



The Goldman Sachs Group, Inc.

**PILLAR 3
DISCLOSURES**

For the period ended December 31, 2019

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Introduction

Overview

The Goldman Sachs Group, Inc. (Group Inc. or parent company), a Delaware corporation, together with its consolidated subsidiaries (collectively, the firm), is a leading global investment banking, securities and investment management firm that provides a wide range of financial services to a substantial and diversified client base that includes corporations, financial institutions, governments and individuals. When we use the terms “the firm,” “we,” “us” and “our,” we mean Group Inc. and its consolidated subsidiaries.

The Board of Governors of the Federal Reserve System (FRB) is the primary regulator of Group Inc., a bank holding company (BHC) under the Bank Holding Company Act of 1956 and a financial holding company under amendments to this Act. We are subject to consolidated regulatory capital requirements which are calculated in accordance with the regulations of the FRB (Capital Framework).

The capital requirements are expressed as risk-based capital and leverage ratios that compare measures of regulatory capital to risk-weighted assets (RWAs), average assets and off-balance-sheet exposures. Failure to comply with these capital requirements could result in restrictions being imposed by our regulators and could limit our ability to repurchase shares, pay dividends and make certain discretionary compensation payments. Our capital levels are also subject to qualitative judgments by the regulators about components of capital, risk weightings and other factors.

The Capital Framework, as described below, requires disclosures based on the third pillar of Basel III (Pillar 3). The purpose of Pillar 3 disclosures is to provide information on banking institutions’ risk management practices and regulatory capital ratios. This document is designed to satisfy these requirements and should be read in conjunction with our most recent Annual Report on Form 10-K, as well as our most recent FFIEC 101 Report, “Regulatory Capital Reporting for Institutions Subject to the Advanced Capital Adequacy Framework.” References to our “2019 Form 10-K” are to our Annual Report on Form 10-K for the year ended December 31, 2019. All references to December 2019 and December 2018 refer to the periods ended, or the dates, as the context requires, December 31, 2019 and December 31, 2018, respectively. References to our FFIEC 101 Report refer to our report filed for the period ended December 31, 2019, available on the National Information Center’s website located at www.ffiec.gov.

Capital Framework

The regulations under the Capital Framework are largely based on the Basel Committee on Banking Supervision’s (Basel Committee) capital framework for strengthening international capital standards (Basel III) and also implement certain provisions of the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act). Under the Capital Framework, we are an “Advanced approach” banking organization and have been designated as a global systemically important bank (G-SIB).

The capital requirements calculated in accordance with the Capital Framework include the minimum risk-based capital and leverage ratios. In addition, the risk-based capital requirements include the capital conservation buffer, countercyclical capital buffer and the G-SIB surcharge, all of which must consist entirely of capital that qualifies as Common Equity Tier 1 (CET1) capital.

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We calculate our CET1 capital, Tier 1 capital and Total capital ratios in accordance with (i) the Standardized approach and market risk rules set out in the Capital Framework (together, the Standardized Capital Rules) and (ii) the Advanced approach and market risk rules set out in the Capital Framework (together, the Advanced Capital Rules). The lower of each risk-based capital ratio calculated in (i) and (ii) is the ratio against which our compliance with risk-based capital requirements is assessed. The Standardized ratios applied to the firm as of December 2019 and the Advanced ratios applied to the firm as of December 2018. Under the Capital Framework, the firm is also subject to leverage requirements which consist of a minimum Tier 1 leverage ratio and a minimum supplementary leverage ratio (SLR), as well as the SLR buffer.

The Standardized CET1 capital, Tier 1 capital and Total capital ratios were 13.3%, 15.2% and 17.8% as of December 2019. For additional information about our Standardized capital ratios, see “Note 20. Regulation and Capital Adequacy” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K.

The Advanced Capital Rules require an Advanced approach BHC to meet a series of qualification requirements on an ongoing basis. They also require notification to supervisors of any change to a model that results in a material change in its RWAs, or of any significant change to its modeling assumptions. These qualification requirements address the following areas: the bank’s governance processes and systems for maintaining adequate capital commensurate with its risk profile; its internal systems for segmenting exposures and applying risk weights; its quantification of risk parameters used including its model-based estimates of exposures; its operational risk management processes, data management and quantification systems; the data management systems that are designed to support the timely and accurate reporting of risk-based capital requirements; and the control, oversight and validation mechanisms exercised by senior management and by the Board of Directors of Group Inc. (Board).

The information presented in this document is calculated in accordance with the Capital Framework with RWAs calculated in accordance with the Advanced Capital Rules, unless otherwise specified.

Definition of Risk-Weighted Assets. As of December 2019, RWAs were calculated in accordance with both the Advanced and Standardized Capital Rules.

For additional information about the Capital Framework and the requirement to calculate RWAs in accordance with both the Advanced and Standardized Capital Rules, see “Note 20. Regulation and Capital Adequacy” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K. Also see “Regulation” in Part I, Item 1 “Business” in our 2019 Form 10-K for additional information about our regulatory capital requirements.

Fair Value

Trading assets and liabilities, certain investments and loans, and certain other financial assets and liabilities, are included in our consolidated balance sheets at fair value (i.e., marked-to-market), with related gains or losses generally recognized in our consolidated statements of earnings and, therefore, in capital. The fair value of a financial instrument is the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The use of fair value to measure financial instruments is fundamental to our risk management practices and is our most critical accounting policy. The daily discipline of marking substantially all of our inventory to current market levels is an effective tool for assessing and managing risk and provides transparent and realistic insight into our financial exposures. The use of fair value is an important aspect to consider when evaluating our capital base and our capital ratios as changes in the fair value of our positions are reflected in the current period’s shareholders’ equity, and accordingly, regulatory capital; it is also a factor used to determine the classification of positions into the banking book and trading book, as discussed further below.

For additional information regarding the determination of fair value under accounting principles generally accepted in the United States (U.S. GAAP) and controls over valuation of inventory, see “Note 3. Significant Accounting Policies” in Part II, Item 8 “Financial Statements and Supplementary Data” and “Critical Accounting Policies – Fair Value” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K.

Pillar 3 Disclosures**Banking Book/Trading Book Classification**

In order to determine the appropriate regulatory capital treatment for our exposures, positions must be first classified into either “banking book” or “trading book.” Positions are classified as banking book unless they qualify to be classified as trading book.

Banking book positions are not generally held “for the purpose of short-term resale or with the intent of benefiting from actual or expected short-term price movements or to lock in arbitrage profits¹.” They may be accounted for at amortized cost, fair value or in accordance with the equity method. Banking book positions are subject to credit risk regulatory capital requirements. Credit risk represents the potential for loss due to the default or deterioration in credit quality of a counterparty (e.g., an OTC derivatives counterparty or a borrower) or an issuer of securities or other instruments we hold. See “Credit Risk” for additional details.

Trading book positions generally meet the following criteria: they are assets or liabilities that are accounted for at fair value; they are risk managed using a Value-at-Risk (VaR) internal model; and they are positions that we hold, generally as part of our market-making and underwriting businesses, “for the purpose of short-term resale or with the intent of benefiting from actual or expected short-term price movements or to lock in arbitrage profits¹.” In accordance with the Capital Framework, trading book positions are generally considered covered positions. Foreign exchange and commodity positions are typically considered covered positions, whether or not they meet the other criteria for classification as trading book positions. Covered positions are subject to market risk regulatory capital requirements which are designed to cover the risk of loss in value of these positions due to changes in market conditions. See “Market Risk” for further details. Some trading book positions, such as derivatives, are also subject to counterparty credit risk regulatory capital requirements.

Basis of Consolidation

The Pillar 3 disclosures and the firm’s regulatory capital ratio calculations are prepared at the consolidated Group Inc. level. Our consolidated financial statements are prepared in accordance with U.S. GAAP and include the accounts of Group Inc. and all other entities in which we have a controlling financial interest. Intercompany transactions and balances have been eliminated. The scope of consolidation for regulatory capital purposes is substantially consistent with the U.S. GAAP consolidation.

For further information about the basis of presentation of our financial statements and accounting consolidation policies, see “Note 2. Basis of Presentation” and “Note 3. Significant Accounting Policies” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K.

Restrictions on the Transfer of Funds or Regulatory Capital within the Firm

Group Inc. is a holding company and, therefore, utilizes dividends, distributions and other payments from its subsidiaries to fund dividend payments and other payments on its obligations, including debt obligations. Regulatory capital requirements, as well as other provisions of applicable law and regulations restrict Group Inc.’s ability to withdraw capital from its regulated subsidiaries.

For information about restrictions on the transfer of funds within Group Inc. and its subsidiaries, see “Note 20. Regulation and Capital Adequacy” in Part II, Item 8 “Financial Statements and Supplementary Data” and “Risk Management – Liquidity Risk Management” and “Equity Capital Management and Regulatory Capital” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K.

Compliance with Capital Requirements

As of December 2019, none of Group Inc.’s consolidated subsidiaries that are subject to minimum regulatory capital requirements in a local jurisdiction had capital levels less than such requirements.

GS Bank USA, the firm’s primary U.S. bank subsidiary, is a Federal Deposit Insurance Corporation (FDIC)-insured, New York State-chartered bank and a member of the Federal Reserve System, is supervised and regulated by the FRB, the FDIC, the New York State Department of Financial Services and the Consumer Financial Protection Bureau. GS Bank USA is an Advanced approach banking organization under the Capital Framework.

¹ See definition of “Trading position” in 12 CFR 217.202.

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For information about GS Bank USA's regulatory capital ratios and for further information about other regulated subsidiaries, see "Note 20. Regulation and Capital Adequacy" in Part II, Item 8 "Financial Statements and Supplementary Data" and "Equity Capital Management and Regulatory Capital – Subsidiary Capital Requirements" in Part II, Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our 2019 Form 10-K. See "Note 20. Regulation and Capital Adequacy" in Part II, Item 8 "Financial Statements and Supplementary Data" in our 2019 Form 10-K for information about GS Bank USA's SLR.

Other Items

For a detailed description of our equity capital and additional information regarding our capital planning and stress testing process, including the Comprehensive Capital Analysis and Review, the Dodd-Frank Act Stress Tests, our internally designed stress tests, our internal risk-based capital assessment, our attribution of capital and contingency capital plan, see "Equity Capital Management and Regulatory Capital" in Part II, Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our 2019 Form 10-K.

For an overview of our risk management framework, including Board governance, processes and committee structure, see "Risk Management – Overview and Structure of Risk Management" in Part II, Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our 2019 Form 10-K.

Measures of exposures and other metrics disclosed in this report and the FFIEC 101 Report may not be based on U.S. GAAP, may not be directly comparable to measures reported in our 2019 Form 10-K and may not all be comparable to similar measures used by other companies. These disclosures are not required to be, and have not been, audited by our independent auditors. Our historical filings with the SEC and previous Pillar 3 and Regulatory Capital Disclosure documents are located at: www.goldmansachs.com/investor-relations.

Regulatory Capital

The table below presents information about regulatory risk-based capital and leverage ratios, calculated in accordance with the Advanced Capital Rules.

Table 1: Regulatory Risk-Based Capital and Leverage Ratios

<i>\$ in millions</i>	As of	
	December 2019	December 2018
CET1 capital	\$ 74,850	\$ 73,116
Tier 1 capital	85,440	83,702
Tier 2 capital	13,473	13,743
Total capital	\$ 98,913	\$ 97,445
RWAs	\$ 544,653	\$ 558,111
CET1 capital ratio	13.7%	13.1%
Tier 1 capital ratio	15.7%	15.0%
Total capital ratio	18.2%	17.5%
Average adjusted total assets	\$ 978,634	\$ 941,207
Tier 1 leverage ratio	8.7%	8.9%
Total leverage exposure	\$ 1,375,467	\$ 1,342,906
SLR	6.2%	6.2%

Beginning in the fourth quarter of 2019, the firm made changes to the calculation of the loss given default for certain wholesale exposures. At the date of adoption, the estimated impact of these changes was an increase in the firm's Advanced CET1 capital ratio of approximately 1 percentage point.

