060	$ 815,321
Trading assets-debt and equity instruments	**349,169**	342,124	300,606
Trading assets-derivative receivables	**60,552**	56,466	63,387
Loans:			
Loans retained[a]	**114,417**	108,368	111,082
Loans held-for-sale and loans at fair value	**6,412**	4,995	3,812
Total loans	**120,829**	113,363	114,894
Core loans	**120,560**	113,006	114,455
Equity	**70,000**	70,000	64,000
Headcount[b]	**54,480**	51,181	48,748

(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.
(b) During the third quarter of 2018 approximately 1,200 employees transferred from CCB to CIB as part of the reorganization of the Commercial Card business.

Selected metrics

As of or for the year ended December 31, (in millions, except ratios)	2018	2017	2016
Credit data and quality statistics			
Net charge-offs/ (recoveries)	**$ 93**	$ 71	$ 168
Nonperforming assets:			
Nonaccrual loans:			
Nonaccrual loans retained[a]	**443**	812	467
Nonaccrual loans held-for-sale and loans at fair value	**220**	–	109
Total nonaccrual loans	**663**	812	576
Derivative receivables	**60**	130	223
Assets acquired in loan satisfactions	**57**	85	79
Total nonperforming assets	**780**	1,027	878
Allowance for credit losses:			
Allowance for loan losses	**1,199**	1,379	1,420
Allowance for lending-related commitments	**754**	727	801
Total allowance for credit losses	**1,953**	2,106	2,221
Net charge-off/(recovery) rate[b]	**0.08%**	0.07%	0.15%
Allowance for loan losses to period-end loans retained	**0.93**	1.27	1.27
Allowance for loan losses to period-end loans retained, excluding trade finance and conduits[c]	**1.24**	1.92	1.86
Allowance for loan losses to nonaccrual loans retained[a]	**271**	170	304
Nonaccrual loans to total period-end loans	**0.47**	0.72	0.50

(a) Allowance for loan losses of $174 million, $316 million and $113 million were held against these nonaccrual loans at December 31, 2018, 2017 and 2016, 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

	Year ended December 31,		
(in millions)	2018	2017	2016
Advisory	**$ 2,509**	$ 2,150	$ 2,110
Equity underwriting	**1,684**	1,468	1,213
Debt underwriting[a]	**3,280**	3,738	3,225
Total investment banking fees	**$ 7,473**	$ 7,356	$ 6,548

(a) Includes loan syndications.

League table results – wallet share

Year ended December 31,	2018 Rank	2018 Share	2017 Rank	2017 Share	2016 Rank	2016 Share
Based on fees[a]						
Long-term debt[b]						
Global	**#1**	**7.3%**	#1	7.8%	#1	6.8%
U.S.	**1**	**11.2**	2	11.1	1	11.1
Equity and equity-related						
Global[c]	**1**	**9.1**	2	7.1	1	7.4
U.S.	**1**	**12.3**	1	11.6	1	13.4
M&A[d]						
Global	**2**	**8.9**	2	8.4	2	8.3
U.S.	**2**	**9.1**	2	9.1	2	9.8
Loan syndications						
Global	**1**	**9.5**	1	9.3	1	9.3
U.S.	**1**	**12.1**	1	11.0	2	11.9
Global investment banking fees [e]	**#1**	**8.7%**	#1	8.1%	#1	7.9%

(a) Source: Dealogic as of January 1, 2019. 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 reflects 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 comprises 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 revenue. For a description of the composition of these income statement line items, refer to 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)	2018 Fixed Income Markets	2018 Equity Markets	2018 Total Markets	2017 Fixed Income Markets	2017 Equity Markets	2017 Total Markets	2016 Fixed Income Markets	2016 Equity Markets	2016 Total Markets
Principal transactions	**$ 7,560**	**$ 5,566**	**$ 13,126**	$ 7,393	$ 3,855	$ 11,248	$ 8,347	$ 3,130	$ 11,477
Lending- and deposit-related fees	**197**	**6**	**203**	191	6	197	220	2	222
Asset management, administration and commissions	**410**	**1,794**	**2,204**	390	1,635	2,025	388	1,551	1,939
All other income	**952**	**22**	**974**	436	(21)	415	1,014	13	1,027
Noninterest revenue	**9,119**	**7,388**	**16,507**	8,410	5,475	13,885	9,969	4,696	14,665
Net interest income[a]	**3,587**	**(500)**	**3,087**	4,402	228	4,630	5,290	1,044	6,334
Total net revenue	**$ 12,706**	**$ 6,888**	**$ 19,594**	$ 12,812	$ 5,703	$ 18,515	$ 15,259	$ 5,740	$ 20,999
Loss days[b]			5			4			0

(a) Declines in Markets net interest income in 2018 and 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 126-128.

Selected metrics

As of or for the year ended December 31, (in millions, except where otherwise noted)	2018	2017	2016
Assets under custody ("AUC") by asset class (period-end) (in billions):			
Fixed Income	**$ 12,440**	$ 13,043	$ 12,166
Equity	**8,078**	7,863	6,428
Other[a]	**2,699**	2,563	1,926
Total AUC	**$ 23,217**	$ 23,469	$ 20,520
Client deposits and other third party liabilities (average)[b]	**$ 434,422**	$ 408,911	$ 376,287

(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)	2018	2017	2016
Total net revenue[a]			
Europe/Middle East/Africa	**$ 12,102**	$ 11,328	$ 10,786
Asia/Pacific	**5,219**	4,525	4,915
Latin America/Caribbean	**1,394**	1,125	1,225
Total international net revenue	**18,715**	16,978	16,926
North America	**17,733**	17,679	18,414
Total net revenue	**$ 36,448**	$ 34,657	$ 35,340
Loans retained (period-end)[a]			
Europe/Middle East/Africa	**$ 26,524**	$ 25,931	$ 26,696
Asia/Pacific	**16,778**	15,248	14,508
Latin America/Caribbean	**5,060**	6,546	7,607
Total international loans	**48,362**	47,725	48,811
North America	**81,027**	61,040	63,061
Total loans retained	**$ 129,389**	$ 108,765	$ 111,872
Client deposits and other third-party liabilities (average)[a][b]			
Europe/Middle East/Africa	**$ 162,846**	$ 154,582	$ 135,979
Asia/Pacific	**82,867**	76,744	68,110
Latin America/Caribbean	**26,668**	25,419	22,914
Total international	**$ 272,381**	$ 256,745	$ 227,003
North America	**162,041**	152,166	149,284
Total client deposits and other third-party liabilities	**$ 434,422**	$ 408,911	$ 376,287
AUC (period-end)[a] **(in billions)**			
North America	**$ 14,359**	$ 13,971	$ 12,290
All other regions	**8,858**	9,498	8,230
Total AUC	**$ 23,217**	$ 23,469	$ 20,520

(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)	2018	2017	2016
Revenue			
Lending- and deposit-related fees	$ 870	$ 919	$ 917
Asset management, administration and commissions	73	68	69
All other income[(a)]	1,400	1,535	1,334
Noninterest revenue	2,343	2,522	2,320
Net interest income	6,716	6,083	5,133
Total net revenue[(b)]	9,059	8,605	7,453
Provision for credit losses	129	(276)	282
Noninterest expense			
Compensation expense[(c)]	1,694	1,534	1,396
Noncompensation expense[(c)]	1,692	1,793	1,538
Total noninterest expense	3,386	3,327	2,934
Income before income tax expense	5,544	5,554	4,237
Income tax expense	1,307	2,015	1,580
Net income	$ 4,237	$ 3,539	$ 2,657

(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 $444 million, $699 million and $505 million for the years ended December 31, 2018, 2017 and 2016, respectively. The decrease in taxable-equivalent adjustments reflects the impact of TCJA.
(c) Effective in the first quarter of 2018, certain Operations and Compliance staff were transferred from CCB and Corporate, respectively, to CB. As a result, expense for this staff is now reflected in CB's compensation expense with a corresponding adjustment for expense allocations reflected in noncompensation expense. CB's, Corporate's and CCB's previously reported headcount, compensation expense and noncompensation expense have been revised to reflect this transfer.

2018 compared with 2017

Net income was $4.2 billion, an increase of 20%.

Net revenue was $9.1 billion, an increase of 5%. Net interest income was $6.7 billion, an increase of 10%, reflecting higher deposit margins and loan growth, partially offset by lower loan spreads. Noninterest revenue was $2.3 billion, a decrease of 7%, reflecting lower Community Development Banking revenue, which was also impacted by the absence of the TCJA benefit in the prior year, and lower deposit fees, partially offset by higher investment banking revenue.

Noninterest expense was $3.4 billion, an increase of 2%, with continued investments in banker coverage and technology in the current year predominantly offset by the absence of an impairment on certain leased equipment in the prior year.

The provision for credit losses was an expense of $129 million, driven by select client downgrades. The prior year provision for credit losses was a benefit of $276 million.

2017 compared with 2016

Net income was $3.5 billion, an increase of 33%, 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%. Net interest income was $6.1 billion, an increase of 19%, driven by higher deposit spreads and loan growth. Noninterest revenue was $2.5 billion, an increase of 9%, 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.

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)	2018	2017	2016
Revenue by product			
Lending	**$ 4,049**	$ 4,094	$ 3,795
Treasury services	**4,074**	3,444	2,797
Investment banking[(a)]	**852**	805	785
Other	**84**	262	76
Total Commercial Banking net revenue	**$ 9,059**	$ 8,605	$ 7,453
Investment banking revenue, gross[(b)]	**$ 2,491**	$ 2,385	$ 2,331
Revenue by client segment			
Middle Market Banking	**$ 3,708**	$ 3,341	$ 2,848
Corporate Client Banking	**2,984**	2,727	2,429
Commercial Term Lending	**1,366**	1,454	1,408
Real Estate Banking	**681**	604	456
Other	**320**	479	312
Total Commercial Banking net revenue	**$ 9,059**	$ 8,605	$ 7,453
Financial ratios			
Return on equity	**20%**	17%	16%
Overhead ratio	**37**	39	39

(a) Includes total Firm revenue from investment banking products sold to CB clients, net of revenue sharing with the CIB.
(b) Represents total Firm revenue from investment banking products sold to CB clients. As a result of the adoption of the revenue recognition guidance, prior period amounts have been revised to conform with the current period presentation. For additional information, refer to Note 1.

Selected metrics

As of or for the year ended December 31, (in millions, except headcount)	2018	2017	2016
Selected balance sheet data (period-end)			
Total assets	**$ 220,229**	$ 221,228	$ 214,341
Loans:			
Loans retained	**204,219**	202,400	188,261
Loans held-for-sale and loans at fair value	**1,978**	1,286	734
Total loans	**$ 206,197**	$ 203,686	$ 188,995
Core loans	**206,039**	203,469	188,673
Equity	**20,000**	20,000	16,000
Period-end loans by client segment			
Middle Market Banking	**$ 56,656**	$ 56,965	$ 53,929
Corporate Client Banking	**48,343**	46,963	43,027
Commercial Term Lending	**76,720**	74,901	71,249
Real Estate Banking	**17,563**	17,796	14,722
Other	**6,915**	7,061	6,068
Total Commercial Banking loans	**$ 206,197**	$ 203,686	$ 188,995
Selected balance sheet data (average)			
Total assets	**$ 218,259**	$ 217,047	$ 207,532
Loans:			
Loans retained	**204,243**	197,203	178,670
Loans held-for-sale and loans at fair value	**1,258**	909	723
Total loans	**$ 205,501**	$ 198,112	$ 179,393
Core loans	**205,320**	197,846	178,875
Client deposits and other third-party liabilities	**170,901**	177,018	174,396
Equity	**20,000**	20,000	16,000
Average loans by client segment			
Middle Market Banking	**$ 57,092**	$ 55,474	$ 52,242
Corporate Client Banking	**47,780**	46,037	41,756
Commercial Term Lending	**75,694**	73,428	66,700
Real Estate Banking	**17,808**	16,525	13,063
Other	**7,127**	6,648	5,632
Total Commercial Banking loans	**$ 205,501**	$ 198,112	$ 179,393
Headcount[a]	**11,042**	10,061	9,352

(a) Effective in the first quarter of 2018, certain Operations and Compliance staff were transferred from CCB and Corporate, respectively, to CB. The prior period amounts have been revised to conform with the current period presentation. For a further discussion of this transfer, refer to page 71, Selected income statement data, footnote (c).

Selected metrics

As of or for the year ended December 31, (in millions, except ratios)	2018	2017	2016
Credit data and quality statistics			
Net charge-offs/(recoveries)	**$ 53**	$ 39	$ 163
Nonperforming assets			
Nonaccrual loans:			
Nonaccrual loans retained[a]	**511**	617	1,149
Nonaccrual loans held-for-sale and loans at fair value	**–**	–	–
Total nonaccrual loans	**511**	617	1,149
Assets acquired in loan satisfactions	**2**	3	1
Total nonperforming assets	**513**	620	1,150
Allowance for credit losses:			
Allowance for loan losses	**2,682**	2,558	2,925
Allowance for lending-related commitments	**254**	300	248
Total allowance for credit losses	**2,936**	2,858	3,173
Net charge-off/(recovery) rate[b]	**0.03%**	0.02%	0.09%
Allowance for loan losses to period-end loans retained	**1.31**	1.26	1.55
Allowance for loan losses to nonaccrual loans retained[a]	**525**	415	255
Nonaccrual loans to period-end total loans	**0.25**	0.30	0.61

(a) Allowance for loan losses of $92 million, $92 million and $155 million was held against nonaccrual loans retained at December 31, 2018, 2017 and 2016, 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 $2.7 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.

Effective January 1, 2018, the Firm adopted several new accounting standards; the guidance which had the most significant impact on the AWM segment results was revenue recognition. The revenue recognition guidance was applied retrospectively and, accordingly, prior period amounts were revised. For additional information, refer to Note 1.

Selected income statement data

Year ended December 31, (in millions, except ratios and headcount)	2018	2017	2016
Revenue			
Asset management, administration and commissions	$10,171	$ 9,856	$ 9,187
All other income	368	600	602
Noninterest revenue	10,539	10,456	9,789
Net interest income	3,537	3,379	3,033
Total net revenue	14,076	13,835	12,822
Provision for credit losses	53	39	26
Noninterest expense			
Compensation expense	5,495	5,317	5,063
Noncompensation expense	4,858	4,901	4,192
Total noninterest expense	10,353	10,218	9,255
Income before income tax expense	3,670	3,578	3,541
Income tax expense	817	1,241	1,290
Net income	$ 2,853	$ 2,337	$ 2,251
Revenue by line of business			
Asset Management	$ 7,163	$ 7,257	$ 6,747
Wealth Management	6,913	6,578	6,075
Total net revenue	$14,076	$13,835	$12,822
Financial ratios			
Return on common equity	31%	25%	24%
Overhead ratio	74	74	72
Pre-tax margin ratio:			
Asset Management	26	22	27
Wealth Management	26	30	28
Asset & Wealth Management	26	26	28
Headcount	23,920	22,975	21,082
Number of Wealth Management client advisors	2,865	2,605	2,504

2018 compared with 2017

Net income was $2.9 billion, an increase of 22%.

Net revenue was $14.1 billion, an increase of 2%. Net interest income was $3.5 billion, up 5%, driven by deposit margin expansion and loan growth. Noninterest revenue was $10.5 billion, up 1%, driven by higher management fees on higher average market levels and the cumulative impact of net inflows, predominantly offset by fee compression, lower investment valuations and lower performance fees.

Revenue from Asset Management was $7.2 billion, down 1%, driven by lower investment valuations, fee compression and lower performance fees, predominantly offset by higher management fees on higher average market levels and the cumulative impact of net inflows.

Revenue from Wealth Management was $6.9 billion, up 5%, reflecting higher management fees on the cumulative impact of net inflows and higher average market levels as well as higher net interest income from deposit margin expansion and continued loan growth, partially offset by fee compression.

Noninterest expense was $10.4 billion, an increase of 1%, driven by investments in advisors and technology and higher external fees on revenue growth, largely offset by lower legal expense.

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 $13.8 billion, an increase of 8%. Net interest income was $3.4 billion, up 11%, driven by higher deposit spreads. Noninterest revenue was $10.5 billion, up 7%, 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 $7.3 billion, up 8% 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 $10.2 billion, an increase of 10%, predominantly driven by higher legal expense and compensation expense on higher revenue and headcount.

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 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 (b). 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)	2018	2017	2016
% of JPM mutual fund assets rated as 4- or 5-star[(a)]	**58%**	60%	63%
% of JPM mutual fund assets ranked in 1st or 2nd quartile:[(b)]			
1 year	**68**	64	54
3 years	**73**	75	72
5 years	**85**	83	79
Selected balance sheet data (period-end)			
Total assets	**$ 170,024**	$ 151,909	$ 138,384
Loans	**147,632**	130,640	118,039
Core loans	**147,632**	130,640	118,039
Deposits	**138,546**	146,407	161,577
Equity	**9,000**	9,000	9,000
Selected balance sheet data (average)			
Total assets	**$ 160,269**	$ 144,206	$ 132,875
Loans	**138,622**	123,464	112,876
Core loans	**138,622**	123,464	112,876
Deposits	**137,272**	148,982	153,334
Equity	**9,000**	9,000	9,000
Credit data and quality statistics			
Net charge-offs	**$ 10**	$ 14	$ 16
Nonaccrual loans	**263**	375	390
Allowance for credit losses:			
Allowance for loan losses	**326**	290	274
Allowance for lending-related commitments	**16**	10	4
Total allowance for credit losses	**342**	300	278
Net charge-off rate	**0.01%**	0.01%	0.01%
Allowance for loan losses to period-end loans	**0.22**	0.22	0.23
Allowance for loan losses to nonaccrual loans	**124**	77	70
Nonaccrual loans to period-end loans	**0.18**	0.29	0.33

(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) 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.

Client assets

2018 compared with 2017

Client assets were $2.7 trillion, a decrease of 2%. Assets under management were $2.0 trillion, a decrease of 2% reflecting lower spot market levels, largely offset by net inflows into liquidity and long-term products.

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.

Client assets

December 31, (in billions)	2018	2017	2016
Assets by asset class			
Liquidity	**$ 480**	$ 459	$ 436
Fixed income	**464**	474	420
Equity	**384**	428	351
Multi-asset and alternatives	**659**	673	564
Total assets under management	**1,987**	2,034	1,771
Custody/brokerage/ administration/deposits	**746**	755	682
Total client assets	**$ 2,733**	$ 2,789	$ 2,453
Memo:			
Alternatives client assets[(a)]	**$ 171**	$ 166	$ 154
Assets by client segment			
Private Banking	**$ 552**	$ 526	$ 435
Institutional	**926**	968	869
Retail	**509**	540	467
Total assets under management	**$ 1,987**	$ 2,034	$ 1,771
Private Banking	**$ 1,274**	$ 1,256	$ 1,098
Institutional	**946**	990	886
Retail	**513**	543	469
Total client assets	**$ 2,733**	$ 2,789	$ 2,453

(a) Represents assets under management, as well as client balances in brokerage accounts.

