



Goldman Sachs Bank USA and Subsidiaries
Annual Report
December 31, 2022

INDEX

	Page No.		Page No.
PART I		PART III	
Introduction	1	Financial Statements and Supplementary Data	80
Business	1	Report of Independent Auditors	80
Lending	1	Consolidated Financial Statements	82
Deposit Taking	2	Consolidated Statements of Earnings	82
Transaction Banking	2	Consolidated Statements of Comprehensive Income	82
Market Making	2	Consolidated Balance Sheets	83
Underwriting	3	Consolidated Statements of Changes in Shareholder's Equity	84
Advisory Services	3	Consolidated Statements of Cash Flows	85
Asset and Wealth Management Services	3	Notes to Consolidated Financial Statements	86
Other Activities	3	Note 1. Description of Business	86
Our Relationship with Group Inc. and our Affiliates	3	Note 2. Basis of Presentation	86
Human Capital Management	4	Note 3. Significant Accounting Policies	87
Competition	5	Note 4. Fair Value Measurements	90
Regulation	6	Note 5. Fair Value Hierarchy	94
Available Information	16	Note 6. Trading Assets and Liabilities	106
Forward-Looking Statements	17	Note 7. Derivatives and Hedging Activities	107
Risk Factors	17	Note 8. Investments	112
PART II		Note 9. Loans	114
Management's Discussion and Analysis of Financial		Note 10. Fair Value Option	123
Condition and Results of Operations	46	Note 11. Collateralized Agreements and Financings	124
Introduction	46	Note 12. Other Assets	127
Executive Overview	47	Note 13. Deposits	129
Business Environment	48	Note 14. Unsecured Borrowings	130
Critical Accounting Policies	48	Note 15. Other Liabilities	131
Use of Estimates	50	Note 16. Securitization Activities	132
Recent Accounting Developments	51	Note 17. Variable Interest Entities	133
Results of Operations	51	Note 18. Commitments, Contingencies and Guarantees	135
Balance Sheet and Funding Sources	54	Note 19. Regulation and Capital Adequacy	138
Capital Management and Regulatory Capital	56	Note 20. Transactions with Related Parties	143
Regulatory and Other Matters	57	Note 21. Interest Income and Interest Expense	144
Off-Balance Sheet Arrangements	58	Note 22. Income Taxes	145
Risk Management	58	Note 23. Credit Concentrations	146
Overview and Structure of Risk Management	59	Note 24. Legal Proceedings	147
Liquidity Risk Management	62	Note 25. Employee Incentive and Benefit Plans	148
Market Risk Management	66	Note 26. Subsequent Events	149
Credit Risk Management	69	Supplemental Financial Information	150
Operational Risk Management	77		
Model Risk Management	78		
Capital Risk Management	79		

PART I

Introduction

Goldman Sachs Bank USA (GS Bank USA), together with its consolidated subsidiaries (collectively, the Bank), is a New York State-chartered bank and a member of the Federal Reserve System. The Bank is supervised and regulated by the Board of Governors of the Federal Reserve System (FRB), the New York State Department of Financial Services (NYDFS) and the Consumer Financial Protection Bureau (CFPB). As a member of the Federal Deposit Insurance Corporation (FDIC), GS Bank USA's deposits are insured by the FDIC up to the maximum amount provided by law. GS Bank USA is registered as a swap dealer with the U.S. Commodity Futures Trading Commission (CFTC) and as a security-based swap dealer with the Securities and Exchange Commission (SEC). GS Bank USA is also a government securities dealer subject to the rules and regulations of the U.S. Department of the Treasury (Treasury Department).

When we use the terms “we,” “us” and “our,” we mean GS Bank USA and its consolidated subsidiaries. When we use the term “GS Group” we are referring to The Goldman Sachs Group, Inc. (Group Inc.) and its consolidated subsidiaries, including us.

Our principal office is located in New York, New York. GS Bank USA operates two domestic branches, which are located in Salt Lake City, Utah and Draper, Utah. Both branches are regulated by the Utah Department of Financial Institutions. GS Bank USA also operates two foreign branches, which are located in London, United Kingdom and Tokyo, Japan. The London branch is regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA) and the Tokyo branch is regulated by the Japan Financial Services Agency. Goldman Sachs Bank Europe SE (GSBE), headquartered in Frankfurt, Germany, is a wholly-owned subsidiary of GS Bank USA. GSBE is directly supervised by the European Central Bank (ECB) and additionally by the Federal Financial Supervisory Authority (BaFin) and Deutsche Bundesbank in the context of the E.U. Single Supervisory Mechanism (SSM). GSBE has branches in Amsterdam, Athens, Copenhagen, Dublin, London, Luxembourg, Madrid, Milan, Paris, Stockholm and Warsaw that are also regulated by the relevant authorities in each jurisdiction. GSBE's London branch is regulated by the FCA and GSBE applied for a permanent authorization of its London branch in March 2022.

GS Bank USA is a wholly-owned subsidiary of Group Inc. Group Inc. is a bank holding company (BHC) under the U.S. Bank Holding Company Act of 1956 (BHC Act) and a financial holding company (FHC) under amendments to the BHC Act effected by the U.S. Gramm-Leach-Bliley Act of 1999. Group Inc. is subject to supervision and examination by the FRB as its primary regulator.

References to “this Annual Report” are to our Annual Report for the year ended December 31, 2022. All references to 2022 and 2021 refer to our years ended, or the dates, as the context requires, December 31, 2022 and December 31, 2021, respectively.

Business

We are a financial services provider that engages in banking activities. We are GS Group's primary lending entity, originating loans to corporate and wealth management clients, as well as issuing credit cards and providing point-of-sale financing through GreenSky, Inc. (GreenSky) to consumers. We are also GS Group's primary deposit-taking entity. Our depositors include private bank clients, U.S. consumers, clients of third-party broker-dealers, institutions, corporations and our affiliates. Our consumer deposit-taking activities are conducted through our digital platform, *Marcus by Goldman Sachs* (Marcus). We also provide transaction banking services to institutions, corporations and our affiliates. In addition, we enter into interest rate, currency, credit and other derivatives, and transact in certain related cash products, for the purpose of market making and risk management. Our activities in the E.U. include underwriting and market making in debt and equity securities; advisory services; and asset and wealth management services.

Lending

We are GS Group's primary lending entity. Our lending activities include providing corporate, residential and commercial real estate, securities-based and other collateralized loans. In addition, we extend financing to consumers through our consumer platforms. We underwrite, structure and negotiate pricing for these loans based on our underwriting criteria. However, in some cases, we rely on services provided by affiliates to assist in this process. See Note 9 to the consolidated financial statements in Part III of this Annual Report for further information about our lending activities.

We also provide lending commitments. Commercial lending commitments are primarily agreements to lend with fixed termination dates. We also issue credit cards that provide consumers with revolving lines of credit, which can be cancelled by us and provide lending commitments for unsecured consumer loans. See Note 18 to the consolidated financial statements in Part III of this Annual Report for further information about our commitments to extend credit.

Corporate Loans. We offer term loans, revolving lines of credit, letter of credit facilities and bridge loans to institutions and corporations. These loans are secured or unsecured, and the typical form of collateral for secured loans is a senior lien on the assets of the borrower. The proceeds from these forms of lending are principally used by borrowers for liquidity and general corporate purposes or in connection with acquisitions. We may elect to syndicate portions of these loans either directly or through our affiliates or may retain the loans.

Some of these lending opportunities arise from referrals made by our affiliates. Accordingly, the volume of loans we make largely corresponds to levels of loan demand from clients of GS Group. The loans are all subject to our underwriting criteria, consistent with applicable banking law and regulation. We are, in some cases, compensated by Group Inc. or our affiliates for participation in certain lending activities.

The type of loan, including whether the loan is secured or unsecured, extended to a borrower varies and is dependent upon the borrower's needs and capital structure and the then-current state of the credit markets. In each case, we underwrite the loan based on our underwriting criteria. However, in some cases, we rely on services provided by affiliates to assist in this process.

Commercial and Residential Real Estate Loans. We originate loans to clients, including wealth management clients, purchase loans secured by commercial and residential real estate and lend to clients who warehouse assets that are directly or indirectly secured by commercial and residential real estate.

Securities-Based Loans. We originate loans that are secured by stocks, bonds, mutual funds, and exchange-traded funds primarily to wealth management clients and used for purposes other than purchasing, carrying or trading margin stocks. Securities-based loans require borrowers to post additional collateral based on changes in the underlying collateral's fair value. We also originate secured loans through *Goldman Sachs Private Bank Select* to clients of financial advisors at third-party broker-dealers, registered investment advisors and asset custodians.

Other Collateralized Loans. We extend loans that are backed by specific collateral (other than securities and real estate), including to clients who warehouse assets that are directly or indirectly secured by corporate loans, consumer loans, including auto loans and private student loans, and other assets. We also extend loans to investment funds (managed by third parties) that are collateralized by capital commitments of the funds' investors or assets held by the fund, as well as to wealth management clients.

Installment, Credit Card and Other Loans. We originate point-of-sale loans to consumers through our GreenSky platform (beginning in the third quarter of 2022), issue credit cards through our partnership arrangements, and purchase unsecured consumer loans. We have issued unsecured consumer loans through Marcus and have started a process to cease offering new loans through this platform. In addition, we provide unsecured loans to our wealth management clients.

Deposit Taking

We are GS Group's primary deposit-taking entity. We accept deposits from private bank clients, U.S. consumers, clients of third-party broker-dealers, institutions, corporations and our affiliates. Deposits are our primary source of funding for our assets.

We accept deposits through Marcus, our sweep programs with affiliates and third-party broker-dealers and our transaction banking activities. We also issue brokered certificates of deposit (CDs), distributed through third-party broker-dealers and Goldman Sachs & Co. LLC (GS&Co.). Additionally, we accept consumer time deposits through Marcus and also accept institutional time deposits.

For further information about our deposits, including the sources and types of our deposits and the amount that is insured by the FDIC, see "Management's Discussion and Analysis of Financial Condition and Results of Operations — Balance Sheet and Funding Sources — Funding Sources — Deposits" in Part II of this Annual Report and Note 13 to the consolidated financial statements in Part III of this Annual Report.

Transaction Banking

We provide transaction banking services to institutions, corporations and affiliates through our cash management platform, offering commercial deposit accounts, as well as payment, escrow and liquidity management services.

Market Making

We enter into interest rate, currency, credit, equity and commodity derivatives, and transact in certain related cash products, for the purpose of market making and also use derivatives to manage our own risk exposure as part of our risk management processes. Derivatives are instruments that derive their value from underlying asset prices, indices, reference rates and other inputs, or a combination of these factors. Derivative transactions provide liquidity to clients and facilitate the active management of risk exposures, including market, credit and other risks.

We enter into various types of derivatives, including (i) swaps (which are agreements to exchange cash flows, such as currency or interest payment streams), (ii) options (contracts which provide the right but not the obligation to buy or sell a certain financial instrument or currency on a specified date in the future at a certain price) and (iii) futures and forwards (which are contracts to purchase or sell a financial instrument, currency or commodity in the future).

Derivatives may be traded on an exchange (exchange-traded) or they may be privately negotiated contracts, which are referred to as over-the-counter (OTC) derivatives. Certain of these OTC derivatives are cleared and settled through central clearing counterparties, while others are bilateral contracts between two counterparties.

We have entered into derivative transactions with both affiliates and unaffiliated third parties. Affiliate trades are part of Group Inc.'s centralized hedging and risk management processes and practices.

See Note 7 to the consolidated financial statements in Part III of this Annual Report for further information about our derivative products and activities.

We also make markets in certain debt and equity securities. See Note 5 to the consolidated financial statements in Part III of this Annual Report for further information about our cash products.

Underwriting

Our underwriting activities include public offerings and private placements of a wide range of securities and other financial instruments, including acquisition financing.

Advisory Services

We provide advisory services, including strategic advisory engagements with respect to mergers and acquisitions, divestitures, corporate defense activities, restructurings and spin-offs.

Asset and Wealth Management Services

We provide asset management services and our revenues include asset-based fees on client assets that are being managed on a fiduciary basis by GS Group's portfolio managers. We also provide wealth advisory services, including portfolio management and financial counseling, brokerage and other transaction services to high-net-worth individuals and families.