In the table above:

- CET1 capital ratio is calculated as CET1 capital divided by RWAs, the Tier 1 capital ratio is defined as Tier 1 capital divided by RWAs, and the Total capital ratio is defined as Total capital divided by RWAs.
- Tier 1 leverage ratio is calculated as Tier 1 capital divided by quarterly average adjusted total assets (which includes adjustments for goodwill and identifiable intangible assets, and certain investments in nonconsolidated financial institutions).
- SLR is calculated as Tier 1 capital divided by total leverage exposure (which includes average daily total assets for the quarter and certain off-balance-sheet exposures, less certain balance sheet deductions). For additional information on our SLR, see our FFIEC 101 Report, "Regulatory Capital Reporting for Institutions Subject to the Advanced Capital Adequacy Framework."

Pillar 3 Disclosures

The table below presents the risk-based capital and leverage requirements.

Table 2: Risk-Based Capital and Leverage Requirements

	As of	
	December 2019	December 2018
Risk-based capital requirements		
CET1 capital ratio	9.5%	8.3%
Tier 1 capital ratio	11.0%	9.8%
Total capital ratio	13.0%	11.8%
Leverage requirements		
Tier 1 leverage ratio	4.0%	4.0%
SLR	5.0%	5.0%

In the table above:

- As of December 2019, the CET1 capital ratio requirement included a minimum of 4.5%, the Tier 1 capital ratio requirement included a minimum of 6.0%, and the Total capital ratio requirement included a minimum of 8.0%. The requirements also included the capital conservation buffer of 2.5%, the G-SIB surcharge of 2.5% (Method 2) and the countercyclical capital buffer, which the FRB has set to zero percent.
- As of December 2018, the CET1 capital ratio requirement included a minimum of 4.5%, the Tier 1 capital ratio requirement included a minimum of 6.0%, and the Total capital ratio requirement included a minimum of 8.0%. The requirements also included the 75% phase-in of the capital conservation buffer of 2.5%, the 75% phase-in of the G-SIB surcharge of 2.5% (Method 2) and the countercyclical capital buffer, which the FRB has set to zero percent.
- The capital conservation buffer, countercyclical capital buffer and G-SIB surcharge phased in ratably from January 1, 2016 through January 1, 2019.
- The G-SIB surcharge is updated annually based on financial data from the prior year and is generally applicable for the following year. The G-SIB surcharge is calculated using two methodologies, the higher of which is reflected in the firm's risk-based capital requirements. The first calculation (Method 1) is based on the Basel Committee's methodology which, among other factors, relies upon measures of the size, activity and complexity of each G-SIB. The second calculation (Method 2) uses similar inputs but includes a measure of reliance on short-term wholesale funding.
- The Tier 1 leverage ratio requirement is a minimum of 4%. The SLR requirement of 5% as of both December 2019 and December 2018 includes a minimum of 3% and a 2% buffer applicable to G-SIBs.

For a detailed description of regulatory capital reforms that impact us, see "Regulation" in Part I, Item 1 "Business" in our 2019 Form 10-K and "Regulatory Matters and Other Developments" in Part II, Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our 2019 Form 10-K.

Capital Structure

The table below presents information about risk-based capital in accordance with the Advanced Capital Rules.

Table 3: Capital Structure

\$ in millions	As of	
	December 2019	December 2018
Common stock	\$ 9	\$ 9
Share-based awards	3,195	2,845
Additional paid-in capital	54,883	54,005
Retained earnings	106,465	100,100
Accumulated other comprehensive income/(loss)	(1,484)	693
Stock held in treasury, at cost	(84,006)	(78,670)
Common Shareholders' Equity	\$ 79,062	\$ 78,982
Deduction for goodwill	(3,529)	(3,097)
Deduction for identifiable intangible assets	(604)	(297)
Other adjustments	(79)	(2,472)
CET1 capital	\$ 74,850	\$ 73,116
Preferred stock	11,203	11,203
Deduction for investments in covered funds	(610)	(615)
Other adjustments	(3)	(2)
Tier 1 capital	\$ 85,440	\$ 83,702
Qualifying subordinated debt	12,847	13,147
Junior subordinated debt	284	442
Other adjustments	342	154
Tier 2 capital	13,473	13,743
Total capital	\$ 98,913	\$ 97,445

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In the table above:

- Deduction for goodwill was net of deferred tax liabilities of \$667 million as of December 2019 and \$661 million as of December 2018.
- Deduction for identifiable intangible assets was net of deferred tax liabilities of \$37 million as of December 2019 and \$27 million as of December 2018.
- Deduction for investments in covered funds represents our aggregate investments in applicable covered funds, excluding investments that are subject to an extended conformance period. For additional information about the Volcker Rule, see “Note 8. Investments” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K.
- Other adjustments within CET1 capital and Tier 1 capital primarily include credit valuation adjustments on derivative liabilities, the overfunded portion of our defined benefit pension plan obligation net of associated deferred tax liabilities, disallowed deferred tax assets, debt valuation adjustments and other required credit risk-based deductions. Other adjustments within Advanced Tier 2 capital include eligible credit reserves.
- Qualifying subordinated debt is subordinated debt issued by Group Inc. with an original maturity of five years or greater. The outstanding amount of subordinated debt qualifying for Tier 2 capital is reduced upon reaching a remaining maturity of five years. For further information about our subordinated debt, see “Note 14. Unsecured Borrowings” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K.
- Junior subordinated debt is debt issued to a Trust. As of December 2019, 30% of this debt was included in Tier 2 capital and 70% was phased out of regulatory capital. As of December 2018, 40% of this debt was included in Tier 2 capital and 60% was phased out of regulatory capital. Junior subordinated debt is reduced by the amount of Trust Preferred securities we purchase and will be fully phased out of Tier 2 capital by 2022 at a rate of 10% per year. See “Note 14. Unsecured Borrowings” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K, for further information about our junior subordinated debt and Trust Preferred securities.

For further information on the terms and conditions of our common stock, perpetual non-cumulative preferred stock, junior subordinated debt issued to trusts and qualifying subordinated debt, see “Note 14. Unsecured Borrowings” and “Note 19. Shareholders’ Equity” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K.

For additional information on the firm’s capital, see “Equity Capital Management and Regulatory Capital” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K, and the following footnotes to the consolidated financial statements in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 10-K:

- “Note 12. Other Assets” for a discussion on our goodwill and identifiable intangible assets;
- “Note 14. Unsecured Borrowings” for a discussion on our subordinated borrowings and junior subordinated debt issued to trusts; and
- “Note 19. Shareholders’ Equity” for detail on common equity, preferred equity and accumulated other comprehensive income/(loss).

Total Loss-Absorbing Capacity (TLAC)

We are subject to the FRB’s TLAC and related requirements, which became effective in January 2019, with no phase-in period. Failure to comply with the TLAC and related requirements could result in restrictions being imposed by the FRB and could limit our ability to repurchase shares, pay dividends and make certain discretionary compensation payments.

For additional information on TLAC, see “Regulatory Matters and Other Developments” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K.

Pillar 3 Disclosures**Risk-Weighted Assets**

The table below presents information about RWAs calculated in accordance with the Advanced Capital Rules. More details on each of the material components, including a description of the methodologies used, can be found in the remainder of this document, under the section headings indicated below.

Table 4: Risk-Weighted Assets by Exposure Category

\$ in millions	As of		Section Reference
	December 2019	December 2018	
Credit RWAs			
Wholesale Exposures	\$ 193,368	\$ 213,215	Credit Risk
Retail Exposures	16,594	18,509	Credit Risk
Cleared Exposures	3,599	3,556	Credit Risk
Other Assets	35,570	29,490	Credit Risk
Equity Exposures	58,389	52,032	Equity Exposures in the Banking Book
Securitization Exposures	6,900	8,011	Securitizations in the Banking Book
Subtotal: Credit RWAs subject to the 6% add-on	314,420	324,813	
6% add-on ¹	18,865	19,489	
Credit Valuation Adjustment	27,794	24,449	Credit Risk
Total Credit RWAs	361,079	368,751	
Market RWAs			
Regulatory VaR	8,933	7,782	Market Risk
Stressed VaR	30,911	27,952	Market Risk
Incremental Risk	4,308	10,469	Market Risk
Comprehensive Risk	1,191	2,770	Market Risk
Specific Risk	19,043	25,599	Market Risk
Total Market RWAs	64,386	74,572	
Total Operational RWAs	119,188	114,788	Operational Risk
Total RWAs	\$ 544,653	\$ 558,111	

1. The FRB's regulations require that a 6% add-on be applied to all components of our Credit RWAs other than the Credit Valuation Adjustment (CVA) component.

Advanced Credit RWAs as of December 2019 decreased by \$7.67 billion compared with December 2018. Beginning in the fourth quarter of 2019, the firm made changes to the calculation of the loss given default for certain wholesale exposures which resulted in a decrease in credit RWAs, primarily in commitments, guarantees and loans and derivatives. This decrease was partially offset by an increase in other credit RWAs, principally due to the recognition of operating lease right-of-use assets upon adoption of ASU No. 2016-02 and an increase in corporate debt exposures. Advanced Market RWAs as of December 2019 decreased by \$10.19 billion compared with December 2018, primarily reflecting a decrease in specific risk, principally due to reduced exposures, and a decrease in incremental risk, principally due to reduced exposures and changes in risk measurements. Advanced Operational RWAs as of December 2019 increased by \$4.40 billion compared with December 2018, associated with litigation and regulatory proceedings.

Credit Risk**Overview**

Credit risk represents the potential for loss due to the default or deterioration in credit quality of a counterparty (e.g., an OTC derivatives counterparty or a borrower) or an issuer of securities or other instruments we hold. Our exposure to credit risk comes mostly from client transactions in OTC derivatives and loans and lending commitments. Credit risk also comes from cash placed with banks, securities financing transactions (i.e., resale and repurchase agreements and securities borrowing and lending activities) and customer and other receivables.

Credit Risk, which is independent of our revenue-producing units and reports to our chief risk officer, has primary responsibility for assessing, monitoring and managing our credit risk through firmwide oversight across our global businesses. The Risk Governance Committee reviews and approves credit policies and parameters. In addition, we hold other positions that give rise to credit risk (e.g., bonds and secondary bank loans). These credit risks are captured as a component of market risk measures, which are monitored and managed by Market Risk. We also enter into derivatives to manage market risk exposures. Such derivatives also give rise to credit risk, which is monitored and managed by Credit Risk.

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Credit Risk Management Process

Our process for managing credit risk includes the critical components of our risk management framework described in the “Overview and Structure of Risk Management” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K, as well as the following:

- Monitoring compliance with established credit risk limits and reporting our credit exposures and credit concentrations;
- Establishing or approving underwriting standards;
- Assessing the likelihood that a counterparty will default on its payment obligations;
- Measuring our current and potential credit exposure and losses resulting from a counterparty default;
- Using credit risk mitigants, including collateral and hedging; and
- Maximizing recovery through active workout and restructuring of claims.

We also perform credit reviews, which include initial and ongoing analyses of our counterparties. For substantially all of our credit exposures, the core of our process is an annual counterparty credit review. A credit review is an independent analysis of the capacity and willingness of a counterparty to meet its financial obligations, resulting in an internal credit rating. The determination of internal credit ratings also incorporates assumptions with respect to the nature of and outlook for the counterparty’s industry, and the economic environment. Senior personnel, with expertise in specific industries, inspect and approve credit reviews and internal credit ratings.

Our risk assessment process may also include, where applicable, reviewing certain key metrics, including, but not limited to, delinquency status, collateral values, Fair Isaac Corporation credit scores and other risk factors.

Our credit risk management systems capture credit exposure to individual counterparties and on an aggregate basis to counterparties and their subsidiaries. These systems also provide management with comprehensive information about our aggregate credit risk by product, internal credit rating, industry, country and region.

Risk Measures

We measure our credit risk based on the potential loss in the event of non-payment by a counterparty using current and potential exposure. For derivatives and securities financing transactions, current exposure represents the amount presently owed to us after taking into account applicable netting and collateral arrangements, while potential exposure represents our estimate of the future exposure that could arise over the life of a transaction based on market movements within a specified confidence level. Potential exposure also takes into account netting and collateral arrangements. For loans and lending commitments, the primary measure is a function of the notional amount of the position.