Client assets (continued)

Year ended December 31, (in billions)	2018	2017	2016
Assets under management rollforward			
Beginning balance	**$ 2,034**	$ 1,771	$ 1,723
Net asset flows:			
Liquidity	**31**	9	24
Fixed income	**(1)**	36	30
Equity	**2**	(11)	(29)
Multi-asset and alternatives	**24**	43	22
Market/performance/other impacts	**(103)**	186	1
Ending balance, December 31	**$ 1,987**	$ 2,034	$ 1,771
Client assets rollforward			
Beginning balance	**$ 2,789**	$ 2,453	$ 2,350
Net asset flows	**88**	93	63
Market/performance/other impacts	**(144)**	243	40
Ending balance, December 31	**$ 2,733**	$ 2,789	$ 2,453

International metrics

Year ended December 31, (in billions, except where otherwise noted)	2018	2017	2016
Total net revenue (in millions)[(a)]			
Europe/Middle East/Africa	**$ 2,721**	$ 2,715	$ 2,425
Asia/Pacific	**1,518**	1,385	1,278
Latin America/Caribbean	**904**	844	726
Total international net revenue	**5,143**	4,944	4,429
North America	**8,933**	8,891	8,393
Total net revenue	**$ 14,076**	$ 13,835	$ 12,822
Assets under management			
Europe/Middle East/Africa	**$ 355**	$ 384	$ 309
Asia/Pacific	**162**	160	123
Latin America/Caribbean	**63**	61	45
Total international assets under management	**580**	605	477
North America	**1,407**	1,429	1,294
Total assets under management	**$ 1,987**	$ 2,034	$ 1,771
Client assets			
Europe/Middle East/Africa	**$ 414**	$ 441	$ 359
Asia/Pacific	**222**	225	177
Latin America/Caribbean	**155**	154	114
Total international client assets	**791**	820	650
North America	**1,942**	1,969	1,803
Total client assets	**$ 2,733**	$ 2,789	$ 2,453

(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 functions and expense that is centrally managed. Treasury and CIO is predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding, capital, structural interest rate and foreign exchange risks. The major Other Corporate functions include Real Estate, Technology, Legal, Corporate Finance, Human Resources, Internal Audit, Risk Management, Compliance, Control Management, Corporate Responsibility and various Other Corporate groups.

Selected income statement and balance sheet data

Year ended December 31, (in millions, except headcount)	2018	2017	2016
Revenue			
Principal transactions	**$ (426)**	$ 284	$ 210
Securities gains/(losses)	**(395)**	(66)	140
All other income/(loss)[a]	**558**	867	588
Noninterest revenue	**(263)**	1,085	938
Net interest income	**135**	55	(1,425)
Total net revenue[b]	**(128)**	1,140	(487)
Provision for credit losses	**(4)**	–	(4)
Noninterest expense[c]	**902**	501	462
Income/(loss) before income tax benefit	**(1,026)**	639	(945)
Income tax expense/(benefit)	**215**	2,282	(241)
Net income/(loss)	**$ (1,241)**	$ (1,643)	$ (704)
Total net revenue			
Treasury and CIO	**510**	566	(787)
Other Corporate	**(638)**	574	300
Total net revenue	**$ (128)**	$ 1,140	$ (487)
Net income/(loss)			
Treasury and CIO	**(69)**	60	(715)
Other Corporate	**(1,172)**	(1,703)	11
Total net income/(loss)	**$ (1,241)**	$ (1,643)	$ (704)
Total assets (period-end)	**$771,787**	$ 781,478	$ 799,426
Loans (period-end)	**1,597**	1,653	1,592
Core loans[d]	**1,597**	1,653	1,589
Headcount[e]	**37,145**	34,601	31,789

(a) Included revenue related to a legal settlement of $645 million for the year ended December 31, 2017.

(b) Included tax-equivalent adjustments, driven by tax-exempt income from municipal bond investments, of $382 million, $905 million and $885 million for the years ended December 31, 2018, 2017 and 2016, respectively. The decrease in taxable-equivalent adjustments reflects the impact of the TCJA.

(c) Included legal expense/(benefit) of $(241) million, $(593) million and $(385) million for the years ended December 31, 2018, 2017 and 2016, respectively.

(d) Average core loans were $1.7 billion, $1.6 billion and $1.9 billion for the years ended December 31, 2018, 2017 and 2016, respectively.

(e) Effective in the first quarter of 2018, certain Compliance staff were transferred from Corporate to CB. The prior period amounts have been revised to conform with the current period presentation. For a further discussion of this transfer, refer to CB segment results on page 71.

2018 compared with 2017

Net loss was $1.2 billion.

Net revenue was a loss of $128 million, compared with net revenue of $1.1 billion in the prior year. The current year includes markdowns on certain legacy private equity investments and investment securities losses related to the repositioning of the investment securities portfolio, partially offset by higher net interest income primarily driven by higher rates. The prior year included a $645 million benefit from a legal settlement.

Noninterest expense of $902 million includes a pre-tax loss of $174 million on the liquidation of a legal entity recorded in the second quarter of 2018, as well as investments in technology and real estate.

Current period income tax expense reflects a net benefit of $302 million resulting from changes in estimates under the TCJA related to the remeasurement of certain deferred taxes and the deemed repatriation tax on non-U.S. earnings. This amount was more than offset by changes to certain tax reserves and other tax adjustments. The prior year income tax expense included a $2.7 billion expense related to the impact of the TCJA.

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.

Treasury and CIO overview

Treasury and CIO is predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding, capital, structural interest rate and foreign exchange risks. 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, refer to Note 5. In addition, Treasury and CIO manage the Firm's cash position primarily through depositing at central banks and investing in short-term instruments. For further information on liquidity and funding risk, refer to Liquidity Risk Management on pages 95–100. For information on interest rate, foreign exchange and other risks, refer to Market Risk Management on pages 124–131.

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, 2018, the investment securities portfolio was $260.1 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). Refer to Note 10 for further information on the Firm's investment securities portfolio.

Selected income statement and balance sheet data

As of or for the year ended December 31, (in millions)	**2018**	2017	2016
Investment securities gains/ (losses)	**$ (395)**	$ (78)	$ 132
Available-for-sale ("AFS") investment securities (average)	**203,449**	219,345	226,892
Held-to-maturity ("HTM") investment securities (average)	**31,747**	47,927	51,358
Investment securities portfolio (average)	**235,197**	267,272	278,250
AFS investment securities (period-end)	**228,681**	200,247	236,670
HTM investment securities (period-end)	**31,434**	47,733	50,168
Investment securities portfolio (period–end)	**260,115**	247,980	286,838

As permitted by the new hedge accounting guidance, the Firm elected to transfer certain investment securities from HTM to AFS in the first quarter of 2018. For additional information, refer to Notes 1 and 10.

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; 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 risk management governance and oversight framework involves understanding drivers of risks, types of risks, and impacts of risks.

Drivers of Risks

Drivers of risks 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.

Types of Risks

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.

Impacts of Risks

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.

Governance and Oversight Functions

The Firm manages its risk through risk governance and oversight functions. The scope of a particular function may include one or more drivers, types and/or impacts of risk. For example, Country Risk Management 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 discusses the risk governance and oversight functions in place to manage the risks inherent in the Firms business activities.

Risk governance and oversight functions	Page
Strategic risk	84
Capital risk	85–94
Liquidity risk	95–100
Reputation risk	101
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Wholesale credit risk	112-119
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Country risk	132-133
Operational risk	134-136
Compliance risk	137
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Estimations and Model risk	140

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 to assess select operational risks, and impact to the Firm's reputation. 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 structure of the Firm. The framework is subject to approval by the DRPC in the form of the primary risk management policies. The Firm's CRO oversees and delegates authorities to LOB CROs, Firmwide Risk Executives ("FREs"), and the Firm's Chief Compliance Officer ("CCO"). The CCO oversees and delegates authorities to the LOB CCOs, and is responsible for the creation and effective execution of the Global Compliance Program.

The Firm places reliance on each of its LOBs and other functional areas giving rise to risk to operate within the parameters identified by the IRM function, and within its own management-identified risk and control standards. Each LOB and Treasury and CIO, inclusive of their aligned Operations, Technology and Control Management are considered the "first line of defense" and owns the identification of risks, as well as the design and execution of controls, inclusive of IRM-specified controls, to manage those risks. The first line of defense is responsible for adherence to applicable laws, rules, and regulations and for the implementation of the risk management structure (which may include policy, standards, limits, thresholds and controls) established by IRM.

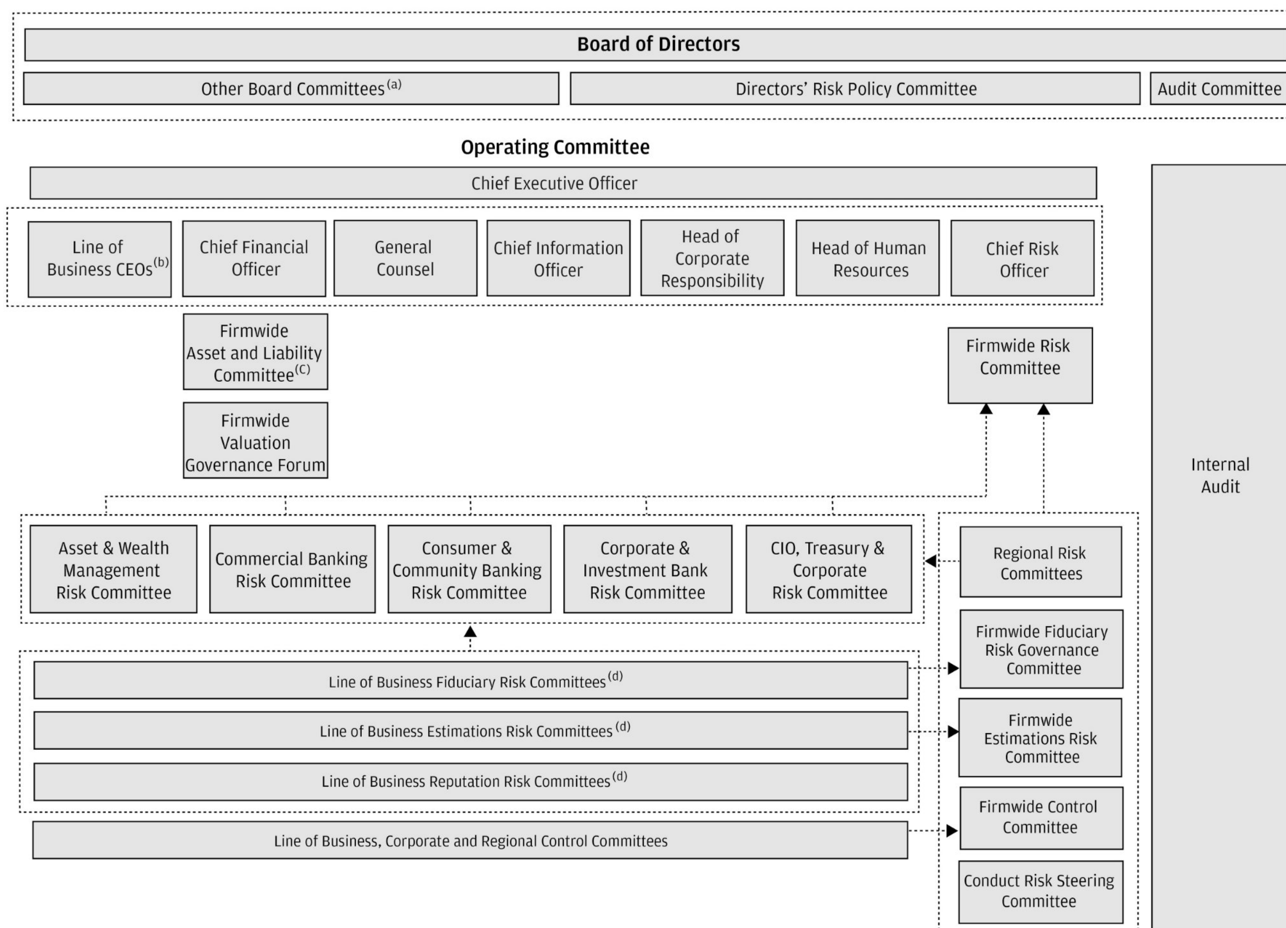
The IRM function is independent of the businesses and is "the second line of defense". The IRM function sets and oversees the risk management structure for firmwide risk governance, and independently assesses and challenges the first line of defense risk management practices. IRM is also responsible for its own adherence to applicable laws, rules, regulations and for the implementation of policies and standards established by IRM with respect to its own processes.

The Internal Audit function operates independently from other parts of the Firm and performs independent testing and evaluation of processes and controls across the entire enterprise as the Firm's "third line of defense". 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 Control Management.

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 which are 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) The Capital Governance Committee and Treasurer Committee report to the Firmwide Asset and Liability Committee.
(d) As applicable.

The Firm's Operating Committee, which consists of the Firm's CEO, CRO, CFO and other senior executives, is accountable to and may refer matters to the Firm's Board of Directors. The Operating Committee is responsible to escalate to the Board the information necessary to facilitate the Board's exercise of its duties.

The Board of Directors provides oversight of risk. The DRPC is the principal committee that oversees risk matters. The Audit Committee oversees the control environment, and the Compensation & Management Development Committee oversees compensation and other management-related matters. Each committee of the Board oversees reputation risk and/or conduct risk issues within its scope of responsibility.

The Directors' Risk Policy Committee of the Board assists the board in its oversight of 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, capital and 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") of the Board 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, including reviewing management updates regarding significant conduct issues and any related employee actions, including but not limited to compensation actions.

The Public Responsibility Committee of the Board assists the Board in its oversight of the Firm's positions and practices on public responsibility matters such as community investment, fair lending, sustainability, consumer practices and other public policy issues that reflect the Firm's values and character and impact the Firm's reputation among all of its stakeholders. The Committee also provides guidance on these matters to management and the Board as appropriate.

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, Conduct Risk Steering 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 Manager and the Firmwide Risk Executive for Operational Risk Management. 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 governance framework for fiduciary risk inherent in each of the Firm's LOBs. The governance framework supports the consistent identification and escalation of fiduciary risk or fiduciary related conflict of interest risk. The FFRGC approves risk or compliance policy exceptions and reviews periodic reports from the LOBs and control functions including fiduciary metrics and control trends. The FFRGC is co-chaired by the Wealth 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 quantitative and qualitative 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 Conduct Risk Steering Committee ("CRSC") provides oversight of the Firm's 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 of focus. The CRSC is co-chaired by the Conduct Risk Compliance Executive and the Human Resources Chief Administrative Officer. The CRSC may escalate systemic conduct risk issues to the FRC and as appropriate to the DRPC.

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 matters 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.

Line of Business and Corporate Control Committees oversee the control environment of their respective business or function. As part of that mandate, they are responsible for reviewing data that indicates the quality and stability of the

processes in a business or function, addressing key operational risk issues, focusing on processes with control concerns and overseeing control remediation. These committees escalate issues to the FCC, as appropriate.

The Firmwide Asset and Liability Committee ("ALCO"), chaired by the Firm's Treasurer and Chief Investment Officer, is responsible for overseeing the Firm's asset and liability management ("ALM") activities and the management of liquidity risk, balance sheet, interest rate risk, and capital risk. The ALCO is supported by the Treasurer Committee and the Capital Governance Committee. The Treasurer Committee is responsible for monitoring the Firm's overall balance sheet, liquidity risk and interest rate risk. The Capital Governance Committee is responsible for overseeing the Firm's strategic end-to-end capital management and governance framework, including capital planning, capital strategy, and the implementation of regulatory capital requirements.

The Firmwide Valuation Governance Forum ("VGF") is composed of senior finance and risk executives and is responsible for overseeing the management of fair value 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 Corporate, 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 designed to facilitate the first line of defense's responsibility to identify material risks inherent to the Firm, catalog them in a central repository and review the most material risks on a regular basis. The second line of defense reviews and challenges the first line's identification of risks, maintains the central repository and provides the consolidated Firmwide results to the FRC and DRPC.

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 and Corporate are responsible for managing the Firm's most significant strategic risks. Strategic risks are overseen by IRM through participation in business reviews, LOB and Corporate 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 and Corporate, is an important process for managing the Firm's strategic risk. Guided by the Firm's How We Do Business Principles (the "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 and Corporate 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, refer to Enterprise-Wide Risk Management on page 79. For further information on the Risk Appetite framework, refer to Enterprise-Wide Risk Management on page 80.

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, refer to Capital Risk Management on pages 85-94. For further information on liquidity risk, refer to Liquidity Risk Management on pages 95-100

For further information on reputation risk, refer to Reputation Risk Management on page 101.

Governance and oversight

On at least an annual basis, the Firm's Operating Committee defines the most significant strategic priorities and initiatives, including those of the Firm, the LOBs and Corporate, 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 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 any significant 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 ensuring the Firm's capital strength.

Capital management

Treasury & CIO assumed responsibility for capital management in March 2018.

The primary objectives of effective capital management are to:

- Maintain sufficient capital in order to continue to build and invest in the Firm's businesses through the cycle and in stressed environments;
- Retain flexibility to take advantage of future investment opportunities;
- Promote the Firm's ability to serve as a source of strength to its subsidiaries;
- Ensure the Firm operates above the minimum regulatory capital ratios as well as maintain "well-capitalized" status for the Firm and its insured depository institution ("IDI") subsidiaries at all times under applicable regulatory capital requirements;
- Meet capital distribution objectives; and
- Maintain sufficient capital resources to operate throughout a resolution period in accordance with the Firm's preferred resolution strategy.

The Firm meets these objectives through the establishment of internal minimum capital requirements and a strong capital management governance framework, both in business as usual conditions and in the event of stress.

Capital risk management is intended to be flexible in order to react to a range of potential events. In its management of capital, the Firm takes into consideration economic risk and all applicable regulatory capital requirements to determine the level of capital needed.

The Firm's minimum capital levels 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 other 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.

Contingency capital plan

The Firm's contingency capital plan, which is approved by the firmwide ALCO and the DRPC, establishes the capital management framework for the Firm and specifies the principles underlying the Firm's approach towards capital management in normal economic times and during stress. The contingency capital plan defines how the Firm calibrates its targeted capital levels and meets minimum capital requirements, monitors the ongoing appropriateness of planned distributions, and sets out the capital contingency actions that must be taken or considered at various levels of capital depletion during a period of stress.