Our asset management business significantly depends on our ability to delegate portfolio management to other affiliates.

Other Activities

We also engage in securities financing transactions and agency lending.

See Notes 11 and 18 to the consolidated financial statements in Part III of this Annual Report for further information about our securities financings and agency lending.

Our Relationship with Group Inc. and our Affiliates

GS Bank USA is a wholly-owned insured depository institution (IDI) subsidiary of Group Inc. We use and benefit from business relationships, certain processes, support systems and infrastructure, and financial support of Group Inc. and our affiliates. We also provide certain processes, support systems and infrastructure to Group Inc. and our affiliates and provide payment services and intraday liquidity for certain affiliates.

Services provided from and to our affiliates are governed under Master Services Agreements and supplemented by Service Level Agreements (collectively, the Master Services Agreement). We benefit from our affiliates' access to third-party vendors, experience and knowledge, and services provided to us by employees of affiliates.

All of our relationships and transactions with our affiliates are closely monitored in accordance with applicable laws and regulations, including, without limitation, Sections 23A and 23B of the Federal Reserve Act and the FRB's Regulation W. For further information about our relationships and transactions with our affiliates, see "Risk Factors — Operational — We are a wholly-owned subsidiary of Group Inc. and are dependent on Group Inc. and certain of our affiliates for client business, various services and capital" and Note 20 to the consolidated financial statements in Part III of this Annual Report.

Business Relationships. Our affiliates are sources of business for certain of our lending and other business activities, and often are counterparties to derivatives transactions with us. See " — Lending," " — Market Making," and " — Asset and Wealth Management Services" for further information about our business relationships.

Support Services. We receive operational and administrative support services from Group Inc. and our affiliates pursuant to the Master Services Agreement. All operational and administrative support services we receive from Group Inc. and our affiliates are overseen by our employees. Support services include trade execution, loan origination and servicing, operational and infrastructure services, control and other support services. We also provide certain operational support to our affiliates.

Funding Sources. In addition to accepting deposits and deposit sweep programs from affiliates, we also have access to funding facilities primarily from Group Inc. and Goldman Sachs Funding LLC (Funding IHC), a wholly-owned subsidiary of Group Inc. See Note 14 to the consolidated financial statements in Part III of this Annual Report for further information about funding facilities from Group Inc. and Funding IHC.

We receive secured funding from Group Inc. and our affiliates. In particular, we enter into collateralized financings including securities sold under agreements to repurchase (repurchase agreements). In addition, our shareholder's equity provides us with a stable and perpetual source of funding. See " — Other Activities" above, "Management's Discussion and Analysis of Financial Condition and Results of Operations — Balance Sheet and Funding Sources — Funding Sources" in Part II of this Annual Report and Note 11 to the consolidated financial statements in Part III of this Annual Report for further information about our funding sources.

Group Inc. General Guarantee. Group Inc. has agreed to guarantee GS Bank USA's payment obligations (General Guarantee Agreement), subject to certain limitations. Subject to the terms and conditions of the General Guarantee Agreement, Group Inc. unconditionally and irrevocably guarantees complete payment of all of GS Bank USA's payment obligations when due, other than non-recourse payment obligations and payment obligations arising in connection with any of its CDs (unless applicable governing documents of the CD expressly state otherwise) and its outstanding notes evidencing senior unsecured debt.

Furthermore, FRB regulation requires Group Inc., as a BHC, to act as a source of strength to us, as its bank subsidiary, and to commit capital and financial resources to support us.

Human Capital Management

As of December 2022, we had 5,162 direct employees and 684 dual employees who perform services for both us and our affiliates pursuant to an Employee Sharing Agreement. Employees of our affiliates also provide services to us under the Master Services Agreement.

Our people are our greatest asset. We believe that a major strength and principal reason for our success is the quality, dedication, determination and collaboration of our people, which enables us to compete effectively in our businesses, serve our clients and contribute to the broader community. We invest heavily in developing and supporting our people throughout their careers, and we strive to maintain a work environment that fosters professionalism, excellence, high standards of business ethics, diversity, teamwork and cooperation among our employees.

Diversity and Inclusion

The strength of our culture, our ability to execute our strategy, and our relationships with clients all depend on a diverse workforce and an inclusive work environment that encourages a wide range of perspectives. We believe that diversity at all levels of our organization, from entry-level analysts to senior management, is essential to our sustainability. Our commitment to diversity is fostered by the focus that GS Group places on diversity. GS Group's Global Inclusion and Diversity Committee continues to advance diversity efforts across all parts of the GS Group organization. In addition, GS Group has Inclusion and Diversity Committees across regions, which promote an environment that values different perspectives, challenges conventional thinking and maximizes the potential of all its people.

For both GS Group and ourselves, increased diversity, including diversity of experience, gender identity, race, ethnicity, sexual orientation, disability and veteran status, in addition to being a social imperative, is vital to our commercial success through the creativity that it fosters. For this reason, GS Group, including us, has established a comprehensive action plan with aspirational diversity hiring and representation goals which are focused on cultivating an inclusive environment for all of its employees.

Diverse leadership is crucial to our long-term success and to driving innovation, and we benefit from the expanded outreach and career advancement programs for rising diverse executive talent that GS Group has implemented. For example, we are focused on providing diverse vice presidents the necessary coaching, sponsorship and advocacy to support their career trajectories and strengthen their leadership platforms, including through programs such as GS Group's Vice President Sponsorship Initiative focused on high-performing women, Black, Hispanic/Latinx, Asian and LGBTQ+ vice presidents across the globe. Many other career development initiatives are aimed at fostering diverse talent at the analyst and associate level, including the Black Analyst and Associate Initiative, the Hispanic/Latinx Analyst Initiative and the Women's Career Strategies Initiative. GS Group's global and regional Inclusion Networks and Interest Forums are open to all professionals at GS Group, including our professionals, to promote and advance connectivity, understanding, inclusion and diversity.

Talent Development and Retention

We seek to help our people achieve their full potential by investing in them and supporting a culture of continuous development. Our goals are to maximize individual capabilities, increase commercial effectiveness and innovation, reinforce our culture, expand professional opportunities, and help our people contribute positively to their communities.

Instilling our culture in all employees is a continuous process, in which training plays an important part. We offer our employees the opportunity to participate in ongoing educational offerings and periodic seminars facilitated by GS Group's Learning & Engagement team. To accelerate their integration into our work environment, new hires have the opportunity to receive training before they start working and orientation programs with an emphasis on culture and networking, and nearly all employees participate in at least one training event each year. For our more senior employees, we provide guidance and training on how to manage people and projects effectively, exhibit strong leadership and exemplify our culture. We are also focused on developing a high performing, diverse leadership pipeline and career planning for our next generation of leaders. Our employees participate in a variety of programs which GS Group has established, which are aimed at employees' professional growth and leadership development, including initiatives, such as the Vice President and Managing Director Leadership Acceleration Initiatives and Partner Development Initiative.

Enhancing our people's experience of internal mobility is a key focus, as we believe that this will inspire employees, help retain top talent and create diverse experiences to build future leaders.

Another important part of instilling our culture is our employee performance review process. Employees are reviewed by supervisors, co-workers and employees whom they supervise in a 360-degree review process that is integral to our team approach and includes an evaluation of an employee's performance with respect to risk management, protecting our reputation, adherence to GS Group's code of conduct, compliance and diversity and inclusion principles. Our approach to evaluating employee performance centers on providing robust, timely and actionable feedback that facilitates professional development. Our managers are expected to take an active coaching role with their teams. GS Group (including us) has implemented "The Three Conversations at GS" through which managers establish goals with their team members at the start of the year, check in mid-year on progress and then close out the year with a conversation on performance against goals.

We believe that our people value opportunities to contribute to their communities and that these opportunities enhance their job satisfaction. We also believe that being able to volunteer together with colleagues and support community organizations through completing local service projects strengthens our people's bond with us. Community TeamWorks, GS Group's signature volunteering initiative in which our employees participate, enables our people to be part of high-impact, team-based volunteer opportunities, including projects coordinated with hundreds of nonprofit partner organizations worldwide.

Wellness

We recognize that for our people to be successful in the workplace they need support in their personal, as well as their professional lives, and our employees benefit from GS Group's policies and programs. GS Group has created a strong support framework for wellness, which is intended to enable all employees to better balance their roles at work and their responsibilities at home. GS Group provides a number of policies for its employees that support taking time away from the office when needed, including 20 weeks of parental leave, family care leave and bereavement leave. In 2022, GS Group also enhanced its vacation policies for its employees, allowing managing directors to take time off, when needed, without a fixed vacation day entitlement and adding a minimum of two additional vacation days for all other employees, as well as setting a minimum annual expected vacation usage of 15 days. For longer-tenured employees, GS Group offers an unpaid sabbatical leave. GS Group also continues to advance resilience programs, offering all of its people a range of counseling, coaching, medical advisory and personal wellness services. GS Group increased the availability of these resources during the coronavirus (COVID-19) pandemic, and continued to evolve and strengthen virtual offerings to enhance access to support, with the aim of maintaining the physical and mental well-being of its people, and enhancing their effectiveness and productivity.

In addition, to support the financial wellness of employees, GS Group offers a variety of resources that help them manage their personal financial health and decision-making, including financial education information sessions, live and on-demand webinars, articles and interactive digital tools.

Competition

The financial services industry is intensely competitive. Our competitors provide private banking and lending, commercial lending, point-of-sale financing, credit cards, transaction banking, deposit-taking and other banking products and services, make markets in interest rate, currency, credit and other derivatives and in loans and other financial assets, and engage in leveraged finance and agency lending. Certain of our competitors operate globally and others regionally, and we compete based on a number of factors, including transaction execution, client experience, products and services, innovation, reputation and price. In addition to financial institutions such as commercial banks, credit card issuers, broker-dealers and investment banking firms, our competitors also include consumer finance companies and financial technology and other internet-based financial companies. We and other banks also compete for deposits on the basis of the rates we offer. Increases in short-term interest rates have resulted in and are expected to continue to result in more intense competition in deposit pricing.

We also face intense competition in attracting and retaining qualified employees. Our ability to continue to compete effectively has depended and will continue to depend upon our ability to attract new employees, retain and motivate our existing employees and to continue to compensate employees competitively amid intense public and regulatory scrutiny on the compensation practices of large financial institutions.

Regulation

We are supervised and regulated by the FRB, the NYDFS, the CFPB and the FDIC and are also regulated by the CFTC, SEC and Treasury Department in respect of our swap dealer, security-based swap dealer and government securities dealer activities, respectively. Our London branch is regulated by the FCA and PRA and our Tokyo branch is regulated by the Japan Financial Services Agency. GSBE is directly supervised by the ECB and additionally by BaFin and Deutsche Bundesbank in the context of the E.U. SSM. GSBE's branches and other offices are also subject to local regulation.

As a participant in the banking industry, we are subject to extensive regulation of, among other things, our lending (including origination of credit card loans) and deposit-taking activities, derivatives activities for purposes of market making and risk management, payment activities, capital adequacy, liquidity, funding, inter-affiliate transactions, loan servicing, the establishment of new businesses and implementation of new activities and the formation of new subsidiaries by both federal and state regulators and by foreign regulators in jurisdictions in which we operate. In addition, through GSBE, we engage in certain activities in the E.U., including underwriting and market making in debt and equity securities; advisory services; and asset and wealth management services. As a foreign bank subsidiary of GS Bank USA, GSBE is subject to limits on the nature and scope of its activities under the FRB's Regulation K, including limits on its underwriting and market making in equity securities based on GSBE's and/or our capital. The FRB, the NYDFS and the CFPB have significant discretion in connection with their supervisory, enforcement and examination policies. Any change in such policies, whether by the FRB, the NYDFS or the CFPB, or through legislation, could have a material adverse impact on our business, financial condition and operations.

New regulations have been adopted or are being considered by regulators and policy makers worldwide, as described below. The impacts of any changes to the regulations affecting our businesses, including as a result of the proposals described below, are uncertain and will not be known until such changes are finalized and market practices and structures develop under the revised regulations. See "Management's Discussion and Analysis of Financial Condition and Results of Operations — Regulatory and Other Matters" in Part II of this Annual Report for further information about regulatory developments impacting us.