Limits

We use credit risk limits at various levels, as well as underwriting standards to manage the size and nature of our credit exposures. Limits for industries and countries are based on our risk appetite and are designed to allow for regular monitoring, review, escalation and management of credit risk concentrations. For information on our limit approval process, see “Overview and Structure of Risk Management” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K.

Credit Risk is responsible for monitoring these limits, and identifying and escalating to senior management and/or the appropriate risk committee, on a timely basis, instances where limits have been exceeded.

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Credit Exposures

For information on our credit exposures, including the gross fair value, netting benefits and current exposure of our derivative exposures and our securities financing transactions, see “Note 7. Derivatives and Hedging Activities” and “Note 11. Collateralized Agreements and Financings” in Part II, Item 8 “Financial Statements and Supplementary Data” and “Credit Risk Management” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K.

Allowance for Losses on Loans and Lending Commitments

For information on our impaired loans, past due loans, loans on nonaccrual status, and allowance for losses on loans and lending commitments, see “Note 9. Loans” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K.

Credit Risk: Risk-Weighted Assets

Credit RWAs are calculated based on measures of credit exposure, which are then risk weighted. Below is a description of the methodology used to calculate RWAs for Wholesale and Retail exposures. Wholesale exposures generally include credit exposures to corporates, sovereigns or government entities (other than Securitization, Retail or Equity exposures). Retail exposures are composed of residential mortgage exposures, qualifying revolving exposures, or other retail exposures, that are managed as part of a segment with homogeneous risk characteristics, not on an individual exposure basis. Certain loans to individuals, including some loans backed by residential real estate, are categorized as Wholesale, rather than Retail, exposures under the Capital Framework as the associated credit risk is assessed on an individual basis and not as part of a portfolio of exposures. We compute risk weights for certain exposures in accordance with the Advanced Internal Ratings-Based (AIRB) approach, which utilizes internal assessments of each counterparty’s creditworthiness.

We utilize internal models to measure exposure for certain products using the Internal Models Methodology (IMM).

Exposure at Default (EAD). For on-balance-sheet Wholesale exposures, such as receivables and cash, the EAD is generally based on the carrying value. For the calculation of EAD for off-balance-sheet exposures, including commitments and guarantees, a credit equivalent exposure amount is calculated based on the notional amount of each transaction multiplied by a credit conversion factor designed to estimate the net additions to funded exposures that would be likely to occur over a one-year horizon, assuming the obligor were to default. Historical studies and empirical data are generally used to estimate the credit conversion factor.

For on-balance-sheet Retail exposures, the EAD is generally based on the carrying value. For off-balance-sheet Retail exposures, EAD is our best estimate of net additions to funded exposures that would be likely to occur over a one-year horizon assuming the Retail exposures in the segment were to default.

For substantially all of the counterparty credit risk arising from OTC derivatives, exchange-traded derivatives and securities financing transactions, we use internal models to calculate the distribution of exposure upon which the EAD calculation is based, in accordance with the IMM. The models estimate Expected Exposures (EE) at various points in the future using risk factor simulations. The model parameters are derived from historical and implied market data using the most recent three-year period as well as a stressed three-year period. The models also estimate the Effective Expected Positive Exposure (EEPE) over the first year of the portfolio, which is the time-weighted average of non-declining positive credit exposure over the EE simulation. In accordance with the Advanced Capital Rules, we calculate two EEPEs: one based on stressed conditions and one based on unstressed conditions. For the stressed EEPE calculation, the model is re-calibrated using historical market parameters from a period of stress as identified by elevated credit spreads for our counterparties. Both stressed and unstressed EAD are calculated by multiplying the EEPE by a standard regulatory factor of 1.4. Our RWAs calculated in accordance with the IMM are the greater of the RWAs based on the stressed or unstressed EEPE.

Our implementation of the IMM incorporates the impact of netting and collateral into calculations of exposure. The EAD detailed in Table 5 below represents the exposures used in computing capital requirements and is not directly comparable to amounts presented in our consolidated balance sheets in our 2019 Form 10-K, due to differences in measurement methodology, counterparty netting and collateral offsets used.

Pillar 3 Disclosures

Advanced Internal Ratings-Based Approach. RWAs are calculated by multiplying EAD by the counterparty's risk weight. In accordance with the AIRB approach, risk weights are a function of the counterparty's Probability of Default (PD), Loss Given Default (LGD) and the effective maturity of the trade or portfolio of trades.

Wholesale Credit Risk Parameters

Wholesale exposures are internally risk rated and assigned PDs and LGDs.

- PD is an estimate of the probability that an obligor will default over a one-year horizon. For the majority of our Wholesale exposure, the PD is assigned using an approach where quantitative factors are combined with a qualitative assessment to determine internal credit rating grades. For each internal credit rating grade, over 5 years of historical empirical data is used to calculate a long run average annual PD which is assigned to each counterparty with that credit rating grade.

While the firm's default experience is incorporated into the determination of probability of default, our internal credit rating grades each have external public rating agency equivalents. The scale that we employ for internal credit ratings corresponds to those used by the major rating agencies and our internal credit ratings, while arrived at independently of public ratings, are assigned using definitions of each internal credit rating grade that are consistent with the definitions used by the major rating agencies for their equivalent credit rating grades. As a result, we are able to map default data published by the major rating agencies for obligors with public ratings to our counterparties with equivalent internal credit ratings for use in quantification and validation of risk parameters.

- LGD is an estimate of the economic loss rate if a default occurs during economic downturn conditions. For Wholesale exposures, the LGD is determined using recognized vendor models, but exposure-specific estimates of LGD are employed where the recovery prospects of an exposure are more accurately captured by an analysis incorporating information about the specific collateral, structure or counterparty.

- The definition of effective maturity depends on the nature of the exposure. For OTC derivatives, effective maturity is an average time measure weighted by credit exposure (based on EE and EEPE). For securities financing transactions, effective maturity represents the notional weighted average number of days to maturity. For other products, the effective maturity is based on the contractual maturity. Effective maturity is floored at one year and capped at five years except where the Advanced Capital Rules allow a maturity of less than one year to be used as long as certain criteria are met.

The table below presents a distribution of EAD, Weighted Average LGD, Weighted Average PD, and Weighted Average Risk Weight by PD band for Wholesale exposures (excluding cleared transactions). The table also shows the notional amount of undrawn commitments and guarantees that are included in the Total EAD.

Table 5: Credit Risk Wholesale Exposures by PD Band*\$ in millions*

As of December 2019

PD Band Range	Total EAD ^{1,2}	Exposure Weighted Average LGD	Exposure Weighted Average PD	RWAs	Exposure Weighted Average Risk Weight	Undrawn Commitments & Guarantees ³	Undrawn Commitments & Guarantees EAD
0 to <0.05%	\$ 224,739	27.72%	0.02%	\$ 10,407	4.63%	\$ 18,148	\$ 13,542
0.05% to <0.25%	181,978	40.35%	0.09%	37,567	20.64%	71,016	51,598
0.25% to <0.75%	33,403	36.68%	0.44%	17,178	51.43%	20,991	10,621
0.75% to <5.0%	64,233	35.87%	2.02%	65,942	102.66%	27,930	13,259
5.0% to <20%	24,613	40.16%	7.27%	39,277	159.58%	8,328	4,112
20% to <100%	8,890	45.65%	21.28%	21,039	236.66%	2,051	1,702
100% (default)	1,958	37.91%	100.00%	1,958	100.00%	12	5
Total	\$ 539,814			\$ 193,368		\$ 148,476	\$ 94,839

1. Includes Counterparty Credit Risk EAD of \$159.53 billion.

2. Collateral is generally factored into the EAD for OTC derivatives and securities financing transactions using the IMM.

3. Excludes \$9.39 billion of unfunded commitments and guarantees that are treated for regulatory capital purposes as securitizations. See "Securitizations in the Banking Book."

Pillar 3 Disclosures**Retail Credit Risk Parameters**

For Retail exposures, statistical techniques are used to devise risk segmentation that results in homogeneous risk segments that are heterogeneous from each other. Segmentation uses borrower-related and exposure-related characteristics that reliably and consistently, over time, differentiate a segment's risk from that of other segments. Risk drivers considered for segmentation are generally consistent with the predominant risk characteristics used for internal credit risk measurement and management.

- Retail PD is our empirically based best estimate of the long-run average one-year default rate for the exposures in the segment, capturing the average default experience for exposures in the segment over a mix of economic conditions, including economic downturn conditions.

- Retail LGD is our empirically based best estimate of the economic loss or long-run default-weighted average economic loss, per dollar of EAD, we would expect to incur if the exposures in the segment were to default within a one-year horizon over a mix of economic conditions, including economic downturn conditions.

The table below presents a distribution of EAD, Weighted Average LGD, Weighted Average PD, and Weighted Average Risk Weight by PD band for Retail exposures. The table also shows the notional amount of undrawn commitments that are included in the Total EAD. The Retail exposures include purchased performing and distressed loans backed by residential real estate and consumer loans.

Table 6: Credit Risk Retail Exposures by PD Band

\$ in millions

As of December 2019

PD Band Range	Total EAD ¹	Exposure Weighted Average LGD	Exposure Weighted Average PD	RWAs	Exposure Weighted Average Risk Weight	Undrawn Commitments ³	Undrawn Commitments EAD
0 to <0.05%	\$ 2,893	50.12%	0.04%	\$ 78	2.70%	\$ 3,921	\$ 1,295
0.05% to <0.25%	7,043	63.62%	0.14%	653	9.27%	8,516	3,027
0.25% to <0.75%	5,145	51.77%	0.41%	1,258	24.45%	2,747	1,133
0.75% to <5.0%	7,373	76.34%	2.14%	6,589	89.37%	1,716	707
5.0% to <20%	2,885	85.47%	10.65%	4,619	160.10%	211	208
20% to <100%	589	68.80%	51.88%	910	154.50%	69	18
100% (default) ²	2,487	39.30%	100.00%	2,487	100.00%	153	134
Total	\$ 28,415			\$ 16,594		\$ 17,333	\$ 6,522

1. Includes residential mortgage EAD of \$12.87 billion, qualifying revolving exposures EAD of \$6.67 billion, and other retail EAD of \$8.87 billion.

2. The majority of exposures within this PD band are purchased distressed loans.

3. The majority of undrawn commitments are qualifying revolving exposures, which are unconditionally cancelable.

Pillar 3 Disclosures**Governance and Validation of Risk Parameters**

Approaches and methodologies for quantifying PD, LGD, and EAD are monitored and managed by Credit Risk. Models used for regulatory capital are independently reviewed, validated and approved by Model Risk. For further information, see “Model Risk Management.”

To assess the performance of the PD parameters used, we perform a benchmarking exercise which includes comparisons of realized annual default rates to the expected annual default rates for each credit rating band and comparisons of the internal realized long-term average default rates to the empirical long-term average default rates assigned to each credit rating band. For the year ended December 2019, as well as in previous annual periods, the PDs used for regulatory capital calculations were, on average, higher (i.e., more conservative) than our actual internal realized default rate.

During the year ended December 2019, our credit exposure to counterparties that defaulted remained low, representing less than 0.5% of our total credit exposure, and substantially all of such exposure was related to loans and lending commitments. Estimated losses associated with these defaults have been recognized in earnings.

To assess the performance of LGD parameters used, we compare recovery rates following counterparty defaults to the recovery rates based on LGD parameters assigned to the corresponding exposures prior to default. While the actual realized recovery on each defaulted exposure varies due to transaction and other situation-specific factors, on average, recovery rates remain higher than those implied by the LGD parameters used in our regulatory capital calculations.

The performance of each IMM model used to quantify EAD is assessed quarterly via backtesting procedures, performed by comparing the predicted and realized exposure of a set of representative trades and portfolios at certain horizons. Our models are monitored and enhanced in response to backtesting.

Credit Risk Mitigation

To reduce our credit exposures on derivatives and securities financing transactions, we may enter into master netting agreements or similar arrangements (collectively, netting agreements) with counterparties that permit us to offset receivables and payables with such counterparties. A netting agreement is a contract with a counterparty that permits net settlement of multiple transactions with that counterparty, including upon the exercise of termination rights by a non-defaulting party. Upon exercise of such termination rights, all transactions governed by the netting agreement are terminated and a net settlement amount is calculated.