Capital planning and stress testing

Comprehensive Capital Analysis and Review

The Federal Reserve requires large bank holding companies, including the Firm, to submit on an annual basis a capital plan that has been reviewed and approved by the Board of Directors. The Federal Reserve uses the CCAR and other stress testing 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 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, 2018, the Federal Reserve informed the Firm that it did not object, on either a quantitative or qualitative basis, to the Firm's 2018 capital plan. For information on actions taken by the Firm's Board of Directors following the 2018 CCAR results, refer to Capital actions on pages 91-92.

Internal Capital Adequacy Assessment Process

Annually, the Firm prepares the ICAAP, which informs the Board of Directors of the ongoing assessment of the Firm's processes for managing the sources and uses of capital as well as compliance with supervisory expectations for capital planning and capital adequacy. The Firm's ICAAP integrates stress testing protocols with capital planning. The Firm's Audit Committee is responsible for reviewing and approving the capital stress testing control framework.

The CCAR and other stress testing processes assess 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. These results are reviewed by management and the Board of Directors.

Capital management oversight

With the reorganization of the Capital Management group into the Treasury and CIO organization, the Firm established a Capital Management oversight function within the CTC risk function. The CTC CRO, who reports to the Firm's CRO, is responsible for Firmwide Capital Management Oversight. Capital Management's Oversight responsibilities include:

- Establishing, calibrating and monitoring capital risk limits and indicators, including capital risk appetite tolerances;
- Performing independent assessment of the Firm's capital management activities; and
- Monitoring the Firm's capital position and balance sheet activities

In addition, the Basel Independent Review function ("BIR"), which is now a part of the IRM function, conducts independent assessments of the Firm's regulatory capital framework. These assessments are intended to ensure compliance with the applicable regulatory capital rules in support of senior management's responsibility for managing capital and for the DRPC's oversight of management in executing that responsibility.

Governance

Committees responsible for overseeing the Firm's capital management include the Capital Governance Committee, the Treasurer Committee and the ALCO. Capital management oversight is governed through the CTC risk committee. In addition, the DRPC approves the Firm's capital management oversight policy and reviews and recommends to the Board of Directors, for formal approval, the Firm's capital risk tolerances. For additional discussion on the DRPC and the ALCO, refer to Enterprise-wide Risk Management on pages 79-140.

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 were subject to phase-in periods that began on January 1, 2014 and continued through the end of 2018 ("transitional period"). While the required capital remained subject to the transitional rules during 2018, the Firm's capital ratios as of December 31, 2018 were equivalent whether calculated on a transitional or fully phased-in basis.

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, refer to page 91.

Key Regulatory Developments

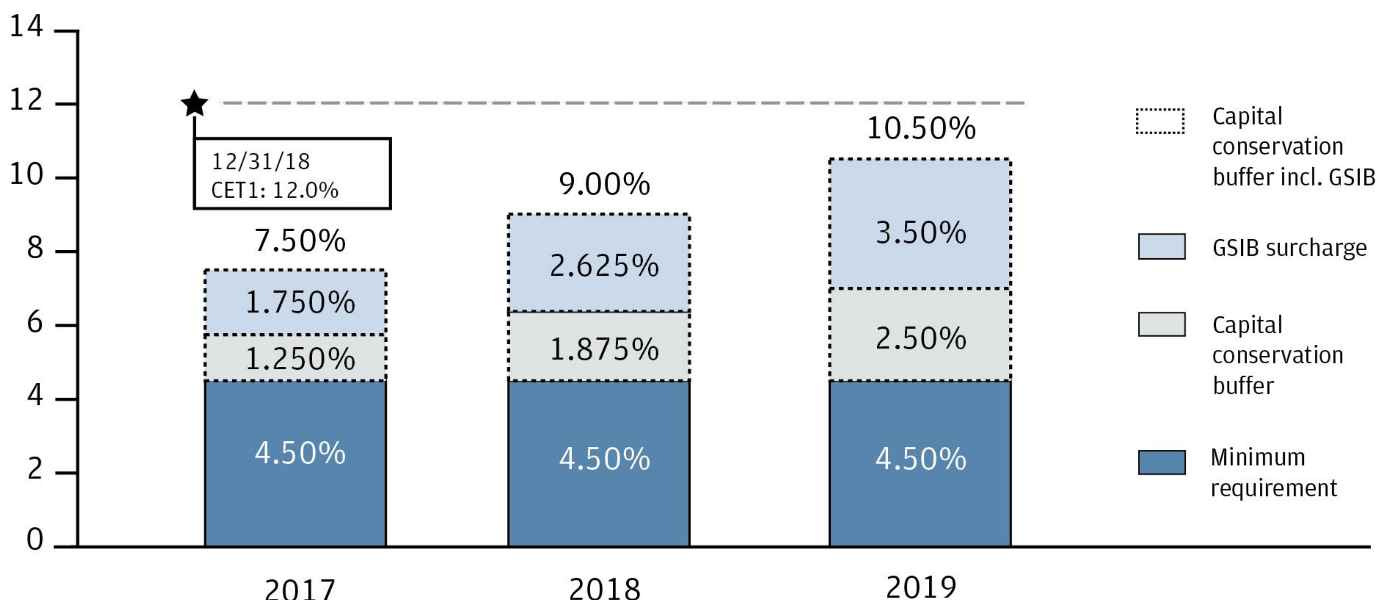
Banking supervisors globally continue to consider refinements and enhancements to the Basel III capital framework for financial institutions, and in December 2017, the Basel Committee issued Basel III: Finalizing post-crisis reforms ("Basel III Reforms"). The Basel Committee expects national regulatory authorities to implement the Basel III Reforms in the laws of their respective jurisdictions and to require banking organizations subject to such laws to meet most of the revised requirements by January 1, 2022, with certain elements being phased in through January 1, 2027.

In April 2018, the Federal Reserve proposed the introduction of a stress buffer framework that would create a single, integrated set of capital requirements by combining the supervisory stress test results of the CCAR assessment and those under the Dodd-Frank Act with current point-in-time capital requirements. The U.S. banking regulators will be proposing final requirements applicable to U.S. financial institutions.

Also in April 2018, the Federal Reserve and the OCC released a proposal to revise the enhanced supplementary leverage ratio ("eSLR") requirements applicable to the U.S. global systemically important banks ("GSIBs") and their IDIs and to make conforming changes to the rules which are applicable to U.S. GSIBs relating to TLAC and external long-term debt that must satisfy certain eligibility criteria.

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 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. The Firm's Basel III Standardized Fully Phased-In risk-based ratios are currently more binding than the Basel III Advanced Fully Phased-In risk-based ratios, and the Firm expects that this will remain the case 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, refer to the Firm's Pillar 3 Regulatory Capital Disclosures reports, which are available on the Firm's website (https://jpmorganchaseco.gcs-web.com/financial-information/basel-pillar-3-us-lcr-disclosures).

All banking institutions are currently required to have a minimum CET1 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. The capital conservation buffer was subject to a phase-in period that began January 1, 2016 and continued 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.

	2018	2017
Fully Phased-In:		
Method 1	2.50%	2.50%
Method 2	3.50%	3.50%
Transitional[(a)]	2.625%	1.75%

(a) The GSIB surcharge is subject to transition provisions (in 25% increments) through the end of 2018.

The Firm's effective GSIB surcharge as calculated under Method 2 for 2019 is anticipated to be 3.5%.

The Federal Reserve's framework for setting the countercyclical capital buffer takes into account the macro financial environment in which large, internationally active banks function. As of December 31, 2018, the U.S. countercyclical capital buffer remained at 0%. The Federal Reserve will continue to review the buffer at least annually. The buffer can be increased if the Federal Reserve, FDIC and OCC determine that credit growth in the economy has become excessive and can be calibrated up to an additional 2.5% of RWA subject to a 12-month implementation period.

Failure to maintain regulatory capital equal to or in excess of the risk-based regulatory capital minimum plus the capital conservation buffer (inclusive of the GSIB surcharge) and any countercyclical buffer may result in limitations to the amount of capital that the Firm may distribute, such as through dividends and common equity repurchases.

Leverage-based Capital Regulatory Minimums

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.

Failure to maintain an SLR ratio equal to or greater than the regulatory minimum may result in limitations on the amount of capital that the Firm may distribute.

In addition to meeting the capital ratio requirements of Basel III, the Firm and its IDI subsidiaries also must maintain minimum capital and leverage ratios in order to be "well-capitalized" under the regulations issued by the Federal Reserve and the Prompt Corrective Action ("PCA") requirements of the FDIC Improvement Act ("FDICIA"), respectively. For additional information, refer to Note 26.

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 exceeded both the Transitional and Fully Phased-In regulatory minimums as of December 31, 2018 and 2017.

December 31, 2018 (in millions, except ratios)	Transitional/Fully Phased-In[c]		Transitional	Fully Phased-In
	Standardized	Advanced	Minimum capital ratios	Minimum capital ratios
Risk-based capital metrics:				
CET1 capital	**$ 183,474**	**$ 183,474**		
Tier 1 capital	**209,093**	**209,093**		
Total capital	**237,511**	**227,435**		
Risk-weighted assets	**1,528,916**	**1,421,205**		
CET1 capital ratio	**12.0%**	**12.9%**	9.0%	10.5%
Tier 1 capital ratio	**13.7**	**14.7**	10.5	12.0
Total capital ratio	**15.5**	**16.0**	12.5	14.0
Leverage-based capital metrics:				
Adjusted average assets[a]	**$ 2,589,887**	**$ 2,589,887**		
Tier 1 leverage ratio	**8.1%**	**8.1%**	4.0%	4.0%
Total leverage exposure	**NA**	**$ 3,269,988**		
SLR[b]	**NA**	**6.4%**	NA	5.0% [b]

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%	7.50%	12.1%	12.7%	10.5%
Tier 1 capital ratio	13.9	14.5	9.00	13.8	14.4	12.0
Total capital ratio	15.9	15.9	11.00	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	8.3%	8.3%	4.0%	8.3%	8.3%	4.0%
Total leverage exposure	NA	$ 3,204,463		NA	$ 3,205,015	
SLR	NA	6.5%	NA	NA	6.5%	5.0% [b]

(a) Adjusted average assets, for purposes of calculating the Tier 1 leverage ratio, 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) Effective January 1, 2018, the SLR was fully phased-in under Basel III. The December 31, 2017 amounts were calculated under the Basel III Transitional rules.
(c) The Firm's capital ratios as of December 31, 2018 were equivalent whether calculated on a transitional or fully phased-in basis.

The Firm believes that it will operate with a Basel III CET1 capital ratio between 11% and 12% over the medium term.

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, refer to Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 57-59.

Capital components

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, 2018 and 2017.

(in millions)	December 31, 2018	December 31, 2017
Total stockholders' equity	**$ 256,515**	**$ 255,693**
Less: Preferred stock	26,068	26,068
Common stockholders' equity	**230,447**	**229,625**
Less:		
Goodwill	47,471	47,507
Other intangible assets	748	855
Other CET1 capital adjustments	1,034	223
Add:		
Deferred tax liabilities[(a)]	2,280	2,204
Standardized/Advanced Fully Phased-In CET1 capital	**183,474**	**183,244**
Preferred stock	26,068	26,068
Less:		
Other Tier 1 adjustments	449	748
Standardized/Advanced Fully Phased-In Tier 1 capital	**209,093**	**208,564**
Long-term debt and other instruments qualifying as Tier 2 capital	13,772	14,827
Qualifying allowance for credit losses	14,500	14,672
Other	146	(103)
Standardized Fully Phased-In Tier 2 capital	**28,418**	**29,396**
Standardized Fully Phased-in Total capital	**237,511**	**237,960**
Adjustment in qualifying allowance for credit losses for Advanced Tier 2 capital	(10,076)	(10,462)
Advanced Fully Phased-In Tier 2 capital	**18,342**	**18,934**
Advanced Fully Phased-In Total capital	**$ 227,435**	**$ 227,498**

(a) Represents certain 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.

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, 2018.

Year Ended December 31, (in millions)	2018
Standardized/Advanced CET1 capital at December 31, 2017	$ 183,244
Net income applicable to common equity	30,923
Dividends declared on common stock	(9,214)
Net purchase of treasury stock	(17,899)
Changes in additional paid-in capital	(1,417)
Changes related to AOCI	(1,203)
Adjustment related to DVA[(a)]	(1,165)
Changes related to other CET1 capital adjustments	205
Increase in Standardized/Advanced CET1 capital	230
Standardized/Advanced CET1 capital at December 31, 2018	**183,474**
Standardized/Advanced Tier 1 capital at December 31, 2017	208,564
Change in CET1 capital	230
Net issuance of noncumulative perpetual preferred stock	–
Other	299
Increase in Standardized/Advanced Tier 1 capital	529
Standardized/Advanced Tier 1 capital at December 31, 2018	**209,093**
Standardized Tier 2 capital at December 31, 2017	29,396
Change in long-term debt and other instruments qualifying as Tier 2	(1,055)
Change in qualifying allowance for credit losses	(172)
Other	249
Decrease in Standardized Tier 2 capital	(978)
Standardized Tier 2 capital at December 31, 2018	**28,418**
Standardized Total capital at December 31, 2018	**237,511**
Advanced Tier 2 capital at December 31, 2017	18,934
Change in long-term debt and other instruments qualifying as Tier 2	(1,055)
Change in qualifying allowance for credit losses	214
Other	249
Decrease in Advanced Tier 2 capital	(592)
Advanced Tier 2 capital at December 31, 2018	**18,342**
Advanced Total capital at December 31, 2018	**$ 227,435**

(a) Includes DVA related to structured notes recorded in AOCI.

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, 2018. The amounts in the rollforward categories are estimates, based on the predominant driver of the change.

Year ended December 31, 2018 (in millions)	Standardized			Advanced			
	Credit risk RWA	Market risk RWA	**Total RWA**	Credit risk RWA	Market risk RWA	Operational risk	**Total RWA**
December 31, 2017	$ 1,386,060	$ 123,702	**$ 1,509,762**	$ 922,905	$ 123,791	$ 400,000	**$ 1,446,696**
Model & data changes[a]	(10,431)	(13,191)	**(23,622)**	3,750	(13,191)	–	**(9,441)**
Portfolio runoff[b]	(8,381)	–	**(8,381)**	(10,161)	–	–	**(10,161)**
Movement in portfolio levels[c]	55,805	(4,648)	**51,157**	10,153	(4,624)	(11,418)	**(5,889)**
Changes in RWA	36,993	(17,839)	**19,154**	3,742	(17,815)	(11,418)	**(25,491)**
December 31, 2018	**$ 1,423,053**	**$ 105,863**	**$ 1,528,916**	**$ 926,647**	**$ 105,976**	**$ 388,582**	**$ 1,421,205**

(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 reduced risk from position rolloffs in legacy portfolios in Home Lending.
(c) Movement in portfolio levels (inclusive of rule changes) refers to: changes in book size, composition, credit quality, and market movements for credit risk RWA; changes in position and market movements for market risk RWA; and updates to cumulative losses for operational risk RWA.

Supplementary leverage ratio

The following table presents the components of the Firm's Fully Phased-In SLR as of December 31, 2018 and 2017.

(in millions, except ratio)	**December 31, 2018**	December 31, 2017
Tier 1 capital	**$ 209,093**	$ 208,564
Total average assets	2,636,505	$ 2,562,155
Less: Adjustments for deductions from Tier 1 capital	46,618	47,333
Total adjusted average assets[a]	2,589,887	2,514,822
Off-balance sheet exposures[b]	680,101	690,193
Total leverage exposure	**$ 3,269,988**	$ 3,205,015
SLR	**6.4%**	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.

For JPMorgan Chase Bank, N.A.'s and Chase Bank USA, N.A.'s SLR ratios, refer to Note 26.

Line of business equity

Each business segment is allocated capital by taking into consideration capital levels of similarly rated peers and applicable regulatory capital requirements. ROE is measured and internal targets for expected returns are established as key measures of a business segment's performance.

The Firm's allocation methodology incorporates Basel III Standardized RWA, Basel III Advanced RWA, leverage, the GSIB surcharge, and a simulation of capital in a severe stress environment. On at least an annual basis, the assumptions and methodologies used in capital allocation are assessed and as a result, the capital allocated to lines of business may change. As of January 1, 2019, line of business capital allocations have increased due to a combination of changes in the relative weights toward Standardized RWA and stress, a higher capitalization rate, updated stress simulations, and general business growth.

The table below presents 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, 2019**	December 31, 2018	December 31, 2017
Consumer & Community Banking	**$ 52.0**	$ 51.0	$ 51.0
Corporate & Investment Bank	**80.0**	70.0	70.0
Commercial Banking	**22.0**	20.0	20.0
Asset & Wealth Management	**10.5**	9.0	9.0
Corporate	**65.9**	80.4	79.6
Total common stockholders' equity	**$ 230.4**	$ 230.4	$ 229.6

Capital actions

Preferred stock

Preferred stock dividends declared were $1.6 billion for the year ended December 31, 2018.

On January 24, 2019, the Firm issued $1.85 billion of 6.00% non-cumulative preferred stock, Series EE, and on January 30, 2019, the Firm announced that it will redeem all $925 million of its outstanding 6.70% non-cumulative preferred stock, Series T, on March 1, 2019. On September 21, 2018, the Firm issued $1.7 billion of 5.75% non-cumulative preferred stock, Series DD. On October 30, 2018, the Firm redeemed $1.7 billion of its fixed-to-floating rate non-cumulative perpetual preferred stock, Series I.

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, refer to Note 20.

Trust preferred securities
On September 10, 2018, the Firm's last remaining issuer of outstanding trust preferred securities ("issuer trust") was liquidated, resulting in $475 million of trust preferred securities and $15 million of trust common securities originally issued by the issuer trust being cancelled.

On December 18, 2017, the Delaware trusts that issued seven series of outstanding trust preferred securities were liquidated, and $1.6 billion of trust preferred and $56 million of trust common securities originally issued by those trusts were cancelled.

For additional information, refer to Note 19.

Common stock dividends
The Firm's common stock dividends are planned as part of the Capital Management governance framework in line with the Firm's capital management objectives.

On September 18, 2018, the Firm announced that its Board of Directors increased the quarterly common stock dividend from $0.56 per share to $0.80 per share, effective with the dividend paid on October 31, 2018. The Firm's dividends are subject to the Board of Directors' approval on a quarterly basis.

For information regarding dividend restrictions, refer to Note 20 and Note 25.

The following table shows the common dividend payout ratio based on net income applicable to common equity.

Year ended December 31,	**2018**	2017	2016
Common dividend payout ratio	**30%**	33%	30%

Common equity
During the year ended December 31, 2018, warrant holders exercised their right to purchase 14.9 million shares of the Firm's common stock. The Firm issued from treasury stock 9.4 million shares of its common stock as a result of these exercises. There were no warrants outstanding at December 31, 2018, as any warrants that were not exercised on or before October 29, 2018, have expired. At December 31, 2017, the Firm had 15.0 million warrants outstanding.