Stress Tests and Capital Planning. Under rules adopted by the U.S. federal bank regulatory agencies, implementing 2018 amendments to the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act), U.S. depository institutions with total consolidated assets of \$250 billion or more that are subsidiaries of U.S. global systemically important banks (G-SIBs), including us, are required to submit annual company-run stress test results to their primary federal regulator, which for us is the FRB. In addition to company-run stress testing requirements, we are also required to have our own Internal Capital Adequacy Assessment Process (ICAAP). GSBE also has its own capital and stress testing process, which incorporates internally designed stress tests and those required under German regulatory requirements and the ECB Guide to the ICAAP.

Prompt Corrective Action. The U.S. Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA) requires the U.S. federal bank regulatory agencies to take "prompt corrective action" in respect of depository institutions that do not meet specified capital requirements. FDICIA establishes five capital categories for FDIC-insured banks, such as us: well-capitalized, adequately capitalized, undercapitalized, significantly undercapitalized and critically undercapitalized.

An institution may be downgraded to, or deemed to be in, a capital category that is lower than is indicated by its capital ratios if it is determined to be in an unsafe or unsound condition or if it receives an unsatisfactory examination rating with respect to certain matters. FDICIA imposes progressively more restrictive constraints on operations, management and capital distributions, as the capital category of an institution declines. Failure to meet the capital requirements could also require a depository institution to raise capital. An institution also is prohibited from accepting, renewing or rolling over deposits by or through a "deposit broker" (as defined in FDICIA) unless the institution is well-capitalized. The FDIC may waive this prohibition if the institution is adequately capitalized; however, the prohibition cannot be waived if the institution is undercapitalized, significantly undercapitalized or critically undercapitalized.

An institution also is restricted with respect to the deposit interest rates it may offer if the institution is not well-capitalized. Ultimately, critically undercapitalized institutions are subject to the appointment of a receiver or conservator, as described in “Insolvency of an IDI” below.

See Note 19 to the consolidated financial statements in Part III of this Annual Report for information about the quantitative requirements for a depository institution to be considered “well-capitalized.”

Dividends. Dividends are reviewed and approved in accordance with our capital management policy. In addition, U.S. federal and state laws impose limitations on the payment of dividends by banks to their shareholders. In general, the amount of dividends that may be paid by us is limited to the lesser of the amounts calculated under a “recent earnings” test and an “undivided profits” test.

Under the recent earnings test, a dividend may not be paid if the total of all dividends declared by the entity in any calendar year is in excess of the current year’s net income combined with the retained net income of the two preceding years, unless the entity obtains prior regulatory approval. Under the undivided profits test, a dividend may not be paid in excess of the entity’s undivided profits (generally, accumulated net profits that have not been paid out as dividends or transferred to surplus).

In addition to the recent earnings test and undivided profits test, capital management decisions are also driven by our capital management policy, which establishes guidelines to assist us in maintaining the appropriate level of capital in both business-as-usual and post-stress conditions.

During the year ended December 2022, we did not declare or pay any dividends to Group Inc. During the year ended December 2021, we declared and paid approximately \$33 billion of dividends to Group Inc., substantially all of which related to the acquisition of GSBE in July 2021. As a result of the 2021 dividend payments made to Group Inc. in connection with the acquisition of GSBE, we cannot currently declare any dividends without prior regulatory approval.

The applicable U.S. banking regulators have authority to prohibit or limit the payment of dividends if, in the banking regulator’s opinion, payment of a dividend would constitute an unsafe or unsound practice in light of the financial condition of the banking organization.

Insolvency of an IDI. Under the Federal Deposit Insurance Act of 1950 (FDIA), if the FDIC is appointed as conservator or receiver for an IDI such as us, upon its insolvency or in certain other events, the FDIC has broad powers, including the power:

- To transfer any of the IDI’s assets and liabilities to a new obligor, including a newly formed “bridge” bank, without the approval of the depository institution’s creditors;

- To enforce the IDI’s contracts pursuant to their terms without regard to any provisions triggered by the appointment of the FDIC in that capacity; or
- To repudiate or disaffirm any contract or lease to which the IDI is a party, the performance of which is determined by the FDIC to be burdensome and the repudiation or disaffirmance of which is determined by the FDIC to promote the orderly administration of the IDI.

In addition, the claims of holders of domestic deposit liabilities and certain claims for administrative expenses against an IDI would be afforded a priority over other general unsecured claims, including claims of debtholders of the institution, in the “liquidation or other resolution” of such an institution by any receiver. As a result, whether or not the FDIC ever sought to repudiate any of our debt obligations, the debtholders (other than depositors at U.S. branches) would be treated differently from, and could receive, if anything, substantially less than, our depositors at our U.S. branches.

Brokered Deposits. We accept brokered deposits through our deposit sweep agreements and by issuing brokered CDs. The FDIA prohibits IDIs from accepting brokered deposits unless the IDI is “well-capitalized” for prompt corrective action purposes or it is “adequately capitalized” and receives a waiver from the FDIC. Under FDIC regulations governing brokered deposits and interest rate restrictions, a bank that is “adequately capitalized” and accepts brokered deposits under a waiver from the FDIC may not pay an interest rate, at the time any such deposit is accepted, in excess of (i) 75 basis points over certain national rates described in the FDIC’s regulations, or (ii) 90% of the highest interest rate paid on a particular deposit product in the bank’s local market area, if the bank provides notice to the FDIC and evidence of such local rate. There are no such restrictions under the FDIA on a bank that is “well-capitalized.”

Resolution Plans. We are required to submit to the FDIC a periodic plan for our rapid and orderly resolution in the event of material financial distress or failure (resolution plan). The guidance applicable to covered IDIs, including us, requires that our resolution plan must, among other things, demonstrate that we are adequately protected from risks arising from Group Inc. and its other subsidiaries. The FDIC released an advanced notice of proposed rulemaking in April 2019 about potential changes to its resolution planning requirements for IDIs, including us, and delayed the next round of IDI resolution plan submissions until the rulemaking process is complete. Although the rulemaking process is still pending, in June 2021, the FDIC provided guidance on IDI resolution plans and divided IDIs with \$100 billion or more in assets, including us, into two groups for purposes of the timing of resolution plan submissions. We are in the second group with a later submission date.

In addition, U.S. G-SIBs, including Group Inc., are required by the FRB and FDIC to submit resolution plans every two years (alternating between submissions of full plans and targeted plans that include only select information). We are included as a material operating entity within Group Inc.'s 2021 resolution plan, which was submitted in June 2021, and the FRB and FDIC did not identify any deficiencies or shortcomings. We are expected to be included as a material operating entity within Group Inc.'s next required submission, which is a full submission due by July 1, 2023. GSBE is also expected to be included as a material operating entity in this submission.

If these regulators jointly determine that a BHC has failed to remediate identified shortcomings in its resolution plan or that its resolution plan, after any permitted resubmission, is not credible or would not facilitate an orderly resolution under the U.S. Bankruptcy Code, they may jointly impose more stringent capital, leverage or liquidity requirements or restrictions on growth, activities or operations or may jointly order a BHC to divest assets or operations, in order to facilitate orderly resolution in the event of failure, any of which may impact us.

The U.S. federal bank regulatory agencies have rules imposing restrictions on qualified financial contracts (QFCs) entered into by G-SIBs, including their subsidiaries. These rules are intended to facilitate the orderly resolution of a failed G-SIB by limiting the ability of the G-SIB to enter into a QFC unless (i) the counterparty waives certain default rights in such contract arising upon the entry of the G-SIB or one of its affiliates into resolution, (ii) the contract does not contain enumerated prohibitions on the transfer of such contract and/or any related credit enhancement, and (iii) the counterparty agrees that the contract will be subject to the special resolution regimes set forth in the Dodd-Frank Act orderly liquidation authority (OLA) and the FDIA. We have achieved compliance by adhering to the International Swaps and Derivatives Association Universal Resolution Stay Protocol (ISDA Universal Protocol) and International Swaps and Derivatives Association 2018 U.S. Resolution Stay Protocol (U.S. ISDA Protocol) described below.

The ISDA Universal Protocol imposes a stay on certain cross-default and early termination rights within standard ISDA derivative contracts and securities financing transactions between adhering parties in the event that one of them is subject to resolution in its home jurisdiction, including a resolution under OLA or the FDIA in the U.S. The U.S. ISDA Protocol, which was based on the ISDA Universal Protocol, was created to allow market participants to comply with the final QFC rules adopted by the federal bank regulatory agencies.

The E.U. Bank Recovery and Resolution Directive (BRRD), as amended by BRRD II, establishes a framework for the recovery and resolution of financial institutions in the E.U., such as GSBE. The BRRD provides national supervisory authorities with tools and powers to pre-emptively address potential financial crises in order to promote financial stability and minimize taxpayers' exposure to losses. The BRRD requires E.U. member states to grant certain resolution powers to national and, where relevant, E.U. resolution authorities, including the power to impose a temporary stay and to recapitalize a failing entity by writing down its unsecured debt or converting its unsecured debt into equity. Financial institutions in the E.U. must provide that contracts governed by non-E.U. law recognize those temporary stay and bail-in powers unless doing so would be impracticable. GSBE is under the direct remit of the Single Resolution Board for resolution planning. Regulatory authorities in the E.U. may require financial institutions in the E.U., including subsidiaries of non-E.U. groups, to submit recovery plans and to assist the relevant resolution authority in constructing resolution plans for the E.U. entities. GSBE's primary regulator with respect to recovery planning is the ECB, and it is also regulated by BaFin and Deutsche Bundesbank. GSBE is required to submit recovery plans to the ECB.

Capital and Liquidity Requirements. We are subject to consolidated regulatory risk-based capital and leverage requirements that are calculated in accordance with the regulations of the FRB (Capital Framework). The Capital Framework is largely based on the Basel Committee on Banking Supervision's (Basel Committee) framework for strengthening the regulation, supervision and risk management of banks (Basel III) and also implements certain provisions of the Dodd-Frank Act. The Basel Committee is the primary global standard setter for prudential bank regulation and its member jurisdictions implement regulations based on its standards and guidelines. However, the Basel Committee's standards do not become effective in a jurisdiction until the relevant regulators have adopted rules to implement its standards. Under the U.S. federal bank regulatory agencies' tailoring framework, we are subject to "Category I" standards because Group Inc. has been designated as a G-SIB and (with respect to liquidity requirements) because we have \$10 billion or more in total consolidated assets. Accordingly, we are an "Advanced approach" banking organization. Under the Capital Framework, we must meet specific regulatory capital requirements that involve quantitative measures of assets, liabilities and certain off-balance sheet items. The sufficiency of our capital levels is also subject to qualitative judgments by regulators. We are also subject to liquidity requirements established by the U.S. federal bank regulatory agencies that require us to meet specified ratios.

GSBE is subject to capital and liquidity requirements prescribed in the E.U. Capital Requirements Regulation, as amended (CRR), and the E.U. Capital Requirements Directive, as amended (CRD), which are largely based on Basel III. The most recent amendments to the CRR and CRD (respectively, CRR II and CRD V) include changes to the liquidity, market risk, counterparty credit risk, large exposures and leverage ratio frameworks. These changes have been applicable in the E.U. since June 2021. From June 2022, the CRR requires large institutions with securities traded on a regulated market of a member state to make qualitative and quantitative disclosures relating to environmental, social and governance risks on an annual basis. Under an E.U. proposal, these requirements would apply to GSBE beginning in January 2025.

Risk-Based Capital Ratios. As an “Advanced approach” banking organization, we calculate risk-based capital ratios in accordance with both the Standardized and Advanced Capital Rules. Both the Advanced Capital Rules and the Standardized Capital Rules include minimum risk-based capital requirements and additional capital conservation buffer requirements that must be satisfied solely with Common Equity Tier 1 capital. Failure to satisfy a buffer requirement in full would result in constraints on capital distributions and discretionary executive compensation. The severity of the constraints would depend on the amount of the shortfall and our “eligible retained income,” defined as the greater of (i) net income for the four preceding quarters, net of distributions and associated tax effects not reflected in net income; and (ii) the average of net income over the preceding four quarters.

As applicable to us, the capital conservation buffer requirements consist of two components: a 2.5% buffer and the countercyclical capital buffer.

The countercyclical capital buffer is designed to counteract systemic vulnerabilities and currently applies only to banking organizations subject to Category I, II or III standards, including us. The countercyclical capital buffer applicable to us may change in the future, including due to additional guidance from our regulators and/or positional changes. As a result, the minimum capital ratios to which we are subject could change over time.