We may also reduce credit risk with counterparties by entering into agreements that enable us to receive and post cash and securities collateral with respect to our derivatives and securities financing transactions, subject to the terms of the related credit support agreements or similar arrangements (collectively, credit support agreements). An enforceable credit support agreement grants the non-defaulting party exercising termination provisions the right to liquidate collateral and apply the proceeds to any amounts owed. In order to assess enforceability of our right to setoff under netting and credit support agreements, we evaluate various factors including applicable bankruptcy laws, local statutes and regulatory provisions in the jurisdiction of the parties to the agreement. Securities collateral obtained primarily includes U.S. and non-U.S. government and agency obligations.

Our collateral is managed by certain functions within the firm which review exposure calculations, make margin calls with relevant counterparties, and ensure subsequent settlement of collateral movements. We monitor the fair value of the collateral to ensure that our credit exposures are appropriately collateralized.

For additional information about our derivatives (including collateral and the impact of the amount of collateral we would have to provide in the event of a ratings downgrade), see “Note 7. Derivatives and Hedging Activities” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K. See “Note 11. Collateralized Agreements and Financings” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K for further information about our collateralized agreements and financings.

Pillar 3 Disclosures

For loans and lending commitments, depending on the credit quality of the borrower and other characteristics of the transaction, we employ a variety of potential risk mitigants. Risk mitigants include collateral provisions, guarantees, covenants, structural seniority of the bank loan claims and, for certain lending commitments, provisions in the legal documentation that allow us to adjust loan amounts, pricing, structure and other terms as market conditions change. The type and structure of risk mitigants employed can significantly influence the degree of credit risk involved in a loan or lending commitment.

When we do not have sufficient visibility into a counterparty's financial strength or when we believe a counterparty requires support from its parent, we may obtain third-party guarantees of the counterparty's obligations. We may also mitigate our credit risk using credit derivatives or participation agreements.

Credit Derivatives

We enter into credit derivative transactions primarily to facilitate client activity and to manage the credit risk associated with market-making, including to hedge counterparty exposures arising from OTC derivatives (intermediation activities).

We also use credit derivatives to hedge counterparty exposure associated with investing and financing activities. Some of these hedges qualify as credit risk mitigants for regulatory capital purposes. For these transactions, the substitution approach is applied, where the PD and/or LGD associated with the credit derivative counterparty replaces the PD and/or LGD of the loan obligors for capital calculations. Where the aggregate notional of credit derivatives hedging exposure to a loan obligor is less than the notional loan exposure, the substitution approach is only employed for the percentage of loan exposure covered by eligible credit derivatives. As of December 2019, our purchased credit default swaps that were used to hedge counterparty exposure associated with investing and financing activities had a notional amount of \$7.42 billion, of which \$3.58 billion were deemed to be eligible hedges for regulatory capital purposes.

For further information regarding our credit derivative transactions, see "Note 7. Derivatives and Hedging Activities" in Part II, Item 8 "Financial Statements and Supplementary Data" in our 2019 Form 10-K.

For information regarding credit risk concentrations, see "Note 26. Credit Concentrations" in Part II, Item 8 "Financial Statements and Supplementary Data" in our 2019 Form 10-K.

Wrong-Way Risk

We seek to minimize risk where there is a significant positive correlation between the probability of default of a counterparty and our exposure to that counterparty (net of the market value of any collateral we receive), which is known as "wrong-way risk." Wrong-way risk is commonly categorized into two types: specific wrong-way risk and general wrong-way risk. We categorize exposure as specific wrong-way risk when our counterparty and the issuer of the reference asset of the transaction are the same entity or are affiliates, or if the collateral supporting a transaction is issued by the counterparty or its affiliates. General wrong-way risk arises when there is a significant positive correlation between the probability of default of a counterparty and general market risk factors affecting the exposure to that counterparty. We have procedures in place to actively identify, monitor and control specific and general wrong-way risk, beginning at the inception of a transaction and continuing through its life, including assessing the level of risk through stress tests. We ensure that material wrong-way risk is mitigated using collateral agreements or increases to initial margin, where appropriate.

Credit Valuation Adjustment Risk-Weighted Assets

RWAs for CVA address the risk of losses related to changes in counterparty credit risk arising from OTC derivatives. We calculate RWAs for CVA primarily using the Advanced CVA approach set out in the Capital Framework, which permits the use of regulator approved VaR models. Consistent with our Regulatory VaR calculation (see "Market Risk" for further details), the CVA RWAs are calculated at a 99% confidence level over a 10-day time horizon. The CVA RWAs also include a stressed CVA component, which is also calculated at a 99% confidence level over a 10-day horizon using both a stressed VaR period and stressed EEs. The CVA VaR model estimates the impact on our credit valuation adjustments of changes to our counterparties' credit spreads. It reflects eligible CVA hedges (as defined in the Capital Framework), but it excludes those hedges that, although used for risk-management purposes, are ineligible for inclusion in the regulatory CVA VaR model. Examples of such hedges are interest rate hedges, or those that do not reference the specific exposures they are intended to mitigate, but are nevertheless highly correlated to the underlying credit risk.

Pillar 3 Disclosures**Other Credit Risk-Weighted Assets**

Credit RWAs (as summarized in Table 4 above) also include the following components:

Cleared Transactions. RWAs for cleared transactions and default fund contributions (defined as payments made by clearing members to central clearing agencies pursuant to mutualized loss arrangements) are calculated based on specific rules within the Capital Framework. A majority of our exposures on centrally cleared transactions are to counterparties that are considered to be Qualifying Central Counterparties in accordance with the Capital Framework. Such exposures arise from the following cleared products: OTC derivatives, exchange-traded derivatives, and securities financing transactions. These exposures are required to be risk weighted at either 2% or 4% based on the specified criteria.

Other Assets. Other assets primarily include property, leasehold improvements and equipment, deferred tax assets, and assets for which there is no defined capital methodology or that are not material. RWAs for other assets are generally based on the carrying value plus a percentage of the notional amount of off-balance-sheet exposures, and are typically risk weighted at 100%.

Equity Exposures in the Banking Book**Overview**

We make investments, both directly and indirectly through funds that we manage, in public and private equity securities, as well as in debt securities and loans and real estate entities. We also enter into commitments to make such investments. These investments are typically longer-term in nature and are primarily held for capital appreciation purposes. Equity investments that are not consolidated are classified for regulatory capital purposes as banking book equity exposures.

See “Note 8. Investments” for further information on our equity investments; “Note 18. Commitments, Contingencies and Guarantees” for information on our equity investment commitments; and “Note 22. Transactions with Affiliated Funds” for a description of transactions with affiliated funds, in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K.

Risk Management

Our equity investments and investment commitments are subject to comprehensive risk management processes through which we assess investment opportunities, and monitor, evaluate and manage the risks associated with such investments.

Risk management governance starts with the Board, which both directly and through its committees oversees our risk management policies and practices.

Prior to making an investment, or entering into an investment commitment, opportunities are subject to rigorous due diligence review by both investment professionals and control side functions and approval by the relevant divisional investment committee and, where appropriate, firmwide transactional committees such as the Firmwide Investment Policy Committee and the Firmwide Reputational Risk Committee. The committees consider, among other matters, the risks and rewards of the opportunity, as well as factors such as balance sheet usage and risk measures such as stress tests.

On an ongoing basis, our equity exposures are reviewed by senior management and the Firmwide Risk Committee.

Pillar 3 Disclosures

Other critical components of our risk management processes and procedures include setting limits (such as balance sheet limits) and our discipline of marking substantially all of our equity investments to current market levels, verified by our independent risk oversight and control functions.

Our equity exposures are included in the scope of our stress tests, which are conducted on a regular basis as part of our routine risk management process and on an ad hoc basis in response to market events or concerns. We use stress tests to examine the risks of specific equity investments as well as the potential impact of significant risk exposures across the firm. We use a variety of scenarios to calculate the potential loss from a wide range of market moves on our equity investments.

Valuation and Accounting Policies

Substantially all of our equity investments are held at fair value. For further information on our accounting and valuation policies applicable to equity investments, see the following sections in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K.

- “Note 3. Significant Accounting Policies” for a discussion of our policies on consolidation, equity-method investments and investment funds;
- “Note 4. Fair Value Measurements” for a description of the valuation techniques and significant inputs used to determine fair values; and
- “Note 8. Investments” for a description of our policies for recognizing gains and losses through earnings.

Regulatory Capital Measurement

Our equity exposures include investments in funds that are required to be treated as “financial institutions” for the purposes of the deduction from capital for investments in the capital of nonconsolidated financial institutions. If an equity investment in a nonconsolidated financial institution is 10% or more of that institution’s common equity (or equivalent), then it is regarded as “significant.” We are required to deduct from our CET1 capital any excess of the aggregate of our significant investments in the common stock of nonconsolidated financial institutions that exceeds 10% of our CET1 capital, subject to certain adjustments. The remainder of the aggregate of our significant investments is risk weighted at 250%. All non-common significant investments must be deducted from Tier 1 or Tier 2 capital using the corresponding deduction approach.

The computation of RWAs for banking book equity investments that are not deducted from capital is based on either the Simple Modified Look-Through Approach (SMLTA) or the Simple Risk Weight Approach (SRWA).

Equity exposures in investment funds that do not have material leverage are risk weighted based on the SMLTA, where risk weights are determined based on the highest risk weights that would apply to the types of investments that the fund is permitted to hold under the terms of its prospectus. An equity investment in an investment fund is considered applicable for treatment in accordance with the look-through approach if the investment fund has no material liabilities and the assets of the fund are substantially all “financial assets.”

Pillar 3 Disclosures

Direct equity investments and equity investments in leveraged investment funds are risk weighted in accordance with the SRWA in accordance with the table below.

Risk Weight Investment Category

20%	An equity exposure to a Public Sector Entity (PSE), Federal Home Loan Bank (FHLB) or Farmer Mac
100%	Community development equity exposures Non-significant equity exposures to the extent that the aggregate adjusted carrying value of the exposures does not exceed 10% of our Tier 1 capital plus Tier 2 capital
250%	Significant common stock investments in financial institutions which are not deducted from capital
300%	A publicly traded equity exposure (other than an equity exposure that receives a 600% risk weight)
400%	A private equity exposure (other than an equity exposure that receives a 600% risk weight)
600%	An equity exposure to an investment firm that (i) would meet the definition of a traditional securitization but for the fact that the investment firm can exercise control over the size and composition of their assets, liabilities, and off-balance-sheet exposures, and (ii) has greater than immaterial leverage

Risk weights are applied to the “adjusted carrying value” of the equity exposure. For on-balance-sheet positions, the adjusted carrying value is the same as the balance sheet carrying value. For our unfunded equity investment commitments, the adjusted carrying value is a percentage of the notional amount, based on the estimated funding of the commitment during economic downturn conditions.

Although the SRWA assigns specific risk weights to different types of equity exposures as set out above, the regulations allow for “non-significant equity exposures” to be risk weighted at 100% to the extent they do not exceed in the aggregate 10% of our Tier 1 plus Tier 2 capital, with the remaining portion then risk weighted as appropriate in accordance with the SRWA. Generally, those equity exposures that would attract the lowest risk weights under SRWA are required to be treated as non-significant equity exposures, before inclusion of any equity exposures that would otherwise attract higher risk weights under SRWA.

The table below presents the adjusted carrying values and RWAs for our equity exposures in the banking book.

Table 7: Equity Exposures in the Banking Book

<i>\$ in millions</i>	As of December 2019		
	Adjusted Carrying Value ^{1,3}	Risk Weight %	RWAs
Simple Risk Weight Approach (SRWA)			
Equity exposures to a PSE, FHLB or Farmer Mac	\$ 52	20%	\$ 10
Community development equity exposures	2,099	100%	2,099
Non-significant equity exposures	9,891	100%	9,891
Significant investments in the common stock of nonconsolidated financial institutions	5,155	250%	12,888
Publicly traded equity exposures ²	-	300%	-
Private equity exposures ²	7,453	400%	29,812
Equity exposures in leveraged investment funds	375	600%	2,250
Total SRWA	\$ 25,025		\$ 56,950
Simple Modified Look-Through Approach (SMLTA)			
Equity Exposures to Investment Funds	1,273		1,439
Total SMLTA	\$ 1,273		\$ 1,439
Total	\$ 26,298		\$ 58,389

1. The adjusted carrying value of the equity exposures includes \$1.95 billion representing a percentage of our unfunded commitment exposure.
2. Our publicly traded and a portion of our private equity exposures are risk weighted as non-significant equity exposures.
3. Adjusted carrying value consists of \$3.24 billion of publicly traded and \$23.06 billion of private equity exposures.