Effective June 28, 2018, the Firm's Board of Directors authorized the repurchase of up to $20.7 billion of common equity between July 1, 2018 and June 30, 2019, as part of its annual capital plan. As of December 31, 2018, $10.4 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, 2018, 2017 and 2016. There were no repurchases of warrants during the years ended December 31, 2018, 2017 and 2016.

Year ended December 31, (in millions)	**2018**	2017	2016
Total number of shares of common stock repurchased	**181.5**	166.6	140.4
Aggregate purchase price of common stock repurchases	**$19,983**	$15,410	$ 9,082

The Firm from time to time enters 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.

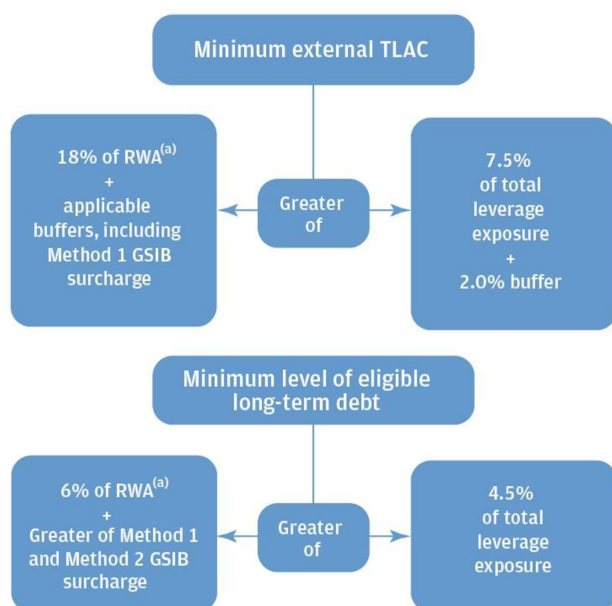
For additional information regarding repurchases of the Firm's equity securities, refer to Part II, Item 5: Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities on page 30.

Other capital requirements

Total Loss-Absorbing Capacity ("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.

Failure to maintain TLAC equal to or in excess of the regulatory minimum plus applicable buffers may result in limitations to the amount of capital that the Firm may distribute, such as through dividends and common equity repurchases.

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, 2018, the Firm exceeded the minimum requirements under the rule to which it became subject to on January 1, 2019.

The following table presents the eligible external TLAC and LTD amounts, as well as a representation of the amounts as a percentage of the Firm's total RWA and total leverage exposure.

December 31, 2018 (in billions, except ratio)	Eligible External TLAC	Eligible LTD
Total eligible TLAC & LTD	$ 380.5	$ 160.5
% of RWA	24.9%	10.5%
Minimum requirement	23.0	9.5
Surplus/(shortfall)	$ 28.9	$ 15.3
% of total leverage exposure	11.6%	4.9%
Minimum requirement[a]	9.5	4.5
Surplus/(shortfall)	$ 69.9	$ 13.4

For information on the financial consequences to holders of the Firm's debt and equity securities in a resolution scenario, refer to Part I, Item 1A: Risk Factors on pages 7-28 of the Firm's 2018 Form 10-K.

Broker-dealer regulatory capital

J.P. Morgan Securities
JPMorgan Chase's principal U.S. broker-dealer subsidiary is J.P. Morgan Securities. J.P. Morgan Securities is subject to Rule 15c3-1 under the Securities Exchange Act of 1934 (the "Net Capital Rule"). J.P. Morgan Securities is also registered as a futures commission merchant and subject to Rule 1.17 of the CFTC.

J.P. Morgan Securities has elected to compute its minimum net capital requirements in accordance with the "Alternative Net Capital Requirements" of the Net Capital Rule.

Under the market and credit risk standards of Appendix E of the Net Capital Rule, J.P. Morgan 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. J.P. Morgan Securities is required to notify the SEC in the event that tentative net capital is less than $5.0 billion. As of December 31, 2018, J.P. Morgan Securities maintained tentative net capital in excess of the minimum and notification requirements.

The following table presents J.P.Morgan Securities' net capital information:

December 31, 2018	Net capital	
(in millions)	Actual	Minimum
J.P. Morgan Securities	$ **16,648**	$ **3,069**

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 PRA and the FCA. J.P. Morgan Securities plc is subject to the European Union Capital Requirements Regulation and the 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, 2018	Total capital[(a)]	CET1 ratio		Total capital ratio	
(in millions, except ratios)	Estimated	Estimated	Minimum	Estimated	Minimum
J.P. Morgan Securities plc	$ **53,086**	**17.4%**	**4.5%**	**22.5%**	**8.0%**

(a) Includes the tier 2 qualifying subordinated debt securities issued to meet the MREL requirements to which J.P. Morgan Securities plc became subject to on January 1, 2019. For additional information on MREL, refer to Supervision & Regulation on pages 1-6

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 CTC CRO, who reports to the Firm's CRO, is responsible for firmwide Liquidity Risk Oversight. Liquidity Risk Oversight's responsibilities include:

- Establishing and monitoring limits and indicators, including liquidity risk appetite tolerances;
- Monitoring and reporting internal firmwide and legal entity liquidity stress tests as well as regulatory defined liquidity stress tests;
- Approving or escalating for review new or updated liquidity stress assumptions;
- Monitoring liquidity positions, balance sheet variances and funding activities;
- Conducting ad hoc analysis to identify potential emerging liquidity risks; and
- Performing independent review of liquidity risk management processes.

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.

As part of the Firm's overall liquidity management strategy, the Firm manages liquidity and funding using a centralized, global approach in order to:

- Optimize liquidity sources and uses;
- Monitor exposures;
- Identify constraints on the transfer of liquidity between the Firm's legal entities; and
- Maintain the appropriate amount of surplus liquidity at a firmwide and legal entity level, where relevant.

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, 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

Committees responsible for liquidity governance include the firmwide ALCO as well as line of business and regional ALCOs, the Treasurer Committee, 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, refer to Enterprise-wide Risk Management on pages 79–140.

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 emerging 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.

Liquidity Coverage Ratio

The LCR rule requires the Firm to maintain an amount of unencumbered High Quality Liquid Assets ("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 amounts 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. The LCR is required to be a minimum of 100%.

The following table summarizes the Firm's average LCR for the three months ended December 31, 2018, September 30, 2018 and December 31, 2017 based on the Firm's current interpretation of the finalized LCR framework.

	Three months ended		
Average amount (in millions)	**December 31, 2018**	September 30, 2018	December 31, 2017
HQLA			
Eligible cash[(a)]	**$ 297,069**	$ 344,660	$ 370,126
Eligible securities[(b)(c)]	**232,201**	190,349	189,955
Total HQLA[(d)]	**$ 529,270**	$ 535,009	$ 560,081
Net cash outflows	**$ 467,704**	$ 466,803	$ 472,078
LCR	**113%**	115%	119%
Net excess HQLA [(d)]	**$ 61,566**	$ 68,206	$ 88,003

(a) Represents cash on deposit at central banks, primarily Federal Reserve Banks.
(b) Predominantly U.S. Treasuries, U.S. Agency MBS, 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 investment 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.

The Firm's average LCR decreased during the three months ended December 31, 2018, compared with the three month period ended September 30, 2018 due to a decrease in the average amount of reportable HQLA. Although HQLA increased in JPMorgan Chase Bank, N.A. during the period, there was a decrease in the amount of HQLA in JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. that was determined to be transferable to non-bank affiliates. This decrease was based on a change in the Firm's interpretation of amounts available for transfer.

The Firm's average LCR decreased for the three months ended December 31, 2018, compared with the prior year period, due to a reduction in average HQLA primarily driven by (a) long-term debt maturities and CIB activities, and (b) a decrease in the amount of HQLA in JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A that was determined to be transferable to non-bank affiliates based on a change in the Firm's interpretation of amounts available for transfer.

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. For a further discussion of the Firm's LCR, refer to the Firm's US LCR Disclosure reports, which are available on the Firm's website at: (https://jpmorganchaseco.gcs-web.com/financial-information/basel-pillar-3-us-lcr-disclosures).

Other liquidity sources

As of December 31, 2018, in addition to assets reported in the Firm's HQLA under the LCR rule, the Firm had approximately $226 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, 2018, the Firm also had approximately $276 billion of available borrowing capacity at various FHLBs, discount windows at the 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 the 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.

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 by Treasury and CIO 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. Refer to 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, 2018 and 2017.

Deposits			Year ended December 31,	
As of or for the year ended December 31,			Average	
(in millions)	**2018**	2017	**2018**	2017
Consumer & Community Banking	**$ 678,854**	$ 659,885	**$ 670,388**	$ 640,219
Corporate & Investment Bank	**482,084**	455,883	**477,250**	447,697
Commercial Banking	**170,859**	181,512	**170,822**	176,884
Asset & Wealth Management	**138,546**	146,407	**137,272**	148,982
Corporate	**323**	295	**729**	3,604
Total Firm	**$ 1,470,666**	$ 1,443,982	**$ 1,456,461**	$ 1,417,386

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, 2018 and 2017.

As of December 31, (in billions except ratios)	**2018**	2017
Deposits	**$ 1,470.7**	$ 1,444.0
Deposits as a % of total liabilities	**62%**	63%
Loans	**984.6**	930.7
Loans-to-deposits ratio	**67%**	64%

The Firm believes that average deposit balances are generally more representative of deposit trends than period-end deposit balances.

Average deposits increased for the year ended December 31, 2018 in CCB and CIB, partially offset by decreases in AWM, CB and Corporate.

- The increase in CCB reflects the continuation of growth from new accounts, and in CIB reflects growth in operating deposits in both Treasury Services and Securities Services driven by growth in client activity.
- The decrease in AWM was driven by balance migration predominantly into the Firm's investment-related products. The decrease in CB was driven by a reduction in non-operating deposits. The decrease in Corporate was predominantly due to maturities of wholesale non-operating deposits, consistent with the Firm's efforts to reduce such deposits.

For further information on deposit and liability balance trends, refer to the discussion of the Firm's Business Segment Results and the Consolidated Balance Sheets Analysis on pages 60-78 and pages 52–53, respectively.

The following table summarizes short-term and long-term funding, excluding deposits, as of December 31, 2018 and 2017, and average balances for the years ended December 31, 2018 and 2017. For additional information, refer to the Consolidated Balance Sheets Analysis on pages 52–53 and Note 19.

Sources of funds (excluding deposits)

As of or for the year ended December 31, (in millions)	2018	2017	Average 2018	Average 2017
Commercial paper	$ 30,059	$ 24,186	$ 27,834	$ 19,920
Other borrowed funds[a]	8,789	10,727	11,369	10,755
Total short-term unsecured funding[a]	$ 38,848	$ 34,913	$ 39,203	$ 30,675
Securities sold under agreements to repurchase[a][b]	$ 171,975	$147,713	$ 177,629	$ 173,450
Securities loaned[a][b]	9,481	9,211	10,692	12,798
Other borrowed funds[a][c]	30,428	16,889	24,320	15,857
Obligations of Firm-administered multi-seller conduits[d]	4,843	3,045	3,396	3,206
Total short-term secured funding[a]	$ 216,727	$176,858	$ 216,037	$ 205,311
Senior notes	$ 162,733	$155,852	$ 153,162	$ 154,352
Trust preferred securities	—	690	471	2,276
Subordinated debt	16,743	16,553	16,178	18,832
Structured notes[e]	53,090	45,727	49,640	42,918
Total long-term unsecured funding	$ 232,566	$218,822	$ 219,451	$ 218,378
Credit card securitization[d]	$ 13,404	$ 21,278	$ 15,900	$ 25,933
Other securitizations[d][f]	—	—	—	626
Federal Home Loan Bank ("FHLB") advances	44,455	60,617	52,121	69,916
Other long-term secured funding[g]	5,010	4,641	4,842	3,195
Total long-term secured funding	$ 62,869	$ 86,536	$ 72,863	$ 99,670
Preferred stock[h]	$ 26,068	$ 26,068	$ 26,249	$ 26,212
Common stockholders' equity[h]	$ 230,447	$229,625	$ 229,222	$ 230,350

(a) The prior period amounts have been revised to conform with the current period presentation.
(b) Primarily consists of short-term securities loaned or sold under agreements to repurchase.
(c) Includes FHLB advances with original maturities of less than one year of $11.4 billion as of December 31, 2018; there were no FHLB advances with original maturities of less than one year as of December 31, 2017.
(d) Included in beneficial interests issued by consolidated variable interest entities on the Firm's Consolidated balance sheets.
(e) Includes certain TLAC-eligible long-term unsecured debt issued by the Parent Company.
(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 refer to Capital Risk Management on pages 85-94, 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 at December 31, 2018, compared to December 31, 2017, was primarily due to higher client-driven market-making activities and higher secured financing of trading assets-debt and equity instruments 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 issuance of wholesale commercial paper. The increase in commercial paper was due to higher net issuance primarily for short-term liquidity management.

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 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, 2018 and 2017. For additional information, refer to Note 19.

Long-term unsecured funding

Year ended December 31,	2018	2017	2018	2017
(Notional in millions)	Parent Company[b]		Subsidiaries[b]	
Issuance				
Senior notes issued in the U.S. market	**$ 22,000**	$ 21,250	**$ 9,562**	$ 62
Senior notes issued in non-U.S. markets	**1,502**	2,220	**–**	–
Total senior notes	**23,502**	23,470	**9,562**	62
Structured notes[a]	**2,444**	2,516	**25,410**	26,524
Total long-term unsecured funding – issuance	**$ 25,946**	$ 25,986	**$ 34,972**	$ 26,586
Maturities/redemptions				
Senior notes	**$ 19,141**	$ 20,971	**$ 4,466**	$ 1,366
Subordinated debt	**136**	3,401	**–**	3,500
Structured notes	**2,678**	5,440	**15,049**	17,141
Total long-term unsecured funding – maturities/redemptions	**$ 21,955**	$ 29,812	**$ 19,515**	$ 22,007

(a) Includes certain TLAC-eligible long-term unsecured debt issued by the Parent Company.
(b) The prior period amounts have been revised to conform with the current period presentation.

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 redemptions for the years ended December 31, 2018 and 2017.

Long-term secured funding

Year ended December 31,	Issuance		Maturities/Redemptions	
(in millions)	2018	2017	2018	2017
Credit card securitization	**$ 1,396**	$ 1,545	**$ 9,250**	$ 11,470
Other securitizations[a]	**–**	–	**–**	55
FHLB advances	**9,000**	–	**25,159**	18,900
Other long-term secured funding[b]	**377**	2,354	**289**	731
Total long-term secured funding	**$ 10,773**	$ 3,899	**$ 34,698**	$ 31,156

(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, refer to 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, refer to SPEs on page 55, and liquidity risk and credit-related contingent features in Note 5.

The credit ratings of the Parent Company and the Firm's principal bank and non-bank subsidiaries as of December 31, 2018, were as follows.

	JPMorgan Chase & Co.			JPMorgan Chase Bank, N.A. Chase Bank USA, N.A.			J.P. Morgan Securities LLC J.P. Morgan Securities plc		
December 31, 2018	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	A2	P-1	Stable	Aa2	P-1	Stable	Aa3	P-1	Stable
Standard & Poor's	A-	A-2	Stable	A+	A-1	Stable	A+	A-1	Stable
Fitch Ratings	AA-	F1+	Stable	AA	F1+	Stable	AA	F1+	Stable

On October 25, 2018, Moody's upgraded the Parent Company's long-term issuer rating to A2 (previously A3) and short-term issuer rating to P-1 (previously P-2). The long-term issuer ratings were also upgraded for JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. to Aa2 (previously Aa3), and for J.P. Morgan Securities LLC and J.P. Morgan Securities plc to Aa3 (previously A1).

On June 21, 2018, Fitch upgraded the Parent Company's long-term issuer rating to AA- (previously A+) and short-term issuer rating to F1+ (previously F1). The long-term issuer ratings were also upgraded to AA for JPMorgan Chase Bank, N.A, Chase Bank USA, N.A., J.P. Morgan Securities LLC and J.P. Morgan Securities plc (all previously AA-).

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. 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 and liquidity ratios, strong credit quality and risk management controls, and diverse funding sources. 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 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, customers, investors, regulators, employees, communities or the broader public.

Organization and management

Reputation Risk Management is an independent risk management function that establishes the governance framework for managing reputation risk across the Firm. The Firmwide Risk Executive for Reputation Risk reports to the Firm's CRO.

The Firm's reputation risk management function includes the following activities:

- Establishing a firmwide Reputation Risk Governance policy and standards
- Managing the governance infrastructure and processes that support consistent identification, escalation, management and monitoring of reputation risk issues firmwide
- Providing oversight to LOB Reputation Risk Offices ("RRO") on certain situations that have the potential to damage the reputation of the LOB or the Firm

The types of events that give rise to reputation risk are broad and could be introduced in various ways, including by the Firm's employees and the clients, customers and counterparties with which the Firm does business. These events could result in financial losses, litigation and regulatory fines, as well as other damages to the Firm. As reputation risk is inherently difficult to identify, manage, and quantify, an independent reputation risk management governance function is critical.

Governance and oversight

The Firm's Reputation Risk Governance policy establishes the principles for managing reputation risk for the Firm, and is approved annually by the Directors' Risk Policy Committee. It is the responsibility of employees in each LOB and Corporate to consider the reputation of the Firm when deciding whether to offer a new product, engage in a transaction or client relationship, enter a new jurisdiction, initiate a business process or other matters. Increasingly, sustainability, social responsibility and environmental impacts are important considerations in assessing the Firm's reputation risk, and are considered as part of reputation risk governance.

The Firm's reputation risk governance framework applies to each LOB and Corporate. Each LOB RRO advises their business on potential reputation risk issues and provides oversight of policy and standards created to guide the identification and assessment of reputation risk. LOB Reputation Risk Committees and forums review and assess reputation risk for their respective businesses. Each function also applies appropriate diligence to reputation risk arising from their day-to-day activities. Reputation risk issues deemed significant are escalated to the appropriate LOB Risk Committee and/or to the Firmwide Risk Committee.

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, including consumer credit risk, wholesale credit risk, and investment portfolio risk.

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 and geographic concentration limits, as appropriate, 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, refer to Critical Accounting Estimates used by the Firm on pages 141-143.

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 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 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, refer to 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 risk is the risk associated with the default or change in credit profile of a client, counterparty or customer.

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 loans which the Firm accounts for at fair value and classifies as trading assets. For further information regarding these loans, refer to Notes 2 and 3. For additional information on the Firm's loans, lending-related commitments and derivative receivables, including the Firm's accounting policies, refer to Notes 12, 27, and 5, respectively.

For further information regarding the credit risk inherent in the Firm's cash placed with banks, refer to Wholesale credit exposure – industry exposures on pages 113–115 ; for information regarding the credit risk inherent in the Firm's investment securities portfolio, refer to Note 10; and for information regarding credit risk inherent in the securities financing portfolio, refer to Note 11.