The U.S. federal bank regulatory agencies have a rule that implements the Basel Committee’s standardized approach for measuring counterparty credit risk exposures in connection with derivative contracts (SA-CCR). Under the rule, “Advanced approach” banking organizations are required to use SA-CCR for calculating their standardized risk-weighted assets (RWAs) and, with some adjustments, for purposes of determining their supplementary leverage ratios (SLRs) discussed below.

The capital requirements applicable to GSBE include both minimum requirements and buffers. See Note 19 to the consolidated financial statements in Part III of this Annual Report for information about our and GSBE’s capital ratios.

The CRD and CRR provide that institutions that are systemically important at the E.U. or member state level, known as other systemically important institutions (O-SIIs), may be subject to additional capital ratio requirements, according to their degree of systemic importance (O-SII buffers). BaFin has identified GSBE as an O-SII in Germany.

The Basel Committee has finalized revisions to the framework for calculating capital requirements for market risk as part of its Fundamental Review of the Trading Book. These revisions are expected to increase market risk capital requirements for most banking organizations. The revised framework, among other things, revises the standardized and internal model-based approaches used to calculate market risk requirements and clarifies the scope of positions subject to market risk requirements. The Basel Committee framework contemplates that national regulators will have implemented the revised framework by January 1, 2023. The U.S. federal bank regulatory agencies have not yet proposed rules implementing the revised framework. Under the CRR, E.U. financial institutions, including GSBE, commenced reporting their market risk calculations under the revised framework in the third quarter of 2021.

The Basel Committee published standards that it described as the finalization of the Basel III post-crisis regulatory reforms (Basel III Revisions). These standards set a floor on internally modeled capital requirements at a percentage of the capital requirements under the standardized approach. They also revise the Basel Committee’s standardized and internal model-based approaches for credit risk, provide a new standardized approach for operational risk capital and revise the frameworks for credit valuation adjustment risk. The Basel Committee framework contemplates that national regulators will have implemented these standards and that the new floor will be phased in through January 1, 2028. The U.S. federal bank regulatory authorities have not yet proposed rules implementing the Basel III Revisions for purposes of their risk-based capital ratios. The European Commission proposed rules to implement the Basel III Revisions in October 2021 and in November 2022, the Council of the E.U. adopted its general approach on implementing the Basel III revisions. The proposed E.U. rules contemplate amendments to the CRR and the CRD, referred to as CRR III and CRD VI, generally taking effect in January 2025.

The Basel Committee has published an updated securitization framework, but the U.S. federal bank regulatory agencies have not yet proposed rules implementing them. The updated securitization framework has been implemented in the E.U.

In December 2022, the Basel Committee published a final standard on the prudential treatment of cryptoasset exposures. The Basel Committee contemplates that national regulators will have incorporated the standard into local capital requirements by January 1, 2025. U.S. federal bank regulatory agencies and E.U. and U.K. authorities have not yet proposed rules implementing the standards.

Leverage Ratios. Under the Capital Framework, we are subject to a Tier 1 leverage ratio and SLR established by the FRB. In April 2018, the FRB and the Office of the Comptroller of the Currency (OCC) issued a proposed rule which would replace the current 6% SLR requirement for depository institution subsidiaries of G-SIBs, including us, to be considered “well-capitalized” with a requirement equal to 3% plus an amount equal to 50% of the G-SIB parent’s risk-based capital surcharge. This proposal, as it relates to the SLR buffer for Group Inc., together with the adopted rule requiring use of SA-CCR for purposes of calculating the SLR, would implement certain of the revisions to the leverage ratio framework published by the Basel Committee in December 2017.

GSBE is also subject to requirements relating to leverage ratios, which are generally based on the Basel Committee leverage ratio standards. The CRR II requires a minimum leverage ratio of 3% for certain E.U. financial institutions, including GSBE.

See Note 19 to the consolidated financial statements in Part III of this Annual Report for information about our Tier 1 leverage ratio and SLR and GSBE’s leverage ratio.

Liquidity Ratios. The Basel Committee’s framework for liquidity risk measurement, standards and monitoring requires banking organizations to measure their liquidity against two specific liquidity tests: the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR).

The LCR rule issued by the U.S. federal bank regulatory agencies and applicable to us is generally consistent with the Basel Committee’s framework and is designed to ensure that a banking organization maintains an adequate level of unencumbered high-quality liquid assets equal to or greater than the expected net cash outflows under an acute short-term liquidity stress scenario. We are required to maintain a minimum LCR of 100%. See “Management’s Discussion and Analysis of Financial Condition and Results of Operations — Risk Management — Liquidity Risk Management — Liquidity Regulatory Framework” in Part II of this Annual Report for further information about our LCR.

GSBE is subject to the LCR rule approved by the European Parliament and Council, which is also generally consistent with the Basel Committee’s framework.

The NSFR is designed to promote medium- and long-term stable funding of the assets and off-balance sheet activities of banking organizations over a one-year time horizon. The Basel Committee’s NSFR framework requires banking organizations to maintain a minimum NSFR of 100%.

Under the final rule issued by the U.S. federal bank regulatory agencies implementing the NSFR for large U.S. banking organizations, we and Group Inc. are subject to NSFR requirements, and Group Inc. will be required to publicly disclose its quarterly average daily NSFR semi-annually and will begin doing so in August 2023. The CRR implements the NSFR for certain E.U. financial institutions, including GSBE. The LCR and NSFR are determined, in part, by applying prescribed supervisory factors to certain categories of liabilities, including deposits that are classified as “brokered.”

The FRB’s enhanced prudential standards require BHCs with \$100 billion or more in total consolidated assets, such as Group Inc., to comply with enhanced liquidity and overall risk management standards, which include maintaining a level of highly liquid assets based on projected funding needs for 30 days, and increased involvement by boards of directors in liquidity and overall risk management. These standards apply on a consolidated basis and therefore impact aspects of the operations of depository institutions that are subsidiaries of BHCs with \$100 billion or more in total consolidated assets, including us. Although the liquidity requirement under these rules has some similarities to the LCR, it is a separate requirement. GSBE also has its own liquidity planning process, which incorporates internally designed stress tests and those required under German regulatory requirements and the ECB Guide to Internal Liquidity Adequacy Assessment Process.

Transactions Between Affiliates. Transactions between us and Group Inc. or our affiliates are subject to restrictions under the Federal Reserve Act and regulations issued by the FRB. These laws and regulations generally limit the types and amounts of transactions (such as loans and other credit extensions, including credit exposure arising from securities purchased under agreements to resell, securities borrowings and derivative transactions, from us to Group Inc. or its other subsidiaries and affiliates and purchases of assets by us from Group Inc. or its other subsidiaries and affiliates) that may take place and generally require those transactions, to the extent permitted, to be on market terms or better to us. These laws and regulations generally do not apply to transactions within the Bank. Similarly, German regulatory requirements provide that certain transactions between GSBE and its parent company, GS Bank USA, as well as its other affiliates, including Group Inc., must be on market terms and are subject to special internal approval requirements.

Total Loss-Absorbing Capacity (TLAC). FRB regulations establish loss-absorbency and related requirements for BHCs that have been designated as U.S. G-SIBs, such as Group Inc. Although it does not apply to depository institutions, the rule impacts aspects of the operations of depository institutions that are subsidiaries of U.S. G-SIBs, including us. For example, it prohibits Group Inc. from (i) guaranteeing our obligations if an insolvency or receivership of Group Inc. could give the counterparty the right to exercise a default right (for example, early termination) against us, subject to an exception for guarantees permitted by rules of the U.S. federal banking agencies imposing restrictions on QFCs; (ii) incurring liabilities guaranteed by us; and (iii) entering into QFCs with any person that is not a subsidiary of Group Inc.

The CRR and the BRRD are designed to, among other things, implement the Financial Stability Board's (FSB's) minimum TLAC requirement for G-SIBs. For example, the CRR requires E.U. subsidiaries of a non-E.U. G-SIB that exceed the threshold of 5% of the G-SIB's RWAs, operating income or leverage exposure, such as GSBE, to meet internal TLAC requirements.

The CRD requires a non-E.U. group with more than €40 billion of assets in the E.U., such as GS Group, to establish an E.U. intermediate holding company (E.U. IHC) by December 30, 2023 if it has, as in GS Group's case, two or more of certain types of E.U. financial institution subsidiaries, including broker-dealers and banks. A non-E.U. group may have two E.U. IHCs if a request for a second is approved. GS Group will be required to hold GSBE and certain other E.U. subsidiaries under a single E.U. IHC unless an exemption is granted. The CRR requires E.U. IHCs to satisfy capital and liquidity requirements, a minimum requirement for own funds and eligible liabilities (MREL), and certain other prudential requirements at a consolidated level.

The BRRD II subjects institutions to an MREL, which is generally consistent with the FSB's TLAC standard. The Single Resolution Board's internal MREL requirements applicable to GSBE are required to be phased in through January 2024.

Deposit Insurance. Our U.S. deposits have the benefit of FDIC insurance up to the applicable limits. The FDIC's Deposit Insurance Fund (DIF) is funded by assessments on IDIs. Our assessment (subject to adjustment by the FDIC) is currently based on our average total consolidated assets less our average tangible equity during the assessment period, our supervisory ratings and specified forward-looking financial measures used to calculate the assessment rate. The deposits of GSBE are covered by the German statutory deposit protection program to the extent provided by law. In addition, GSBE has elected to participate in the German voluntary deposit protection program which provides insurance for certain eligible deposits not covered by the German statutory deposit program. Eligible deposits at the London branch of GS Bank USA are covered by the U.K. Financial Services Compensation Scheme up to the applicable limits.

In October 2022, the FDIC adopted a rule applicable to all FDIC-insured banks that increased initial base deposit insurance assessment rates by 2 basis points, beginning with the first quarterly assessment period of 2023.

Lending and Credit Limits. New York Banking Law imposes lending limits (which also take into account credit exposure from derivative transactions and securities financing transactions of securities representing debt obligations) and other requirements that could impact the manner and scope of our activities.

We are also subject to limits under state and U.S. federal law that restrict the type and amount of investments we can make.

U.S. G-SIBs, such as Group Inc., are also required to comply with a rule regarding single counterparty credit limits, which imposes more stringent requirements for credit exposures among major financial institutions and applies in the aggregate to Group Inc. and its subsidiaries on a consolidated basis. Accordingly, although not applicable to us on a standalone basis, these limits could have the effect of constraining our management of our credit exposures because of the consolidated application of the limits, including with respect to hedges.

The U.S. federal bank regulatory agencies have issued guidance that focuses on transaction structures and risk management frameworks and that outlines high-level principles for safe-and-sound leveraged lending, including underwriting standards, valuation and stress testing. This guidance has, among other things, limited the percentage amount of debt that can be included in certain transactions. The agencies have also issued guidance relating to underwriting standards and general risk management standards in the area of commercial real estate addressing the need for prudent risk management practices by financial institutions engaging in commercial real estate lending activity.

Community Reinvestment Act (CRA). We are subject to the provisions of the CRA. Under the terms of the CRA, we have a continuing and affirmative obligation, consistent with safe and sound operation, to help meet the credit needs of our communities.

The CRA does not establish specific lending requirements or programs for financial institutions nor does it limit an institution's discretion to develop the types of products and services that it believes are best suited to its particular community, so long as they are consistent with the CRA. The CRA requires each appropriate federal bank regulatory agency, in connection with its examination of a depository institution, to assess such institution's record of meeting the credit needs of the community served by that institution, including low- and moderate-income neighborhoods, and to make such assessment available to the public.

The assessment also is part of the FRB's consideration of applications to acquire, merge or consolidate with another banking institution or its holding company, to assume deposits of or acquire assets from another depository institution, to establish a new domestic branch office that will accept deposits, or to relocate an office. In the case of a BHC applying for approval to acquire a bank or another BHC, the FRB will assess the records of performance under the CRA of the IDIs involved in the transaction, and such records may be the basis for denying the application.

If any IDI subsidiary of an FHC fails to maintain at least a "satisfactory" rating under the CRA, the FHC would be subject to restrictions on certain new activities and acquisitions.