Securitizations in the Banking Book

Overview

The Capital Framework defines certain activities as securitization transactions which attract capital requirements in accordance with the “Securitization Framework.” A portion of our positions that meet the regulatory definition of a securitization are in our trading book and capital requirements for those positions are calculated in accordance with the market risk capital rules (see “Market Risk - Specific Risk - Securitization Positions”). However, we also have certain banking book positions that meet the regulatory definition of a securitization.

In accordance with the Capital Framework, the regulatory definition of a securitization includes the following criteria:

- All or a portion of the credit risk of one or more underlying exposures is transferred to one or more third parties;
- The credit risk associated with the underlying exposures has been separated into at least two tranches reflecting different levels of seniority;
- Performance of the securitization exposures depends upon the performance of the underlying exposures; and
- All or substantially all of the underlying exposures are financial exposures.

The regulations also distinguish between traditional and synthetic securitizations, the primary difference being that a traditional securitization involves the transfer of assets from a bank’s balance sheet into a securitization vehicle, whereas a synthetic securitization involves the transfer of credit risk through credit derivatives or guarantees.

There are also specific rules for resecuritization exposures (a resecuritization exposure is one which involves the securitization of assets, one or more of which has already been securitized). As of December 2019, we did not have any material banking book securitization exposures that met the definition of a resecuritization.

We have described below our banking book activities that meet the regulatory definition of a securitization. It is important to note that the scope of banking book securitizations for regulatory purposes is not comparable to the securitization activity reported in “Note 16. Securitization Activities” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K.

Credit Protection (Synthetic Securitizations). Some of the credit protection that we have purchased meets the definition of a “synthetic securitization” in accordance with the Capital Framework. The positions on which we have purchased protection are therefore treated for regulatory capital purposes in accordance with the Securitization Framework. In the most material of these synthetic securitization transactions, our hedge counterparty provides us with credit loss protection on certain approved loan commitments (primarily investment-grade commercial lending commitments). The notional amount of such loan commitments was \$5.74 billion as of December 2019. The credit loss protection on loan commitments provided by our hedge counterparty is generally limited to 95% of the first loss we realize on such commitments, up to a maximum of approximately \$950 million. In addition, subject to the satisfaction of certain conditions, upon the firm’s request, our hedge counterparty will provide protection for 70% of additional losses on such commitments, up to a maximum of \$750 million, of which no protection had been provided as of December 2019.

Warehouse Financing and Lending. We provide financing to clients who warehouse financial assets. These arrangements are secured by the warehoused assets. Some of these transactions meet the definition of a securitization exposure in accordance with the Capital Framework, and are primarily secured by corporate loans and asset-backed and other loans. We also provide financing to non-operating companies on an over-collateralized basis.

OTC Derivatives facing Securitization Special Purpose Entities (SSPEs). We have OTC derivatives (primarily credit derivatives) with counterparties that meet the definition of an SSPE. An SSPE is an entity organized for the specific purpose of holding the assets underlying a securitization, whose activities are limited to holding such assets, and whose structure is intended to isolate the underlying assets from the credit risk of the seller who originally sold them to the SSPE. An OTC derivative with an SSPE counterparty attracts counterparty credit risk capital requirements in accordance with the Securitization Framework. All of our derivatives that fall into this category are considered to be covered positions in accordance with the FRB’s final rules, and as such they are also subject to market risk regulatory capital requirements (see “Market Risk”).

Pillar 3 Disclosures

Other. We have certain other banking book securitization activities such as holding securities issued by securitization vehicles.

Risk Management

By engaging in the banking book securitization activities noted above, we are primarily exposed to credit risk and to the performance of the underlying assets. We mitigate the credit risk arising on our banking book securitization activities primarily through the purchase of credit protection and through obtaining collateral, predominantly in the form of cash, securities or loans. These positions are incorporated into our overall risk management of financial instruments.

Accounting/Valuation Policies

For information on accounting and valuation policies applicable to these positions, see “Note 3. Significant Accounting Policies” and related footnotes in Part II, Item 8 “Financial Statements and Supplementary” in our 2019 Form 10-K.

Calculation of Risk-Weighted Assets

RWAs for banking book securitization exposures (including counterparty credit risk exposures that arise from trading book derivative positions) are calculated through application of a hierarchy of approaches described below.

Deduction. A bank is required to deduct from CET1 capital any after-tax gain on sale resulting from the sale of loans for the purpose of a traditional securitization, unless the banking organization’s equity capital has increased as a consequence of having received cash in connection with the securitization. As of December 2019, we did not have any material deductions of this nature.

Supervisory Formula Approach (SFA). If a bank is in a position to obtain or calculate, on an on-going basis, (using data no more than 91 days old) all of the parameters needed to perform the SFA calculation, then it must use this methodology to calculate the capital requirements for a securitization position. In accordance with the SFA, RWAs are based on the capital requirements that would apply to the underlying assets if they were held directly on our balance sheet; this is then adjusted to take account of the degree of subordination (i.e., loss absorbance by junior tranches) of a given tranche. The capital requirements that would apply in accordance with the Advanced Capital Rules to the underlying assets must be calculated separately for each asset, unless the underlying assets are a homogenous pool of retail exposures, in which case the calculation can be done for the overall pool. The parameters required in order to calculate RWAs in accordance with the SFA are set out below:

Amount of underlying exposure (UE)	The EAD of all underlying exposures within the pool
Tranche Percentage (TP)	Ratio of the amount of the bank’s securitization exposure to the amount of the tranche that contains the securitization exposure
Capital requirement on underlying exposures (Kirb)	The AIRB capital requirement if the underlying exposures were held directly on balance sheet. This requires an assignment of PD and LGD to the underlying exposures. It is calculated as the ratio of i) the sum of the risk-based capital requirements for the underlying exposures plus the expected credit losses of the underlying exposures; to ii) UE
Credit Enhancement Level (L)	Ratio of the amount of all securitization exposure subordinated to the tranche that contains the bank’s securitization exposure to UE
Thickness of Tranche (T)	Ratio of the amount of the tranche that contains the bank’s securitization exposure to UE
N	Effective number of exposures in the underlying pool
EWALGD	Exposure weighted average loss given default of the underlying pool

Based on the above inputs, the SFA uses a prescribed regulatory formula to calculate the capital requirement. It results in a 1,250% risk weight for portions of the tranche with a subordination level below the Kirb threshold (see definition in the table above) and applies progressively lower RWAs to more senior tranches above the Kirb threshold, subject to a minimum risk weight of 20%.

Pillar 3 Disclosures**Simplified Supervisory Formula Approach (SSFA).**

The SSFA is allowed only if the information needed to perform the SFA is not available, and only if the data used in the calculation is no more than 91 calendar days old.

Consistent with the SFA, the SSFA is based on the capital requirements that would apply to the underlying pool of assets if they were held directly on the balance sheet; this is then adjusted to take account of the degree of subordination of a given tranche, and the level of delinquent exposures in the pool. A key difference, however, is that the capital requirements applicable to the assets in the securitization pool are calculated using the Standardized Capital Rules, rather than the Advanced Capital Rules. The SSFA also mirrors the SFA in that the capital requirements are lower for senior securitization exposures and higher for more junior ones.

The parameters required in order to calculate RWAs in accordance with the SSFA are set out below:

Weighted average capital requirement on underlying exposures (Kg)	Weighted average capital requirement of the underlying pool based on the Standardized Capital Rules
Severe delinquency and non-performance (W)	Ratio of delinquent exposures in the underlying pool
Attachment point (A)	Represents the threshold at which credit losses will first be allocated to the exposure
Detachment point (D)	Represents the threshold at which credit losses of principal allocated to the exposure would result in a total loss of principal
Securitization Surcharge (P)	Supervisory calibration parameter (0.5 for securitizations and 1.5 for resecuritizations). This parameter results in a capital requirement that would be 50% or 150% higher than assets held directly on balance sheet

Similar to the SFA, the SSFA results in a 1,250% risk weight for portions of the tranche with a subordination level below the Kg threshold, and applies progressively lower RWAs to more senior tranches above the Kg threshold, subject to a minimum risk weight of 20%.

1,250% Risk Weight. If the securitization is neither deducted from regulatory capital, nor qualifies for either SFA or SSFA, a 1,250% risk weight is applied.

An exception to the hierarchy of approaches described above is for securitizations that are non-credit OTC derivatives that have a first priority claim on the cash flows from the underlying exposures. Subject to supervisory approval, the RWAs for such securitizations may be equal to the exposure amount.

Exposure Amount

The definition of “exposure amount” that is used for regulatory purposes for banking book securitizations is set out below.

Exposure Amount by product - Banking Book

On-Balance-Sheet	Loans and Securities: carrying value (either fair value or cost)
Off-Balance-Sheet	Unfunded commitments: the notional amount for unfunded commitments adjusted by the appropriate credit conversion factor
	Credit derivatives: the notional amount for credit derivatives adjusted for applicable collateral after applying the appropriate haircuts
	Other derivatives: model-based EEPE is used for OTC derivative contracts (except for credit derivatives)

Pillar 3 Disclosures

The table below presents the exposure amount and related RWAs of our banking book securitizations, including on-balance-sheet (retained or purchased) and off-balance-sheet exposures, broken out between traditional and synthetic securitizations, by underlying exposure type.

Exposure amounts below represent the associated EAD as calculated and defined by the regulatory rules, and are not comparable to securitization measures reported in “Note 16. Securitization Activities” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K.

Table 8: Securitization Exposures and Related RWAs by Exposure Type

\$ in millions

As of December 2019

	Exposure Amount (EAD)				RWAs
	On-balance-sheet EAD	Off-balance-sheet EAD		Total EAD	
	Traditional EAD	Traditional EAD	Synthetic EAD		
Residential mortgages	\$ 2,110	\$ -	\$ -	\$ 2,110	\$ 1,854
Commercial mortgages	5,205	142	-	5,347	1,792
Corporates	1,616	1,179	3,087	5,882	1,414
Asset-backed and other	3,231	2,965	-	6,196	1,738
OTC Derivatives facing SSPEs ¹	-	-	50	50	102
Total	\$ 12,162	\$ 4,286	\$ 3,137	\$ 19,585	\$ 6,900

1. Represents counterparty credit risk charges on trading book OTC derivative transactions that face securitization SPEs. See “Market Risk – Specific Risk – Securitization Positions” for further information on our trading book exposures.

The table below presents the aggregate amount of our banking book securitization exposures further categorized by risk-based capital approach and risk-weight bands.

Exposure amounts below represent the associated EAD, as calculated and defined by the regulatory rules.

Table 9: Securitization Exposures and Related RWAs by Regulatory Capital Approach

\$ in millions

As of December 2019

	SFA		SSFA		1,250 percent risk weight		Total	
	EAD	RWAs	EAD	RWAs	EAD	RWAs	EAD	RWAs
0% - 25%	\$ 3,986	\$ 797	\$ 12,182	\$ 2,459	\$ -	\$ -	\$ 16,168	\$ 3,256
26% - 100%	415	255	1,579	600	-	-	1,994	855
101% - 250%	283	473	1,006	1,602	-	-	1,289	2,075
251% - 650%	19	57	83	267	-	-	102	324
651% - 1,250%	29	355	3	35	-	-	32	390
Total	\$ 4,732	\$ 1,937	\$ 14,853	\$ 4,963	\$ -	\$ -	\$ 19,585	\$ 6,900

Pillar 3 Disclosures

We account for a securitization as a sale when we have relinquished control over the transferred financial assets. Prior to securitization, we account for assets pending transfer at fair value and therefore do not typically recognize significant gains or losses upon the transfer of assets. As of December 2019, total assets held with the intent to securitize were \$10.07 billion.