For a further discussion of the consumer credit environment and consumer loans, refer to Consumer Credit Portfolio on pages 106–111 and Note 12. For a further discussion of the wholesale credit environment and wholesale loans, refer to Wholesale Credit Portfolio on pages 112–119 and Note 12.

Total credit portfolio

December 31, (in millions)	Credit exposure		Nonperforming[d][e]	
	2018	2017	**2018**	2017
Loans retained	**$ 969,415**	$ 924,838	**$ 4,611**	$ 5,943
Loans held-for-sale	**11,988**	3,351	**–**	–
Loans at fair value	**3,151**	2,508	**220**	–
Total loans – reported	**984,554**	930,697	**4,831**	5,943
Derivative receivables	**54,213**	56,523	**60**	130
Receivables from customers and other[a]	**30,217**	26,272	**–**	–
Total credit-related assets	**1,068,984**	1,013,492	**4,891**	6,073
Assets acquired in loan satisfactions				
Real estate owned	**NA**	NA	**269**	311
Other	**NA**	NA	**30**	42
Total assets acquired in loan satisfactions	**NA**	NA	**299**	353
Lending-related commitments	**1,039,258**	991,482	**469**	731
Total credit portfolio	**$ 2,108,242**	$ 2,004,974	**$ 5,659**	$ 7,157
Credit derivatives used in credit portfolio management activities[b]	**$ (12,682)**	$ (17,609)	**$ –**	$ –
Liquid securities and other cash collateral held against derivatives[c]	**(15,322)**	(16,108)	**NA**	NA

Year ended December 31, (in millions, except ratios)	**2018**	2017
Net charge-offs[f]	**$ 4,856**	$ 5,387
Average retained loans		
Loans	**936,829**	898,979
Loans – reported, excluding residential real estate PCI loans	**909,386**	865,887
Net charge-off rates[f]		
Loans	**0.52%**	0.60%
Loans – excluding PCI	**0.53**	0.62

(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, refer to Credit derivatives on page 119 and Note 5.
(c) Includes collateral related to derivative instruments where an appropriate legal opinion has not been either sought or obtained.
(d) Excludes PCI loans. The Firm is recognizing interest income on each pool of PCI loans as each of the pools is performing.
(e) At December 31, 2018 and 2017, nonperforming assets excluded mortgage loans 90 or more days past due and insured by U.S. government agencies of $2.6 billion and $4.3 billion, respectively, and real estate owned ("REO") insured by U.S. government agencies of $75 million and $95 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").
(f) For the year ended December 31, 2017, excluding net charge-offs of $467 million related to the student loan portfolio transfer, 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 low unemployment and increasing home prices. The total amount of residential real estate loans delinquent 30+ days, excluding government guaranteed and purchased credit-impaired loans, decreased from December 31, 2017 due to improved credit performance and the impact of loans that were delinquent in 2017 due to hurricanes. 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, refer to Note 12. For further information on lending-related commitments, refer to 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, refer to Note 12.

Consumer credit portfolio

As of or for the year ended December 31, (in millions, except ratios)	Credit exposure		Nonaccrual loans[i][j]		Net charge-offs/ (recoveries)[d][k]		Net charge-off/ (recovery) rate[d][k][l]	
	2018	2017	**2018**	2017	**2018**	2017	**2018**	2017
Consumer, excluding credit card								
Loans, excluding PCI loans and loans held-for-sale								
Residential mortgage	**$ 231,078**	$ 216,496	**$ 1,765**	$ 2,175	**$ (291)**	$ (10)	**(0.13)%**	–%
Home equity	**28,340**	33,450	**1,323**	1,610	**(5)**	69	**(0.02)**	0.19
Auto[a][b]	**63,573**	66,242	**128**	141	**243**	331	**0.38**	0.51
Consumer & Business Banking[b][c]	**26,612**	25,789	**245**	283	**236**	257	**0.90**	1.03
Student[d]	**–**	–	**–**	–	**–**	498	**–**	NM
Total loans, excluding PCI loans and loans held-for-sale	**349,603**	341,977	**3,461**	4,209	**183**	1,145	**0.05**	0.34
Loans – PCI								
Home equity	**8,963**	10,799	**NA**	NA	**NA**	NA	**NA**	NA
Prime mortgage	**4,690**	6,479	**NA**	NA	**NA**	NA	**NA**	NA
Subprime mortgage	**1,945**	2,609	**NA**	NA	**NA**	NA	**NA**	NA
Option ARMs[e]	**8,436**	10,689	**NA**	NA	**NA**	NA	**NA**	NA
Total loans – PCI	**24,034**	30,576	**NA**	NA	**NA**	NA	**NA**	NA
Total loans – retained	**373,637**	372,553	**3,461**	4,209	**183**	1,145	**0.05**	0.31
Loans held-for-sale	**95**	128	**–**	–	**–**	–	**–**	–
Total consumer, excluding credit card loans	**373,732**	372,681	**3,461**	4,209	**183**	1,145	**0.05**	0.31
Lending-related commitments[f]	**46,066**	48,553						
Receivables from customers[g]	**154**	133						
Total consumer exposure, excluding credit card	**419,952**	421,367						
Credit Card								
Loans retained[h]	**156,616**	149,387	**–**	–	**4,518**	4,123	**3.10**	2.95
Loans held-for-sale	**16**	124	**–**	–	**–**	–	**–**	–
Total credit card loans	**156,632**	149,511	**–**	–	**4,518**	4,123	**3.10**	2.95
Lending-related commitments[f]	**605,379**	572,831						
Total credit card exposure	**762,011**	722,342						
Total consumer credit portfolio	**$ 1,181,963**	$ 1,143,709	**$ 3,461**	$ 4,209	**$ 4,701**	$ 5,268	**0.90 %**	1.04%
Memo: Total consumer credit portfolio, excluding PCI	**$ 1,157,929**	$ 1,113,133	**$ 3,461**	$ 4,209	**$ 4,701**	$ 5,268	**0.95 %**	1.11%

(a) At December 31, 2018 and 2017, excluded operating lease assets of $20.5 billion and $17.1 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.
(b) 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.
(c) Predominantly includes Business Banking loans.
(d) 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%.
(e) At December 31, 2018 and 2017, approximately 69% and 68%, respectively, of the PCI option adjustable rate mortgages ("ARMs") portfolio has been modified into fixed-rate, fully amortizing loans.
(f) 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 commitments, and if certain conditions are met, home equity commitments, 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, refer to Note 27.
(g) 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.
(h) Includes billed interest and fees net of an allowance for uncollectible interest and fees.
(i) At December 31, 2018 and 2017, nonaccrual loans excluded mortgage loans 90 or more days past due and insured by U.S. government agencies of $2.6 billion and $4.3 billion, 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.
(j) Excludes PCI loans. The Firm is recognizing interest income on each pool of PCI loans as each of the pools is performing.
(k) Net charge-offs/(recoveries) and net charge-off/(recovery) rates excluded write-offs in the PCI portfolio of $187 million and $86 million for the years ended December 31, 2018 and 2017, respectively. These write-offs decreased the allowance for loan losses for PCI loans. Refer to Allowance for Credit Losses on pages 120–122 for further information.
(l) Average consumer loans held-for-sale were $387 million and $1.5 billion for the years ended December 31, 2018 and 2017, respectively. These amounts were excluded when calculating net charge-off/(recovery) rates.

Consumer, excluding credit card

Portfolio analysis

Consumer loan balances increased from December 31, 2017 predominantly due to originations of high-quality prime mortgage loans that have been retained on the balance sheet, largely offset by 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, refer to Note 12.

Residential mortgage: The residential mortgage portfolio, including loans held-for-sale, predominantly consists of high-quality prime mortgage loans with approximately 1% consisting of subprime mortgage loans, which continue to run off. The residential mortgage portfolio increased from December 31, 2017 driven by the retention of originated high-quality prime mortgage loans, which exceeded paydowns and mortgage loan sales. Residential mortgage 30+ day delinquencies decreased from December 31, 2017. Nonaccrual loans decreased from December 31, 2017 due to lower delinquencies. Net recoveries for the year ended December 31, 2018 improved when compared with the prior year, reflecting loan sales and continued improvement in home prices and delinquencies.

At December 31, 2018 and 2017, the Firm's residential mortgage portfolio included $21.6 billion and $20.2 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. Performance of this portfolio for the year ended December 31, 2018 was in line with the performance of the broader residential mortgage portfolio for the same period. The Firm continues to monitor the risks associated with these loans.

The following table provides a summary of the Firm's residential mortgage portfolio insured and/or guaranteed by U.S. government agencies, including loans held-for-sale. 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.

(in millions)	**December 31, 2018**	December 31, 2017
Current	**$ 2,884**	$ 2,401
30-89 days past due	**1,528**	1,958
90 or more days past due	**2,600**	4,264
Total government guaranteed loans	**$ 7,012**	$ 8,623

Home equity: The home equity portfolio declined from December 31, 2017 primarily reflecting loan paydowns. The amount of 30+ day delinquencies decreased from December 31, 2017. Nonaccrual loans decreased from December 31, 2017 due to lower delinquencies. There was a net recovery for the year ended December 31, 2018 compared to a net charge-off for the prior year, as a result of continued improvement in home prices and lower delinquencies.

At December 31, 2018, approximately 90% of the Firm's home equity portfolio consists of home equity lines of credit ("HELOCs") and the remainder consisted 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 $26 billion at December 31, 2018. This amount included $12 billion of HELOCs that have recast from interest-only to fully amortizing payments or have been modified and $4 billion of 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 either 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, 2018, the Firm estimated that the carrying value of its home equity portfolio contained approximately $550 million of current junior lien loans that were considered high-risk seconds, compared with approximately $725 million at December 31, 2017.

Auto: The auto loan portfolio, which predominantly consists of prime-quality loans, declined when compared with December 31, 2017, as paydowns and the charge-off or liquidation of delinquent loans were predominantly offset by new originations. Nonaccrual loans decreased from December 31, 2017. Net charge-offs for the year ended December 31, 2018 declined when compared with the prior year primarily as a result of an incremental adjustment recorded in 2017 in accordance with regulatory guidance regarding the timing of loss recognition for certain loans in bankruptcy and loans where assets were acquired in loan satisfactions.

Consumer & Business banking: Consumer & Business Banking loans increased when compared with December 31, 2017 due to loan originations, predominantly offset by paydowns and charge-offs of delinquent loans. Nonaccrual loans and net charge-offs decreased when compared with the prior year.

Purchased credit-impaired loans: PCI loans represent certain loans that were acquired and deemed to be credit-impaired on the acquisition date. PCI loans decreased from December 31, 2017 due to portfolio run off and loan sales. As of December 31, 2018, approximately 10% of the option ARM PCI loans were delinquent and approximately 69% of the portfolio had been modified into fixed-rate, fully amortizing loans. The borrowers for substantially all of the remaining option ARM 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

	Lifetime loss estimates[(a)]		Life-to-date liquidation losses[(b)]	
December 31, (in billions)	**2018**	2017	**2018**	2017
Home equity	**$ 14.1**	$ 14.2	**$ 13.0**	$ 12.9
Prime mortgage	**4.1**	4.0	**3.9**	3.8
Subprime mortgage	**3.3**	3.3	**3.2**	3.1
Option ARMs	**10.3**	10.0	**9.9**	9.7
Total	**$ 31.8**	$ 31.5	**$ 30.0**	$ 29.5

(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 $512 million and $842 million at December 31, 2018 and 2017, 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, refer to Note 12.

Geographic composition of residential real estate loans

At December 31, 2018, $160.3 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 $152.8 billion, or 63%, at December 31, 2017. For additional information on the geographic composition of the Firm's residential real estate loans, refer to 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, refer to 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 22% for residential mortgages and 20% for home equity. 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 19% for home equity, 18% for prime mortgages, 16% for option ARMs and 32% for subprime mortgages. The cumulative redefault rates reflect the performance of modifications completed from October 1, 2009 through December 31, 2018.

Certain modified loans have interest rate reset provisions ("step-rate modifications") where the 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, 2018, 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 $2 billion and $3 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, 2018 and 2017, 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, 2018 and 2017, refer to Note 12.

Modified residential real estate loans

December 31, (in millions)	2018 Retained loans	2018 Nonaccrual retained loans[d]	2017 Retained loans	2017 Nonaccrual retained loans[d]
Modified residential real estate loans, excluding PCI loans[a][b]				
Residential mortgage	**$ 4,565**	**$ 1,459**	$ 5,620	$ 1,743
Home equity	**2,012**	**955**	2,118	1,032
Total modified residential real estate loans, excluding PCI loans	**$ 6,577**	**$ 2,414**	$ 7,738	$ 2,775
Modified PCI loans[c]				
Home equity	**$ 2,086**	**NA**	$ 2,277	NA
Prime mortgage	**3,179**	**NA**	4,490	NA
Subprime mortgage	**2,041**	**NA**	2,678	NA
Option ARMs	**6,410**	**NA**	8,276	NA
Total modified PCI loans	**$13,716**	**NA**	$17,721	NA

(a) Amounts represent the carrying value of modified residential real estate loans.
(b) At December 31, 2018 and 2017, $4.1 billion and $3.8 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, refer to Note 14.
(c) Amounts represent the unpaid principal balance of modified PCI loans.
(d) As of December 31, 2018 and 2017, nonaccrual loans included $2.0 billion and $2.2 billion, respectively, of troubled debt restructurings ("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 Note 12.

Nonperforming assets

The following table presents information as of December 31, 2018 and 2017, about consumer, excluding credit card, nonperforming assets.

Nonperforming assets[a]

December 31, (in millions)	2018	2017
Nonaccrual loans[b]		
Residential real estate	**$ 3,088**	$ 3,785
Other consumer	**373**	424
Total nonaccrual loans	**3,461**	4,209
Assets acquired in loan satisfactions		
Real estate owned	**210**	225
Other	**30**	40
Total assets acquired in loan satisfactions	**240**	265
Total nonperforming assets	**$ 3,701**	$ 4,474

(a) At December 31, 2018 and 2017, nonperforming assets excluded mortgage loans 90 or more days past due and insured by U.S. government agencies of $2.6 billion and $4.3 billion, respectively, and real estate owned ("REO") insured by U.S. government agencies of $75 million and $95 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.

Nonaccrual loans in the residential real estate portfolio at December 31, 2018 decreased to $3.1 billion from $3.8 billion at December 31, 2017, of which 24% and 26% 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 32% and 40% to the estimated net realizable value of the collateral at December 31, 2018 and 2017, respectively.

Nonaccrual loans: The following table presents changes in the consumer, excluding credit card, nonaccrual loans for the years ended December 31, 2018 and 2017.

Nonaccrual loan activity

Year ended December 31, (in millions)	2018	2017
Beginning balance	**$ 4,209**	$ 4,820
Additions	**2,799**	3,525
Reductions:		
Principal payments and other[a]	**1,407**	1,577
Charge-offs	**468**	699
Returned to performing status	**1,399**	1,509
Foreclosures and other liquidations	**273**	351
Total reductions	**3,547**	4,136
Net changes	**(748)**	(611)
Ending balance	**$ 3,461**	$ 4,209

(a) Other reductions includes loan sales.

Active and suspended foreclosure: For information on loans that were in the process of active or suspended foreclosure, refer to Note 12.

Credit card

Total credit card loans increased from December 31, 2017 due to new account growth and higher sales volume. The December 31, 2018 30+ day delinquency rate increased to 1.83% from 1.80% at December 31, 2017, but the December 31, 2018 90+ day delinquency rate of 0.92% was flat compared to December 31, 2017. Net charge-offs increased for the year ended December 31, 2018 when compared with the prior year, primarily due to the seasoning of more recent vintages with higher loss rates, as anticipated given underwriting standards at the time of origination.

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 reduces interest income, for the estimated uncollectible portion of accrued and billed interest and fee income.

Geographic and FICO composition of credit card loans

At December 31, 2018, $71.2 billion, or 45% of the total retained credit card loan portfolio, were concentrated in California, Texas, New York, Florida and Illinois, compared with $67.2 billion, or 45%, at December 31, 2017. For additional information on the geographic and FICO composition of the Firm's credit card loans, refer to Note 12.

Modifications of credit card loans

At December 31, 2018 and 2017, the Firm had $1.3 billion and $1.2 billion, respectively, of credit card loans outstanding that have been modified in TDRs. For additional information about loan modification programs to borrowers, refer to Note 12.

WHOLESALE CREDIT PORTFOLIO

In its wholesale businesses, the Firm is exposed to credit risk primarily through its underwriting, lending, market-making, and hedging activities with and for clients and counterparties, as well as through various operating services (such as cash management and clearing activities), securities financing activities 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 that it originates into the market as part of its syndicated loan business and to manage portfolio concentrations and credit risk.

The credit quality of the wholesale portfolio was stable for the year ended December 31, 2018, characterized by low levels of criticized exposure, nonaccrual loans and charge-offs. Refer to the industry discussion on pages 113–115 for further information. Retained loans increased across all wholesale lines of business, primarily driven by commercial and industrial and financial institution clients in CIB, and Wealth Management clients globally in AWM. 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]	
	2018	2017	**2018**	2017
Loans retained	**$439,162**	$402,898	**$ 1,150**	$ 1,734
Loans held-for-sale	**11,877**	3,099	**—**	—
Loans at fair value	**3,151**	2,508	**220**	—
Loans – reported	**454,190**	408,505	**1,370**	1,734
Derivative receivables	**54,213**	56,523	**60**	130
Receivables from customers and other[a]	**30,063**	26,139	**—**	—
Total wholesale credit-related assets	**538,466**	491,167	**1,430**	1,864
Lending-related commitments	**387,813**	370,098	**469**	731
Total wholesale credit exposure	**$926,279**	$861,265	**$ 1,899**	$ 2,595
Credit derivatives used in credit portfolio management activities[b]	**$ (12,682)**	$ (17,609)	**$ —**	$ —
Liquid securities and other cash collateral held against derivatives	**(15,322)**	(16,108)	**NA**	NA

(a) Receivables from customers and other include $30.1 billion and $26.0 billion of held-for-investment margin loans at December 31, 2018 and 2017, respectively, to prime brokerage customers in CIB and 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, refer to Credit derivatives on page 119, 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, 2018 and 2017. 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, refer to Note 12.

