

Morgan Stanley

Basel III Pillar 3 Disclosures Report

For the Quarterly Period Ended December 31, 2022

Morgan Stanley

BASEL III PILLAR 3 DISCLOSURES REPORT

For the quarterly period ended December 31, 2022

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1. Morgan Stanley

Morgan Stanley is a global financial services firm that, through its subsidiaries and affiliates, provides a wide variety of products and services to a large and diversified group of clients and customers, including corporations, governments, institutions, and individuals. Unless the context otherwise requires, the terms “Morgan Stanley” or the “Firm” mean Morgan Stanley (the “Company”) together with its consolidated subsidiaries.

Morgan Stanley was originally incorporated under the laws of the State of Delaware in 1981, and its predecessor companies date back to 1924. The Firm is a financial holding company under the Bank Holding Company Act of 1956, as amended (the “BHC Act”), and is subject to the regulation and oversight of the Board of Governors of the Federal Reserve System (the “Federal Reserve”).

The Firm conducts its business from its headquarters in and around New York City, its regional offices and branches throughout the United States of America (“U.S.”), and its principal offices in London, Tokyo, Hong Kong, and other world financial centers. The basis of consolidation for accounting and regulatory purposes is materially the same. The Federal Reserve establishes capital requirements for the Firm, including well-capitalized standards, and evaluates the Firm’s compliance with such capital requirements. The Office of the Comptroller of the Currency (the “OCC”) establishes similar capital requirements and standards for the Firm’s U.S. bank subsidiaries Morgan Stanley Bank, National Association (“MSBNA”) and Morgan Stanley Private Bank, National Association (“MSPBNA”), (collectively, “U.S. Bank Subsidiaries”).

At December 31, 2022, the Firm’s insurance subsidiaries surplus capital included in the total capital of the consolidated group was \$37 million. At December 31, 2022, none of the Firm’s subsidiaries had capital less than the minimum required capital amount. For descriptions of the Firm’s business, see “Business” in Part I, Item 1 of the 2022 Form 10-K.

Russia and Ukraine War

The Firm continues to monitor the war in Ukraine and its impact on both the Ukrainian and Russian economies, as well as related impacts on other world economies and the financial markets. The Firm’s direct exposure to both Russia and Ukraine remains limited. The Firm is not entering any new business onshore in Russia and its activities in Russia are limited to helping the global clients address and close out pre-existing obligations.

2. Capital Framework

In December 2010, the Basel Committee on Banking Supervision (“Basel Committee”) established a new risk-based capital, leverage ratio, and liquidity framework, known as “Basel III.” In July 2013, the U.S. banking regulators issued a final rule to implement many aspects of Basel III (“U.S. Basel III”). The Firm, MSBNA, and MSPBNA became subject to U.S. Basel III beginning on January 1, 2014. On February 21, 2014, the Federal Reserve and the OCC approved the Firm, MSBNA, and MSPBNA’s respective use of the U.S. Basel III advanced internal ratings-based approach for determining credit risk capital requirements and advanced measurement approaches for determining operational risk capital requirements (the “Advanced Approach”) to calculate and publicly disclose their risk-based capital ratios beginning with the second quarter of 2014, subject to the “capital floor” discussed below (the “Advanced Approach”). As a U.S. Basel III Advanced Approach banking organization, the Firm is required to compute risk-based capital ratios using both (i) standardized approaches for calculating credit risk weighted assets (“RWA”) and market risk RWA (the “Standardized Approach”); and (ii) an advanced internal ratings-based approach for calculating credit risk RWA, an advanced measurement approach for calculating operational risk RWA, and an advanced approach for market risk RWA calculated under U.S. Basel III. For a further discussion of the regulatory capital framework applicable to the Firm and other regulatory developments, see “MD&A—Liquidity and Capital Resources Regulatory Requirements Regulatory Developments and Other Matters” in Part II, Item 7 of the 2022 Form 10-K, respectively.

U.S. Basel III requires banking organizations that calculate risk-based capital ratios using the Advanced Approach, including the Firm, to make qualitative and quantitative disclosures regarding their capital and RWA on a quarterly basis (“Pillar 3 Disclosures”). This report contains the Firm’s Pillar 3 Disclosures for its credit, market and operational risks for the quarter ended December 31, 2022, in accordance with the U.S. Basel III, 12 C.F.R. § 217.171 through 217.173 and 217.212.

The Firm's Pillar 3 Disclosures are not required to be, and have not been, audited by the Firm's independent registered public accounting firm. Some measures of exposures contained in this report may not be consistent with accounting principles generally accepted in the U.S. ("U.S. GAAP"), and may not be comparable with measures reported in the 2022 Form 10-K.

3. Capital Structure

The Firm has issued a variety of capital instruments to meet its regulatory capital requirements and to maintain a strong capital base. These capital instruments include common stock that qualifies as Common Equity Tier 1 ("CET1") capital, non-cumulative perpetual preferred stock that qualifies as Additional Tier 1 capital, and subordinated debt that qualifies as Tier 2 capital, each under U.S. Basel III. For a discussion of the Firm's capital instruments, see Note 14 (Borrowings and Other Secured Financings) and Note 18 (Total Equity) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K, as well as "MD&A—Liquidity and Capital Resources—Regulatory Requirements—Regulatory Capital Requirements" in the Form 10-K.¹

4. Capital Adequacy

Capital strength is fundamental to the Firm's operation as a credible and viable market participant. To assess the amount of capital necessary to support the Firm's current and prospective risk profile, which ultimately informs the Firm's capital distribution capacity, the Firm determines its overall capital requirement under normal and stressed operating environments, both on a current and forward-looking basis. For a further discussion of the Firm's required capital framework, see "MD&A—Liquidity and Capital Resources—Regulatory Requirements—Attribution of Average Common Equity According to the Required Capital Framework" in the Form 10-K.

In determining its overall capital requirement, the Firm classifies its exposures as either "banking book" or "trading book." Banking book positions, which may be accounted for at amortized cost, lower of cost or market, fair value or under the equity method, are subject to credit risk capital requirements which are discussed in Section 5 "Credit Risk" and Section 6 "Equities Not Subject to Market Risk Capital Rule" included herein. Trading book positions represent positions that the Firm holds as part of its market-making and underwriting businesses. These positions, which reflect assets or liabilities that are accounted for at fair value, and certain banking book positions which are subject to both credit risk and market risk charges, (collectively, "covered positions") as well as certain non-covered positions included in Value-at-Risk ("VaR"), are subject to market risk capital requirements, which are discussed in Section 9 "Market Risk" included herein. Some trading book positions, such as derivatives, are also subject to counterparty credit risk capital requirements. Credit and market risks related to securitization exposures are discussed in Section 7 "Securitization Exposures" included herein.

1. Regulatory requirements, including capital requirements and certain covenants contained in various agreements governing indebtedness of the Firm may restrict the Firm's ability to access capital from its subsidiaries. For discussions of restrictions and other major impediments to transfer of funds or capital, see "Risk Factors—Liquidity Risk" in Part I, Item 1A, "Quantitative and Qualitative Disclosures about Risk—Risk Management—Country and Other Risks—Liquidity Risk" in Part II, Item 7A, and Note 17 (Regulatory Requirements) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K. For further information on the Firm's capital structure in accordance with U.S. Basel III, see "MD&A—Liquidity and Capital Resources—Regulatory Requirements" in the Form 10-K.

The following table presents components of the Firm's RWA in accordance with the Advanced Approach:

Risk-weighted assets by U.S. Basel III exposure category

<i>\$ in millions</i>	At December 31, 2022 ¹	
Credit risk RWA:		
Wholesale exposures	\$	169,189
Retail exposures:		
Residential mortgage		2,785
Revolving		169
Other retail		3,752
Securitization exposures:		
Subject to Supervisory Formula Approach		3,839
Subject to Simplified Supervisory Formula Approach		5,672
Subject to 1,250% risk weight		68
Cleared transactions		2,893
Equity exposures:		
Subject to the Simple Risk-Weighted Approach		22,733
Subject to the Alternative Modified Look-Through Approach		487
Other assets ²		40,495
Credit valuation adjustment		33,556
Total credit risk RWA^{3,4}	\$	285,638
Market risk RWA:		
Regulatory VaR	\$	10,307
Regulatory stressed VaR		15,948
Incremental risk charge		2,979
Comprehensive risk measure		809
Specific risk:		
Non-securitizations		12,720
Securitizations		7,800
Total market risk RWA⁵	\$	50,563
Total operational risk RWA		102,605
Total RWA	\$	438,806

1. For information on the Firm's credit risk RWA, market risk RWA and operational risk RWA rollforward from December 31, 2021 to December 31, 2022, see "MD&A—Liquidity and Capital Resources—Regulatory Requirements—RWA Rollforward" in the Form 10-K.

2. Amount reflects assets not in a defined category of \$35,577 million, non-material portfolios of exposures of \$3,251 million and unsettled transactions of \$1,667 million.

3. In accordance with U.S. Basel III, credit risk RWA, with the exception of Credit Valuation Adjustment ("CVA") and certain products under 12 C.F.R. § 217.124, reflect a 1.06 multiplier.

4. Credit risk RWA reflects approximately \$3 billion of RWAs, calculated under the Standardized Approach, associated with any acquisitions subject to 12 C.F.R. § 217.124.

5. For more information on the Firm's measure for market risk and market risk RWA, see Section 9 "Market Risk" herein.

The following tables present the risk-based capital ratios for the Firm, MSBNA and MSPBNA under both the Advanced and Standardized approaches. The Firm, MSBNA and MSPBNA risk-based and leverage-based capital amounts and ratios, as well as RWA, adjusted average assets and supplementary leverage exposure are calculated excluding the effect of the adoption of Current Expected Credit Losses ("CECL") based on the Firm's election to defer this effect over a five-year transition period that began on January 1, 2020. In 2022 the deferral impacts began to phase in at 25% per year and will become fully phased-in beginning in 2025. For further information, see "MD&A—Liquidity and Capital Resources—Regulatory Requirements—Regulatory Developments and Other Matters" in Part II, Item 7 of the 2022 Form 10-K.

Regulatory Capital

<i>\$ in millions</i>	Morgan Stanley	
	Standardized Approach	Advanced Approach
CET1 capital	\$ 68,670	\$ 68,670
Tier 1 capital	\$ 77,191	\$ 77,191
Total capital	\$ 86,575	\$ 86,159
Total RWA	\$ 447,849	\$ 438,806
CET1 capital ratio	15.3%	15.6%
Tier 1 capital ratio	17.2%	17.6%
Total capital ratio	19.3%	19.6%
Adjusted average assets	\$ 1,150,772	N/A
Tier 1 leverage ratio	6.7%	N/A
Supplementary leverage exposure	N/A	\$ 1,399,403
SLR	N/A	5.5%

	Morgan Stanley Bank, N.A.	
	Standardized Approach	Advanced Approach
CET1 capital ratio	20.5%	27.3%
Tier 1 capital ratio	20.5%	27.3%
Total capital ratio	21.1%	27.8%
Tier 1 leverage ratio	10.1%	N/A
SLR	N/A	8.1%

	Morgan Stanley Private Bank, N.A.	
	Standardized Approach	Advanced Approach
CET1 capital ratio	27.5%	46.3%
Tier 1 capital ratio	27.5%	46.3%
Total capital ratio	27.8%	46.6%
Tier 1 leverage ratio	7.6%	N/A
SLR	N/A	7.4%

Risk Management Objectives, Structure and Policies

For a discussion of the Firm's risk management objectives, structure and policies, including its risk management strategies and processes, the structure and organization of its risk management function, the scope and nature of its risk reporting and measurement systems, and its policies for hedging and mitigating risk and strategies and processes for monitoring the continuing effectiveness of hedges and mitigants, see "Quantitative and Qualitative Disclosures about Risk—Risk Management" in the 2022 Form 10-K.