The table below provides the principal amount of positions that we held in our banking book that have been securitized in the current year, whether or not we have retained a position. There has been no material new activity in relation to our synthetic securitization hedge transactions for the year ended December 2019.

The principal amount is presented for the purpose of providing information about the size of our banking book securitization activities. This amount is not representative of our risk of loss.

Table 10: Securitization Activity – Banking Book

<i>\$ in millions</i>	Year Ended December 2019	
Residential mortgages	\$	7,812
Commercial mortgages		10,438
Asset-backed and other		1,933
Total Activity	\$	20,183

Market Risk**Overview**

Market risk is the risk of loss in the value of our inventory, investments, loans and other financial assets and liabilities accounted for at fair value due to changes in market conditions. Categories of market risk include the following:

- Interest rate risk: results from exposures to changes in the level, slope and curvature of yield curves, the volatilities of interest rates, prepayment speeds and credit spreads;
- Equity price risk: results from exposures to changes in prices and volatilities of individual equities, baskets of equities and equity indices;
- Currency rate risk: results from exposures to changes in spot prices, forward prices and volatilities of currency rates; and
- Commodity price risk: results from exposures to changes in spot prices, forward prices and volatilities of commodities, such as crude oil, petroleum products, natural gas, electricity, and precious and base metals.

Market Risk, which is independent of our revenue-producing units and reports to our chief risk officer, has primary responsibility for assessing, monitoring and managing our market risk through firmwide oversight across our global businesses.

Managers in revenue-producing units and Market Risk discuss market information, positions and estimated loss scenarios on an ongoing basis. Managers in revenue-producing units are accountable for managing risk within prescribed limits. These managers have in-depth knowledge of their positions, markets and the instruments available to hedge their exposures.

Pillar 3 Disclosures

Market Risk Management Process

Our process for managing market risk includes the critical components of our risk management framework described in the “Overview and Structure of Risk Management” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K, as well as the following:

- Monitoring compliance with established market risk limits and reporting our exposures;
- Diversifying exposures;
- Controlling position sizes; and
- Evaluating mitigants, such as economic hedges in related securities or derivatives.

We produce risk measures and monitor them against established market risk limits. These measures reflect an extensive range of scenarios and the results are aggregated at product, business and firmwide levels. For additional information regarding our market risk measures, and risk limits, see “Risk Management – Market Risk Management” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K.

Market Risk-Weighted Assets

Our covered positions are subject to market risk capital requirements which are designed to cover the risk of loss in value of these positions due to changes in market conditions. These capital requirements are determined either by applying prescribed risk weighting factors, or they are based on internal models which are subject to various qualitative and quantitative parameters. The market risk regulatory capital rules require that a BHC obtain prior written agreement from its regulators before using any internal model to calculate its risk-based capital requirement for covered positions.

RWAs for market risk under the market risk regulatory capital rules are calculated using the following internal models: VaR, Stressed VaR (SVaR), Incremental risk and Comprehensive risk. In addition, the Specific risk measure is also used to calculate RWAs for market risk, under the standardized measurement method, for certain securitized and non-securitized covered positions by applying risk-weighting factors predetermined by regulators, to positions after applicable netting is performed. As defined in the FRB’s regulations, RWAs for market risk are the sum of each of these measures multiplied by 12.5. An overview of each of these measures is provided below.

Regulatory VaR. VaR is the potential loss in value of trading assets and liabilities, as well as certain investments, loans, and other financial assets and liabilities accounted for at fair value, due to adverse market movements over a defined time horizon with a specified confidence level. For both risk management purposes (positions subject to VaR limits) and regulatory capital calculations (for covered positions), the firm uses a single VaR model, which captures risks including those related to interest rates, equity prices, currency rates and commodity prices. As such, VaR facilitates comparison across portfolios of different risk characteristics. VaR also captures the diversification of aggregated risk at the firmwide level.

VaR used for regulatory capital requirements (Regulatory VaR) differs from risk management VaR due to different time horizons and confidence levels (10-day and 99% for Regulatory VaR vs. one-day and 95% for risk management VaR), as well as differences in the scope of positions on which VaR is calculated. In addition, the daily net revenues used to determine risk management VaR exceptions (i.e., comparing the daily net revenues to the VaR measure calculated as of the end of the prior business day) include intraday activity, whereas the FRB’s regulatory capital rules require that intraday activity be excluded from daily net revenues when calculating Regulatory VaR exceptions. Intraday activity includes bid/offer net revenues, which are more likely than not to be positive by their nature. As a result, there may be differences in the number of VaR exceptions and the amount of daily net revenues calculated for Regulatory VaR compared to the amounts calculated for risk management VaR.

In accordance with the market risk regulatory capital requirements, we evaluate the accuracy of our VaR model through daily backtesting. The results of the backtesting determine the size of the VaR multiplier used to compute RWAs.

Pillar 3 Disclosures

The table below presents by risk category our period-end, high, low and mean of the average daily Regulatory VaR for the period-end VaR as of December 2019. Average, per the market risk regulatory capital requirements, is determined based on the average daily Regulatory VaR over the preceding 60 business days.

Table 11: Regulatory VaR

<i>\$ in millions</i>	As of	Three Months Ended		
	December 2019	December 2019		
		High	Low	Mean
Regulatory VaR	\$ 238	\$ 238	\$ 222	\$ 228
VaR x Multiplier	715 ¹			
RWAs	\$ 8,933			
Regulatory VaR	\$ 238	\$ 238	\$ 222	\$ 228
Interest rates	182	182	177	180
Equity prices	100	119	100	111
Currency rates	40	51	40	46
Commodity prices	53	56	53	55
Diversification effect ²	\$ (137)			\$ (164)

1. Regulatory VaR is subject to a regulatory multiplier that is set at a minimum of three (which is the multiplier used in this table) and can be increased up to four, depending upon the number of backtesting exceptions. See "Regulatory VaR Backtesting Results." This result is further multiplied by 12.5 to convert into RWAs. Calculation differences may exist due to rounding.
2. Diversification effect represents the difference between total VaR and the sum of the VaRs for the four risk categories. This effect arises because the four market risk categories are not perfectly correlated.

Stressed VaR. SVaR is the potential loss in value of trading assets and liabilities, as well as certain investments, loans, and other financial assets and liabilities accounted for at fair value, during a period of significant market stress. SVaR is calculated at a 99% confidence level over a 10-day horizon using market data inputs from a continuous 12-month period of stress. We identify the stressed period by comparing VaR using market data inputs from different historical periods.

The table below presents our period-end, high, low and mean of the average weekly SVaR for the three months ended December 2019. Average, per the market risk regulatory capital requirements, is determined based on the average weekly amount for the preceding 12 weeks.

Table 12: Stressed VaR

<i>\$ in millions</i>	As of	Three Months Ended		
	December 2019	December 2019		
		High	Low	Mean
SVaR	\$ 824	\$ 824	\$ 713	\$ 745
SVaR x Multiplier	2,473 ¹			
RWAs	\$ 30,911			

1. SVaR is subject to the same regulatory multiplier used for Regulatory VaR and is further multiplied by 12.5 to convert into RWAs. Calculation differences may exist due to rounding.

Incremental Risk. Incremental risk is the potential loss in value of non-securitized positions due to the default or credit migration of issuers of financial instruments over a one-year time horizon. As required by the market risk regulatory capital rules, this measure is calculated at a 99.9% confidence level over a one-year time horizon. It uses a multi-factor model assuming a constant level of risk. When assessing the risk, we take into account market and issuer-specific concentration, credit quality, liquidity horizons and correlation of default and migration risk. The liquidity horizon is calculated based on the size of exposures and the speed at which we can reduce risk by hedging or unwinding positions, given our experience during a historical stress period, and is subject to the prescribed regulatory minimum.

The table below presents our period-end, high, low and mean of the maximum of the average weekly Incremental risk measure or the point-in-time measure. Average, per the market risk regulatory capital requirements, is determined based on the average weekly amount over the preceding 12 weeks.

Table 13: Incremental Risk

<i>\$ in millions</i>	As of	Three Months Ended		
	December 2019	December 2019		
		High	Low	Mean
Incremental Risk	\$ 345 ¹	\$ 365	\$ 236	\$ 299
RWAs	\$ 4,308			

1. In order to convert the results of Incremental risk into RWAs, it is multiplied by 12.5. Calculation differences may exist due to rounding.

Pillar 3 Disclosures

Comprehensive Risk. Comprehensive risk is the potential loss in value, due to price risk and defaults, within our credit correlation positions. A credit correlation position is defined as a securitization position for which all or substantially all of the value of the underlying exposures is based on the credit quality of a single company for which a two-way market exists, or indices based on such exposures for which a two-way market exists, or hedges of these positions (which are typically not securitization positions).

As required by the market risk regulatory capital requirements, Comprehensive risk consists of a model-based measure, subject to a floor based on the standardized measurement method. The model-based measure is calculated at a 99.9% confidence level over a one-year time horizon applying a constant level of risk. The model comprehensively covers price risks including nonlinear price effects and takes into account contractual structure of cash flows, the effect of multiple defaults, credit spread risk, volatility of implied correlation, recovery rate volatility and basis risk. The liquidity horizon is based on our experience during a historical stress period, subject to the prescribed regulatory minimum.

The floor is 8% of the standardized specific risk add-on. For detail on the calculation of the add-on for securitization positions, see “Specific Risk - Securitization Positions” below, and for detail on the calculation of the add-on for hedges see “Specific Risk - Other Specific Risk Positions” below.

As of December 2019, we had credit correlation positions, subject to the Comprehensive risk measure, with a fair value of \$209 million in net liabilities.

The table below presents our period-end, high, low and mean of the maximum of the average weekly Comprehensive risk measure or the point-in-time measure, inclusive of both modeled and non-modeled components for the three months ended December 2019. Average, per the market risk regulatory capital requirements, is determined based on the average weekly amount for the preceding 12 weeks.

Table 14: Comprehensive Risk

<i>\$ in millions</i>	As of	Three Months Ended		
	December 2019	December 2019		
		High	Low	Mean
Comprehensive Risk	\$ 95 ¹	\$ 95	\$ 71	\$ 79
RWAs	\$ 1,191			

1. In order to convert the Comprehensive risk measure into RWAs, it is multiplied by 12.5. Calculation differences may exist due to rounding.

Model Review and Validation

The models discussed above, which are used to determine Regulatory VaR, SVaR, Incremental risk and Comprehensive risk, are independently reviewed, validated and approved by Model Risk. For more information, see “Model Risk Management.”

Regulatory VaR Backtesting Results

As required by the market risk regulatory capital requirements, we validate the accuracy of our Regulatory VaR models by backtesting the output of such models against the daily positional loss results. The actual number of exceptions (that is, the number of business days for which the positional losses exceed the corresponding 99% one-day Regulatory VaR) over the most recent 250 business days is used to determine the size of the VaR multiplier, which could increase from a minimum of three to a maximum of four, depending on the number of exceptions.

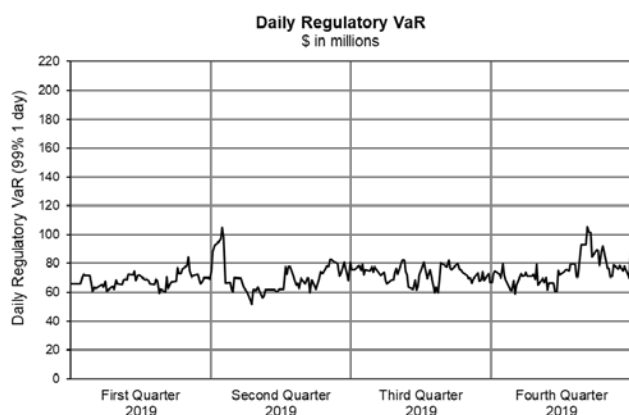
Pillar 3 Disclosures

As defined in the market risk regulatory capital requirements, positional net revenues for any given day represent the impact of that day’s price variation on the value of positions held at the close of business the previous day. As a consequence, these results exclude certain revenues associated with market-making businesses, such as bid/offer net revenues, which are more likely than not to be positive by their nature. In addition, positional net revenues used in our Regulatory VaR backtesting relate only to positions which are included in Regulatory VaR and, as noted above, differ from positions included in our risk management VaR. This measure of positional net revenues is used to evaluate the performance of the Regulatory VaR model and is not comparable to our actual daily net revenues. See “Risk Management — Market Risk Management” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K.