Wholesale credit exposure – maturity and ratings profile

	Maturity profile[d]				Ratings profile			
					Investment-grade	Noninvestment-grade		
December 31, 2018 (in millions, except ratios)	Due in 1 year or less	Due after 1 year through 5 years	Due after 5 years	**Total**	AAA/Aaa to BBB-/Baa3	BB+/Ba1 & below	**Total**	Total % of IG
Loans retained	**$ 138,458**	**$ 196,974**	**$ 103,730**	**$ 439,162**	**$ 339,729**	**$ 99,433**	**$ 439,162**	**77%**
Derivative receivables				**54,213**			**54,213**	
Less: Liquid securities and other cash collateral held against derivatives				**(15,322)**			**(15,322)**	
Total derivative receivables, net of all collateral	**11,038**	**9,169**	**18,684**	**38,891**	**31,794**	**7,097**	**38,891**	**82**
Lending-related commitments	**79,400**	**294,855**	**13,558**	**387,813**	**288,724**	**99,089**	**387,813**	**74**
Subtotal	**228,896**	**500,998**	**135,972**	**865,866**	**660,247**	**205,619**	**865,866**	**76**
Loans held-for-sale and loans at fair value[a]				**15,028**			**15,028**	
Receivables from customers and other				**30,063**			**30,063**	
Total exposure – net of liquid securities and other cash collateral held against derivatives				**$ 910,957**			**$ 910,957**	
Credit derivatives used in credit portfolio management activities[b][c]	**$ (447)**	**$ (9,318)**	**$ (2,917)**	**$ (12,682)**	**$ (11,213)**	**$ (1,469)**	**$ (12,682)**	**88%**

	Maturity profile[d]				Ratings profile			
					Investment-grade	Noninvestment-grade		
December 31, 2017 (in millions, except ratios)	Due in 1 year or less	Due after 1 year through 5 years	Due after 5 years	Total	AAA/Aaa to BBB-/Baa3	BB+/Ba1 & below	Total	Total % of IG
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%

(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, 2018, 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 $12.1 billion at December 31, 2018, compared with $15.6 billion at December 31, 2017. The decrease was driven by Oil & Gas, including credit quality improvements in the portfolio, and a loan sale in the first quarter of 2018.

Below are summaries of the Firm's exposures as of December 31, 2018 and 2017. The industry of risk category is generally based on the client or counterparty's primary business activity. For additional information on industry concentrations, refer to Note 4.

As a result of continued growth and the relative size of the portfolio, exposure to "Individuals," which was previously disclosed in "All Other," is now separately disclosed in the table below as "Individuals and Individual Entities." This category predominantly consists of Wealth Management clients within AWM and includes exposure to personal investment companies and personal and testamentary trusts. Predominantly all of this exposure is secured, largely by cash and marketable securities. In the table below, prior period amounts have been revised to conform with the current period presentation.

Wholesale credit exposure – industries[a]

						Selected metrics			
			Noninvestment-grade						
As of or for the year ended December 31, 2018 (in millions)	Credit exposure[f]	Investment-grade	Noncriticized	Criticized performing	Criticized nonperforming	30 days or more past due and accruing loans	Net charge-offs/ (recoveries)	Credit derivative hedges[g]	Liquid securities and other cash collateral held against derivative receivables
Real Estate	$ 143,316	$ 117,988	$ 24,174	$ 1,019	$ 135	$ 70	$ (20)	$ (2)	$ (1)
Individuals and Individual Entities[b]	97,077	86,581	10,164	174	158	703	12	–	(915)
Consumer & Retail	94,815	60,678	31,901	2,033	203	43	55	(248)	(14)
Technology, Media & Telecommunications	72,646	46,334	24,081	2,170	61	8	12	(1,011)	(12)
Industrials	58,528	38,487	18,594	1,311	136	171	20	(207)	(29)
Banks & Finance Cos	49,920	34,120	15,496	299	5	11	–	(575)	(2,290)
Healthcare	48,142	36,687	10,625	761	69	23	(5)	(150)	(133)
Asset Managers	42,807	36,722	6,067	4	14	10	–	–	(5,829)
Oil & Gas	42,600	23,356	17,451	1,158	635	6	36	(248)	–
Utilities	28,172	23,558	4,326	138	150	–	38	(142)	(60)
State & Municipal Govt[c]	27,351	26,746	603	2	–	18	(1)	–	(42)
Central Govt	18,456	18,251	124	81	–	4	–	(7,994)	(2,130)
Automotive	17,339	9,637	7,310	392	–	1	–	(125)	–
Chemicals & Plastics	16,035	11,490	4,427	118	–	4	–	–	–
Transportation	15,660	10,508	4,699	393	60	21	6	(31)	(112)
Metals & Mining	15,359	8,188	6,767	385	19	1	–	(174)	(22)
Insurance	12,639	9,777	2,830	–	32	–	–	(36)	(2,080)
Financial Markets Infrastructure	7,484	6,746	738	–	–	–	–	–	(26)
Securities Firms	4,558	3,099	1,459	–	–	–	–	(158)	(823)
All other[d]	68,284	64,664	3,606	12	2	2	2	(1,581)	(804)
Subtotal	$ 881,188	$ 673,617	$ 195,442	$ 10,450	$ 1,679	$ 1,096	$ 155	$ (12,682)	$ (15,322)
Loans held-for-sale and loans at fair value	15,028								
Receivables from customers and other	30,063								
Total[e]	$ 926,279								

As of or for the year ended December 31, 2017 (in millions)	Credit exposure[f]	Investment-grade	Noninvestment-grade: Noncriticized	Noninvestment-grade: Criticized performing	Noninvestment-grade: Criticized nonperforming	Selected metrics: 30 days or more past due and accruing loans	Selected metrics: Net charge-offs/ (recoveries)	Selected metrics: Credit derivative hedges[g]	Selected metrics: Liquid securities and other cash collateral held against derivative receivables
Real Estate	$ 139,409	$ 115,401	$ 23,012	$ 859	$ 137	$ 254	$ (4)	$ –	$ (2)
Individuals and Individual Entities[b]	87,371	77,029	10,024	80	238	899	10	–	(762)
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)
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)
Healthcare	55,997	42,643	12,731	585	38	82	(1)	–	(207)
Asset Managers	32,531	28,029	4,484	4	14	27	–	–	(5,290)
Oil & Gas	41,317	21,430	14,854	4,046	987	22	71	(747)	(1)
Utilities	29,317	24,486	4,383	227	221	–	11	(160)	(56)
State & Municipal Govt[c]	28,633	27,977	656	–	–	12	5	(130)	(524)
Central Govt	19,182	18,741	376	65	–	4	–	(10,095)	(2,520)
Automotive	14,820	9,321	5,278	221	–	10	1	(284)	–
Chemicals & Plastics	15,945	11,107	4,764	74	–	4	–	–	–
Transportation	15,797	9,870	5,302	527	98	9	14	(32)	(131)
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[d]	60,529	57,081	3,259	180	9	2	(2)	(2,817)	(838)
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[e]	$ 861,265								

(a) The industry rankings presented in the table as of December 31, 2017, are based on the industry rankings of the corresponding exposures at December 31, 2018, not actual rankings of such exposures at December 31, 2017.

(b) Individuals and Individual Entities predominantly consists of Wealth Management clients within AWM and includes exposure to personal investment companies and personal and testamentary trusts.

(c) In addition to the credit risk exposure to states and municipal governments (both U.S. and non-U.S.) at December 31, 2018 and 2017, noted above, the Firm held: $7.8 billion and $9.8 billion, respectively, of trading securities; $37.7 billion and $32.3 billion, respectively, of AFS securities; and $4.8 billion and $14.4 billion, respectively, of held-to-maturity ("HTM") securities, issued by U.S. state and municipal governments. For further information, refer to Note 2 and Note 10.

(d) All other includes: SPEs and Private education and civic organizations, representing approximately 92% and 8%, respectively, at December 31, 2018 and 90% and 10%, respectively, at December 31, 2017.

(e) Excludes cash placed with banks of $268.1 billion and $421.0 billion, at December 31, 2018 and 2017, 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 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.

Real Estate

Presented below is additional information on the Real Estate industry to which the Firm has significant exposure.

Real Estate exposure increased $3.9 billion to $143.3 billion during the year ended December 31, 2018, while the investment-grade percentage of the portfolio remained relatively flat at 82%. For further information on Real Estate loans, refer to Note 12.

	December 31, 2018				
(in millions, except ratios)	**Loans and Lending-related Commitments**	**Derivative Receivables**	**Credit exposure**	**% Investment-grade**	**% Drawn[c]**
Multifamily[a]	**$ 85,683**	**$ 33**	**$ 85,716**	**89%**	**92%**
Other	**57,469**	**131**	**57,600**	**72**	**63**
Total Real Estate Exposure[b]	**143,152**	**164**	**143,316**	**82**	**81**

	December 31, 2017				
(in millions, except ratios)	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

(a) Multifamily exposure is largely in California.
(b) Real Estate exposure is predominantly secured; unsecured exposure is predominantly investment-grade.
(c) 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 a further discussion on loans, including information on credit quality indicators and sales of loans, refer to Note 12.

The following table presents the change in the nonaccrual loan portfolio for the years ended December 31, 2018 and 2017.

Wholesale nonaccrual loan activity

Year ended December 31, (in millions)	**2018**	2017
Beginning balance	**$ 1,734**	$ 2,063
Additions	**1,188**	1,482
Reductions:		
Paydowns and other	**692**	1,137
Gross charge-offs	**299**	200
Returned to performing status	**234**	189
Sales	**327**	285
Total reductions	**1,552**	1,811
Net changes	**(364)**	(329)
Ending balance	**$ 1,370**	$ 1,734

The following table presents net charge-offs/recoveries, which are defined as gross charge-offs less recoveries, for the years ended December 31, 2018 and 2017. 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)	**2018**	2017
Loans – reported		
Average loans retained	**$ 416,828**	$ 392,263
Gross charge-offs	**313**	212
Gross recoveries	**(158)**	(93)
Net charge-offs	**155**	119
Net charge-off rate	**0.04%**	0.03%

Lending-related commitments

The Firm uses lending-related financial instruments, such as commitments (including revolving credit facilities) and guarantees, to address the financing needs of its clients. The contractual amounts of these financial instruments represent the maximum possible credit risk should the clients draw down on these commitments or the Firm fulfill its obligations under these guarantees, and the clients 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, refer to Note 27.

Clearing services

The Firm provides clearing services for clients entering into certain securities and derivative contracts. 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 CCPs. 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, refer to Note 27.

Derivative contracts

Derivatives enable clients and counterparties to manage risks including credit risk and risks arising from fluctuations in interest rates, foreign exchange, equities, and commodities. The Firm makes markets in derivatives in order to meet these needs 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. 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 contracts through the use of legally enforceable master netting arrangements and collateral agreements. For a further discussion of derivative contracts, counterparties and settlement types, refer to Note 5.

The following table summarizes the net derivative receivables for the periods presented.

Derivative receivables

December 31, (in millions)	2018	2017
Total, net of cash collateral	**$ 54,213**	$ 56,523
Liquid securities and other cash collateral held against derivative receivables[(a)]	**(15,322)**	(16,108)
Total, net of all collateral	**$ 38,891**	$ 40,415

(a) Includes collateral related to derivative instruments where appropriate legal opinions have not been either sought or obtained with respect to master netting agreements.

The fair value of derivative receivables reported on the Consolidated balance sheets were $54.2 billion and $56.5 billion at December 31, 2018 and 2017, respectively. Derivative receivables 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 securities) and other cash collateral held by the Firm aggregating $15.3 billion and $16.1 billion at December 31, 2018 and 2017, 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 contracts 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, refer to 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 contracts, 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 as an input for aggregating derivative credit risk exposures with loans and other credit risk.

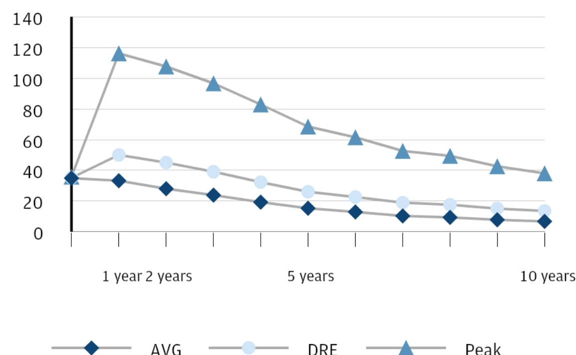
Finally, AVG is a measure of the expected fair value of the Firm's derivative receivables at future time periods, including the benefit of collateral. AVG over the total life of the derivative contract is used as the primary metric for pricing purposes and is used to calculate credit risk capital and the CVA, as further described below.

The 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 contracts, as well as interest rate, foreign exchange, equity and commodity derivative contracts.

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, 2018
(in billions)



The following table summarizes the ratings profile 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	2018		2017	
December 31, (in millions, except ratios)	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	**$ 11,831**	**31%**	$ 11,529	29%
A+/A1 to A-/A3	**7,428**	**19**	6,919	17
BBB+/Baa1 to BBB-/Baa3	**12,536**	**32**	13,925	34
BB+/Ba1 to B-/B3	**6,373**	**16**	7,397	18
CCC+/Caa1 and below	**723**	**2**	645	2
Total	**$ 38,891**	**100%**	$ 40,415	100%

As previously noted, the Firm uses collateral agreements to mitigate counterparty credit risk. The percentage of the Firm's over-the-counter derivative 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% at both December 31, 2018, and December 31, 2017.

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, refer to 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, refer to 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, refer to Credit derivatives in Note 5.

Credit derivatives used in credit portfolio management activities

	Notional amount of protection purchased and sold [(a)]	
December 31, (in millions)	**2018**	2017
Credit derivatives used to manage:		
Loans and lending-related commitments	**$ 1,272**	$ 1,867
Derivative receivables	**11,410**	15,742
Credit derivatives used in credit portfolio management activities	**$ 12,682**	$ 17,609

(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

The Firm'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 further information on the components of the allowance for credit losses and related management judgments, refer to Critical Accounting Estimates Used by the Firm on pages 141-143 and Note 13.

At least quarterly, the allowance for credit losses is reviewed by the CRO, the CFO and the Controller of the Firm. As of December 31, 2018, 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 compared with December 31, 2017 driven by:

- a reduction in the consumer allowance due to a $250 million reduction in the CCB allowance for loan losses in the residential real estate PCI portfolio, reflecting continued improvement in home prices and lower delinquencies, as well as a $187 million reduction in the allowance for write-offs of PCI loans partially due to loan sales. These reductions were largely offset by a $300 million addition to the allowance in the credit card portfolio, due to loan growth and higher loss rates, as anticipated.

For additional information on the consumer and wholesale credit portfolios, refer to Consumer Credit Portfolio on pages 106–111, Wholesale Credit Portfolio on pages 112–119 and Note 12.

Summary of changes in the allowance for credit losses

Year ended December 31, (in millions, except ratios)	2018 Consumer, excluding credit card	2018 Credit card	2018 Wholesale	2018 Total	2017 Consumer, excluding credit card	2017 Credit card	2017 Wholesale	2017 Total
Allowance for loan losses								
Beginning balance at January 1,	$ 4,579	$ 4,884	$ 4,141	$ 13,604	$ 5,198	$ 4,034	$ 4,544	$ 13,776
Gross charge-offs	1,025	5,011	313	6,349	1,779	4,521	212	6,512
Gross recoveries	(842)	(493)	(158)	(1,493)	(634)	(398)	(93)	(1,125)
Net charge-offs[a]	183	4,518	155	4,856	1,145	4,123	119	5,387
Write-offs of PCI loans[b]	187	–	–	187	86	–	–	86
Provision for loan losses	(63)	4,818	130	4,885	613	4,973	(286)	5,300
Other	–	–	(1)	(1)	(1)	–	2	1
Ending balance at December 31,	$ 4,146	$ 5,184	$ 4,115	$ 13,445	$ 4,579	$ 4,884	$ 4,141	$ 13,604
Impairment methodology								
Asset-specific[c]	$ 196	$ 440	$ 297	$ 933	$ 246	$ 383	$ 461	$ 1,090
Formula-based	2,162	4,744	3,818	10,724	2,108	4,501	3,680	10,289
PCI	1,788	–	–	1,788	2,225	–	–	2,225
Total allowance for loan losses	$ 4,146	$ 5,184	$ 4,115	$ 13,445	$ 4,579	$ 4,884	$ 4,141	$ 13,604
Allowance for lending-related commitments								
Beginning balance at January 1,	$ 33	$ –	$ 1,035	$ 1,068	$ 26	$ –	$ 1,052	$ 1,078
Provision for lending-related commitments	–	–	(14)	(14)	7	–	(17)	(10)
Other	–	–	1	1	–	–	–	–
Ending balance at December 31,	$ 33	$ –	$ 1,022	$ 1,055	$ 33	$ –	$ 1,035	$ 1,068
Impairment methodology								
Asset-specific	$ –	$ –	$ 99	$ 99	$ –	$ –	$ 187	$ 187
Formula-based	33	–	923	956	33	–	848	881
Total allowance for lending-related commitments[d]	$ 33	$ –	$ 1,022	$ 1,055	$ 33	$ –	$ 1,035	$ 1,068
Total allowance for credit losses	$ 4,179	$ 5,184	$ 5,137	$ 14,500	$ 4,612	$ 4,884	$ 5,176	$ 14,672
Memo:								
Retained loans, end of period	$ 373,637	$ 156,616	$ 439,162	$ 969,415	$ 372,553	$ 149,387	$ 402,898	$ 924,838
Retained loans, average	374,395	145,606	416,828	936,829	366,798	139,918	392,263	898,979
PCI loans, end of period	24,034	–	3	24,037	30,576	–	3	30,579
Credit ratios								
Allowance for loan losses to retained loans	1.11%	3.31%	0.94%	1.39%	1.23%	3.27%	1.03%	1.47%
Allowance for loan losses to retained nonaccrual loans[e]	120	NM	358	292	109	NM	239	229
Allowance for loan losses to retained nonaccrual loans excluding credit card	120	NM	358	179	109	NM	239	147
Net charge-off rates[a]	0.05	3.10	0.04	0.52	0.31	2.95	0.03	0.60
Credit ratios, excluding residential real estate PCI loans								
Allowance for loan losses to retained loans	0.67	3.31	0.94	1.23	0.69	3.27	1.03	1.27
Allowance for loan losses to retained nonaccrual loans[e]	68	NM	358	253	56	NM	239	191
Allowance for loan losses to retained nonaccrual loans excluding credit card	68	NM	358	140	56	NM	239	109
Net charge-off rates[a]	0.05%	3.10%	0.04%	0.53%	0.34%	2.95%	0.03%	0.62%

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 transfer, 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.