Capital Conservation Buffer, Countercyclical Capital Buffer and Global Systemically Important Bank Surcharge and Stress Capital Buffer

As of December 31, 2022, under the U.S. Basel III Advanced Approach, the Firm, MSBNA, and MSPBNA continue to be subject to the capital conservation buffer and the countercyclical capital buffer ("CCyB"). In addition, the Firm is also subject to the global systemically important bank ("G-SIB") surcharge. Collectively, these buffers apply above the respective minimum risk-based capital ratio requirements. As of December 31, 2022, the aggregate of the minimum buffers required to be maintained under the Advanced Approach is 5.5%, representing the sum of 2.5% CET1 capital conservation buffer, up to a 2.5% CET1 CCyB (currently set by Federal Reserve at zero), and a CET1 G-SIB capital surcharge (currently at 3%).

Under the U.S. Basel III Standardized Approach, the Firm is subject to the Stress Capital Buffer ("SCB"), as well as the CET1 G-SIB capital surcharge and any applicable CET1 CCyB. The SCB is the greater of (i) the maximum decline in the Firm's CET1 capital ratio under the severely adverse scenario over the supervisory stress test measurement period plus the sum of the four quarters of planned common stock dividends divided by the projected RWAs from the quarter in which the Firm's projected CET1 capital ratio reaches its minimum in the supervisory stress test and (ii) 2.5%.

The aggregate of the minimum buffers applicable to the Standardized Approach is 8.8%, representing the sum of SCB (currently at 5.8%), up to a 2.5% CET1 CCyB (currently set by Federal Reserve at zero), and a CET1 G-SIB capital surcharge (currently at 3%). For the 2022 capital planning and stress test cycle, the Firm submitted its capital plan and company-run stress test results to the Federal Reserve on April 5, 2022. On June 23, 2022, the Federal Reserve published summary results of its supervisory stress tests of each large BHC, in which the projected decline in the firm's CET1 ratio in the severely adverse scenario improved from the prior annual supervisory stress test, from 4.7% to 4.6%. Following the publication of the supervisory stress test results, and as a result of the increase in the firm's common stock dividend and the resulting dividend add-on, the firm announced that its SCB will be 5.8% from October 1, 2022 through September 30,

2023. Together with other features of the regulatory capital framework, this SCB results in an aggregate Standardized Approach CET1 ratio of 13.3%. Generally, the Firm's SCB is determined annually based on the results of the supervisory stress test. See "MD&A—Liquidity and Capital Resources—Regulatory Requirements—Capital Plans, Stress Tests and the Stress Capital Buffer" in Part II, Item 7 of the 2022 Form 10-K for additional information on the calculation of the Firm's SCB.

A firm's SCB is subject to revision each year, with effect from October 1, to reflect the results of the Federal Reserve's annual supervisory stress test and revisions to a firm's four quarters of planned common stock dividends. The Federal Reserve has discretion to recalculate a firm's SCB outside of the October 1 annual cycle in certain circumstances.

The SCB does not change the regulatory capital requirements under the Advanced Approach, the Tier 1 leverage ratio, or the SLR. Failure to meet applicable Advanced Approach, Standardized Approach, or leverage capital requirements, inclusive of capital buffers would result in restrictions on the Firm's ability to make capital distributions, including the payment of dividends and the repurchase of stock, and to pay discretionary bonuses to executive officers.

At December 31, 2022, the Firm's CET1 capital available to meet the minimum buffer requirement is 11.1% under the Advanced Approach and 10.8% under the Standardized Approach. On this basis, the Firm is not subject to payout ratio limitations on its eligible retained income of \$12,489 million, which is defined as the greater of (i) its net income for the four preceding quarters, net of any distributions and associated tax effects not already reflected in net income, and (ii) the average of its net income over the preceding four quarters.

For further information on the minimum risk-based capital ratios, see "MD&A—Liquidity and Capital Resources—Regulatory Requirements—Regulatory Capital Requirements" in Part II, Item 7 of the 2022 Form 10-K.

Total Loss-Absorbing Capacity

The Federal Reserve has established external total loss-absorbing capacity (“TLAC”), eligible long-term debt (“LTD”) and clean holding company requirements for top-tier BHCs of U.S. G-SIBs (“covered BHCs”), including the Parent Company. These requirements include various restrictions, such as requiring eligible LTD to be issued by the covered BHC and be unsecured, have a maturity of one year or more from the date of issuance and not contain certain embedded features, such as a principal or redemption amount subject to reduction based on the performance of an asset, entity or index, or a similar feature.

For a further discussion of TLAC requirements and on the Firm’s TLAC ratios, see “MD&A—Liquidity and Capital Resources—Total Loss-Absorbing Capacity, Long-Term Debt and Clean Holding Company Requirements” in the 2022 Form 10-K.

5. Credit Risk

5.1. Credit Risk: General Disclosures

Credit risk refers to the risk of loss arising when a borrower, counterparty, or issuer does not meet its financial obligations to the Firm. The Firm primarily incurs credit risk exposure to institutions and individuals through its Institutional Securities and Wealth Management business segments. In order to help protect the Firm from losses, the Credit Risk Management Department establishes Firm-wide practices to evaluate, monitor, and control credit risk exposure at the transaction, obligor, and portfolio levels. The Credit Risk Management Department approves extensions of credit, evaluates the creditworthiness of the Firm’s counterparties and borrowers on a regular basis, and helps ensure that credit exposure is actively monitored and managed. For a further discussion of the Firm’s credit risk and credit risk management framework, see “Quantitative and Qualitative Disclosures about Risk—Risk Management—Credit Risk” and “Quantitative and Qualitative Disclosures about Risk—Risk Management—Country Risk” in Part II, Item 7A of the 2022 Form 10-K. For a discussion of the Firm’s risk governance structure, see “Quantitative and Qualitative Disclosures about Risk—Risk Management—Overview—Risk Governance Structure” in Part II, Item 7A of the 2022 Form 10-K.

The following tables present certain of the Firm's on- and off-balance sheet positions for which the Firm is subject to credit risk exposure. These amounts do not include the effects of certain credit risk mitigation techniques (e.g., collateral and netting not permitted under U.S. GAAP), equity investments or liability positions that also would be subject to credit risk capital calculations, and amounts related to items that are deducted from regulatory capital.

The following tables are presented on a U.S. GAAP basis and reflect amounts by product type, region (based on the legal domicile of the counterparty), remaining contractual maturity and counterparty or industry type.

Credit Risk Exposures by Product Type and Geographic Region

	At December 31, 2022					
<i>\$ in millions</i>	Americas	Europe, Middle East and Africa	Asia	Netting	Total	Quarterly Average ¹
Product Type						
Cash ²	\$ 75,307	\$ 35,249	\$ 17,571	\$ -	\$ 128,127	\$ 113,510
Derivative and other contracts ³	160,420	182,698	26,388	(325,294)	44,212	53,377
Investment securities	159,931	-	-	-	159,931	160,293
Securities financing transactions ^{3,4}	219,766	88,908	77,021	(138,414)	247,281	257,511
Loans ⁵	236,254	19,599	5,569	-	261,422	265,021
Other ⁶	34,824	12,635	16,956	-	64,415	66,140
Total on-balance sheet	\$ 886,502	\$ 339,089	\$ 143,505	\$ (463,708)	\$ 905,388	\$ 915,852
Commitments ⁷	\$ 128,297	\$ 62,739	\$ 12,255	\$ -	\$ 203,291	\$ 203,655
Guarantees ⁸	9,317	37	4	-	9,358	9,839
Total off-balance sheet	\$ 137,614	\$ 62,776	\$ 12,259	\$ -	\$ 212,649	\$ 213,494

Remaining Contractual Maturity Breakdown by Product Type

	At December 31, 2022				
	Years to Maturity			Netting	Total
<i>\$ in millions</i>	Less than 1	1-5	Over 5		
Product Type					
Cash ²	\$ 128,127	\$ -	\$ -	\$ -	\$ 128,127
Derivative and other contracts ³	124,632	96,734	148,140	(325,294)	44,212
Investment securities	20,508	57,891	81,532	-	159,931
Securities financing transactions ^{3,4}	385,643	52	-	(138,414)	247,281
Loans ⁵	144,523	50,472	66,427	-	261,422
Other ⁶	41,570	7,942	14,903	-	64,415
Total on-balance sheet	\$ 845,003	\$ 213,091	\$ 311,002	\$ (463,708)	\$ 905,388
Commitments ⁷	\$ 96,316	\$ 98,378	\$ 8,597	\$ -	\$ 203,291
Guarantees ⁸	4,710	1,985	2,663	-	9,358
Total off-balance sheet	\$ 101,026	\$ 100,363	\$ 11,260	\$ -	\$ 212,649

Distribution of Exposures by Product Type and Counterparty or Industry Type

	At December 31, 2022					
	Wholesale ⁹					
<i>\$ in millions</i>	Bank ¹⁰	Sovereign	Corporate and Other ¹¹	Retail	Netting	Total
Product Type						
Cash ²	\$ 22,362	\$ 75,981	\$ 29,784	\$ -	\$ -	\$ 128,127
Derivative and other contracts ³	139,631	10,329	219,546	-	(325,294)	44,212
Investment securities	-	156,127	3,804	-	-	159,931
Securities financing transactions ^{3,4}	37,144	41,934	306,617	-	(138,414)	247,281
Loans ⁵	18	249	111,150	150,005	-	261,422
Other ⁶	-	3,074	61,341	-	-	64,415
Total on-balance sheet	\$ 199,155	\$ 287,694	\$ 732,242	\$ 150,005	\$ (463,708)	\$ 905,388
Commitments ⁷	\$ 20,545	\$ 1,098	\$ 171,442	\$ 10,206	\$ -	\$ 203,291
Guarantees ⁸	-	-	9,358	-	-	9,358
Total off-balance sheet	\$ 20,545	\$ 1,098	\$ 180,800	\$ 10,206	\$ -	\$ 212,649

1. Average balances are calculated based on month-end balances or, where month-end balances are unavailable, quarter-end balances are used.
2. Amounts consist of cash and cash equivalents.
3. For further discussions of master netting agreements and collateral agreements, see Note 7 (Derivative Instruments and Hedging Activities) and Note 9 (Collateralized Transactions) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K.
4. Amounts reflect Securities purchased under agreements to resell and Securities borrowed.
5. Amounts reflect loans held for investment, loans held for sale, and banking book loans at fair value, as well as margin lending and employee loans.
6. Amounts primarily reflect Customer and other receivables, Intangible assets, premises, equipment and software costs and banking book U.S. government and agency securities at fair value.
7. Amounts reflect letters of credit and other financial guarantees obtained by the Firm and provided to counterparties to satisfy collateral requirements, lending commitments, forward-starting securities purchased under agreement to resell and forward-starting securities borrowed. For a further discussion of the Firm's commitments, see Note 15 (Commitments, Guarantees and Contingencies) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K.
8. Amounts reflect standby letters of credit and other financial guarantees issued, liquidity facilities, and client clearing guarantees. For a further discussion of the Firm's guarantees, see Note 15 (Commitments, Guarantees and Contingencies) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K.
9. Amounts also include securitization exposures.
10. Bank counterparties primarily include banks and depository institutions.
11. Corporate and Other counterparties include exchanges and clearing houses.