We are also subject to provisions of the New York Banking Law that impose continuing and affirmative obligations upon a New York State-chartered bank to serve the credit needs of its local community (NYCRA). Such obligations are substantially similar to those imposed by the CRA. The NYCRA requires the NYDFS to make a periodic written assessment of an institution's compliance with the NYCRA, and to make such assessment available to the public. The NYCRA also requires the Superintendent to consider the NYCRA rating when reviewing an application to engage in certain transactions, including mergers, asset purchases and the establishment of domestic branch offices, and provides that such assessment may serve as a basis for the denial of any such application.

In 2022, we were designated as a "wholesale bank" for CRA compliance purposes. A wholesale bank generally is a bank that is not in the business of extending home mortgage, small business, small farm or consumer loans to retail clients and for which a designation as a wholesale bank is in effect. During the period in which this designation was in effect, we fulfilled our CRA obligations through community development loans, qualified investments and community development services, rather than consumer loans.

In 2023, in light of our business of lending to consumers, we will no longer be designated as a wholesale bank and therefore our CRA compliance will be assessed pursuant either to the regulatory framework applicable to large commercial banks or to an approved strategic plan. See "Risk Factors — Market Developments and General Business Environment — We face enhanced risks as new business initiatives and acquisitions lead us to engage in new activities, operate in new locations, transact with a broader array of clients and counterparties, and expose us to new assets, activities and markets" for further information about our CRA compliance obligations, which could impact our CRA ratings.

In May 2022, the FRB, the FDIC and the OCC jointly released a notice of proposed rulemaking to significantly amend each agency's regulations implementing the CRA. Among other things, the proposed rules would revise the framework for evaluating bank performance under the CRA and update CRA assessment areas to include activities associated with online, mobile and branchless banking.

Consumer Protection Laws. We are subject to a number of federal and state consumer protection laws, including laws designed to protect clients and customers and promote lending to various sectors of the economy and population. These laws include the Equal Credit Opportunity Act, the Fair Credit Reporting Act, the Truth in Savings Act, the Electronic Funds Transfer Act, the Expedited Funds Availability Act, the Electronic Signatures in Global and National Commerce Act, the Truth in Lending Act, the Home Mortgage Disclosure Act, the Real Estate Settlement Procedures Act, the Flood Disaster Protection Act, the Military Lending Act, the Servicemembers Civil Relief Act, and their respective state law counterparts, as well as state and local laws regarding unfair, deceptive or abusive acts and practices in connection with the offer, sale or provision of consumer financial products and services. These laws, rules and regulations, among other things, impose obligations relating to marketing, origination, servicing and collections activities in our consumer businesses. Many of these laws, rules and regulations also apply to our small business lending activities, which are also subject to supervision and regulation by federal and state regulators as well.

The CFPB has broad rulemaking, supervisory and enforcement powers under various federal consumer financial protection laws, including the laws referenced above and certain other statutes. We are supervised by the CFPB, and we are also subject to oversight by the FRB and the NYDFS, with respect to one or more of the foregoing laws and activities.

We have expanded our existing risk management platform and controls and are continuing to enhance, as appropriate, our existing regulatory and legal compliance programs, policies, procedures and processes to cover the activities, products and customers associated with these activities.

Swaps, Derivatives and Commodities Regulation. The commodity futures, commodity options and swaps industry in the U.S. is subject to regulation under the U.S. Commodity Exchange Act (CEA). The CFTC is the federal agency charged with the administration of the CEA. In addition, the SEC is the U.S. federal agency charged with the regulation of security-based swaps.

The “swap push-out” provisions of Section 716 of the Dodd-Frank Act restrict the ability of an IDI to enter into “structured finance swaps,” which are swaps referencing asset-backed securities, when such swaps are not entered into for hedging or other risk mitigation purposes. An IDI that fails to comply with Section 716 could face restrictions on the institution’s access to the Federal Reserve’s discount window or FDIC deposit insurance or guarantees.

The terms “swaps” and “security-based swaps” include a wide variety of derivative instruments in addition to those conventionally referred to as swaps (including certain forward contracts and options), and relate to a wide variety of underlying assets or obligations, including currencies, commodities, interest or other monetary rates, yields, indices, securities, credit events, loans and other financial obligations.

GS Bank USA, and two subsidiaries, GSBE and Goldman Sachs Mitsui Marine Derivative Products, L.P. (MMDP), are registered swap dealers with the CFTC and are subject to CFTC regulations. The rules and regulations of various self-regulatory organizations, such as the Chicago Mercantile Exchange, other CFTC-registered clearinghouses and exchanges and the National Futures Association, also govern commodity futures, commodity options and swaps activities.

CFTC rules require registration of swap dealers, mandatory clearing and execution of interest rate and credit default swaps and real-time public reporting and adherence to business conduct standards for all in-scope swaps. A number of these requirements, particularly those regarding recordkeeping and reporting, also apply to transactions that do not involve a registered swap dealer. The CFTC has rules establishing capital requirements for swap dealers, such as MMDP, that are not subject to the capital rules of a prudential regulator, such as the FRB. The CFTC also has financial reporting requirements for covered swap entities and capital rules for CFTC-registered futures commission merchants that provide explicit capital requirements for proprietary positions in swaps and security-based swaps that are not cleared by a clearing organization.

SEC rules govern the registration and regulation of security-based swap dealers, and GS Bank USA and GSBE are registered as security-based swap dealers with the SEC. Security-based swaps are defined as swaps on single securities or narrow-based baskets or indices of securities. The SEC has adopted a number of rules for security-based swap dealers, including (i) capital, margin and segregation requirements; (ii) record-keeping, financial reporting and notification requirements; (iii) business conduct standards; (iv) regulatory and public trade reporting; and (v) the application of risk mitigation techniques to uncleared portfolios of security-based swaps. The SEC has proposed additional regulations regarding security-based swaps that would, among other things, require public reporting of large positions in security-based swaps.

GS Bank USA is also subject to the FRB’s swaps margin rules. These rules require the exchange of initial and variation margin in connection with transactions in swaps and security-based swaps that are not cleared through a registered or exempt clearinghouse. GS Bank USA is required to post and collect margin in connection with transactions with swap dealers, security-based swap dealers, major swap participants and major security-based swap participants, or financial end users.

The CFTC and the SEC have adopted rules relating to cross-border regulation of swaps and securities-based swaps, and business conduct and registration requirements. The CFTC and the SEC have entered into agreements with certain non-U.S. regulators regarding the cross-border regulation of derivatives and the mutual recognition of cross-border execution facilities clearinghouses, and have approved substituted compliance with certain non-U.S. regulations, related to certain business conduct requirements and margin rules. The U.S. prudential regulators have not yet made a determination with respect to substituted compliance for transactions subject to non-U.S. margin rules.

Similar types of regulation have been proposed or adopted in jurisdictions outside the U.S., including in the E.U. and Japan. Under the European Market Infrastructure Regulation, and the relevant U.K. on-shoring legislation, for example, the E.U. and the U.K. have established regulatory requirements relating to portfolio reconciliation and reporting, clearing certain OTC derivatives and margining for uncleared derivatives activities. In addition, under the European Markets in Financial Instruments Directive and Regulation (MiFID II), transactions in certain types of derivatives are required to be executed on regulated platforms or exchanges.

GS Bank USA and GSBE are subject to the margin rules issued by the FRB and MMDP is subject to margin rules issued by the CFTC. Inter-affiliate transactions under the CFTC and FRB margin rules are generally exempt from initial margin requirements.

The CFTC has adopted rules that limit the size of positions in physical commodity derivatives that can be held by any entity, or any group of affiliates or other parties trading under common ownership or control. The CFTC position limits apply to futures on physical commodities and options on such futures, apply to both physically and cash settled positions and apply to swaps that are economically equivalent to such futures and options. The position limit rules initially impose limits in the spot month only (i.e., during the delivery period for the physical commodities, which is typically a period of several days). CFTC spot and non-spot month limits will continue to apply to futures on certain legacy agricultural commodities, and it is possible that non-spot month limits will at some point be adopted for futures, options on futures and swaps on other categories of physical commodities. See “Risk Factors — Legal and Regulatory — Our businesses, and the businesses of our clients, are subject to extensive and pervasive regulation around the world” for further information about how derivatives regulation could impact our business.

Compensation Practices. Our compensation practices, as a subsidiary of Group Inc., are subject to oversight by the FRB and other regulatory bodies worldwide.

The U.S. federal bank regulatory agencies have provided guidance designed to ensure that incentive compensation arrangements at banking organizations take into account risk and are consistent with safe and sound practices. The guidance sets forth the following three key principles with respect to incentive compensation arrangements: (i) the arrangements should provide employees with incentives that appropriately balance risk and financial results in a manner that does not encourage employees to expose their organizations to imprudent risk; (ii) the arrangements should be compatible with effective controls and risk management; and (iii) the arrangements should be supported by strong corporate governance. The guidance provides that supervisory findings with respect to incentive compensation will be incorporated, as appropriate, into the organization’s supervisory ratings, which can affect its ability to make acquisitions or perform other actions. The guidance also notes that enforcement actions may be taken against a banking organization if its incentive compensation arrangements or related risk management, control or governance processes pose a risk to the organization’s safety and soundness.

The Dodd-Frank Act requires U.S. financial regulators, including the FRB, to adopt rules on incentive-based payment arrangements at specified regulated entities having at least \$1 billion in total assets. The U.S. financial regulators proposed revised rules in 2016, which have not been finalized.

The NYDFS’ guidance emphasizes that any incentive compensation arrangements tied to employee performance indicators at banking institutions regulated by the NYDFS, including us, must be subject to effective risk management, oversight and control.

In the E.U., certain provisions in the CRR and CRD are designed to meet the FSB’s compensation standards. These provisions limit the ratio of variable to fixed compensation of all employees at GSBE, including those employees identified as having a material impact on the risk profile of regulated entities. CRR II and CRD V amended certain aspects of these rules, including by increasing minimum variable compensation deferral periods.

Anti-Money Laundering and Anti-Bribery Rules and Regulations. The U.S. Bank Secrecy Act, as amended (BSA), including by the USA PATRIOT Act of 2001, contains anti-money laundering (AML) and financial transparency laws and authorizes or mandates the promulgation of various regulations applicable to financial institutions, including standards for verifying client identification at account opening, and obligations to monitor client transactions and report suspicious activities. Through these and other provisions, the BSA seeks, among other things, to promote the identification of parties that may be involved in terrorism, money laundering or other suspicious activities.

The Anti-Money Laundering Act of 2020 (AMLA), which amends the BSA, is intended to comprehensively reform and modernize U.S. AML laws. Among other things, the AMLA codifies a risk-based approach to AML compliance for financial institutions; requires the Treasury Department to promulgate priorities for AML and countering the financing of terrorism policy; requires the development of standards by the Treasury Department for testing technology and internal processes for BSA compliance; expands enforcement- and investigation-related authority, including a significant expansion in the available sanctions for certain BSA violations; and expands BSA whistleblower incentives and protections. Many of the statutory provisions in the AMLA will require additional rulemakings, reports and other measures, and the impact of the AMLA will depend on, among other things, rulemaking and implementation guidance. The Financial Crimes Enforcement Network, a bureau of the Treasury Department, has issued the priorities for AML and countering the financing of terrorism policy required under the AMLA. The priorities include: corruption, cybercrime, terrorist financing, fraud, transnational crime, drug trafficking, human trafficking and proliferation financing.

The NYDFS imposes requirements on regulated institutions, including us, regarding their BSA/AML and sanctions compliance programs and requires us to maintain transaction-monitoring and filtering programs reasonably designed to comply with BSA/AML requirements and to stop transactions prohibited under the sanctions programs of the U.S. Treasury's Office of Foreign Assets Control. The rule also requires us to provide a certification to the NYDFS annually that we are in compliance with the transaction-monitoring and filtering program requirements.

We are subject to other laws and regulations relating to AML and financial transparency, including the E.U. Anti-Money Laundering Directives. In addition, we are subject to the U.S. Foreign Corrupt Practices Act (FCPA), the U.K. Bribery Act, and other laws and regulations worldwide regarding corrupt and illegal payments, or providing anything of value, for the benefit of government officials and others. The scope of the types of payments or other benefits covered by these laws is very broad. These laws and regulations include requirements relating to the identification of clients, monitoring for and reporting suspicious transactions, monitoring direct and indirect payments to politically exposed persons, providing information to regulatory authorities and law enforcement agencies, and sharing information with other financial institutions. See "Risk Factors — Legal and Regulatory — Substantial civil or criminal liability or significant regulatory action against us or our affiliates could have material adverse financial effects or cause us significant reputational harm, which in turn could seriously harm our business prospects" for further information about how these laws and regulations could impact us.