(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		
	2018	2017	2016	**2018**	2017	2016	**2018**	2017	2016
Consumer, excluding credit card	**$ (63)**	$ 613	$ 467	**$ –**	$ 7	$ –	**$ (63)**	$ 620	$ 467
Credit card	**4,818**	4,973	4,042	**–**	–	–	**4,818**	4,973	4,042
Total consumer	**4,755**	5,586	4,509	**–**	7	–	**4,755**	5,593	4,509
Wholesale	**130**	(286)	571	**(14)**	(17)	281	**116**	(303)	852
Total	**$ 4,885**	$ 5,300	$ 5,080	**$ (14)**	$ (10)	$ 281	**$ 4,871**	$ 5,290	$ 5,361

Provision for credit losses

The **provision for credit losses** decreased for the year ended December 31, 2018 as a result of a decline in the consumer provision, partially offset by an increase in the wholesale provision

- the decrease in the **consumer, excluding credit card** portfolio in CCB was due to
  - lower net charge-offs in the residential real estate portfolio, largely driven by recoveries from loan sales, and
  - lower net charge-offs in the auto portfolio

  partially offset by
  - a $250 million reduction in the allowance for loan losses in the residential real estate portfolio – PCI, reflecting continued improvement in home prices and lower delinquencies; the reduction was $75 million lower than the prior year for the residential real estate portfolio – non credit-impaired
- the prior year also included a net $218 million write-down recorded in connection with the sale of the student loan portfolio, and
- the decrease in the **credit card** portfolio was due to
  - a $300 million addition to the allowance for loan losses, reflecting loan growth and higher loss rates, as anticipated; the addition was $550 million lower than the prior year,

  largely offset by
  - higher net charge-offs due to seasoning of more recent vintages, as anticipated, and
- in **wholesale**, the current period expense of $116 million reflected additions to the allowance for loan losses from select client downgrades,

  largely offset by
  - other net portfolio activity, including a reduction in the allowance for loan losses related to a single name in the Oil & Gas portfolio in the first quarter of 2018, compared to a net benefit of $303 million in the prior year. The prior year benefit reflected a reduction in the allowance for loan losses on credit quality improvements in the Oil & Gas, Natural Gas Pipelines, and Metals and Mining portfolios.

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 predominantly 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 and Corporate in predominantly privately-held financial 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 a default in the payment of principal and interest. This risk is minimized given that Treasury and CIO substantially invest in high-quality securities. At December 31, 2018, the investment securities portfolio was $260.1 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, refer to Corporate segment results on pages 77–78 and Note 10. For further information on the market risk inherent in the portfolio, refer to Market Risk Management on pages 124–131. For further information on related liquidity risk, refer to Liquidity Risk on pages 95–100.

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. In general, new principal investments include tax-oriented investments, as well as investments made to enhance or accelerate LOB and Corporate strategic business initiatives. The Firm's principal investments are managed by the various LOBs and Corporate and are reflected within their respective financial results. Effective January 1, 2018, the Firm adopted new accounting guidance related to the recognition and measurement of financial assets, which requires fair value adjustments upon observable price changes to certain equity investments previously held at cost in the principal investment portfolios. For additional information, refer to Notes 1 and 2.

As of December 31, 2018 and 2017, the aggregate carrying values of the principal investment portfolios were $22.2 billion and $19.5 billion, respectively, which included tax-oriented investments (e.g., affordable housing and alternative energy investments) of $16.6 billion and $14.0 billion, respectively, and private equity, various debt and equity instruments, and real assets of $5.6 billion and $5.5 billion, respectively.

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. As part of the risk governance structure, approved levels for investments are established and monitored for each relevant business or segment in order to manage the overall size 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, Corporate, and firmwide market risk
- Definition, approval and monitoring of limits
- Performance of stress testing and qualitative risk assessments

Risk measurement

Measures used to capture market 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:

- Value-at-risk (VaR)
- Stress testing
- Profit and loss drawdowns
- Earnings-at-risk
- Other sensitivity-based measures

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, accommodation of client business, and management experience. The Firm maintains different levels of limits. Firm level limits include VaR and stress limits. Similarly, line of business and Corporate limits include VaR and stress limits and may be supplemented by certain nonstatistical risk measures such as profit and loss drawdowns. Limits may also be set within the lines of business and Corporate, as well as at the portfolio and/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 or Corporate 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. Limits that have not been reviewed within specified time periods by Market Risk Management are escalated to senior management. The lines of business and Corporate 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, which include Market Risk Management and senior management. In the event of a breach, Market Risk Management consults with senior management of the Firm and of the line of business or Corporate 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 or granting a temporary increase in limits to accommodate an expected increase in client activity and/or market volatility. Certain Firm, Corporate or line of business-level limits that have been breached are escalated to senior management, the LOB Risk Committee, and/or the Firmwide Risk Committee.

The following table summarizes, by line of business and Corporate, the predominant business activities that give rise to market risks, and certain measures used to capture those risks.

Predominant business activities that give rise to market risk by line of business and Corporate

LOBs and Corporate	Predominant business activities[a]	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 • Originates loans and takes deposits	• Non-linear risk primarily from prepayment options embedded in mortgages and changes in the probability of newly originated mortgage commitments actually closing • Basis risk from differences in the relative movements of the rate indices underlying mortgage exposure and other interest rates	• 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 • Originates loans and takes deposits	• Risk of loss from adverse movements in market prices across interest rate, credit, currency, commodity and equity risk factors	• 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 • Marketable equity investments	• Retained loan portfolio • Deposits	• Privately held equity and other investments measured at fair value • Derivatives FVA and fair value option elected liabilities DVA
CB	• Originates loans and takes deposits	• Interest rate risk and prepayment risk		• Retained loan portfolio • Deposits	
AWM	• Provides initial capital investments in products such as mutual funds and capital invested alongside third-party investors • Originates loans and takes deposits	• Risk from changes in market factors (e.g., rates and credit spreads)	• Debt securities held in advance of distribution to clients, classified as trading assets - debt instruments[b]	• 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, capital, structural interest rate and foreign exchange risks	• Structural interest rate risk from the Firm's traditional banking activities • Structural non-USD foreign exchange risks	• Derivative positions measured at fair value through noninterest revenue in earnings • Marketable equity investments	• Deposits with banks • Investment securities portfolio and related interest rate hedges • Long-term debt and related interest rate hedges	• Privately held equity and other investments measured at fair value • Foreign exchange exposure related to Firm-issued non-USD long-term debt ("LTD") and related hedges

(a) In addition to the predominant business activities, each of the LOBs and Corporate may engage in principal investing activities. To the extent principal investments are deemed market risk sensitive, they are reflected in relevant risk measures (i.e., VaR or Other sensitivity-based measures) and captured in the table above. For additional discussion on principal investments refer to Investment Portfolio Risk Management on page 123.
(b) The AWM contribution to Firmwide average VaR was not material for the year ended December 31, 2018 and 2017.

Value-at-risk

JPMorgan Chase utilizes VaR, a statistical risk measure, to estimate the potential loss from adverse market moves in the current 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 daily measure of risk that is closely aligned to risk management decisions made by the lines of business and Corporate, and provides the appropriate information needed to respond to risk events.

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 risk factors and/or product types. 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 future losses. 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 nonstatistical measures such as stress testing, 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. For further information on the Firm's valuation process, refer to Valuation process in Note 2. 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, refer to Estimations and Model Risk Management on page 140.

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.

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), refer to 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,	2018			2017		
(in millions)	Avg.	Min	Max	Avg.	Min	Max
CIB trading VaR by risk type						
Fixed income	**$ 33**	**$ 25**	**$ 46**	$ 28	$ 20	$ 40
Foreign exchange	**6**	**3**	**15**	10	4	20
Equities	**17**	**13**	**26**	12	8	19
Commodities and other	**8**	**4**	**13**	7	4	10
Diversification benefit to CIB trading VaR	**(26)** (a)	**NM** (b)	**NM** (b)	(30) (a)	NM (b)	NM (b)
CIB trading VaR	**38**	**26** (b)	**58** (b)	27	14 (b)	38 (b)
Credit portfolio VaR	**3**	**3**	**4**	7	3	12
Diversification benefit to CIB VaR	**(2)** (a)	**NM** (b)	**NM** (b)	(6) (a)	NM (b)	NM (b)
CIB VaR	**39**	**26** (b)	**59** (b)	28	17 (b)	39 (b)
CCB VaR	**1**	**—**	**3**	2	1	4
Corporate VaR	**12**	**9**	**14**	4	1	16
Diversification benefit to other VaR	**(1)** (a)	**NM** (b)	**NM** (b)	(1) (a)	NM (b)	NM (b)
Other VaR	**12**	**9** (b)	**14** (b)	5	2 (b)	16 (b)
Diversification benefit to CIB and other VaR	**(10)** (a)	**NM** (b)	**NM** (b)	(4) (a)	NM (b)	NM (b)
Total VaR	**$ 41**	**$ 28** (b)	**$ 62** (b)	$ 29	$ 17 (b)	$ 42 (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, Corporate, 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.

Average Total VaR increased $12 million for the year-ended December 31, 2018 as compared with the prior year.

The increase was primarily due to changes in the risk profile for Fixed Income and Equities risk types, the inclusion of certain CIB marketable equity investments and a Corporate private equity position that became publicly traded in the fourth quarter of 2017, as well as increased volatility in the one-year historical look-back period.

In addition, average Credit Portfolio VaR has declined by $4 million, reflecting the sale of select positions in the prior year.

VaR can vary significantly over time as positions change, market volatility fluctuates, and diversification benefits change.

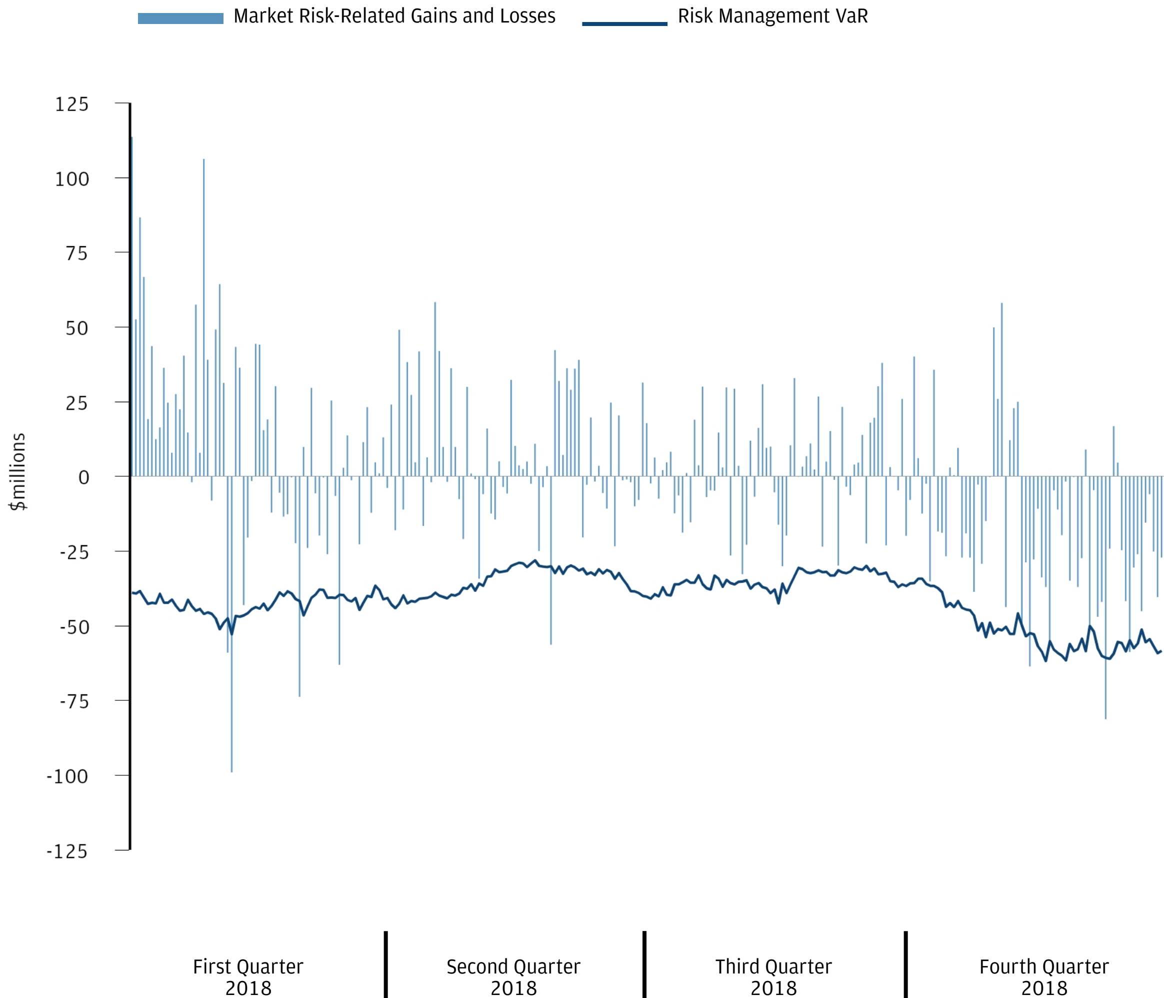
VaR back-testing

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, 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, 2018. 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, 2018 the Firm observed ten VaR back-testing exceptions and posted gains on 128 of the 259 days.

Daily Market Risk-Related Gains and Losses
vs. Risk Management VaR (1-day, 95% Confidence level)
Year ended December 31, 2018



Other risk measures

Stress testing

Along with VaR, stress testing is an important tool used to assess risk. While VaR reflects the risk of loss due to adverse changes in markets using recent historical market behavior, stress testing reflects the risk of loss from hypothetical changes in the value of market risk sensitive positions applied simultaneously. Stress testing measures the Firm's vulnerability to losses under a range of stressed but possible economic and market scenarios. The results are used to understand the exposures responsible for those potential losses and are measured against limits.

The Firm's stress framework covers Corporate and all lines of business with market risk sensitive positions. The framework is used to calculate multiple magnitudes of potential stress for both market rallies and market sell-offs, assuming significant changes in market factors such as credit spreads, equity prices, interest rates, currency rates and commodity prices, and combines them in multiple ways to capture an array of hypothetical economic and market scenarios.

The Firm generates a number of scenarios that focus on tail events in specific asset classes and geographies, including how the event may impact multiple market factors simultaneously. Scenarios also incorporate specific idiosyncratic risks and stress basis risk between different products. The flexibility in the stress framework allows the Firm to construct new scenarios that can test the outcomes against possible future stress events. Stress testing results are reported on a regular basis to the respective LOBs, Corporate and the Firm's senior management.

Stress scenarios are governed by an overall stress framework and are subject to the standards outlined in the Firm's policies related to model risk management. Significant changes to the framework are reviewed by the relevant LOB Risk Committees on an annual basis or as changing market conditions warrant and may be redefined to reflect current or expected market conditions.

The Firm's stress testing framework is utilized in calculating the Firm's CCAR and other stress test results, which are reported to the Board of Directors. In addition, stress testing results are incorporated into the Firm's Risk Appetite framework, and are reported quarterly to the DRPC.

Profit and loss drawdowns

Profit and loss drawdowns are 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 and Corporate, identifying positions included in earnings-at-risk, refer to the table on page 125.

The CTC Risk Committee establishes the Firm's structural interest rate risk policy and related 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. 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 125.

Earnings-at-risk scenarios estimate the potential change in this baseline, over the following 12 months utilizing multiple assumptions. These scenarios include a parallel shift involving changes to both short-term and long-term rates by an equal amount; a steeper yield curve involving holding short-term rates constant and increasing long-term rates or decreasing short-term rates and holding long-term rates constant; and a flatter yield curve involving holding short-term rates constant and decreasing long-term rates or increasing short-term rates and holding long-term rates constant. 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 the interest rates used in the scenarios 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.

December 31, (in billions)	2018	2017
Parallel shift:		
+100 bps shift in rates	**$ 0.9**	$ 1.7
-100 bps shift in rates	**(2.1)**	(3.6)
Steeper yield curve:		
+100 bps shift in long-term rates	**0.5**	0.7
-100 bps shift in short-term rates	**(1.2)**	(2.2)
Flatter yield curve:		
+100 bps shift in short-term rates	**0.4**	1.0
-100 bps shift in long-term rates	**(0.9)**	(1.4)

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 as of December 31, 2018 decreased when compared to December 31, 2017 primarily as a result of updating the Firm's baseline to reflect higher interest rates. As higher interest rates are now reflected in the Firm's baselines, sensitivities to changes in rates are expected to be less significant.

The Firm's non-U.S. dollar sensitivities are presented in the table below.

December 31, (in billions)	2018	2017
Parallel shift:		
+100 bps shift in rates	**$ 0.5**	$ 0.5
Flatter yield curve:		
+100 bps shift in short-term rates	**0.5**	0.5

The results of the non-U.S. dollar interest rate scenario involving a steeper yield curve with long-term rates rising by 100 basis points and short-term rates staying at current levels were not material to the Firm's earnings-at-risk at December 31, 2018 and 2017.

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, refer to the table Predominant business activities that give rise to market risk on page 125.

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, 2018 and 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.

Year ended December 31, **Gain/(loss)** (in millions) **Activity**	**Description**	**Sensitivity measure**	**2018**	**2017**
Investment activities[(a)]				
Investment management activities	Consists of seed capital and related hedges; and fund co-investments	10% decline in market value	$ (102)	$ (110)
Other investments	Consists of privately held equity and other investments held at fair value	10% decline in market value	(218)	(338)
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[(b)]	1 basis point parallel tightening of cross currency basis	(13)	(10)
Non-USD LTD hedges foreign currency ("FX") exposure	Primarily represents the foreign exchange revaluation on the fair value of the derivative hedges[(b)]	10% depreciation of currency	17	(13)
Derivatives – funding spread risk	Impact of changes in the spread related to derivatives FVA	1 basis point parallel increase in spread	(4)	(6)
Fair value option elected liabilities – funding spread risk	Impact of changes in the spread related to fair value option elected liabilities DVA[(b)]	1 basis point parallel increase in spread	30	22
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[(b)]	1 basis point parallel increase in spread	1	(1)

(a) Excludes equity securities without readily determinable fair values that are measured under the measurement alternative. Refer to Note 2 for additional information.

(b) Impact recognized through OCI.

COUNTRY RISK MANAGEMENT

The Firm, through its lines of business and Corporate, may be exposed to country risk resulting from financial, economic, political or other significant developments which 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 and measures the extent to which the Firm's exposures are diversified 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, 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, attribution of exposure to a specific country is based on the country where the largest proportion of the assets of the counterparty, issuer, obligor or guarantor are located or where the largest proportion of its revenue is derived, which may be different than the domicile (i.e. legal residence) or country of incorporation of the counterparty, issuer, obligor or guarantor. Country exposures are generally measured by considering the Firm's risk to an immediate default of the counterparty, issuer, obligor or guarantor, 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.

During the fourth quarter of 2018, the Firm refined its country exposure measurement approach to exclude capital invested in local entities. With this change, country exposure more directly measures the Firm's risk to an immediate default of a counterparty, issuer, obligor or guarantor. The risk associated with capital invested in local entities will continue to be examined in tailored stress scenarios, depending on the vulnerabilities being tested. For more on the Firm's country risk stress testing, refer to page 133.

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 eligible 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 eligible 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 eligible collateral received
- 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, refer to Cross-border outstandings on page 306 of the 2018 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 sets of countries in response to specific or potential market events, sector performance concerns, sovereign actions and geopolitical risks. These tailored stress results are used to inform potential risk reduction across the Firm, as necessary.