5.2. Credit Risk: General Disclosure for Allowance for Credit Losses and Past Due Loans

The Firm provides loans and lending commitments predominantly within its Institutional Securities and Wealth Management business segments. The Firm accounts for loan and lending commitments using the following categories: held for investment, held for sale, and fair value. The allowance for credit losses (“ACL”) represents an estimate of current expected credit losses (“CECL”) over the entire life of the loans and lending commitments. For a discussion of the Firm’s ACL calculated under the CECL methodology, see Note 2 (Significant Accounting Policies) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K.

For the Firm’s loan disclosures (including current and comparable prior period loan information by product type), such as ACL, reconciliation of changes in ACL, credit quality indicators, past due and nonaccrual, see Note 2 (Significant Accounting Policies) and Note 10 (Loans, Lending Commitments and Related Allowance for Credit Losses) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K.

For a discussion of the Firm’s determination of placing loans on nonaccrual status, returning of loans to accrual status, methodology for estimating ACL and charge-offs of uncollectible amounts, see Note 2 (Significant Accounting Policies) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K.

Actual losses on loans held for investment are recorded as net charge-offs. For net charge-offs/recoveries recorded on loans held for investments for the twelve months ended December 31, 2022, see Note 10 (Loans, Lending Commitments and Related Allowance for Credit Losses) to the consolidated financial statements in the Part II, Item 8 of the 2022 Form 10-K.

For a discussion on the factors impacting the loss experience in the preceding period and comparison of the estimates to actual outcomes over the longer term, see Note 2 (Significant Accounting policies) and Note 10 (Loans, Lending Commitments and Related Allowances for Credit Losses) to the consolidated financial statements in part II, Item 8 of the 2022 Form 10-K.

5.3. Portfolios Subject to Internal Ratings-Based Risk-Based Capital Formulas

The Firm utilizes its internal ratings system in the calculation of RWA for the purpose of determining U.S. Basel III regulatory capital requirements for wholesale and retail exposures, as well as other internal risk management processes such as determining credit limits.

Internal Ratings System Design

As a core part of its responsibility for the independent management of credit risk, the Credit Risk Management Department maintains a control framework to evaluate the risk of obligors and the structure of credit facilities (for loans, derivatives, securities financing transactions, etc.), both at inception and periodically thereafter. For both wholesale and retail exposures, the Firm has internal ratings methodologies that assign a Probability of Default (“PD”) or a rating mapped to PD as well as a Loss Given Default (“LGD”). These risk parameters, along with Exposure at Default (“EAD”), are used to compute credit risk RWA under the Advanced Approach. Internal credit ratings serve as the Credit Risk Management Department’s assessment of credit risk, and the basis for a comprehensive credit limits framework used to control credit risk. The Firm uses quantitative models and judgment to estimate the various risk parameters related to each obligor and/or credit facility. Internal ratings procedures, methodologies, and models are all independently and formally governed, and models and methodologies are reviewed by a separate model risk management oversight function.

The Credit Risk Management Department employs a PD scale that reflects the long-run “through the cycle” average one-year default probability of counterparties in every rating category. The LGD is an estimate of the expected economic loss incurred by the Firm during an economic downturn in the event of default by an obligor within a one-year horizon, or an estimate of the long-run default-weighted average economic loss incurred by the Firm in the event of default by an obligor within a one-year horizon, whichever is greater, expressed as a percentage of EAD. The estimation of LGD considers all the costs of workout and collections net of recoveries (adjusted for time value of money). EAD is the estimated amount due at the time of default, expected during economic downturn conditions, if the default occurs within a one-year horizon. EAD for certain products may be reduced by certain credit risk mitigants. Contingent liabilities, such as undrawn commitments and standby letters of credit, are considered in determining EAD.

Internal Ratings System Process

The performance of the overall internal ratings system is monitored on a quarterly basis. This involves a review of key performance measures that include rating overrides, the accuracy ratio and a comparison of internal ratings versus applicable agency ratings. The review results and conclusions are reported to corresponding credit risk governance committees. The overall effectiveness of the internal ratings system is assessed annually and the evaluation results go through a rigorous challenge process by various governance committees before they are presented to the Firm's Board of Directors.

Wholesale Exposures

Wholesale exposures refer to credit exposures that are evaluated and rated on an individual basis. Wholesale exposures may be to companies, sovereigns, individuals, trusts, funds, or Special Purpose Entities/Special Purpose Vehicles that may arise from a variety of business activities, including, but not limited to, entering into swap or other derivative contracts under which counterparties have obligations to make payments to the Firm; extending credit to clients through various lending commitments; providing short-term or long-term funding that is secured by physical or financial collateral whose value may at times be insufficient to fully cover the loan repayment amount; and posting margin and/or collateral and/or deposits to clearing houses, clearing agencies, exchanges, banks, securities companies and other financial counterparties.

The Credit Risk Management Department rates wholesale counterparties based on an analysis of the obligor and industry- or sector-specific qualitative and quantitative factors. The ratings process typically includes an analysis of the obligor's financial statements; evaluation of its market position, strategy, management and legal and environmental issues; and consideration of industry dynamics affecting its performance. The Credit Risk Management Department also considers securities prices and other financial markets to assess financial flexibility of the obligor. The Credit Risk Management Department collects relevant information to rate an obligor. If the available information for an obligor is limited, a conservative rating is assigned to reflect uncertainty arising from the limited information.

Retail Exposures

Retail exposures generally include exposures to individuals and exposures to small businesses that are managed as part of a pool of exposures with similar risk characteristics, and not on an individual exposure basis. The Firm incurs retail exposure credit risk within its Wealth Management residential mortgage business by making single-family residential mortgage loans in the form of conforming, nonconforming, or

home equity lines of credit ("HELOC"). In addition, the Firm grants loans to certain Wealth Management employees primarily in conjunction with a program to recruit such employees. The primary source of the Firm's retail exposure is concentrated in two of three U.S. Basel III retail exposure categories: Residential Mortgages and Other Retail Exposures. The third U.S. Basel III retail category, Qualifying Revolving Exposures, is not currently relevant to the Firm as it has no assets related to this category.

Retail exposures consist of many small loans, thereby making it generally inefficient to assign ratings to each individual loan. Individual loans, therefore, are segmented and aggregated into pools. The Credit Risk Management Department develops the methodology to assign PD, LGD, and EAD estimates to these pools of exposures with similar risk characteristics, using factors such as the Fair Isaac Corporation ("FICO") scores of the borrowers.

Internal Ratings System Exposures

The following table provides a summary of the distribution of Internal Ratings-Based Advanced Approach risk parameters that the Firm uses to calculate credit risk RWA for wholesale and retail exposures. The table also provides average risk-weighted values across obligor types and rating grades. The Firm currently does not have any qualifying revolving exposures; there is one high volatility commercial real estate loan in the portfolio.

At December 31, 2022

<i>\$ in millions</i>	PD Band (%)	Average PD (%) ¹	Average LGD % ^{1,2}	Undrawn Commitment	EAD ²	Average Counterparty EAD ³	Average risk weight (%)
Subcategory							
Wholesale							
Exposures	0.00 ≤ PD < 0.35	0.06%	41.78%	\$ 95,308	\$ 440,886	\$ 28,296	19.76%
	0.35 ≤ PD < 1.35	0.77%	39.00%	17,427	43,242	207	71.67%
	1.35 ≤ PD < 10.00	4.90%	41.29%	12,534	28,995	428	149.83%
	10.00 ≤ PD < 100.00	28.11%	37.18%	686	2,679	88	213.35%
	100 (Default)	100.00%	N/A	428	2,062	155	106.00%
Sub-total				\$ 126,383	\$ 517,864	\$ 29,174	
Residential							
Mortgages	0.00 ≤ PD < 0.15	0.12%	15.16%	\$ 87	\$ 56,144	\$ 2	4.38%
	0.15 ≤ PD < 0.35	0.25%	81.53%	204	284	2	40.90%
	0.35 ≤ PD < 1.35	0.43%	19.41%	10	374	1	16.09%
	1.35 ≤ PD < 10.00	6.61%	22.59%	-	159	2	83.25%
	10.00 ≤ PD < 100.00	30.53%	26.44%	-	58	1	140.67%
	100 (Default)	100.00%	N/A	-	95	4	106.00%
Sub-total				\$ 301	\$ 57,114	\$ 12	
Other Retail							
Exposures	0.00 ≤ PD < 1.50	-	-	\$ -	\$ -	\$ -	-
	1.50 ≤ PD < 3.00	-	-	-	-	-	-
	3.00 ≤ PD < 5.00	-	-	-	-	-	-
	5.00 ≤ PD < 8.00	6.23%	53.87%	-	4,022	2	86.40%
	8.00 ≤ PD < 100.00	-	-	-	-	-	-
	100 (Default)	100%	N/A	-	188	2	106.00%
Sub-total				\$ -	\$ 4,210	\$ 4	
Total				\$ 126,684	\$ 579,188	\$ 29,190	

N/A—Not Applicable

- Amounts reflect the effect of eligible guarantees and eligible credit derivatives.
- Under U.S. Basel III, credit risk mitigation in the form of collateral may be applied by either reducing EAD or adjusting the LGD, and the approach must be applied consistently by product type.
- Amounts represent the weighted average EAD per counterparty within the respective PD band, weighted by its pro rata EAD contribution.

5.4. General Disclosure for Wholesale Counterparty Credit Risk of Derivative Contracts, Repo-Style Transactions, and Eligible Margin Loans

Counterparty Credit Risk Overview

Counterparty credit exposure arises from the risk that parties are unable to meet their payment obligations under derivative contracts, repo-style transactions, and eligible margin loans. Derivative contracts, repo-style transactions and eligible margin loans have a risk of increased potential future counterparty exposure from changes in movements in market prices and other risk factors. Potential future exposure is mitigated using netting and collateral agreements. The Firm uses the internal models methodology (“IMM”) to compute an exposure that includes the mitigating effects of netting and collateral in valuing over-the-counter (“OTC”) and exchange-traded derivative contracts and repo-style transactions. For certain exchange-traded derivatives where IMM is not used, as of December 31, 2022 the Firm uses SA-CCR to quantify the exposures. For eligible margin loans, the Firm uses either IMM or the collateral haircut approach (“CHA”) as prescribed in the U.S. Basel III rules. The use of netting, collateral, IMM, SA-CCR and CHA is discussed further below, in addition to other counterparty credit risk management practices.