Our positional losses observed on a single day did not exceed our 99% one-day Regulatory VaR during the three months ended December 2019. Our positional losses observed on a single day exceeded our 99% one-day Regulatory VaR on one occasion during the previous 12 months. There was no change in the VaR multiplier used to calculate Market RWAs. Note that, although a one-day time horizon is used for backtesting purposes, a 10-day time horizon is used, as described earlier, to determine RWAs associated with Regulatory VaR.

The table below presents our 99% one-day Regulatory VaR during the previous 12 months.

Table 15: Daily Regulatory VaR



Stress Testing

Stress testing is a method of determining the effect of various hypothetical stress scenarios. We use stress testing to examine risks of specific portfolios, as well as the potential impact of our significant risk exposures. We use a variety of stress testing techniques to calculate the potential loss from a wide range of market moves on our portfolios, including firmwide stress tests, sensitivity analysis and scenario analysis.

For a detailed description of our stress testing practices, see “Risk Management – Market Risk Management – Risk Measures – Stress Testing” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K.

Specific Risk

Specific risk is the risk of loss on a position that could result from factors other than broad market movements, including event risk, default risk and idiosyncratic risk. The specific risk add-on is applicable for both securitization positions and for certain non-securitized debt and equity positions, to supplement the model-based measures, and is primarily based on supervisory prescribed risk-weighting factors and methodologies. The table below presents the RWAs of our non-model-based specific risk measure on securitization (excluding credit correlation positions captured by the Comprehensive risk measure) and non-securitization positions.

Table 16: Specific Risk

<i>\$ in millions</i>	As of December 2019
Securitization positions	\$ 7,058
Other specific risk positions	11,985
Total Specific Risk RWAs	\$ 19,043

Pillar 3 Disclosures

Securitization Positions. The “Securitization Framework” section of the rules is used to calculate the RWAs for any covered position that has been identified as a securitization or resecuritization (for detailed descriptions of the regulatory definition of a securitization and of the hierarchy of approaches used within the Securitization Framework to calculate regulatory capital requirements, see “Securitized in the Banking Book”). Products covered by the regulatory definition of a securitization include mortgage-backed securities (MBS) and other asset-backed securities (ABS), derivatives referencing MBS or ABS, or derivatives referencing indices of MBS or ABS, which are held in inventory. The population includes positions purchased in the secondary market, as well as retained interests in securitization structures we sponsor. Consistent with the rules, this notably excludes mortgage-backed pass-through securities guaranteed by government-sponsored entities (for example, Federal National Mortgage Association).

The RWAs for trading book securitization positions are calculated by multiplying the exposure amount by the specific risk-weighting factors assigned and then multiplying by 12.5. The exposure amount is defined as the carrying value for securities, or the market value of the effective notional of the instrument or indices underlying derivative positions. The securitization capital requirements are the greater of the capital requirements on the net long or short exposure (incorporating applicable netting), and are capped at the maximum loss that could be incurred on any given transaction.

The table below presents our aggregate on-balance-sheet and off-balance-sheet trading book securitization exposures (excluding credit correlation positions captured by the Comprehensive risk measure) by underlying exposure type. Amounts below reflect securitization exposures, as defined for regulatory capital purposes and are not comparable to securitization measures reported in “Note 16. Securitization Activities” in Part II, Item 8 “Financial Statements and Supplementary Data” in our 2019 Form 10-K.

Table 17: Trading Book Securitization Exposures

<i>\$ in millions</i>	As of December 2019
Residential mortgages	\$ 620
Commercial mortgages	691
Corporates ¹	244
Asset-backed and other	411
Total Securitization Exposures²	\$ 1,966

1. Reflects corporate collateralized debt and loan obligations.

2. Includes securities with a fair value of \$1.61 billion.

Securitization positions, including resecuritizations, are incorporated into our overall risk management approach for financial instruments. For a detailed discussion of our risk management process and practices, see “Risk Management – Market Risk Management” and “Risk Management – Credit Risk Management” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K.

Other Specific Risk Positions. The standard specific risk add-on for debt positions ranges from 0.25% to 12%, other than for certain sovereign and supranational positions which have a 0% add-on. The add-on for sovereigns, public sector entities and depository institutions is based on the Organization for Economic Co-operation and Development country risk classifications of the sovereign and the remaining contractual maturity of the position. The add-on for corporate entities that have issued public financial instruments is based on internal assessments of creditworthiness and the remaining contractual maturity of the position. All other types of debt positions are subject to an 8% add-on. The standard specific risk add-on for equity positions will generally be 8%, but this could decrease to 2% for well-diversified portfolios of equities, certain indices, and certain futures-related arbitrage strategies. The standard specific risk RWAs for debt and equity positions are calculated by multiplying the exposure amount by the appropriate standard specific risk add-on, and then multiplying by 12.5. The exposure amount is defined as the carrying value for securities and loans, or the market value of the effective notional of the instrument or indices underlying derivative positions. The specific risk capital requirements are capped at the maximum loss that could be incurred on any given transaction.

Operational Risk

Overview

Operational risk is the risk of an adverse outcome resulting from inadequate or failed internal processes, people, systems or from external events. Our exposure to operational risk arises from routine processing errors, as well as extraordinary incidents, such as major systems failures or legal and regulatory matters.

Potential types of loss events related to internal and external operational risk include:

- Clients, products and business practices;
- Execution, delivery and process management;
- Business disruption and system failures;
- Employment practices and workplace safety;
- Damage to physical assets;
- Internal fraud; and
- External fraud.

Operational Risk, which is independent of our revenue-producing units and reports to our chief risk officer, has primary responsibility for developing and implementing a formalized framework for assessing, monitoring and managing operational risk with the goal of maintaining our exposure to operational risk at levels that are within our risk appetite.

Operational Risk Management Process

Our process for managing operational risk includes the critical components of our risk management framework described in “Overview and Structure of Risk Management” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K, including a comprehensive data collection process, as well as firmwide policies and procedures, for operational risk events.

We combine top-down and bottom-up approaches to manage and measure operational risk. From a top-down perspective, our senior management assesses firmwide and business-level operational risk profiles. From a bottom-up perspective, our first and second lines of defense are responsible for risk identification and risk management on a day-to-day basis, including escalating operational risks to senior management.

We maintain a comprehensive control framework designed to provide a well-controlled environment to minimize operational risks. The Firmwide Conduct and Operational Risk Committee is responsible for the ongoing approval and monitoring of the frameworks, policies, parameters, limits and thresholds which govern our operational risks.

Our operational risk management framework is in part designed to comply with the operational risk measurement rules under the Capital Framework and has evolved based on the changing needs of our businesses and regulatory guidance.

We have established policies that require all employees to report and escalate operational risk events. When operational risk events are identified, our policies require that the events be documented and analyzed to determine whether changes are required in our systems and/or processes to further mitigate the risk of future events.

We use operational risk management applications to capture and organize operational risk event data and key metrics. One of our key risk identification and assessment tools is an operational risk and control self-assessment process, which is performed by our managers. This process consists of the identification and rating of operational risks, on a forward-looking basis, and the related controls. The results from this process are analyzed to evaluate operational risk exposures and identify businesses, activities or products with heightened levels of operational risk.

Pillar 3 Disclosures**Risk Measurement**

We measure our operational risk exposure using both statistical modeling and scenario analyses, which involve qualitative and quantitative assessments of internal and external operational risk event data and internal control factors for each of our businesses. Operational risk measurement also incorporates an assessment of business environment factors, including:

- Evaluations of the complexity of our business activities;
- The degree of automation in our processes;
- New activity information;
- The legal and regulatory environment; and
- Changes in the markets for our products and services, including the diversity and sophistication of our customers and counterparties.

The results from these scenario analyses are used to monitor changes in operational risk and to determine business lines that may have heightened exposure to operational risk. These analyses are used in the determination of the appropriate level of operational risk capital to hold.

Regulatory Capital Measurement

In accordance with the Advanced Measurement Approach of the Capital Framework, we employ a Scenario-Based Approach (SBA) model that incorporates qualitative and quantitative data elements. Scenario analysis is conducted across a matrix of businesses and centralized corporate functions throughout the firm and across their applicable operational risk categories: clients, products and business practices; execution, delivery and process management; business disruption and system failures; employment practices and workplace safety; damage to physical assets; internal fraud; and external fraud. Each intersection of a business or corporate function and a risk category is referred to as a risk class. For each risk class, internal loss data, external data, business environment and internal control factors and judgment are used to develop and substantiate estimates of the likely frequency and severity of operational risk losses over a twelve-month time horizon. These estimates are used as inputs to produce two separate distributions (one for frequency, one for severity) which are then combined for each risk class. The results for all risk classes are aggregated, taking into consideration the possibility of correlations between them. The SBA model calculates operational risk capital requirements for the firm at the 99.9th percentile confidence level.

For a subset of risks in our operational risk capital determination we incorporate insurance as a risk transfer mechanism. We continue to seek opportunities to use compliant insurance, where appropriate.

Model Review and Validation

The statistical models used to measure operational risk exposure are independently reviewed, validated and approved by Model Risk. See “Model Risk Management” for further information.

Model Risk Management

Overview

Model risk is the potential for adverse consequences from decisions made based on model outputs that may be incorrect or used inappropriately. We rely on quantitative models across our business activities primarily to value certain financial assets and liabilities, to monitor and manage our risk, and to measure and monitor our regulatory capital.

Model Risk, which is independent of our revenue-producing units, model developers, model owners and model users, and reports to our chief risk officer, has primary responsibility for assessing, monitoring and managing our model risk through firmwide oversight across our global businesses, and provides periodic updates to senior management, risk committees and the Risk Committee of the Board.

Our model risk management framework is managed through a governance structure and risk management controls, which encompass standards designed to ensure we maintain a comprehensive model inventory, including risk assessment and classification, sound model development practices, independent review and model-specific usage controls. The Firmwide Model Risk Control Committee oversees our model risk management framework.

Model Review and Validation Process

Model Risk consists of quantitative professionals who perform an independent review, validation and approval of our models. This review includes an analysis of the model documentation, independent testing, an assessment of the appropriateness of the methodology used, and verification of compliance with model development and implementation standards.

We regularly refine and enhance our models to reflect changes in market or economic conditions and our business mix. All models are reviewed on an annual basis, and new models or significant changes to existing models and their assumptions are approved prior to implementation.

The model validation process incorporates a review of models and trade and risk parameters across a broad range of scenarios (including extreme conditions) in order to critically evaluate and verify:

- The model's conceptual soundness, including the reasonableness of model assumptions, and suitability for intended use;
- The testing strategy utilized by the model developers to ensure that the models function as intended;
- The suitability of the calculation techniques incorporated in the model;
- The model's accuracy in reflecting the characteristics of the related product and its significant risks;
- The model's consistency with models for similar products; and
- The model's sensitivity to input parameters and assumptions.

For more information regarding the use of models within these areas, see "Critical Accounting Policies – Fair Value – Review of Valuation Models," "Risk Management – Liquidity Risk Management," "Risk Management – Market Risk Management," "Risk Management – Credit Risk Management" and "Risk Management – Operational Risk Management" in Part II, Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our 2019 Form 10-K and "Credit Risk," "Market Risk," and "Operational Risk" in this document.

Interest Rate Sensitivity

Interest Rate Risk Management Practices

The firm centrally monitors and sets limits on its interest rate risk sensitivity on both trading and banking book activities. Our interest rate risk is managed dynamically in response to changing market conditions. A significant portion of our assets reprice frequently in relation to interest rates because they are held at fair value, and are either floating rate or are hedged to floating rate. Although our assets are mostly funded by floating rate liabilities, they are also partially funded by fixed-rate debt and common equity. As a result, in an environment of rising interest rates, as floating rate assets generate increased revenues but fixed-rate liabilities do not generate a corresponding increase in interest expense, the impact on net revenues across our trading book and banking book exposures would be positive.