Risk reporting

To enable effective risk management of country risk to the Firm, country 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, 2018, and their comparative exposures 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.

As discussed on page 132, during the fourth quarter of 2018 the Firm refined its country exposure measurement approach to exclude capital invested in local entities. While this change did not have a material impact to country exposure, prior period amounts have been revised within the following table to conform with the current period presentation.

Top 20 country exposures (excluding the U.S.)[a]

December 31, (in billions)	2018				2017[f]
	Lending and deposits[b]	Trading and investing[c][d]	Other[e]	Total exposure	Total exposure
Germany	$ 53.7	$ 8.1	$ 0.3	$ 62.1	$ 57.4
United Kingdom	28.0	10.1	2.6	40.7	44.9
Japan	25.4	3.3	0.4	29.1	30.8
China	9.5	7.1	2.7	19.3	16.3
France	10.8	6.5	0.6	17.9	19.4
Canada	10.8	3.4	0.1	14.3	14.9
Australia	7.2	5.4	0.4	13.0	11.4
Switzerland	9.1	0.6	3.1	12.8	13.9
India	6.1	4.0	1.7	11.8	12.3
Luxembourg	10.5	0.5	—	11.0	9.5
South Korea	4.2	3.2	0.2	7.6	6.8
Brazil	4.4	2.9	—	7.3	4.6
Singapore	3.9	1.4	1.5	6.8	6.3
Italy	2.4	3.8	0.2	6.4	6.7
Netherlands	5.0	0.4	0.4	5.8	8.0
Mexico	3.7	1.8	—	5.5	5.2
Hong Kong	2.4	1.1	1.9	5.4	4.2
Saudi Arabia	4.7	0.6	—	5.3	4.5
Spain	3.8	1.3	—	5.1	6.8
Malaysia	1.8	1.1	1.4	4.3	3.0

(a) Country exposures presented in the table reflect 87% and 86% of total firmwide non-U.S. exposure, where exposure is attributed to a specific country, for the periods ending December 31, 2018 and 2017, respectively.
(b) Lending and deposits includes loans and accrued interest receivable (net of eligible 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 those from settlement and clearing activities.
(c) Includes market-making inventory, AFS securities, and counterparty exposure on derivative and securities financings net of eligible 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) Predominantly includes physical commodity inventory.
(f) The country rankings presented in the table as of December 31, 2017, are based on the country rankings of the corresponding exposures at December 31, 2018, not actual rankings of such exposures at December 31, 2017.

OPERATIONAL RISK MANAGEMENT

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. Operational risk is inherent in the Firm's activities and can manifest itself in various ways, including fraudulent acts, business interruptions, cybersecurity attacks, inappropriate employee behavior, failure to comply with applicable laws and regulations or failure of vendors to perform in accordance with their agreements. 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, Operational Risk Identification and Assessment, Operational Risk Measurement, and Operational Risk Monitoring and Reporting.

Governance

The lines of business and Corporate are responsible for applying the ORMF in order to manage the operational risk that arises from their activities. The Control Management organization, which consists of control managers within each line of business and Corporate, is responsible for the day-to-day execution of the ORMF.

Line of business and Corporate control committees are responsible for reviewing data that indicates the quality and stability of processes, addressing key operational risk issues, focusing on processes with control concerns, and overseeing control remediation. These committees escalate operational risk issues to the FCC, as appropriate. For additional information on the FCC, refer to Enterprise-wide Risk Management on pages 79–140.

The Firmwide Risk Executive for Operational Risk Management ("ORM"), 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 ORM, and are independent of the respective businesses or corporate functions they oversee.

The Firm's Operational Risk Management Policy is approved by the DRPC. This policy establishes the Operational Risk Management Framework for the Firm.

Operational Risk identification and assessment

The Firm utilizes a structured risk and control self-assessment process which is executed by the lines of business and Corporate in accordance with the minimum standards established by ORM, to identify, assess, mitigate and manage its operational risk. As part of this process, lines of business and Corporate identify key operational risks inherent in their activities, address gaps or deficiencies identified, and define actions to reduce residual risk. Action plans are developed for identified control issues and lines of business and Corporate are held accountable for tracking and resolving issues in a timely manner. Operational Risk Officers independently challenge the execution of the self-assessment and evaluate the appropriateness of the residual risk results.

In addition to the self-assessment process, the Firm tracks and monitors events that have led to or could lead to actual operational risk losses, including litigation-related events. Responsible lines of business and Corporate 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. ORM provides oversight of these activities and may also perform independent assessments of significant operational risk events and areas of concentrated or emerging risk.

Operational 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 ("AMA"), 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. The Firm does not reflect the impact of insurance in its AMA estimate of operational risk capital.

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 other stress testing processes.

For information related to operational risk RWA, CCAR or ICAAP, refer to Capital Risk Management section, pages 85-94.

Operational Risk Monitoring and reporting
ORM has established standards for consistent operational risk monitoring and reporting. Operational risk reports are produced on a firmwide basis as well as by line of business and Corporate. Reporting includes the evaluation of key risk indicators against established thresholds as well as the assessment of different types of operational risk against stated risk appetite. The standards reinforce escalation protocols to senior management and to the Board of Directors.

Subcategories and examples of operational risks

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. For more information on Compliance risk, Conduct risk, Legal risk and Estimations and Model risk, refer to pages 137, 138, 139 and 140, 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 designed to protect against, among other things, cybersecurity attacks by unauthorized parties attempting 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 maintains a cybersecurity program to prevent, detect, and respond to cyberattacks. The Global Chief Information Officer, Chief Technology Control Officer, and Chief Information Security Officer ("CISO") update the Audit Committee of the Board of Directors at least annually on the Firm's Information Security Program, recommended changes, cybersecurity policies and practices, ongoing efforts to improve security, as well as its efforts regarding significant cybersecurity events. In addition, the Firm has a detailed cybersecurity incident response plan ("IRP") designed to enable the Firm to respond to attempted cybersecurity incidents, coordinate such responses with law enforcement and other government agencies, and notify clients and customers. Among other key focus areas, the IRP is designed to mitigate the risk of insider trading connected to a cybersecurity incident, and includes various escalation points in this regard including Compliance and the Legal Department.

The Cybersecurity and Technology Control functions are responsible for governance and oversight of the Firm's Information Security Program. In partnership with the Firm's lines of business, the Cybersecurity and Technology Control organization identifies information security risk issues and champions programs for the technological protection of the Firm's information resources including applications, infrastructure as well as confidential and personal information related to the Firm's customers. The Cybersecurity and Technology Control organization comprises Governance and Control, Assessments, Assurance and Training, Cybersecurity Operations, business aligned control officers, Identity and Access Management, and resiliency functions that execute the Information Security Program.

The Global Cybersecurity and Technology Control governance structure is designed to identify, escalate, and mitigate information security risks. This structure uses key governance forums to disseminate information and monitor technology efforts. These forums are established at multiple levels throughout the Firm and include representatives from each line of business and Corporate.

Reports containing overviews of key technology risks and efforts to enhance related controls are produced for these forums, and are reviewed by management at multiple levels including technology management, Firmwide management and the Operating Committee. The forums are used to escalate information security risks or other matters as appropriate to the FCC.

IRM provides oversight of the activities which identify, assess, manage and mitigate cybersecurity risk. As integral participants in cybersecurity governance forums, the IRM organization actively monitors and oversees the Cybersecurity and Technology Control functions.

The Firm's Security Awareness Program includes training that reinforces the Firm's Information Technology Risk and Security Management policies, standards and practices, as well as the expectation that employees comply with these policies. The Security Awareness Program engages personnel through training on how to identify potential cybersecurity risks and protect the Firm's resources and information. This training is mandatory for all employees globally on an annual basis, and it is supplemented by firmwide testing initiatives, including quarterly phishing tests. Finally, the Firm's Global Privacy Program requires all employees to take annual awareness training on data privacy. This privacy-focused training includes information about confidentiality and security, as well as responding to unauthorized access to or use of information.

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 training, and testing of recovery strategies, 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. Over the past year, the risk of payment fraud remained at a heightened level across the industry. The complexities of these incidents and the strategies used by perpetrators continue to evolve. A Payments Control Program including the LOBs and Corporate develop methods for managing the risk, implementing controls and providing employee and client education and awareness training. The Firm's monitoring of customer behavior is periodically evaluated and enhanced in an effort 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 the lines of business and Corporate 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, as needed to comply 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, a subcategory of operational risk, is the risk of failure to comply with legal or regulatory obligations or codes of conduct and standards of self-regulatory organizations applicable to the business activities of the Firm.

Overview

Each line of business and Corporate hold primary ownership of and accountability for managing 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 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 and standards, testing, monitoring, training and providing guidance.

Governance and oversight

Compliance is led by the Firms' 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 Audit Committee receives a report on the Code of Conduct program, including 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 or employees could lead to unfair client or customer outcomes, impact the integrity of the markets in which the Firm operates, or compromise the Firm's reputation.

Overview

Each line of business and Corporate 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 (the "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, refer to Compliance Risk Management on page 137.

Governance and oversight

The Conduct Risk Program is governed by a Board-level approved Conduct Risk Governance Policy. The Conduct Risk Governance Policy establishes the framework for ownership, assessment, managing and escalating conduct risk in the Firm.

The CRSC provides oversight of the Firm's conduct initiatives to develop a more holistic view of conduct risks and to connect key programs across the Firm in order to identify opportunities and emerging areas of focus.

The CRSC may escalate systemic conduct risk issues to the FRC and as appropriate to the DRPC. The misconduct (actual or potential) of individuals involved in material risk and control issues are escalated to the HR Control Forum.

Certain committees of the Board oversee conduct risk issues within the scope of their responsibilities.

Conduct risk management encompasses various aspects of people management practices throughout the employee life cycle, including recruiting, onboarding, training and development, performance management, promotion and compensation processes. Each LOB, Treasury and CIO, 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.

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, 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.

The governance of analytical and judgment-based estimations within MRGR's scope follows a consistent approach to the approach used for models, which is described in detail below.

Model risks are owned by the users of the models within 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. In its review of a model, the Model Risk function considers whether the model is suitable for the specific purposes for which it will be used. 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.

For a summary of model-based valuations and other valuation techniques, refer to Critical Accounting Estimates Used by the Firm on pages 141-143 and Note 2.

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 information on these components, areas of judgment and methodologies used in establishing the Firm's allowance for credit losses, refer to Allowance for credit losses on pages 120–122 and 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. Refer to 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, 2018, 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 $425 million for PCI loans.
  - an increase to modeled annual credit loss estimates of approximately $50 million for residential real estate loans, 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 credit loss estimates of approximately $875 million.
- An increase in probability of default ("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 $1.6 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

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, including, derivatives and structured note products. 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, refer to Note 2.

December 31, 2018 (in billions, except ratios)	Total assets at fair value	Total level 3 assets
Trading debt and equity instruments	$ 359.5	$ 4.2
Derivative receivables[(a)]	54.2	5.8
Trading assets	413.7	10.0
AFS securities	230.4	–
Loans	3.2	0.1
MSRs	6.1	6.1
Other	27.2	1.0
Total assets measured at fair value on a recurring basis	680.6	17.2
Total assets measured at fair value on a nonrecurring basis	1.4	1.1
Total assets measured at fair value	$ 682.0	$ 18.3
Total Firm assets	$ 2,622.5	
Level 3 assets as a percentage of total Firm assets[(a)]		0.7%
Level 3 assets as a percentage of total Firm assets at fair value[(a)]		2.7%

(a) For purposes of the table above, the derivative receivables total reflects the impact of netting adjustments; however, the $5.8 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, refer to 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 a further discussion of valuation adjustments applied by the Firm, refer to 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, refer to 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 testing goodwill for impairment. The goodwill associated with each business combination is allocated to the related reporting units for goodwill impairment testing.

For the year ended December 31, 2018, the Firm reviewed current economic conditions, business performance, estimated market cost of equity, and projections of business performance for all its businesses. Based upon such reviews, the Firm concluded that the goodwill allocated to its reporting units was not impaired as of December 31, 2018. The fair values of these reporting units exceeded their carrying values by approximately 20% or higher and did not indicate a significant risk of goodwill impairment based on current projections and valuations.

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 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 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, refer to Note 15.

Credit card rewards liability

JPMorgan Chase offers credit cards with various rewards programs which allow cardholders to earn rewards 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 rewards 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 rewards 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 $5.8 billion and $4.9 billion at December 31, 2018 and 2017, 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, 2018, 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 is no longer maintaining 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 will recognize any taxes it may incur on global intangible low tax income as income tax expense in the period in which the tax is incurred.

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 change in estimate recorded under SEC Staff Accounting Bulletin No. 118 (SAB 118) resulting from the enactment of the TCJA. The accounting under SAB 118 is complete.

For additional information on income taxes, refer to Note 24.

Litigation reserves

For a description of the significant estimates and judgments associated with establishing litigation reserves, refer to Note 29.

ACCOUNTING AND REPORTING DEVELOPMENTS

Financial Accounting Standards Board ("FASB") Standards Adopted during 2018

Standard	Summary of guidance	Effects on financial statements
Revenue recognition – revenue from contracts with customers *Issued May 2014*	• 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.	• Adopted January 1, 2018. • For further information, refer to Note 1.
Recognition and measurement of financial assets and financial liabilities *Issued January 2016*	• 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 are reflected in earnings beginning in the period of adoption.	• Adopted January 1, 2018. • For further information, refer to Note 1.
Classification of certain cash receipts and cash payments in the statement of cash flows *Issued August 2016*	• Provides targeted amendments to the classification of certain cash flows, including the treatment of settlement payments for zero coupon debt instruments and distributions received from equity method investments.	• Adopted January 1, 2018. • The adoption of the guidance had no material impact as the Firm was either in compliance with the amendments or the amounts to which it was applied were immaterial.
Treatment of restricted cash on the statement of cash flows *Issued November 2016*	• Requires restricted cash to be combined with unrestricted cash when reconciling the beginning and ending cash balances on the Consolidated statements of cash flows. • Requires additional disclosures to supplement the Consolidated statements of cash flows.	• Adopted January 1, 2018 • For further information, refer to Note 1.

FASB Standards Adopted during 2018 (continued)

Standard	Summary of guidance	Effects on financial statements
Definition of a business *Issued January 2017*	• Narrows the definition of a business and clarifies that, to be considered a business, substantially all of the fair value of the gross assets acquired (or disposed of) may not be concentrated in a single identifiable asset or a group of similar assets. • In addition, a business must now include, at a minimum, an input and a substantive process that together significantly contribute to the ability to create outputs.	• Adopted January 1, 2018. • The adoption of the guidance had no impact because it is 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 *Issued March 2017*	• Requires the service cost component of net periodic pension and postretirement benefit cost to be reported separately in the Consolidated statements of income from the other cost components.	• Adopted January 1, 2018. • For further information, refer to Note 1.
Premium amortization on purchased callable debt securities *Issued March 2017*	• Requires amortization of premiums to the earliest call date on certain debt securities.	• Adopted January 1, 2018. • For further information, refer to Note 1.
Hedge accounting *Issued August 2017*	• Aligns 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. • Permits an election at adoption to transfer certain investment securities classified as held-to-maturity to available-for-sale. • Simplifies hedge documentation requirements.	• Adopted January 1, 2018. • For further information, refer to Note 1.
Reclassification of certain tax effects from AOCI *Issued February 2018*	• Permits reclassification of the income tax effects of the TCJA on items within AOCI to retained earnings so that the tax effects of items within AOCI reflect the appropriate tax rate.	• Adopted January 1, 2018. • For further information, refer to Note 1.

FASB Standards Issued but not adopted as of December 31, 2018

Standard	Summary of guidance	Effects on financial statements
Leases *Issued February 2016*	• Requires lessees to recognize all leases longer than twelve months on the Consolidated balance sheets as a lease liability with a corresponding right-of-use asset. • Requires lessees and lessors to classify most leases using principles similar to existing lease accounting, but eliminates the "bright line" classification tests. • Expands qualitative and quantitative leasing disclosures.	• Adopted January 1, 2019. • The Firm elected the practical expedient to adopt and implement the new lease guidance as of January 1, 2019 through a cumulative-effect adjustment without revising prior comparative periods. Upon adoption, the Firm recognized lease right-of-use ("ROU") assets and lease liabilities on the Consolidated balance sheet of $8.1 billion and $8.2 billion, respectively. The impact to the Firm's CET1 capital ratio was a reduction of approximately 6 bps. The adoption of the new lease guidance did not have a material impact on the Firm's Consolidated statement of income. • The Firm elected the available practical expedients to not reassess whether existing contracts contain a lease or whether classification or unamortized initial lease costs would be different under the new lease guidance.
Financial instruments – credit losses *Issued June 2016*	• Replaces existing incurred loss impairment guidance and establishes a single allowance framework for financial assets carried at amortized cost, which will reflect management's estimate of credit losses over the full remaining expected life of the financial assets and will consider expected future changes in macroeconomic conditions. • Eliminates existing guidance for PCI loans, and requires recognition of the nonaccretable difference as an increase to the allowance for expected credit losses on financial assets purchased with more than insignificant credit deterioration since origination, which will be offset by an increase in the recorded investment of the related loans. • Amends existing impairment guidance for AFS securities to incorporate an allowance, which will allow for reversals of credit impairments 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 established a Firmwide, cross-discipline governance structure, which provides implementation oversight. The Firm continues to test and refine its current expected credit loss models that satisfy the requirements of the new standard. This review and testing, as well as efforts to meet expanded disclosure requirements, will extend through the remainder of 2019. • The Firm expects that the allowance related to the Firm's loans and commitments will increase as it will cover credit losses over the full remaining expected life of the portfolios. The Firm currently intends to estimate losses over a two-year forecast period using the weighted-average of a range of macroeconomic scenarios (established on a Firmwide basis), and then revert to longer term historical loss experience to estimate losses over more extended periods. • The Firm currently expects the increase in the allowance to be in the range of $4-6 billion, primarily driven by Card. This estimate is subject to further refinement based on continuing reviews and approvals of models, methodologies and judgments. The ultimate impact will depend upon the nature and characteristics of the Firm's portfolio at the adoption date, the macroeconomic conditions and forecasts at that date, and other management judgments. • The Firm plans to adopt the new guidance on January 1, 2020.
Goodwill *Issued January 2017*	• 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. However, the impact of the new accounting guidance will depend on the performance of the reporting units and the market conditions at the time of adoption. • After adoption, the guidance may result in more frequent goodwill impairment losses due to the removal of the second condition. • The Firm plans to adopt the new guidance on January 1, 2020.

(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 2018 Form 10-K 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 appropriately address social and environmental concerns that may arise from its business activities;
- 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 effectiveness of the Firm’s control agenda;
- Ability of the Firm to develop or discontinue 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 2018 Form 10-K.

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.