Derivative Contracts

The Firm actively manages its credit exposure through the application of collateral arrangements and readily available market instruments such as credit derivatives. The use of collateral in managing derivative risk is standard in the market place, and is governed by appropriate documentation such as the Credit Support Annex to the International Swaps and Derivatives Association, Inc. (“ISDA”) documentation. In line with these standards, the Firm generally accepts only cash, government bonds, corporate debt, and main index equities as collateral. The Firm has policies and procedures for reviewing the legal enforceability of credit support documents in accordance with applicable rules.

Repo-Style Transactions

Repo-style transactions include securities sold under agreements to repurchase (“repurchase agreements”), securities purchased under agreements to resell (“reverse repurchase agreements”), securities borrowed transactions and securities loaned transactions. The Firm enters into repo-style transactions to, among other things, acquire securities to cover short positions and settle other securities obligations, to accommodate customers’ needs and to finance the Firm’s inventory positions. The Firm manages credit exposure arising from such transactions by, in appropriate circumstances, entering into master netting agreements and collateral agreements with counterparties that provide the Firm, in the

event of a counterparty default (such as bankruptcy or a counterparty’s failure to pay or perform), with the right to net a counterparty’s rights and obligations under such agreement, and liquidate and set off collateral held by the Firm against the net amount owed by the counterparty. Under these agreements and transactions, the Firm either receives or provides collateral, including U.S. government and agency securities, other sovereign government obligations, corporate and other debt, and corporate equities.

Eligible Margin Loans

The Firm also engages in customer margin lending and securities-based lending to its Institutional Securities and Wealth Management clients that allow clients to borrow against the value of qualifying securities. This lending activity is included within Trading Assets, Loans or Customer and other receivables in the consolidated balance sheets. The Firm monitors required margin levels and established credit terms daily and, pursuant to such guidelines, requires customers to deposit additional collateral or reduce positions, when necessary.

Netting

The Firm recognizes netting in its estimation of EAD where it has a master netting agreement in place and other relevant requirements are met. The ISDA Master Agreement is an industry-standard master netting agreement that is typically used to document derivative transactions. The Firm generally uses the ISDA Master Agreement and similar master netting agreements to document derivative and repo-style transactions. For a discussion of the Firm’s master netting agreements, see Note 7 (Derivative Instruments and Hedging Activities) and Note 9 (Collateralized Transactions) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K.

Collateral

The Firm may require collateral depending on the credit profile of the Firm’s counterparties. There is an established infrastructure to manage, maintain, and value collateral on a daily basis. Collateral held is managed in accordance with the Firm’s guidelines and the relevant underlying agreements.

For a discussion of the Firm’s use of collateral as a credit risk mitigant, including with respect to derivatives, repo-style transactions and eligible margin loans, see Note 7 (Derivative Instruments and Hedging Activities) and Note 9 (Collateralized Transactions) to the consolidated financial statements in the Form 10-K. For further information on the Firm’s valuation approaches, including those for collateral, see Note 2 (Significant Accounting Policies) and Note 5 (Fair Values) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K.

General Disclosure for Counterparty Credit Risk

The following table presents the exposures for derivative and other contracts and securities financing transactions, consisting of repo-style transactions and eligible margin loans, presented on a U.S. GAAP basis.

<i>\$ in millions</i>	At December 31, 2022
Derivative and Other Contracts:	
Gross positive fair value	\$ 369,506
Counterparty netting benefit	(279,235)
Net current credit exposure	\$ 90,271
Securities collateral	(19,406)
Cash collateral	(46,059)
Net exposure (after netting and collateral)	\$ 24,806
Securities Financing Transactions:	
Repo-Style Transactions:	
Gross notional exposure	\$ 385,695
Net exposure (after netting and collateral)	9,306
Eligible Margin Loans:	
Gross notional exposure ¹	\$ 108,404

1. At December 31, 2022, the fair value of the collateral held exceeded the carrying value of margin loans.

The following table is presented on a U.S. GAAP basis and reflects the notional amount of outstanding credit derivatives at December 31, 2022, used to hedge the Firm's own portfolio and those undertaken in connection with client intermediation activities.

<i>\$ in millions</i>	At December 31, 2022			
	Hedge Portfolio		Intermediation Activities	
	Purchased	Sold	Purchased	Sold
Credit derivative type				
Credit default swaps	\$ 39,082	\$ 12,453	\$ 231,153	\$ 232,090
Total return swaps	3,405	1,273	14,855	12,301
Credit options	823	249	66,282	77,080
Total	\$ 43,310	\$ 13,975	\$ 312,290	\$ 321,471

For a further discussion of the Firm's credit derivatives, see "Quantitative and Qualitative Disclosures about Risk—Credit Risk—Derivatives" and Note 7 (Derivative Instruments and Hedging Activities) to the consolidated financial statements Part II, Item 8 of the 2022 Form 10-K.

Internal Models Methodology

The Firm has been approved by its primary regulators to use IMM to estimate counterparty exposure for regulatory capital purposes. Under IMM approach, the Firm uses simulation models to estimate the distribution of counterparty exposures at specified future time horizons. The simulation models project potential values of various risk factors that affect the

Firm's counterparty portfolio (e.g., interest rates, equity prices, commodity prices, and credit spreads) under a large number of simulation paths, and then determine possible changes in counterparty exposure for each path by re-pricing transactions with that counterparty under the projected risk factor values. A counterparty's expected positive exposure profile is determined from the resulting modeled exposure distribution to estimate EAD in calculating credit risk RWA for regulatory capital ratio purposes. For a small population of exposures not modeled under this simulation method, the Firm calculates EAD for regulatory capital purposes using a more conservative but less risk-sensitive method. The internal models incorporate the effects of legally enforceable netting and collateral agreements in estimating counterparty exposure.

Collateral Haircut Approach Methodology

For certain eligible margin loans, EAD is adjusted to reflect the risk mitigating effect of financial collateral in line with the CHA as prescribed in the U.S. Basel III rules. Other counterparty credit risk management practices are discussed further below.

Standardized Approach for Counterparty Credit Risk Methodology

EAD for derivative contracts under SA-CCR is equal to the sum of the replacement cost ("RC") of the derivative and the potential future exposure ("PFE"), multiplied by the alpha factor, as prescribed in the U.S. Basel III rules. Where applicable, RC and PFE incorporate the effects of credit risk mitigation of financial collateral and qualifying master netting agreements.

The table below presents the EAD and RWA by methodology used for the Firm's determination of regulatory capital for derivative and other contracts and securities financing transactions, excluding default fund contributions.

<i>\$ in millions</i>	At December 31, 2022					
	Internal Models Methodology		Non-Internal Models Methodology ¹		Total	
	EAD	RWA	EAD	RWA	EAD	RWA
Derivative and other contracts ²	\$ 135,688	\$ 45,716	\$ 1,650	\$ 1,825	\$ 137,338	\$ 47,541
Securities financing transactions	33,136	- 9,187	2,988	- 4,244	36,124	13,431
Other	3,977	84	-	-	3,977	84
Total	\$ 172,801	\$ 54,987	\$ 4,638	\$ 6,069	\$ 177,439	\$ 61,056

1. Amount includes both CHA and SA-CCR.
2. Amount includes client exposures related to cleared transactions.

Other Counterparty Credit Risk Management Practices

Credit Valuation Adjustment

CVA refers to the fair value adjustment to reflect counterparty credit risk in the valuation of OTC derivative contracts. U.S. Basel III requires the Firm to calculate RWA for CVA.

The Firm establishes a CVA for OTC derivative transactions based on expected credit losses given the probability and severity of a counterparty default. The adjustment is determined by evaluating the credit exposure to the counterparty and by taking into account the market value of a counterparty's credit risk as implied by credit spreads, and the effect of allowances for any credit risk mitigants such as legally enforceable netting and collateral agreements.

CVA is recognized in profit and loss on a daily basis and effectively represents an adjustment to reflect the credit component of the fair value of the derivatives receivable. Given that the previously recognized CVA reduces the potential loss faced in the event of a counterparty default, exposure metrics are reduced for CVA.

Credit Limits Framework

The Firm employs an internal comprehensive and global Credit Limits Framework as one of the primary tools used to manage credit risk levels across the Firm. The Credit Limits Framework includes single-name limits and portfolio concentration limits by country, industry, and product type. The limits within the Credit Limits Framework are calibrated to the Firm's risk tolerance and reflect factors that include the Firm's capital levels and the risk attributes of the exposures managed by the limits. Credit exposure from internal models, including stress models, is actively monitored against credit limits, and excesses are identified and escalated in accordance with established governance standards. In addition, credit limits are evaluated and reaffirmed annually or more frequently as necessary.

Additional Collateral Requirements Due to Credit Rating Downgrade

For a discussion of the additional collateral or termination payments that may be called in the event of a future credit rating downgrade of the Firm, see "MD&A—Liquidity and Capital Resources—Balance Sheet—Credit Ratings" in the Form 10-K.

Wrong-Way Risk

The Firm incorporates the effect of specific wrong-way risk in its calculation of the counterparty exposure. Specific wrong-way risk arises when a transaction is structured in such a way that the exposure to the counterparty is positively correlated with the PD of the counterparty; for example, a counterparty

writing put options on its own stock or a counterparty collateralized by its own or related party stock. The Firm considers specific wrong-way risk when approving transactions. The Firm also monitors general wrong-way risk, which arises when the counterparty PD is correlated with general market or macroeconomic factors. The credit assessment process identifies these correlations and manages the risk accordingly.

5.5. Credit Risk Mitigation

Overview

In addition to the use of netting and collateral for mitigating counterparty credit risk discussed above, the Firm may seek to mitigate credit risk from its lending and derivatives transactions in multiple ways, including through the use of guarantees and hedges. At the transaction level, the Firm seeks to mitigate risk through management of key risk elements such as size, tenor, financial covenants, seniority and collateral. The Firm actively hedges its lending and derivatives exposure through various financial instruments that may include single-name, portfolio, and structured credit derivatives. Additionally, the Firm may sell, assign, or syndicate funded loans and lending commitments to other financial institutions in the primary and secondary loan market.

In connection with its derivative and other contracts and securities financing transaction activities, the Firm generally enters into master netting agreements and collateral arrangements with counterparties. These agreements provide the Firm with the ability to demand collateral, as well as to liquidate collateral and offset receivables and payables covered under the same master netting agreement in the event of a counterparty default. For further information on the impact of netting on the Firm's credit exposures, see "Collateral" in Section 5.4 herein and "Quantitative and Qualitative Disclosures about Risk—Risk Management—Credit Risk" in Part II, Item 7A of the 2022 Form 10-K.

Loan Collateral Recognition and Management

Collateralizing loans significantly reduces the credit risk to the Firm. As part of the credit evaluation process, the Credit Risk Management Department assesses the ability of obligors to grant collateral. The Credit Risk Management Department may consider the receipt of collateral as a factor when approving loans, as applicable.

Loans secured by customer margin accounts, a source of credit exposure, are collateralized in accordance with internal and regulatory guidelines. The Firm monitors exposure against required margin levels daily and pursuant to such guidelines, requires customers to deposit additional collateral or reduce positions, when necessary. Factors considered in the review of margin loans are the amount of the loan, the intended purpose,

the degree of leverage being employed in the account and the amount of collateral, and overall evaluation of the portfolio to ensure proper diversification or, in the case of concentrated positions, appropriate liquidity of the underlying collateral or potential risk reduction strategies. Additionally, transactions relating to restricted positions require a review of any legal impediments to liquidation of the underlying collateral. Underlying collateral for margin loans is reviewed with respect to the liquidity of the proposed collateral positions, valuation of securities, historic trading range, volatility analysis and an evaluation of industry concentrations.