Volcker Rule. The Volcker Rule prohibits "proprietary trading," but permits activities such as market making and risk-mitigation hedging, which we currently engage in and will continue to engage in, and requires an extensive compliance program, which includes additional reporting and record-keeping requirements.

In addition, the Volcker Rule limits the sponsorship of, and investment in, "covered funds" (as defined in the rule) by banking entities, including us. Collateralized loan obligations and other vehicles in which we invest, subject to certain exclusions, including an exclusion for certain loan securitizations, may be considered "covered funds" under the rule. The rule also limits certain types of transactions between us and covered funds sponsored or advised by Group Inc. and its subsidiaries, similar to the limitations on transactions between depository institutions and their affiliates. The limitation on investments in covered funds requires Group Inc. and its subsidiaries, including us, to limit their investments in each such fund to 3% or less of the fund's net asset value, and to limit their aggregate investments in all such funds to 3% or less of GS Group's Tier 1 capital.

As a German credit institution, GSBE will become subject to Volcker Rule-type prohibitions under German banking law and regulations on December 31, 2023 because its financial assets exceeded certain thresholds. Prohibited activities include (i) proprietary trading, (ii) high-frequency trading at a German trading venue, and (iii) lending and guarantee businesses with German hedge funds, German funds of hedge funds or any non-German substantially leveraged alternative investment funds, unless an exclusion or an exemption applies.

Privacy and Cybersecurity Regulation. We are subject to numerous laws and regulations relating to the privacy of information regarding clients, employees and others. These include, but are not limited to, the California Consumer Privacy Act of 2018, as amended by the California Privacy Rights Act of 2020 (CCPA) and the E.U.'s General Data Protection Regulation (GDPR), each of which is described further below. In addition, several other states and non-U.S. jurisdictions have enacted, or are proposing, privacy and data protection laws similar to the GDPR and the CCPA. Among other things, the CCPA imposes compliance obligations with regard to the collection, use and disclosure of personal information. The GDPR has heightened our privacy compliance obligations, impacted certain of our businesses' collection, processing and retention of personal data and imposed strict standards for reporting data breaches. The GDPR also provides for significant penalties for non-compliance.

Our businesses are also subject to laws and regulations governing cybersecurity and related risks, and which require regulatory disclosures of certain security incidents. The NYDFS also requires financial institutions regulated by the NYDFS, including us, to, among other things, (i) establish and maintain a cybersecurity program designed to ensure the confidentiality, integrity and availability of their information systems; (ii) implement and maintain a written cybersecurity policy setting forth policies and procedures for the protection of their information systems and nonpublic information; and (iii) designate a Chief Information Security Officer.

In January 2023, the E.U. Digital Operational Resilience Act (DORA) became effective, and will apply from January 2025. DORA requires E.U. financial entities, such as GSBE, to have a comprehensive governance and control framework for the management of information and communications technology risk.

Securitizations. We are also subject to rules adopted by federal agencies pursuant to the Dodd-Frank Act that require any person who organizes or initiates certain asset-backed securities transactions to retain a portion (generally, at least five percent) of any credit risk that the person conveys to a third party. For certain securitization transactions, retention by third-party purchasers may satisfy this requirement. E.U. regulations also provide that no investor may be exposed to a securitization position unless the originator, sponsor, or original lender retains a material net economic interest in the securitization of not less than five percent.

Asset Management and Wealth Management Regulation. Our asset management and wealth management businesses are subject to extensive oversight by regulators relating to, among other things, the fair treatment of clients, safeguarding of client assets, offerings of funds, marketing activities, transactions among affiliates and our management of client funds.

GSBE is subject to MiFID II, which governs the approval, organizational, marketing and reporting requirements of E.U.-based investment managers and the ability of investment fund managers located outside the E.U. to access those markets.

Other Regulation. A number of our activities, including our cross-border lending and derivatives activities, require us to obtain licenses, adhere to applicable regulations and be subject to the oversight of various regulators in the jurisdictions in which we conduct these activities.

In Europe, GSBE provides broker-dealer services that are subject to oversight by European and national regulators. These services are regulated in accordance with E.U., U.K., and other national laws and regulations. These laws require, among other things, compliance with certain capital adequacy and liquidity standards, customer protection requirements and market conduct and trade reporting rules. GSBE is also regulated by the securities, derivatives and commodities exchanges of which it is a member.

In the E.U., MiFID II established trading venue categories for the purposes of discharging the obligation to trade OTC derivatives on a trading platform, enhanced pre- and post-trade transparency covering a wide range of financial instruments, placed volume caps on non-transparent liquidity trading for equities trading venues, limited the use of broker-dealer equities crossing networks and created a regime for systematic internalizers, which are investment firms that execute client equity transactions outside a trading venue. Additional control requirements apply to algorithmic trading, high frequency trading and direct electronic access. Commodities trading firms are required to calculate their positions and adhere to specific position limits. MiFID II also requires enhanced transaction reporting, the publication of best execution data by investment firms and trading venues, transparency on costs and charges of service to investors, restrictions on the way investment managers can pay for the receipt of investment research, rules limiting the payment and receipt of soft commissions and other forms of inducements, and mandatory unbundling for broker-dealers between execution and other major services. GSBE is subject to risk retention requirements in connection with securitization activities.

The SEC issued a proposed rule in November 2021 which, if adopted, would require lenders of securities to provide the material terms of securities lending transactions to a registered national securities association, such as FINRA.

Available Information

This Annual Report, as well as annual and periodic reports for prior periods, are available at www.goldmansachs.com/investor-relations/financials/. In addition, certain of our affiliates, including Group Inc., provide annual and periodic reports relating to their businesses and activities, which are also available on this website. Information contained on such website is not part of, nor is it incorporated by reference into, this Annual Report.

Forward-Looking Statements

In this Annual Report, we have included statements that may constitute “forward-looking statements.” Forward-looking statements are not historical facts or statements of current conditions, but instead represent only our beliefs regarding future events, many of which, by their nature, are inherently uncertain and outside our control.

By identifying these statements for you in this manner, we are alerting you to the possibility that our actual results, financial condition, liquidity and capital actions may differ, possibly materially, from the anticipated results, financial condition, liquidity and capital actions in these forward-looking statements. Important factors that could cause our results, financial condition and liquidity to differ from those in these statements include, among others, those described below and in “Risk Factors” in this Annual Report.

These statements may relate to, among other things, (i) our future plans and objectives, (ii) our expense savings initiative, (iii) expenses we may incur, including expenses from investing in our consumer and transaction banking activities and new business initiatives, (iv) the growth of our deposits and other funding, asset liability management and funding strategies, (v) our business initiatives, including transaction banking and new consumer financial products, (vi) our expected provisions for credit losses, (vii) the adequacy of our allowance for credit losses (viii) the projected growth of our consumer activities, (ix) the objectives and effectiveness of our risk management and liquidity policies, (x) our resolution plan and strategy, (xi) the impact of regulatory changes applicable to us, and our future status, activities or reporting under banking and financial regulation, (xii) legal proceedings, governmental investigations or other contingencies, (xiii) the replacement of Interbank Offered Rates (IBORs) and our transition to alternative risk-free reference rates, (xiv) the impact of the COVID-19 pandemic on our businesses, results, financial position and liquidity, (xv) the effectiveness of our management of human capital, (xvi) future inflation and (xvii) the impact of Russia’s invasion of Ukraine and related sanctions and other developments on our business, results and financial position.

Statements about the timing, costs, profitability, benefits and other aspects of our businesses and expense savings initiatives and increases in market share are based on our current expectations regarding our ability to implement these initiatives and actual results may differ, possibly materially, from current expectations due to, among other things, a delay in the timing of these initiatives, increased competition and an inability to reduce expenses and grow businesses.

Statements about the growth of our deposits and associated interest expense savings, and our consumer activities are subject to the risk that actual growth may differ, possibly materially, from that currently anticipated due to, among other things, changes in interest rates and competition from other similar products.

Statements about our expected provisions for credit losses are subject to the risk that actual credit losses may differ and our expectations may change, possibly materially, from that currently anticipated due to, among other things, changes to the composition of our loan portfolio and changes in the economic environment in future periods and our forecasts of future economic conditions, as well as changes in our models, policies and other management judgments.

Statements about the future state of our liquidity and regulatory capital ratios are subject to the risk that our actual liquidity and regulatory capital ratios may differ, possibly materially, from what is currently expected due to, among other things, increased regulatory requirements resulting from changes in regulations or the interpretation or application of existing regulations and changes to the composition of our balance sheet.

Statements about our objectives in management of human capital are based on our current expectations and are subject to the risk that we may not achieve these objectives and goals due to, among other things, competition in recruiting and attracting diverse candidates and unsuccessful efforts in retaining diverse employees.

Statements about future inflation are subject to the risk that actual inflation may differ, possibly materially, due to, among other things, changes in economic growth, unemployment or consumer demand.

Statements about the impact of Russia’s invasion of Ukraine and related sanctions and other developments on our business, results and financial position are subject to the risks that hostilities may escalate and expand, that sanctions may increase and that the actual impact may differ, possibly materially, from what is currently expected.

Risk Factors

We face a variety of risks that are substantial and inherent in our businesses.

The following is a summary of some of the more important factors that could affect our businesses:

Market

- Our businesses have been and may in the future be adversely affected by conditions in the global financial markets and broader economic conditions.

- Our businesses have been and may in the future be adversely affected by declining asset values, particularly where we have net “long” positions, or receive or post collateral.
- Our market-making activities have been and may in the future be affected by changes in the levels of market volatility.
- Our investment banking and asset and wealth management businesses have been adversely affected and may in the future be adversely affected by market uncertainty or lack of confidence among investors and CEOs due to declines in economic activity and other unfavorable economic, geopolitical or market conditions.
- Our asset management and wealth management business has been and may in the future be adversely affected by the poor investment performance of investment products that we offer or a client preference for products other than those which we offer or for products that generate lower fees.
- Inflation has had, and could continue to have, a negative effect on our business, results of operations and financial condition.
- Changes in market interest rates could adversely affect our revenues and expenses, the value of assets and obligations, and the availability and cost of funding.

Liquidity

- Our liquidity, profitability and businesses may be adversely affected by an inability to obtain funding or to sell assets.
- Our businesses have been and may in the future be adversely affected by disruptions or lack of liquidity in the credit markets, including reduced access to credit and higher costs of obtaining credit.
- Reductions in our credit ratings or an increase in our credit spreads may adversely affect our liquidity and cost of funding.
- Loss of deposits could increase our funding costs and adversely affect our liquidity and ability to grow our businesses.

Credit

- Our businesses, profitability and liquidity may be adversely affected by deterioration in the credit quality of or defaults by third parties.
- Concentration of risk increases the potential for significant losses in our lending, market-making, underwriting and other activities.
- Derivative transactions and delayed documentation or settlements may expose us to credit risk, unexpected risks and potential losses.
- A failure by Group Inc. to guarantee certain of our obligations could adversely affect our financial condition.

- We might underestimate the credit losses inherent in our loan portfolio and have credit losses in excess of the amount reserved.

Operational

- A failure in our or our affiliates’ operational systems or human error, malfeasance or other misconduct, could impair our liquidity, disrupt our businesses, result in the disclosure of confidential information, damage our reputation and cause losses.
- A failure or disruption in our infrastructure, or in the operational systems or infrastructure of third parties, could impair our liquidity, disrupt our businesses, damage our reputation and cause losses.
- A failure to protect our computer systems, networks and information, and our clients’ information, against cyber attacks and similar threats could impair our ability to conduct our businesses, result in the disclosure, theft or destruction of confidential information, damage our reputation and cause losses.
- We may incur losses as a result of ineffective risk management processes and strategies.
- We are a wholly-owned subsidiary of Group Inc. and are dependent on Group Inc. and certain of our affiliates for client business, various services and capital.