Common Equity and Fixed-Rate Liabilities

We monitor the implied interest rate sensitivity related to our common equity and fixed-rate liabilities by performing a hypothetical scenario on a quarterly basis in which we assess the short-term impact of an instantaneous rise in interest rates of 100 basis points and assume the size and composition of our balance sheet remains constant. As of December 2019, we estimate that this rise in interest rates could result in a positive impact of approximately \$1.3 billion to our net revenues over a one-year period. This hypothetical scenario does not reflect our expectations regarding the movement of interest rates in the near term. Furthermore, the level of client and other market activity is generally the primary driver of our net revenues, and changes to such activity levels as a consequence of a rise in interest rates are not reflected in this hypothetical scenario.

Interest Rate Risk in the Trading Book

Our exposure to interest rate risk in our trading book arises mostly from positions held to support client market-making activities. These positions are accounted for at fair value and the interest rate risk is monitored as a component of Market risk. For additional information regarding interest rate risk, see “Risk Management – Market Risk Management” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K.

Interest Rate Risk in the Banking Book

Our exposure to interest rate risk in our banking book activities arises from differences in interest earned or paid as interest rates change, due to the reset characteristics of our assets and liabilities. Apart from our fixed-rate debt, a significant portion of both our assets and liabilities reset frequently in relation to interest rates, therefore limiting our exposure to interest rate risk. We evaluate our sensitivity to changes in interest rates across a range of interest rate scenarios. One of the methodologies used to monitor our sensitivity to interest rate risk is the Economic Value of Equity (EVE) sensitivity analysis. This measures the change in the present value of banking book assets and liabilities as a function of different interest rate assumptions.

For further information regarding asset-liability management, see “Risk Management – Liquidity Risk Management” in Part II, Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our 2019 Form 10-K.

Cautionary Note on Forward-Looking Statements

We have included in these disclosures, and our management may make, statements that may constitute “forward-looking statements” within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995. Forward-looking statements are not historical facts or statements of current conditions, but instead represent only our beliefs regarding future events, many of which, by their nature, are inherently uncertain and outside our control. These statements may relate to, among other things, (i) our future plans and objectives and results, (ii) the objectives and effectiveness of our risk management and liquidity policies, and (iii) the effect of changes to the regulations applicable to us, as well as our future status, activities or reporting under U.S. or non-U.S. banking and financial regulation. For more information on forward-looking statements, refer to “Cautionary Statement Pursuant to the U.S. Private Securities Litigation Reform Act of 1995” in Part I, Item 1 in our 2019 Form 10-K.

We have provided in this report information regarding interest rate sensitivity. Certain statements with respect to potential net revenue impact from a hypothetical change in interest rates on our banking book and trading book assets and common equity and fixed-rate liabilities are forward-looking statements that are based on the current composition of our balance sheet and do not address any adverse impacts on our businesses that could be caused by a change in interest rates. The estimated impact to our net revenues does not reflect our expectations regarding movement of interest rates in the near term or any estimated business revenue that might be generated in a changing interest rate environment.

It is possible that our actual results and financial condition may differ, possibly materially, from the anticipated results and financial condition indicated in these forward-looking statements. Important factors that could cause our actual results and financial condition to differ from those indicated in these statements include, among others, those discussed in “Risk Factors” in Part I, Item 1A in our 2019 Form 10-K.

Glossary of Risk Terms

- **Advanced Internal Ratings-Based (AIRB).** The AIRB approach of the Capital Framework provides a methodology for banks, subject to supervisory approval, to use various risk parameters to determine the EAD and risk weights for regulatory capital calculations. Other risk parameters used in the determination of risk weights are each counterparty's Probability of Default (PD), Loss Given Default (LGD) and the effective maturity of the trade or portfolio of trades.
- **Advanced Measurement Approach (AMA).** The AMA of the Capital Framework provides a methodology for a bank to estimate capital requirements for Operational Risk, subject to meeting a range of qualitative and quantitative data requirements, and to supervisory approval. The AMA establishes requirements for a bank's operational risk management processes, data and assessment systems, and quantification systems.
- **Central Counterparty (CCP).** A counterparty, such as a clearing house, that facilitates trades between counterparties.
- **Comprehensive Risk.** The potential loss in value, due to price risk and defaults, within our credit correlation positions. Comprehensive risk consists of a modeled measure which is calculated at a 99.9% confidence level over a one-year time horizon, subject to a floor which is 8% of the standardized specific risk add-on.
- **Credit Correlation Position.** A securitization position for which all or substantially all of the value of the underlying exposures is based on the credit quality of a single company for which a two-way market exists, or indices based on such exposures for which a two-way market exists, or hedges of these positions (which are typically not securitization positions).
- **Credit Risk.** The potential for loss due to the default or deterioration in credit quality of a counterparty (e.g., an OTC derivatives counterparty or a borrower) or an issuer of securities or other instruments we hold.
- **Current Exposure Methodology (CEM).** Calculation used to measure derivative current and potential future exposure. The potential future exposure is calculated using static conversion factors applied to gross notional balances and incorporates partial netting. The conversion factors are based on broad product type, and for some products on maturity bucket.
- **Default.** A default is considered to have occurred when either or both of the two following events have taken place: (i) we consider that the obligor is unlikely to pay its credit obligations to us in full; or (ii) the obligor has defaulted on a payment and/or is past due more than 90 days on any material Wholesale credit obligation, 180 days on residential mortgage obligations or 120 days on other retail obligations.
- **Default Risk.** The risk of loss on a position that could result from failure of an obligor to make timely payments of principal or interest on its debt obligation, and the risk of loss that could result from bankruptcy, insolvency, or similar proceedings.
- **Economic Value of Equity (EVE).** Methodology used to monitor interest rate risk sensitivity that measures the change in the present value of asset and liability cash flows as a function of different interest rate assumptions.
- **Effective Expected Positive Exposure (EEPE).** The time-weighted average of non-declining positive credit exposure over the EE simulation. EEPE is used in accordance with the IMM as the exposure measure that is then risk weighted to determine counterparty risk capital requirements.
- **Event Risk.** The risk of loss on equity or hybrid equity positions as a result of a financial event, such as the announcement or occurrence of a company merger, acquisition, spin-off, or dissolution.
- **Expected Exposure (EE).** The expected value of the probability distribution of non-negative credit risk exposures to a counterparty at any specified future date before the maturity date of the longest term transaction in a netting set.

Pillar 3 Disclosures

- **Exposure at Default (EAD).** The exposure amount that is risk weighted for regulatory capital calculations. For on-balance-sheet assets, such as receivables and cash, EAD is generally based on the balance sheet value. For the calculation of EAD for off-balance-sheet exposures, including commitments and guarantees, an equivalent exposure amount is calculated based on the notional amount of each transaction multiplied by a credit conversion factor designed to estimate the net additions to funded exposures that would be likely to occur over a one-year horizon, assuming the obligor were to default. For substantially all of the counterparty credit risk arising from OTC derivatives, exchange-traded derivatives and securities financing transactions, internal models calculate the distribution of exposure upon which the EAD calculation is based.
- **Global Systemically Important Banks (G-SIBs).** Of the 75 largest global banks as measured by the supplementary leverage exposure measure, those banks that are deemed to be systemically important by the Basel Committee. Banks are measured by size, interconnectedness, complexity, substitutability, and cross-jurisdictional activity. G-SIBs are subject to more stringent supervisory and regulatory requirements, including higher minimum risk-based capital requirements and higher minimum SLR requirements, among others.
- **Idiosyncratic Risk.** The risk of loss in the value of a position that arises from changes in risk factors unique to that position.
- **Incremental Risk.** The potential loss in value of non-securitized positions due to the default or credit migration of issuers of financial instruments over a one-year time horizon. This measure is calculated at a 99.9% confidence level over a one-year time horizon using a multi-factor model.
- **Internal Models Methodology (IMM).** The IMM of the Capital Framework establishes a methodology for banks to use their internal models to estimate exposures arising from OTC derivatives, securities financing transactions, and cleared transactions subject to qualitative and quantitative requirements and supervisory approval.
- **Loss Given Default (LGD).** An estimate of the economic loss rate if a default occurs during economic downturn conditions.
- **Market Risk.** The risk of loss in the value of our inventory, investments, loans and other financial assets and liabilities accounted for at fair value, due to changes in market conditions.
- **Model Risk.** The potential for adverse consequences from decisions made based on model outputs that may be incorrect or used inappropriately.
- **Model Validation.** The set of processes and activities intended to verify that models are performing as expected.
- **Operational Risk.** The risk of an adverse outcome resulting from inadequate or failed internal processes, people, systems or from external events.
- **Probability of Default (PD).** Estimate of the probability that an obligor will default over a one-year horizon.
- **Regulatory VaR Backtesting.** Comparison of daily positional loss results to the Regulatory VaR measure calculated as of the end of the prior business day.
- **Resecuritization Position.** Represents an on or off-balance-sheet transaction in which one or more of the underlying exposures is a securitization position, or an exposure that directly or indirectly references a re-securitization exposure.
- **Retail Exposure.** Residential mortgage exposures, qualifying revolving exposures, or other retail exposures that are managed as part of a segment with homogeneous risk characteristics, not on an individual exposure basis.
- **Securitization Position.** Represents an on- or off-balance-sheet transaction in which all or a portion of the credit risk of one or more underlying exposures is transferred to one or more third parties; the credit risk associated with the underlying exposures has been separated into at least two tranches, reflecting different levels of seniority; the performance of the securitization exposures is dependent upon the performance of the underlying exposures; all or substantially all of the underlying exposures are financial exposures; and the underlying exposure ownership is subject to certain ownership criteria prescribed by the regulatory rules.

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- **Simplified Supervisory Formula Approach (SSFA).** Calculation method used in the Securitization Framework under which RWAs are based on the capital requirements that would apply to the underlying pool of assets if they were held directly on the balance sheet; this is then adjusted to take account for the degree of subordination of a given tranche. The capital requirement applicable to the assets in the securitization pool are calculated using the general risk-based requirements (i.e. the Standardized Capital Rules), rather than the Advanced Capital Rules. The SSFA is allowed only if the information needed to use the SFA is not available, and only if the data used in the calculation is no more than 91 calendar days old.
- **Specific Risk.** The risk of loss on a position that could result from factors other than broad market movements and includes event risk, default risk and idiosyncratic risk. The specific risk add-on is applicable for both securitization positions and for certain non-securitized debt and equity positions, to supplement the model-based measures.
- **Stress Testing.** Stress testing is a method of determining the effect on the firm of various hypothetical stress scenarios.
- **Stressed VaR (SVaR).** The potential loss in value of trading assets and liabilities, as well as certain investments, loans, and other financial assets and liabilities accounted for at fair value, during a period of significant market stress. SVaR is calculated at a 99% confidence level over a 10-day horizon using market data inputs from a continuous 12-month period of stress.
- **Supervisory Formula Approach (SFA).** Calculation methodology used in the Securitization Framework under which RWAs are based on the capital requirements that would apply to the underlying pool of assets if they were held directly on our balance sheet; this is then adjusted to take account of the degree of subordination (i.e. loss absorbance by junior tranches) of a given tranche.
- **Synthetic Securitization.** Defined in the Capital Framework as a transaction in which all or some of the following criteria are met; all or a portion of the credit risk of the underlying exposures is transferred to a third party through the use of credit derivatives or guarantees; credit risk associated with the underlying exposures has been separated into at least two tranches reflecting different levels of seniority; the performance of the securitization exposures depends on the performance of the underlying exposures; and, all or substantially all of the underlying exposures are financial exposures.
- **Traditional Securitization.** Defined in the Capital Framework as a transaction which meets various criteria including that all or a portion of the credit risk of underlying exposures is transferred to a third party other than through the use of credit derivatives or guarantees; the credit risk associated with the underlying exposures has been separated into at least two tranches reflecting different levels of seniority; the performance of the securitization exposures depends on the performance of the underlying exposures; and, all or substantially all of the underlying exposures are financial exposures.
- **Value-at-Risk (VaR).** The potential loss in value of trading assets and liabilities, as well as certain investments, loans, and other financial assets and liabilities accounted for at fair value, due to adverse market movements over a defined time horizon with a specified confidence level. Risk management VaR is calculated at a 95% confidence level over a one-day horizon.
- **Wholesale Exposure.** A term used in the Capital Framework to refer collectively to credit exposures to companies, sovereigns or government entities (other than Securitization, Retail or Equity exposures).

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