With respect to first and second mortgage loans, including HELOC loans, a loan evaluation process is part of the framework of the credit underwriting policies and collateral valuation. Loan-to-collateral value ratios are determined based on independent third-party property appraisal/valuations, and the security lien position is established through title/ownership reports.

Guarantees and Credit Derivatives

The Firm may accept or request guarantees from related or third parties to mitigate credit risk for wholesale obligors. Such arrangements represent obligations for the guarantor to make payments to the Firm if the counterparty fails to fulfill its obligation under a borrowing arrangement or other contractual obligation. The Firm typically accepts guarantees from corporate entities and financial institutions within its Institutional Securities business segment, and individuals and their small- and medium-sized domestic businesses within its Wealth Management business segment. The Firm may also hedge certain exposures using credit derivatives. The Firm enters into credit derivatives, principally through credit default swaps, under which it receives or provides protection against the risk of default on a set of debt obligations issued by a specified reference entity or entities. A majority of the Firm's hedge counterparties are banks, broker-dealers, insurance, and other financial institutions.

The Firm recognizes certain credit derivatives and third-party guarantees for the reduction of capital requirements under the Advanced Approach. At December 31, 2022, the aggregate EAD amount of the Firm's wholesale exposure hedged by such credit derivatives or third-party guarantees, excluding CVA hedges, was \$8,761 million.

6. Equities Not Subject to Market Risk Capital Rule

Overview

The Firm occasionally makes equity investments that may include business facilitation or other investing activities. Such investments are typically strategic investments undertaken by the Firm to facilitate core business activities. The Firm may also make equity investments and capital commitments to public and private companies, funds, and other entities. Additionally, the Firm sponsors and manages investment vehicles and separate accounts for clients seeking exposure to private equity, infrastructure, mezzanine lending, and real estate-related and other alternative investments. The Firm may also invest in and provide capital to such investment vehicles.

Valuation for equity investments not subject to market risk capital rule

The Firm's equity investments include investments in private equity funds, real estate funds, and hedge funds (which include investments made in connection with certain employee deferred compensation plans), as well as direct investments in equity securities, which are presented on a U.S. GAAP basis.

The Firm applies the Alternative Modified Look-Through Approach for equity exposures to investment funds. Under this approach, the adjusted carrying value of an equity exposure to an investment fund is assigned on a pro rata basis to different risk weight categories based on the information in the fund's prospectus or related documents. For all other equity exposures, the Firm applies the Simple Risk-Weight Approach ("SRWA"). Under SRWA, the RWA for each equity exposure is calculated by multiplying the adjusted carrying value of the equity exposure by the applicable regulatory prescribed risk weight.

The following table consists of U.S. GAAP amounts disclosed in the Firm's balance sheet of investments and the types and nature of investments, capital requirements by appropriate equity groupings, realized gains/(losses) from sales and liquidations in the reporting period, unrecognized gains/(losses) related to investments carried at cost and unrealized gains/(losses) included in Tier 1 and/or Tier 2 capital.

At December 31, 2022

<i>\$ in millions</i>	Total On-balance Sheet ¹	Risk Weight %	RWA ²
Type of Equity Investments			
Simple Risk-Weight Approach:			
Exposures in the 0% risk weight category	\$ 604	0%	\$ -
Exposures in the 20% risk weight category	100	20%	21
Community development equity exposures	4,202	100%	4,478
Non-significant equity exposures	7,159	100%	8,581
Significant investments in unconsolidated financial institutions ³	2,817	250%	6,953
Publicly traded equity exposures	-	300%	-
Non-publicly traded equity exposures	-	400%	-
Exposures in the 600% risk weight category	375	600%	2,700
Sub-total	\$ 15,257	N/A	\$ 22,733
Equity exposures to investment funds:			
Alternative Modified Look-Through Approach	1,285	N/A	487
Total Equities Not Subject to Market Risk Capital Rule	\$ 16,542	N/A	\$ 23,220
Quarter-to-date realized gains/(losses) from sales and liquidations ⁴			\$ 217
Total unrealized gains/(losses) on equity securities reflected in AOCI ⁴			-
Unrecognized gains/(losses) related to investments carried at cost ⁴			-
Unrealized gains/(losses) included in Tier 1 and/or Tier 2 capital			-

N/A—Not Applicable

- The total on-balance sheet amount reflects \$13,194 million and \$3,348 million of non-publicly traded and publicly traded investments, respectively, at December 31, 2022. The on-balance sheet amounts are presented on a U.S. GAAP basis, which include investments in the Firm's own capital instruments and investments in the capital instruments of unconsolidated financial institutions that are subject to capital deductions under U.S. Basel III. At December 31, 2022, the amount of Equities Not Subject to Market Risk Capital Rule that was deducted from Total capital was \$784 million, which also includes certain deductions applicable under the Volcker Rule. For a discussion of the Firm's deductions under the Volcker Rule, see "Business—Supervision and Regulation—Financial Holding Company—Activities Restrictions under the Volcker Rule" in Part I, Item 1 of the 2022 Form 10-K. For further information on the Firm's valuation techniques related to investments, see Note 2 (Significant Accounting Policies) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K.
- In accordance with U.S. Basel III, RWA reflect a 1.06 multiplier and include both on- and off-balance sheet equity exposures.
- Under the Advanced Approach, significant investments in unconsolidated financial institutions in the form of common stock, which are not deducted from CET1, are assigned a 250% risk weight.
- For the quarter ended December 31, 2022.

7. Securitization Exposures

A securitization exposure is defined (in line with the U.S. Basel III definition) as a transaction in which:

- All or a portion of the credit risk of the underlying exposures is transferred to third parties, and has been separated into two or more tranches reflecting different levels of seniority;
- Performance of the securitization depends upon the performance of the underlying exposures;
- All or substantially all of the underlying exposures are financial exposures; and
- Underlying exposures are not owned by an operating company or certain other issuers.

Securitization exposures include on- or off-balance sheet exposures (including credit enhancements) that arise from a traditional securitization or synthetic securitization (including a re-securitization transaction); or an exposure that directly or indirectly references a securitization exposure (*e.g.*, a credit derivative). A re-securitization is a securitization which has more than one underlying exposure and in which one or more of the underlying exposures is itself a securitization exposure.

On-balance sheet exposures include securitization notes purchased and loans made to securitization trusts. Off-balance sheet exposures include liquidity commitments and derivatives (including tranching credit derivatives and derivatives for which the reference obligation is a securitization).

Securitization exposures are classified as either traditional or synthetic. In a traditional securitization, risk is transferred other than through the use of credit derivatives or guarantees. Typically, the originator establishes a special purpose entity ("SPE") and sells assets (either originated or purchased) off its balance sheet into the SPE, which issues securities to investors. In a synthetic securitization, credit risk is transferred to an investor through the use of credit derivatives or guarantees.

The Firm does not manage or advise entities that invest in securitizations sponsored by the Firm.

The Firm engages in securitizations primarily as a trading activity, except for (i) the AFS securities portfolios, for which the Firm purchases mostly highly rated tranches of ABS securitizations not sponsored by the Firm, and (ii) warehouse loans and liquidity commitments to client sponsored SPEs.

The Firm retains securities issued in some of the securitization transactions it sponsors, and it purchases securities issued in securitization transactions sponsored by others as part of its trading inventory. These interests are included in the consolidated balance sheets at fair value with mark-to-market changes reported in net income.

For further information on securitization transactions in which the Firm holds any exposure in either the banking book or the trading book, see Note 16 (Variable Interest Entities and Securitization Activities) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K.

7.1. Accounting and Valuation

For a discussion of the Firm's accounting and valuation techniques related to securitizations, see Note 2 (Significant Accounting Policies), Note 5 (Fair Values) and Note 16 (Variable Interest Entities and Securitization Activities) to the consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K.

7.2. Securitization and Resecuritization Exposures in the Banking Book

The following table presents the total outstanding exposures securitized by the Firm as a sponsor for which the Firm has retained credit or counterparty exposures in the banking book as securitizations at December 31, 2022. This table is primarily comprised of transactions in which the Firm transferred assets and entered into a derivative transaction with the securitization SPE. For residential mortgage and commercial mortgage transactions, these derivatives are interest rate and/or currency swaps. Traditional securitization exposures reflect unpaid principal balances of the underlying collateral, and synthetic securitization exposures reflect notional amounts.

<i>\$ in millions</i>	At December 31, 2022		
	Traditional		Synthetic
	Amounts Sold by the Firm	Amounts Sold by Third Parties in Transactions Sponsored by the Firm	
Exposure type			
Commercial mortgages	\$ -	\$ -	-
Residential mortgages	225	-	-
Corporate debt	-	-	-
Asset-backed and other	-	-	-
Total	\$ 225	\$ -	-

The following table is presented on a U.S. GAAP basis and reflects a summary of the Firm's securitization activity during 2022, regardless of whether the Firm retained credit or counterparty exposure, including the amount of exposures securitized (by exposure type), and the corresponding

recognized gain or loss on sale. This table includes assets transferred by unaffiliated co-depositors into these transactions.

<i>\$ in millions</i>	Year Ended December 31, 2022		
	Amounts Sold by the Firm	Recognized Gain/(Loss) on Sale	Amounts Sold by Third Parties in Transactions Sponsored by the Firm
Exposure type			
Commercial mortgages	\$ 6,705	\$ 64	\$ 20,382
Residential mortgages	367	(2)	-
Corporate debt	594	-	-
Asset-backed and other	-	-	-
Total	\$ 7,666	\$ 62	\$ 20,382

The following table is presented on a U.S. GAAP basis and reflects a summary of the Firm's securitization activity during 2022, for those transactions in which the Firm has not retained an interest, including the amount of exposures securitized (by exposure type), and the corresponding recognized gain or loss on sale. This table includes assets transferred by unaffiliated co-depositors into these transactions.

<i>\$ in millions</i>	Year Ended December 31, 2022		
	Amounts Sold by the Firm	Recognized Gain/(Loss) on Sale	Amounts Sold by Third Parties in Transactions Sponsored by the Firm
Exposure type			
Commercial mortgages	\$ 3,952	\$ 24	\$ 14,903
Residential mortgages	-	-	-
Corporate debt	315	-	-
Asset-backed and other	-	-	-
Total	\$ 4,267	\$ 24	\$ 14,903

For information on securities held in the Firm's trading book, see "Securitization and Resecuritization Exposures in the Trading Book" in Section 7.3 herein.

During the quarter ended December 31, 2022, the Firm recognized \$1 million credit loss relating to retained senior or subordinate tranches in the banking book. The Firm did not have any impaired/past due exposures or losses on securitized assets.

In addition, the Firm may enter into derivative contracts, such as interest rate swaps with securitization SPEs. These derivative transactions generally represent senior obligations of the SPEs, senior to the most senior beneficial interest outstanding in the securitized exposures and are included in the Firm's consolidated balance sheets at fair value.