Legal and Regulatory

- Our businesses, and the businesses of our clients, are subject to extensive and pervasive regulation around the world.
- A failure to appropriately identify and address potential conflicts of interest could adversely affect our business.
- We may be adversely affected by increased governmental and regulatory scrutiny or negative publicity.
- Substantial civil or criminal liability or significant regulatory action against us or our affiliates could have material adverse financial effects or cause us significant reputational harm, which in turn could seriously harm our business prospects.
- In conducting our businesses around the world, we are subject to political, legal, regulatory and other risks that are inherent in operating in many countries.
- The application of regulatory strategies and requirements in the U.S. and non-U.S. jurisdictions to facilitate the orderly resolution of large financial institutions could create greater risk of loss for our security holders.
- The ability-to-repay requirement for residential mortgage loans may limit our ability to sell certain of our mortgage loans and give borrowers potential claims against us.

- Increases in FDIC insurance premiums may adversely affect our earnings.

Competition

- The financial services industry is highly competitive.
- The growth of electronic trading and the introduction of new products and technologies, including trading and distributed ledger technologies, including cryptocurrencies, has increased competition.
- Our businesses would be adversely affected if we are unable to hire and retain qualified employees.

Market Developments and General Business Environment

- Our businesses, financial condition, liquidity and results of operations have been and may in the future be adversely affected by unforeseen or catastrophic events, including pandemics, terrorist attacks, extreme weather events or other natural disasters.
- Climate change could disrupt our businesses and adversely affect client activity levels and the creditworthiness of our clients and counterparties, and our efforts to address concerns relating to climate change could result in damage to our reputation.
- Our business, financial condition, liquidity and results of operations may be adversely affected by disruptions in the global economy caused by Russia's invasion of Ukraine and related sanctions and other developments.
- Certain of our businesses, our funding instruments and financial products may be adversely affected by changes in or the discontinuance of IBORs, in particular USD London Interbank Offered Rate (USD LIBOR).
- Certain of our businesses and our funding instruments may be adversely affected by changes in other reference rates, currencies, indexes or baskets to which products we offer or funding that we raise are linked.
- Our business, financial condition, liquidity and results of operations may be adversely affected by disruptions in the global economy caused by escalating tensions between the U.S. and China.
- We face enhanced risks as new business initiatives and acquisitions lead us to engage in new activities, operate in new locations, transact with a broader array of clients and counterparties, and expose us to new assets, activities and markets.
- We may not be able to fully realize the expected benefits or synergies from acquisitions or other business initiatives in the time frames we expect, or at all.

The following are detailed descriptions of our Risk Factors summarized above:

Market

Our businesses have been and may in the future be adversely affected by conditions in the global financial markets and broader economic conditions.

Certain of our businesses by their nature do not produce predictable earnings. We generate a substantial amount of our revenue and earnings from transactions in financial instruments, including in connection with our market-making activities in interest rate and other derivatives and related products, and interest we charge on our lending portfolio.

Our financial performance is highly dependent on the environment in which we operate. A favorable business environment is generally characterized by, among other factors, high global gross domestic product growth, regulatory and market conditions that result in transparent, liquid and efficient capital markets, low inflation, business, consumer and investor confidence, stable geopolitical conditions and strong business earnings.

Unfavorable or uncertain economic and market conditions can be caused by: low levels of or declines in economic growth, business activity or investor, business or consumer confidence; concerns over a potential recession; changes in consumer spending or borrowing patterns; pandemics; limitations on the availability or increases in the cost of credit and capital; illiquid markets; increases in inflation, interest rates, exchange rate or basic commodity price volatility or default rates; high levels of inflation or stagflation; concerns about sovereign defaults; uncertainty concerning fiscal or monetary policy, government shutdowns, debt ceilings or funding; the extent of and uncertainty about potential increases in tax rates and other regulatory changes; limitations on international trade and travel; laws and regulations that limit trading in, or the issuance of, securities of issuers outside their domestic markets; outbreaks of domestic or international tensions or hostilities, terrorism, nuclear proliferation, cybersecurity threats or attacks and other forms of disruption to or curtailment of global communication, energy transmission or transportation networks or other geopolitical instability or uncertainty; corporate, political or other scandals that reduce investor confidence in capital markets; extreme weather events or other natural disasters; or a combination of these or other factors.

The financial services industry and the securities and other financial markets have been materially and adversely affected in the past by significant declines in the values of nearly all asset classes, by a serious lack of liquidity and by high levels of borrower defaults. In addition, concerns about actual or potential increases in interest rates, inflation and other borrowing costs, a resurgence of COVID-19 cases, European sovereign debt risk and its impact on the European banking system, and limitations on international trade have, at times, negatively impacted the levels of client activity. Actual changes in interest rates and other market conditions, have also resulted, at times, in significant volatility and negative impact to client activity levels and creditworthiness.

General uncertainty about economic, political and market activities, and the scope, timing and impact of regulatory reform, as well as weak consumer, investor and CEO confidence resulting in large part from such uncertainty, has in the past negatively impacted the client activity of GS Group's or our clients, which can adversely affect our businesses. Periods of low volatility and periods of high volatility combined with a lack of liquidity, have at times had an unfavorable impact on our market-making business.

Changes, or proposed changes, to U.S. international trade and investment policies, particularly with important trading partners, have in recent years negatively impacted financial markets. Continued or escalating tensions may result in further actions taken by the U.S. or other countries that could disrupt international trade and investment and adversely affect financial markets. Those actions could include, among others, the implementation of sanctions, tariffs or foreign exchange measures, the large-scale sale of U.S. Treasury securities or other restrictions on cross-border trade, investment, or transfer of information or technology. Any such developments could adversely affect GS Group's or our clients' businesses.

Financial institution returns may be negatively impacted by increased funding costs due in part to the lack of perceived government support of such institutions in the event of future financial crises relative to financial institutions in countries in which governmental support is maintained. In addition, liquidity in the financial markets has in the past been, and could in the future be, negatively impacted as market participants and market practices and structures adjust to evolving regulatory frameworks.

In January 2023, the outstanding debt of the U.S. reached its statutory limit and the U.S. Treasury Department commenced taking extraordinary measures to prevent the U.S. from defaulting on its obligations. If Congress does not raise the debt ceiling, the U.S. could default on its obligations, including Treasury securities that play an integral role in financial markets. A default by the U.S. could result in unprecedented market volatility and illiquidity, heightened operational risks relating to the clearance and settlement of transactions, margin and other disputes with clients and counterparties, an adverse impact to investors including money market funds that invest in U.S. Treasuries, downgrades in the U.S. credit rating, further increases in interest rates and borrowing costs and a recession in the U.S. or other economies. Even if the U.S. does not default, continued uncertainty relating to the debt ceiling could result in downgrades of the U.S. credit rating, which could adversely affect market conditions, lead to margin disputes, further increases in interest rates and borrowing costs and necessitate significant operational changes among market participants, including us. A downgrade of the federal government's credit rating could also materially and adversely affect the market for repurchase agreements, securities borrowing and lending, and other financings typically collateralized by U.S. Treasury or agency obligations. Further, the fair value, liquidity and credit ratings of securities issued by, or other obligations of, agencies of the U.S. government or related to the U.S. government or its agencies, as well as municipal bonds could be similarly adversely affected.

In addition, a significant portion of our businesses involves transactions with, through, arising from, involving, or otherwise related to other GS Group entities, and any adverse change in the businesses or activity levels of GS Group more broadly can have an adverse impact on us. Accordingly, we are materially affected by conditions in the global financial markets and economic conditions generally, both directly through their impact on our business levels and indirectly through their impact on the business levels of our affiliates. These conditions can change suddenly and negatively.

Our businesses have been and may in the future be adversely affected by declining asset values, particularly where we have net “long” positions, or receive or post collateral.

We have net “long” positions in loans, derivatives, mortgages and other asset classes, including U.S. government and agency obligations and may in the future take net long positions in other asset classes. These include positions we take when we commit capital to our clients as part of our lending activities or when we act as a principal to facilitate the activities of our clients or counterparties (including our affiliates) through our market-making activities relating to interest rate and currency derivatives and other derivatives and related products. Because our market-making positions are marked-to-market on a daily or other periodic basis, declines in asset values directly and promptly impact our earnings, unless we have effectively “hedged” our exposures to those declines.

See “Management’s Discussion and Analysis of Financial Condition and Results of Operations — Critical Accounting Policies” in Part II of this Annual Report and Note 4 to the consolidated financial statements in Part III of this Annual Report for further information about fair value measurements.

In certain circumstances (particularly in the case of credit products, including leveraged loans or other securities that are not freely tradable or lack established and liquid trading markets), it may not be possible or economic to hedge our exposures and to the extent that we do so the hedge may be ineffective or may greatly reduce our ability to profit from increases in the values of the assets. Sudden declines and significant volatility in the prices of assets have in the past substantially curtailed or eliminated, and may in the future substantially curtail or eliminate the trading markets for certain assets, which may make it difficult to sell, hedge or value such assets. We may incur losses from time to time as trading markets deteriorate or cease to function, including with respect to loan commitments we have made or securities offerings we have underwritten. The inability to sell or effectively hedge assets reduces our ability to limit losses in such positions and the difficulty in valuing assets has in the past negatively affected, and may in the future negatively affect, our capital, liquidity or leverage ratios, our funding costs and our ability to deploy capital.

In connection with our market-making activities, we are obligated by the rules of relevant trading venues to provide executable quotes to maintain an orderly market. This may result in an increased need for liquidity and corresponding risk for the Bank to manage. Risk, including market risk, may expose the Bank to gains or losses.

We post collateral to support our obligations and receive collateral that supports the obligations of our clients and counterparties. When the value of the assets posted as collateral or the credit ratings of the party posting collateral decline, the party posting the collateral may need to provide additional collateral or, if possible, reduce its position. Therefore, declines in the value of asset classes used as collateral mean that either the cost of funding positions is increased or the size of positions is decreased. If we are the party providing collateral, this can increase our costs and reduce our profitability and if we are the party receiving collateral, this can also reduce our profitability by reducing the level of business done with our clients and counterparties.

In our capacity as an agency lender, we indemnify all of our securities lending customers against losses incurred in the event that borrowers do not return securities and the collateral held is insufficient to cover the market value of the securities borrowed, and, therefore, declines in the value of collateral can subject us to additional costs.

In addition, volatile or less liquid markets increase the difficulty of valuing assets, which can lead to costly and time-consuming disputes over asset values and the level of required collateral, as well as increased credit risk to the recipient of the collateral due to delays in receiving adequate collateral. In cases where we foreclose on collateral, sudden declines in the value or liquidity of the collateral have in the past resulted in and may in the future, despite credit monitoring, over-collateralization, the ability to call for additional collateral or the ability to force repayment of the underlying obligation, result in significant losses to us, especially where there is a single type of collateral supporting the obligation.

Our market-making activities have been and may in the future be affected by changes in the levels of market volatility.

Certain of our market-making activities depend on market volatility to provide trading and arbitrage opportunities to our clients, and decreases in volatility have reduced and may in the future reduce these opportunities and the level of client activity associated with them and adversely affect the results of these activities, which could adversely impact our revenues. Increased volatility, while it can increase trading volumes and spreads, also increases risk as measured by Value-at-Risk (VaR) and may expose us to increased risks in connection with our market-making activities or may cause us to reduce our inventory in order to avoid increasing our VaR. Limiting the size of our market-making positions can adversely affect our profitability. In periods when volatility is increasing, but asset values are declining significantly, it may not be possible to sell assets at all or it may only be possible to do so at steep discounts. In those circumstances, we have been and may in the future be forced to either take on additional risk or to realize losses in order to decrease our VaR. In addition, increases in volatility increase the level of our RWAs, which increases our capital requirements.

Our investment banking and asset and wealth management businesses have been adversely affected and may in the future be adversely affected by market uncertainty or lack of confidence among investors and CEOs due to declines in economic activity and other unfavorable economic, geopolitical or market conditions.

Our investment banking business has been and may in the future be adversely affected by market conditions. Poor economic conditions and other uncertain geopolitical conditions may adversely affect and have in the past adversely affected investor and CEO confidence, resulting in significant industry-wide declines in the size and number of underwritings and of advisory transactions, which would likely have an adverse effect on our revenues and our profit margins. In particular, because a significant portion of our investment banking revenues is derived from our participation in large transactions, a decline in the number of large transactions has in the past and would in the future adversely affect our investment banking business. Market uncertainty, volatility and adverse economic conditions, as well as declines in asset values, may cause our clients to transfer their assets out of our funds or other products or their brokerage accounts and result in reduced net revenues, principally in our asset management and wealth management businesses. Even if clients do not withdraw their funds, they may invest them in products that generate less fee income.