The following table is presented on a U.S. GAAP basis and reflects the outstanding exposures intended to be securitized:

<i>\$ in millions</i>	At December 31, 2022	
Exposure type		
Commercial mortgages	\$	532
Residential mortgages		-
Corporate debt		179
Asset-backed and other		-
Total	\$	711

The following table presents the aggregate EAD amount of the Firm's outstanding on- and off-balance sheet securitization positions by exposure type:

<i>\$ in millions</i>	At December 31, 2022		
	On-balance sheet	Off-balance sheet	Total
Exposure type			
Commercial mortgages	\$ 12,025	\$ 1,278	\$ 13,303
Residential mortgages	1,711	315	2,026
Corporate debt	6,214	3,251	9,465
Asset-backed and other ¹	3,851	3,465	7,316
Total	\$ 23,801	\$ 8,309	\$ 32,110

1. Amounts primarily reflect student loans, auto receivables, municipal bond liquidity facilities and consumer loan receivables.

The following tables present the aggregate EAD amount of securitization exposures retained or purchased and the associated RWA for these exposures, categorized between securitization and re-securitization exposures. In addition, these exposures are further categorized into risk weight bands and by risk-based capital approaches. The Firm employs the Supervisory Formula Approach and the Simplified Supervisory Formula Approach to calculate counterparty credit capital for securitization exposures in the Firm's banking book. The Supervisory Formula Approach uses internal models to calculate the risk weights for securitization exposures. The Simplified Supervisory Formula Approach is a simplified version of the Supervisory Formula Approach under which the risk weights for securitization exposures are determined using non-modeled inputs. In those cases where the Firm does not apply either of the Supervisory Formula Approach or the Simplified Supervisory Formula Approach, the securitization exposures will be assigned to the 1,250% risk weight category.

At December 31, 2022						
Securitized						
\$ in millions	Supervisory Formula Approach		Simplified Supervisory Formula Approach		1,250% Risk Weight Category	
	EAD	RWA	EAD	RWA	EAD	RWA
Risk Weight						
0% to <=20%	\$ 13,262	\$ 2,811	\$ 14,699	\$ 3,117	\$ -	\$ -
>20% to <=100%	2,546	1,012	483	227	-	-
>100% to <=500%	-	-	1,101	2,185	-	-
>500% to <1250%	2	16	2	19	-	-
1,250%	-	-	9	123	5	66
Total	\$ 15,810	\$ 3,839	\$ 16,294	\$ 5,671	\$ 5	\$ 66

At December 31, 2022						
Re-securitizations						
\$ in millions	Supervisory Formula Approach		Simplified Supervisory Formula Approach		1,250% Risk Weight Category	
	EAD	RWA	EAD	RWA	EAD	RWA
Risk Weight						
0% to <=20%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
>20% to <=100%	-	-	-	-	-	-
>100% to <=500%	-	-	1	1	-	-
>500% to <1250%	-	-	-	-	-	-
1250%	-	-	-	-	-	2
Total	\$ -	\$ -	\$ 1	\$ 1	\$ -	\$ 2

At December 31, 2022, the amount of exposures that was deducted from Tier 1 common capital, representing the after-tax gain on sale resulting from securitization was \$29 million.

The following table presents the aggregate EAD amount of re-securitization exposures retained or purchased, categorized according to exposures to which credit risk mitigation is applied and those not applied.

\$ in millions	At December 31, 2022
Re-securitization exposures:	
Re-securitization exposure to which credit risk mitigation is applied	\$ -
Re-securitization exposure to which credit risk mitigation is not applied	1
Total re-securitization exposures retained or purchased	\$ 1
Total re-securitization exposure to guarantors	\$ -
Total re-securitization exposure not to guarantors	1
Total re-securitization exposures retained or purchased	\$ 1

The credit risk of the Firm's securitizations and re-securitizations is controlled by actively monitoring and managing the associated credit exposures. The Firm evaluates collateral quality, credit subordination levels, and structural characteristics of securitization transactions at inception and on an ongoing basis, and manages exposures against internal concentration limits.

7.3. Securitization and Resecuritization Exposures in the Trading Book

The Firm also engages in securitization activities related to commercial and residential mortgage loans, corporate bonds and loans, municipal bonds and other types of financial instruments. The Firm records such activities in the trading book.

The following table presents the Net Market Value of the Firm's aggregate on- and off-balance sheet securitization positions by exposure type, inclusive of hedges, in the trading book:

\$ in millions	At December 31, 2022
Exposures	Net Market Value ¹
Commercial mortgages	\$ 570
Residential mortgages	1,255
Corporate debt ²	682
Asset-backed securitizations and other	179
Total	\$ 2,686

1. Net Market Value represents the fair value for cash instruments and the replacement value for derivative instruments.
2. Amount includes correlation trading positions that are not eligible for Comprehensive Risk Measure ("CRM") surcharge. For more information on CRM, see "Comprehensive Risk Measure" in Section 9.1 included herein.

The Firm closely monitors the price, basis and liquidity risk in the covered securitization and resecuritization positions that are held in the trading book. Each position falls into at least one or more trading limits that have been set to limit the aggregate, concentration and basis risk in the portfolio to acceptable levels. Holdings are monitored against these limits on a daily basis.

The inherent market risk of these positions are captured in various risk measurement models including Regulatory VaR, Regulatory stressed VaR and stress loss scenarios which are calculated and reviewed on a daily basis. Further, the Firm regularly performs additional analysis to comprehend various risks in its securitization and resecuritization portfolio, and changes in these risks. Analysis is performed in accordance with U.S. Basel III to understand structural features of the portfolio and the performance of underlying collateral.

The Firm calculates the standard specific risk regulatory capital for securitization and resecuritization positions under the Simplified Supervisory Formula Approach. Under this approach, a risk weight assigned to each position is calculated based on a prescribed regulatory methodology. The resulting capital charge represents the higher of the total net long or net short capital charge calculated after applicable netting.

In addition, the Firm uses a variety of hedging strategies to mitigate credit spread and default risk for the securitization and resecuritization positions. Hedging decisions are based on

market conditions, and are evaluated within the Firm's risk governance structure.

8. Interest Rate Risk Sensitivity Analysis

The Firm believes that the net interest income sensitivity analysis is an appropriate representation of the Firm's 'Wealth Management business segment' interest rate risk for non-trading activities. For information on the interest rate risk sensitivity analysis, see "Quantitative and Qualitative Disclosures about Risk—Market Risk—Non-Trading Risks—Wealth Management Net Interest Income Sensitivity Analysis" in the 2022 Form 10-K.

9. Market Risk

Market risk refers to the risk that a change in the level of one or more market prices, rates, indices, implied volatilities (the price volatility of the underlying instrument imputed from option prices), correlations or other market factors, such as market liquidity, will result in losses for a position or portfolio. Generally, the Firm incurs market risk as a result of trading, investing and client facilitation activities, principally within its Institutional Securities business segment where the substantial majority of the Firm's market risk capital is required. In addition, the Firm incurs trading-related market risk within its Wealth Management business segment. The Firm's Investment Management business segment incurs principally non-trading market risk primarily from investments in real estate funds and private equity vehicles. For a further discussion of the Firm's market risk and market risk management framework, see "Quantitative and Qualitative Disclosures about Risk—Risk Management—Market Risk" and "Quantitative and Qualitative Disclosures about Risk—Risk Management—Country Risk" in Part II, Item 7A of the 2022 Form 10-K.

The following table presents the Firm's measure for market risk and market risk RWA in accordance with the Advanced Approach, categorized by component type. RWA for market risk are computed using either regulator-approved internal models or standardized methods that involve applying risk-weighting factors prescribed by regulators. Pursuant to U.S. Basel III, multiplying the measure for market risk by 12.5 results in market risk RWA.

At December 31, 2022		
<i>\$ in millions</i>	Measure for Market Risk	RWA ¹
Components of measure for market risk and market risk RWA		
Regulatory VaR ²	\$ 825	\$ 10,307
Regulatory stressed VaR ³	1,276	15,948
Incremental risk charge ³	238	2,979
Comprehensive risk measure ^{3,4}	65	809
Specific risk:		
Non-securitizations ⁵	1,018	12,720
Securitizations ⁶	624	7,800
Total market risk	\$ 4,046	\$ 50,563

- For information on the Firm's market risk RWA roll-forward from December 31, 2021 to December 31, 2022, see "MD&A—Liquidity and Capital Resources—Regulatory Requirements—Regulatory Capital Requirements" in the Form 10-K.
- Per regulatory requirements, the daily average of the previous 60 business days from the period-end date is utilized in the regulatory capital calculation.
- Per regulatory requirements, the weekly average of the previous 12 weeks from the period-end date is utilized in the regulatory capital calculation.
- Amount represents the greater of the modeled component and the 8% surcharge computed under the Standardized approach. As of the most recent reporting date, RWA from the CRM modeled charge was \$809 million and the surcharge was \$625 million. For more information on CRM, see "Comprehensive Risk Measure" in Section 9.1 included herein.
- Non-securitization specific risk charges calculated using regulatory-prescribed risk-weighting factors for certain debt and equity positions. The prescribed risk-weighting factors are generally based on, among other things, the Organization for Economic Cooperation and Development's country risk classifications for the relevant home country (in the case of public sector and depository institution debt positions), the remaining contractual maturity and internal assessments of creditworthiness. Additionally, amounts include a De Minimis RWA for positions not captured in the VaR model.
- For information on market risk related to securitizations, see Section 7.3 "Securitization and Resecuritization Exposures in the Trading Book" included herein.

9.1. Model Methodology, Assumptions and Exposure Measures

Regulatory VaR

The Firm estimates VaR using an internal model based on historical simulation for general market risk factors and Monte Carlo simulation for name-specific risk in bonds, loans and related derivatives. The model constructs a distribution of hypothetical daily changes in the value of trading portfolios based on the following: historical observation of daily changes in key market indices or other market risk factors; and information on the sensitivity of the portfolio values to these market risk factor changes. The Firm's VaR model uses one year of historical data.

The Firm utilizes the same VaR model for risk management purposes as well as regulatory capital calculations. The portfolio of positions used for the Firm's VaR for risk management purposes ("Management VaR") differs from that used for regulatory capital requirements ("Regulatory VaR"), as it contains certain positions that are excluded from Regulatory VaR. Examples include counterparty CVAs and loans that are carried at fair value and associated hedges.

For regulatory capital purposes, Regulatory VaR is computed at a 99% level of confidence over a 10-day time horizon. The Firm's Management VaR is computed at a 95% level of confidence over a one-day time horizon, which is a useful indicator of possible trading losses resulting from adverse daily market moves. For more information about the Firm's Management VaR model, related statistics and limit monitoring process, see "Quantitative and Qualitative Disclosures about Risk—Market Risk" in Part II, Item 7A of the 2022 Form 10-K.

The following table presents the period-end, daily average, and high and low Regulatory VaR by risk category for a 10-day holding period for the quarter ended December 31, 2022. Additionally, the daily average Regulatory VaR for a one-day holding period is shown for comparison. The metrics below are calculated over the calendar quarter and therefore may not coincide with the period applied in the regulatory capital calculations.

	One-Day Holding Period		10-Day Holding Period		
	Daily Average ¹	Period End	Daily Average ¹	High	Low
<i>\$ in millions</i>					
Interest rate	\$ 64	\$ 219	\$ 203	\$ 295	\$ 133
Credit spread	33	110	106	171	75
Equity price	28	68	89	118	66
Foreign exchange rate	21	75	67	105	46
Commodity price	41	101	129	167	92
Less: Diversification benefit ^{2,3}	(101)	(333)	(322)	N/A	N/A
Total Regulatory VaR \$	86	\$ 240	\$ 272	\$ 324	\$ 222

N/A—Not Applicable

- The daily average shown is calculated over the entire quarter. Per regulatory requirements, the daily average of the previous 60 business days from the period-end date is utilized in the regulatory capital calculation.
- Diversification benefit equals the difference between the total Regulatory VaR and the sum of the component VaRs. This benefit arises because the simulated one-day losses for each of the components occur on different days; similar diversification benefits also are taken into account within each component.
- The high and low VaR values for the total Regulatory VaR and each of the component VaRs might have occurred on different days during the quarter, and therefore the diversification benefit is not an applicable measure.

Regulatory Stressed VaR

Regulatory stressed VaR is calculated using the same methodology and portfolio composition as Regulatory VaR. However, Regulatory stressed VaR is based on a continuous one-year historical period of significant market stress, appropriate to the Firm's portfolio. The Firm's selection of the one-year stressed window is evaluated on an ongoing basis.

The following table presents the period-end, weekly average, and high and low Regulatory stressed VaR for a 10-day holding period for the quarter ended December 31, 2022. Additionally, the weekly average Regulatory stressed VaR for a one-day holding period is shown for comparison. The metrics below are calculated over the calendar quarter and therefore may not coincide with the period applied in the regulatory capital calculations.

	One-Day Holding Period		10-Day Holding Period		
	Weekly Average ¹	Period End	Weekly Average ¹	High	Low
<i>\$ in millions</i>					
Total Regulatory stressed VaR	\$ 134	\$ 440	\$ 423	\$ 484	\$ 367

- The weekly average shown is calculated over the entire quarter. Per regulatory requirements, the weekly average of the previous 12 weeks from the period-end date is utilized in the regulatory capital calculation.

Incremental Risk Charge

The Incremental Risk Charge (“IRC”) is an estimate of default and migration risk of unsecuritized credit products in the trading book. The IRC also captures recovery risk, and assumes that average recoveries are lower when default rates are higher. A Monte Carlo simulation-based model is used to calculate the IRC at a 99.9% level of confidence over a one-year time horizon. A constant level of risk assumption is imposed which ensures that all positions in the IRC portfolio are evaluated over the full one-year time horizon.

The IRC model differentiates the underlying traded instruments by liquidity horizons, with the minimum liquidity horizon set to 3 months. Lower rated issuers receive longer liquidity horizons of between 6 and 12 months. In addition to the ratings-based liquidity horizon, the Firm also applies liquidity horizon penalties to positions that are deemed concentrated.

The following table presents the period-end, weekly average, and high and low IRC for the quarter ended December 31, 2022. The metrics below are calculated over the calendar quarter and therefore may not coincide with the period applied in the regulatory capital calculations.

<i>\$ in millions</i>	Quarter Ended December 31, 2022			
	Period End	Weekly Average ¹	High	Low
Total Incremental Risk Charge	\$ 238	\$ 219	\$ 319	\$ 165

1. The weekly average shown is calculated over the entire quarter. Per regulatory requirements, the weekly average of the previous 12 weeks from the period-end date is utilized in the regulatory capital calculation.

Comprehensive Risk Measure

CRM is an estimate of risk in the correlation trading portfolio, taking into account credit spread, correlation, basis, recovery and default risks. A Monte Carlo simulation-based model is used to calculate the CRM at a 99.9% level of confidence over a one-year time horizon, applying the constant level of risk assumption.

All positions in the CRM portfolio are given a liquidity horizon of 6 months.

Positions eligible for CRM are also subject to an 8% capital surcharge, which is reflected in “Comprehensive risk measure” in the “Components of measure for market risk and market risk RWA” table in Section 9 herein.

Correlation Trading Positions

A correlation trading position is a securitization position for which all or substantially all of the value of the underlying exposure is based on the credit quality of a single company for which a two-way market exists, or on commonly traded indices based on such exposures for which a two-way market exists on the indices. Hedges of correlation trading positions are also considered correlation trading positions. For the quarter ended December 31, 2022, the Firm’s aggregate CRM eligible correlation trading positions had a Net Market Value of \$175 million, which is comprised of net long market values of \$96 million and net short market values of \$79 million. The net long and net short market values are inclusive of netting permitted under U.S. Basel III.

The following table presents the period-end, weekly average, and high and low CRM for the quarter ended December 31, 2022. The metrics below are calculated over the calendar quarter and therefore may not coincide with the period applied in the regulatory capital calculations.

<i>\$ in millions</i>	Quarter Ended December 31, 2022			
	Period End	Weekly Average ¹	High	Low
Comprehensive Risk Measure Modeled	\$ 63	\$ 63	\$ 82	\$ 37
Comprehensive Risk Measure Surcharge	47	50	56	45

1. The weekly average shown is calculated over the entire quarter. Per regulatory requirements, the weekly average of the previous 12 weeks from the period-end date is utilized in the regulatory capital calculation.

9.2. Model Limitations

The Firm uses VaR and Stressed VaR as components in a range of risk management tools. Among their benefits, VaR models permit estimation of a portfolio’s aggregate market risk exposure, incorporating a range of varied market risks and portfolio assets. However, VaR has various limitations, which include, but are not limited to: use of historical changes in market risk factors, which may not be accurate predictors of future market conditions, and may not fully incorporate the risk of extreme market events that are outsized relative to observed historical market behavior or reflect the historical distribution of results beyond the 99% confidence interval; and reporting of losses over a defined time horizon, which does not reflect the risk of positions that cannot be liquidated or hedged over that defined horizon.

The Firm also uses IRC and CRM models to measure default and migration risk of credit spread and correlation trading positions in the trading book. Among their benefits, these models permit estimation of a portfolio's aggregate exposure to default and migration risk, incorporating a range of market risk factors in a period of financial stress. However, the IRC and CRM models have various limitations, which include, but are not limited to: use of historical default rates, credit spread movements, correlation and recovery rates, which may not be accurate predictors of future credit environments, and may not fully incorporate the risk of extreme credit events that are outsized relative to observed historical behavior or reflect the historical distribution of results beyond the 99.9% confidence interval.

Regulatory VaR, Regulatory stressed VaR, IRC and CRM numbers are not readily comparable across firms because of differences in the firms' portfolios, modeling assumptions and methodologies. In IRC and CRM, those differences may be particularly pronounced because of the long risk horizon measured by these models as well as the difficulty in performing backtesting. These differences can result in materially different numbers across firms for similar portfolios. As a result, the model-based numbers tend to be more useful when interpreted as indicators of trends in a firm's risk profile rather than as an absolute measure of risk to be compared across firms.

9.3. Model Validation

The Firm validates its Regulatory VaR model, Regulatory stressed VaR model, IRC model and CRM model on an ongoing basis. The Firm's model validation process is independent of the internal models' development, implementation and operation. The validation process includes, among other things, an evaluation of the conceptual soundness of the internal models.

The Firm's Regulatory VaR model, Regulatory stressed VaR model, IRC model and CRM model have all been approved for use by the Firm's regulators.

9.4. Regulatory VaR Backtesting

To evaluate the reasonableness of the Firm's VaR model as a measure of the Firm's potential volatility of net revenue, the Firm regularly conducts a comparison of its 99%/one-day VaR-based estimates with hypothetical buy-and-hold trading revenue ("backtesting"). The hypothetical buy-and-hold gains or losses are defined in the U.S. Basel III as profits or losses on covered positions, as defined in Section 9.5 below, excluding fees, commissions, reserves, net interest income and intraday trading. The buy-and-hold gains or losses utilized for Regulatory VaR backtesting differs from the daily net trading revenue as disclosed in "Quantitative and Qualitative Disclosures about Risk—Market Risk" in Part II, Item 7A of the 2022 Form 10-K. For the quarter ended December 31,

2022, there were no Regulatory VaR backtesting exceptions. Over a 250-day period ended December 31, 2022, the Firm had two Regulatory VaR backtesting exceptions, representing the number of days where trading losses exceeded the 99% confidence level.

9.5. Covered Positions

During the quarter ended December 31, 2022, the Firm had exposures to a wide range of interest rates, credit spreads, equity prices, foreign exchange rates and commodity prices—and the associated implied volatilities and spreads—related to the global markets in which it conducts its trading activities. For more information about such exposures, see "Quantitative and Qualitative Disclosures about Risk—Risk Management—Market Risk—Trading Risks" in Part II, Item 7A of the 2022 Form 10-K.

Under U.S. Basel III, covered positions include trading assets or liabilities held by the Firm for the purpose of short-term resale or with the intent of benefiting from actual or expected price movements related to its market-making activities, as well as, foreign exchange and commodity exposure of certain banking book positions. CVA is not a covered position under U.S. Basel III and as a result, hedges to the non-covered CVA are themselves not eligible to be covered positions. However, any foreign exchange or commodity exposure of CVA hedges is a covered position.

The Firm manages its covered positions by employing a variety of risk mitigation strategies. These strategies include diversification of risk exposures and hedging. Hedging activities consist of the purchase or sale of positions in related securities and financial instruments, including a variety of derivative products (*e.g.*, futures, forwards, swaps and options). Hedging activities may not always provide effective mitigation against trading losses due to differences in the terms, specific characteristics or other basis risks that may exist between the hedge instrument and the risk exposure that is being hedged. The Firm manages the market risk associated with its trading activities on a Firm-wide basis, on a world-wide trading division level and on an individual product basis. The Firm manages and monitors its market risk exposures in such a way as to maintain a portfolio that the Firm believes is well-diversified in the aggregate with respect to market risk factors and that reflects the Firm's aggregate risk tolerance as established by the Firm's senior management.

Valuation Policies, Procedures, and Methodologies for Covered Positions

For more information on the Firm's valuation policies, procedures, and methodologies for covered positions (trading assets and trading liabilities), see Note 2 (Significant Accounting Policies) and Note 5 (Fair Values) to the

consolidated financial statements in Part II, Item 8 of the 2022 Form 10-K.

9.6. Stress Testing of Covered Positions

The Firm stress tests the market risk of its covered positions at a frequency appropriate to each portfolio and in no case less frequently than quarterly. The stress tests take into account concentration risk, illiquidity under stressed market conditions and other risks arising from the Firm's trading activities.

In addition, the Firm utilizes a proprietary economic stress testing methodology that comprehensively measures the Firm's market and credit risk. The methodology simulates many stress scenarios based on more than 25 years of historical data and attempts to capture the different liquidities of various types of general and specific risks. Event and default risks for relevant credit portfolios are also captured.

Furthermore, as part of the Federal Reserve's annual Comprehensive Capital Analysis and Review, commonly referred to as "CCAR," the Firm is required to perform annual capital stress testing under scenarios prescribed by the Federal Reserve. The stress testing results are submitted to the Federal Reserve and a summary of the results under the severely adverse economic scenario is publicly disclosed. For more information on the Firm's capital plans and stress tests, see "MD&A—Liquidity and Capital Resources—Regulatory Requirements" in Part II, Item 7 of the 2022 Form 10-K.

10. Operational Risk

As defined by U.S. Basel III, operational risk is the risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events (including legal risk but excluding strategic and reputational risk). The Firm may incur operational risk across the full scope of its business activities, including revenue-generating activities (*e.g.*, sales and trading) and support and control groups (*e.g.*, information technology and trade processing). For a further discussion of the Firm's operational risk, see "Quantitative and Qualitative Disclosures about Risk—Country and Other Risks—Operational Risk" in Part II, Item 7A of the 2022 Form 10-K.

As an advanced approach banking organization, the Firm is required to compute operational risk RWA using an advanced measurement approach. The Firm has established an operational risk framework to identify, measure, monitor, and control risk across the Firm. Effective operational risk management is essential to reducing the impact of operational risk incidents and mitigating legal risks. The framework is continually evolving to account for changes in the Firm and to respond to the changing regulatory and business environment. The Firm has implemented operational risk data and assessment systems to monitor and analyze internal and external operational risk events, to assess business environment and internal control factors, and to perform

scenario analysis. The collected data elements are incorporated in the operational risk capital model. The model encompasses both quantitative and qualitative elements. Internal loss data and scenario analysis results are direct inputs to the capital models, while external operational risk incidents and business environment and internal control factors are evaluated as part of the scenario analysis process. The Firm maintains governance, review, and validation processes of its advanced measurement approach framework.

The Firm uses the Loss Distribution Approach to model operational risk exposures. In this approach, loss frequency and severity distributions are separately modeled using the Firm's internal loss data experience and combined to produce an Aggregate Loss Distribution at various confidence levels over a one-year period. Regulatory Operational Risk capital is calculated at the 99.9% confidence level. The model also includes Scenario Analysis estimates to complement the Internal Loss Data model. Scenario Analysis is a forward-looking systematic process to obtain plausible high severity and low frequency estimates of operational risk losses based on expert opinion. This modeling process is performed separately on each of the units of measure. The results are aggregated across all units of measure, taking into account diversification, to determine operational risk regulatory capital.

In addition, the Firm employs a variety of risk processes and mitigants to manage its operational risk exposures. These include a strong governance framework, a comprehensive risk management program and insurance. The Firm continually undertakes measures to improve infrastructure and mitigate operational risk. The goal of the Firm's operational risk management framework is to identify and assess significant operational risks, and to ensure that appropriate mitigation actions are undertaken. Operational risks and associated risk exposures are assessed relative to the risk tolerance established by the Firm's Board of Directors and are prioritized accordingly. The breadth and range of operational risk are such that the types of mitigating activities are wide-ranging. Examples of activities include the enhancing defenses against cyberattacks, use of legal agreements and contracts to transfer and/or limit operational risk exposures; due diligence; implementation of enhanced policies and procedures; exception management processing controls; and segregation of duties.

See "Capital Adequacy" in Section 4 herein for the Firm's operational risk RWA at December 31, 2022.

11. Supplementary Leverage Ratio

Minimum leverage-based capital requirements include a Tier 1 leverage ratio and a Supplementary Leverage Ratio (“SLR”). The Firm is required to maintain an SLR of 5%, inclusive of an enhanced SLR capital buffer of at least 2% in order to avoid potential limitations on capital distributions including dividends and stock repurchase, and discretionary bonus payments to executive officers. In addition, MSBNA and MSPBNA must maintain an SLR of 6% to be considered well-capitalized.

The Tier 1 leverage ratio and SLR are capital measures that are both computed under U.S. Basel III rules, with the primary difference between the two being that the SLR denominator includes off-balance sheet exposures. The SLR denominator is calculated for each reporting period based on the average daily balance of consolidated on-balance sheet assets during the calendar quarter less certain amounts deducted from Tier 1 capital at quarter-end. The SLR denominator also includes the arithmetic mean of month-end balances during the calendar quarter of certain off-balance sheet exposures associated with derivatives (including derivatives that are centrally cleared for clients and sold credit protection), repo-style transactions and other off-balance sheet items. For more information on the supplementary leverage ratio, see “MD&A—Liquidity and Capital Resources—Regulatory Requirements—Regulatory Capital Ratios” in the Form 10-K.

Summary comparison of accounting assets and supplementary leverage ratio

The following table presents the consolidated total assets under U.S. GAAP and the supplementary leverage exposure.

<i>\$ in millions</i>	At December 31, 2022
Total consolidated assets as reported in published financial statements ¹	\$ 1,180,231
Adjustment for investments in banking, financial, insurance or commercial entities that are consolidated for accounting purposes but outside the scope of regulatory consolidation	-
Adjustment for fiduciary assets recognized on balance sheet but excluded from total leverage exposure	-
Adjustment for derivative exposures ²	127,697
Adjustment for repo-style transactions ²	15,282
Adjustment for off-balance sheet exposures ²	78,108
Other adjustments	
a. Adjustments for deductions from tier 1 capital ³	(23,522)
b. Adjustments for frequency calculations ⁴	21,607
c. Adjustments for deductions of qualifying central bank deposits for custodial banking organizations	-
Supplementary leverage exposure	\$ 1,399,403

1. Total consolidated on-balance sheet assets under U.S. GAAP at quarter end.
2. Computed as the arithmetic mean of the month-end balances over the calendar quarter.
3. Includes disallowed goodwill, intangible assets, investments in covered funds, defined benefit pension plan assets, after-tax gain on sale from assets sold into securitizations, investments in the Firm’s own capital instruments, certain deferred tax assets, and other capital deductions.
4. Reflects the difference between spot and average daily balance of consolidated total assets during the calendar quarter.

Supplementary leverage ratio: The following table presents the Firm's Tier 1 leverage ratio, as well as the detailed components of the SLR computation.

<i>\$ in millions</i>	At December 31, 2022
On-balance sheet exposures	
On-balance sheet assets (excluding on-balance sheet assets for repo-style transactions and derivative exposures, but including cash collateral received in derivative transactions) ¹	\$ 859,412
Less: Amounts deducted from tier 1 capital ²	(23,522)
Less: Deduction of qualifying central bank deposits for custodial banking organizations	-
Total on-balance sheet exposures (excluding on-balance sheet assets for repo style transactions and derivatives exposures, but including cash collateral received in derivative transactions)	835,890
Derivative disclosures	
Replacement cost for derivative exposures (net of cash variation margin) ¹	\$ 80,799
Add-on amounts for potential future exposure (PFE) for derivatives ³	109,293
Gross-up for cash collateral posted if deducted from the on-balance sheet assets, except for cash variation margin that meets qualifying criteria ³	2,064
Less: Deductions of receivable assets for cash variation margin posted in derivative transactions, if included in on-balance sheet assets	-
Less: Exempted CCP leg of client-cleared transactions ⁴	-
Effective notional principal amount of sold credit protection ³	266,037
Less: Effective notional principal amount offsets and PFE adjustments for sold credit protection ³	(249,697)
Total derivatives exposures	\$ 208,496
Repo-style transactions	
On-balance sheet assets for repo-style transactions, including the gross value of receivables for reverse repurchase transactions and the value of securities that qualified for sales treatment, and excluding the value of securities received in a security-for-security repo-style transaction where the securities lender has not sold or re-hypothecated the securities received ¹	\$ 367,236
Less: Reduction of the gross value of receivables in reverse repurchase transactions by cash payables in repurchase transactions under netting agreements ¹	(105,609)
Counterparty credit risk for all repo-style transactions ³	15,282
Exposure for repo-style transactions where a banking organization acts as an agent	-
Total repo-style transactions	\$ 276,909
Other off-balance sheet exposures	
Off-balance sheet exposures at gross notional amounts ^{3,5}	\$ 170,884
Less: Adjustments for conversion to credit equivalent amounts ³	(92,776)
Total off-balance sheet exposures	\$ 78,108
Supplementary leverage exposure	\$ 1,399,403
Tier 1 capital	77,191
Supplementary leverage ratio ⁶	5.5%
Tier 1 leverage ratio⁷	6.7%

1. Computed as the average daily balance of consolidated total assets during the calendar quarter.
2. Includes disallowed goodwill, intangible assets, investments in covered funds, defined benefit pension plan assets, after-tax gain on sale from assets sold into securitizations, investments in the Firm's own capital instruments, certain deferred tax assets, and other capital deductions.
3. Computed as the arithmetic mean of the month-end balances over the calendar quarter.
4. Where the Firm acts as clearing member with respect to transactions cleared on behalf of clearing member clients, the Firm does not guarantee the performance of the CCP, and therefore the trade exposure to the CCP is excluded from total leverage exposure. These amounts are reflected net in the replacement cost and PFE lines above.
5. Off-balance sheet exposures primarily include lending commitments, forward starting reverse repurchase agreements, standby letters of credit and other unfunded commitments and guarantees.
6. The Supplementary leverage ratio equals Tier 1 capital divided by the Supplementary leverage exposure.
7. The Tier 1 leverage ratio equals Tier 1 capital divided by the average daily balance of consolidated on-balance sheet assets. During the calendar quarter, adjusted for disallowed goodwill, intangible assets, investments in covered funds, defined benefit pension plan assets, after-tax gain on sale from assets sold into securitizations, investments in the Firm's own capital instruments, certain deferred tax assets, and other capital deductions in accordance with U.S. Basel III rules.

12. Disclosure Map

<i>Disclosure starts on page number</i>	Description	Form 10-K	For the quarterly period ended December 31, 2022	
				Pillar 3 Report
Basel III Pillar 3 Requirement				
Scope of Application	Business Regulatory capital framework	46		1 1
Capital Structure	Capital instruments Restrictions and other major impediments to transfer of funds or capital Capital structure	101, 102, 115, 124 46		2 2 2
Capital Adequacy	Required capital framework Credit risk, market risk and operational risk RWA Risk management objectives, structure and policies Minimum risk-based capital ratio Total Loss-Absorbing Capacity	46 48 47 49		2 3 4 4 5
Credit Risk	Credit risk and credit risk management framework Risk governance structure Master netting agreements and collateral agreements Commitments Guarantees Reconciliation of changes in allowance for loan losses Credit quality indicator Determination of past due or delinquency status	60 101, 107 115 116 111 110		5 5 6 6 6 8 8 8
General Disclosure for Wholesale Counterparty Credit Risk of Derivative Contracts, Repo-Style Transactions and Margin Lending	Use of collateral as a credit risk mitigants and master netting agreements Valuation approaches Credit derivatives Additional collateral requirements due to credit rating downgrade	101, 107 102 103		11 12 12 12
Credit Risk Mitigation	Impact of netting on the Firm's credit exposures	66		13
Equities Not Subject to Market Risk Capital Rule	Valuation techniques related to investments Deductions under the Volcker Rule			14 15
Securitization	Securitization transactions Accounting and valuation techniques related to securitization	119 119		15 16
Interest Rate Risk for Non-Trading Activities	Interest rate risk sensitivity analysis on non-trading activities	59		19
Market Risk	Market risk RWA Management VaR model, related statistics and limit monitoring process Daily net trading revenues Primary market risk exposures and market risk management Valuation policies, procedures and methodologies for covered positions Stress testing and Regulatory Stressed VaR	48 58 59 56 49		19 20 22 22 22 23
Operational Risk	Operational Risk	68		23
Supplementary Leverage Ratio	Supplementary Leverage Ratio	47		24