Our asset management and wealth management business has been and may in the future be adversely affected by the poor investment performance of investment products that we offer or a client preference for products other than those which we offer or for products that generate lower fees.

Poor investment returns in our asset management and wealth management business, due to either general market conditions or underperformance (relative to our competitors or to benchmarks) of investment products that we sell, affect our ability to retain existing assets and to attract new clients or additional assets from existing clients. This could affect the commissions and net spreads that we earn for selling other investment products, such as structured notes or derivatives. To the extent that our clients choose to invest in products that we do not currently offer, we will suffer outflows and a loss of management fees. Further, if, due to changes in investor sentiment or the relative performance of certain asset classes or otherwise, clients continue to invest in products that generate lower fees (e.g., passively managed or fixed income products), our average effective management fee would continue to decline and our asset management and wealth management businesses could be adversely affected.

Inflation has had, and could continue to have, a negative effect on our business, results of operations and financial condition.

Inflationary pressures have affected economies, financial markets and market participants worldwide. Inflationary pressures have increased certain of our operating expenses, and have adversely affected consumer sentiment and CEO confidence. Central bank responses to inflationary pressures have also resulted in higher market interest rates, which, in turn, have contributed to lower activity levels across financial markets, in particular for debt underwriting transactions and mortgage originations, and resulted in lower values for certain financial assets which have adversely affected our equity and debt investments. Higher interest rates increase our borrowing costs and have required us to increase interest paid on our deposits. If inflationary pressures persist, our expenses may increase further; activity levels for certain of our businesses, in particular debt underwriting and mortgages, may remain at low levels or decline further; our interest expense could increase faster than our interest income, reducing our net interest income and net interest margin; certain of our investments could continue to incur losses or generally low levels of returns; economies worldwide could experience recessions; and we could continue to operate in a generally unfavorable economic and market environment.

Changes in market interest rates could adversely affect our revenues and expenses, the value of assets and obligations, and the availability and cost of funding.

As a result of our lending and deposit-taking activities, we have exposure to market interest rate movements. In addition to the impact on the general economy, changes in interest rates could directly impact us in one or more of the following ways:

- The yield on interest-earning assets, primarily on our loan portfolio, and rates paid on interest-bearing liabilities, primarily our deposit-taking activities, may change in disproportionate ways;
- The value of certain balance sheet and off-balance sheet financial instruments that we hold could decline; or
- The cost of funding from affiliates or third parties may increase and the ability to raise funding could become more difficult.

Our profitability depends to a significant extent on our net interest income, which is the difference between the interest income we earn on our interest-earning assets, such as loans and securities, and our interest expense on interest-bearing liabilities, such as deposits and borrowed funds. Accordingly, our results of operations depend to a significant extent on movements in market interest rates and our ability to manage our interest-rate-sensitive assets and liabilities in response to these movements. Factors such as inflation, recession and instability in financial markets, among other factors beyond our control, may affect interest rates.

Any substantial, unexpected, prolonged change in market interest rates could have a material adverse effect on our financial condition, liquidity and results of operations. Changes in the level of interest rates also have in the past negatively affected and may in the future negatively affect our ability to originate loans, the value of our assets and our ability to realize gains from the sale of our assets, all of which ultimately affect our earnings.

Liquidity

Our liquidity, profitability and businesses may be adversely affected by an inability to obtain funding or to sell assets.

Liquidity is essential to our businesses. It is of critical importance to us, as most of the failures of financial institutions have occurred in large part due to insufficient liquidity. Our liquidity may be impaired by an inability to obtain or maintain sufficient funding, whether through deposits or funding from our affiliates, access to the debt capital markets, sales of assets or access to Federal Home Loan Bank of New York advances, or by lack of timely settlement of transactions, unusual deposit outflows, or other unforeseen outflows of cash or collateral, such as in March 2020, when corporate clients drew on revolving credit facilities in response to the COVID-19 pandemic. This situation may arise due to circumstances that we may be unable to control, such as a general market or economic disruption or an operational problem that affects third parties or us, or GS Group more broadly, or even by the perception among market participants that we, or other market participants, are experiencing greater liquidity risk.

We employ structured products to benefit our clients and hedge our own risks and risks incurred by our affiliates. The financial instruments that we hold and the contracts to which we are a party are often complex, and these complex structured products often do not have readily available markets to access in times of liquidity stress. In addition, our financing activities may lead to situations where the holdings from these activities represent a significant portion of specific markets, which could restrict liquidity for our positions.

Further, our ability to sell assets may be impaired if there is not generally a liquid market for such assets, as well as in circumstances where other market participants are seeking to sell similar otherwise generally liquid assets at the same time, as is likely to occur in a liquidity or other market crisis or in response to changes to rules or regulations. In addition, clearinghouses, exchanges and other financial institutions with which we interact may exercise set-off rights or the right to require additional collateral, including in difficult market conditions, which could further impair our liquidity.

Numerous regulations have been adopted that impose more stringent liquidity requirements on large financial institutions, such as us or Group Inc. These regulations require us to hold large amounts of highly liquid assets and reduce our flexibility to source and deploy funding.

Our businesses have been and may in the future be adversely affected by disruptions or lack of liquidity in the credit markets, including reduced access to credit and higher costs of obtaining credit.

Widening credit spreads for us or Group Inc., as well as significant declines in the availability of credit, have in the past adversely affected and may in the future affect our ability to borrow. We obtain a portion of our funding directly or indirectly from Group Inc., which funds itself on an unsecured basis by issuing debt and a variety of financial instruments. We also seek to finance certain of our assets on a secured basis. Any disruptions in the credit markets may make it harder and more expensive for us to obtain secured funding, whether from third parties or affiliates. If our available funding is limited or we are forced to fund our operations at a higher cost, these conditions may require us to curtail our activities and increase our cost of funding, both of which could reduce our profitability, particularly in our activities that involve lending and market making.

Our clients engaging in mergers, acquisitions and other types of strategic transactions often rely on access to the secured and unsecured credit markets to finance their transactions. A lack of available credit or an increased cost of credit can adversely affect the size, volume and timing of our clients' merger and acquisition transactions, particularly large transactions, and adversely affect our advisory and underwriting businesses.

We may also syndicate credit transactions to other financial institutions. Market volatility, a lack of available credit or an increased cost of credit can negatively impact our ability to syndicate financing, and, as a result, can adversely affect our businesses.

Reductions in our credit ratings or an increase in our credit spreads may adversely affect our liquidity and cost of funding.

Our credit ratings, as well as the credit ratings of Group Inc. (as described further below), are important to our liquidity. A reduction in our or Group Inc.'s credit ratings could adversely affect our liquidity and competitive position, increase our borrowing costs (including borrowing from our affiliates), limit our access to the capital markets or trigger our obligations under certain provisions in some of our derivatives or collateralized financing contracts. Under these provisions, counterparties could be permitted to terminate contracts with us or require us to post additional collateral or make termination payments. Termination of our derivatives and collateralized financing contracts could cause us to sustain losses and impair our liquidity by requiring us to find other sources of financing or to make significant cash payments or securities movements.

A downgrade by any one rating agency, depending on the agency's relative ratings of us or Group Inc. at the time of the downgrade, may have an impact which is comparable to the impact of a downgrade by all rating agencies. For further information about our credit ratings, see "Management's Discussion and Analysis of Financial Condition and Results of Operations — Risk Management — Liquidity Risk Management — Credit Ratings" in Part II of this Annual Report.

As noted above, Group Inc.'s credit ratings also are important to our liquidity. Group Inc. generally guarantees GS Bank USA's payment obligations, subject to certain limitations. Group Inc. generally raises the majority of non-deposit unsecured funding of GS Group and then lends to Funding IHC and other subsidiaries, including us, to meet subsidiaries' funding needs. Any increase in Group Inc.'s borrowing costs may require us to seek alternative sources of funding, which could result in an increase in borrowing costs for us.

Our cost of obtaining long-term unsecured funding is directly related to our credit spreads (the amount in excess of the interest rate of benchmark securities that we need to pay). Increases in our credit spreads can significantly increase our cost of this funding. Changes in credit spreads are continuous, market-driven, and subject at times to unpredictable and highly volatile movements. Our credit spreads are also influenced by market perceptions of our creditworthiness and movements in the costs to purchasers of credit default swaps referenced to our long-term debt. The market for credit default swaps has proven to be extremely volatile and at times has lacked a high degree of transparency or liquidity. Increases in Group Inc.'s credit spreads and negative market perceptions of Group Inc.'s creditworthiness could also impact our ability to obtain long-term unsecured funding, and Group Inc.'s inability to obtain long-term unsecured funding could negatively impact our operations.

Loss of deposits could increase our funding costs and adversely affect our liquidity and ability to grow our businesses.

We rely primarily on deposits to be a low-cost and stable source of funding for the loans we make and the financial transactions in which we engage. We accept savings, demand and time deposits from private bank clients, U.S. consumers, clients of third-party broker-dealers, institutions, corporations and affiliates. Certain deposit accounts do not have significant restrictions on withdrawal, and depositors can generally withdraw some or all of the funds in their accounts with little or no notice.

Furthermore, we compete with banks and other financial services companies for deposits. Competitors have in the past and may in the future raise the rates they pay on deposits and we have in the past and may in the future be required to raise our rates to avoid losing deposits.

If we experience significant withdrawals, for any reason, our funding costs may increase as we may be required to rely on more expensive sources of funding. If we are required to fund our operations at a higher cost, these conditions may require us to curtail our activities, which also could reduce our profitability.

All of our deposits held under external deposit sweep program agreements are placed through third-party brokers. As of December 2022, those programs accounted for approximately 12% of our total deposits. These brokers may not unilaterally terminate the currently-existing sweep agreements; however, they could determine not to engage in additional sweep agreements with us in the future. The termination of these broker relationships could result in a significant decrease in deposits and adversely affect our liquidity if we cannot extend such agreements with third-party brokers.

The FDIA and related FDIC regulations prohibit an insured bank from accepting brokered deposits or offering interest rates on any deposits significantly higher than the prevailing rate in the bank's normal market area or nationally (depending upon where the deposits are solicited) unless the bank is "well-capitalized" for prompt corrective action purposes or it is "adequately capitalized" and receives a waiver from the FDIC.

There can be no assurance that we will continue to meet all applicable requirements to accept brokered deposits. In the event that we do not continue to meet those requirements in the future, we may be prohibited from accepting brokered deposits, including brokered CDs and those raised pursuant to our deposit sweep agreements. Restrictions or limitations on our ability to accept brokered deposits for any reason (including regulatory limitations on the amount of brokered deposits in total or as a percentage of total assets) in the future could materially and adversely impact our funding costs and liquidity because a substantial portion of our deposits are "brokered deposits" for prompt corrective action purposes.

Any limitation on the interest rates we can pay on deposits could competitively disadvantage us in attracting and retaining deposits and have a material adverse effect on our businesses.

Credit

Our businesses, profitability and liquidity may be adversely affected by deterioration in the credit quality of or defaults by third parties.

A number of our products and activities expose us to credit risk, including loans, lending commitments, derivatives and credit cards. We are exposed to the risk that third parties that owe us money, securities or other assets will not perform their obligations. These parties may default on their obligations to us due to bankruptcy, lack of liquidity, operational failure or other reasons. The provision of payment services in our transaction banking business may expose us to intraday liquidity and credit risks, to the extent our clients and affiliates experience delays in making payments, or are unable to repay amounts that are extended in the normal course of business. A failure of a significant market participant, or even concerns about a default by such an institution, could lead to significant liquidity problems, losses or defaults by other institutions, which in turn could adversely affect us.

We are also subject to the risk that our rights against third parties may not be enforceable in all circumstances. In addition, deterioration in the credit quality of third parties whose securities or obligations we hold, including a deterioration in the value of collateral posted by third parties to secure their obligations to us under derivative contracts and loan agreements, could result in losses and/or adversely affect our ability to rehypothecate or otherwise use those securities or obligations for liquidity purposes.

A significant downgrade in the credit ratings of our counterparties could also have a negative impact on our results. While in many cases we are permitted to require additional collateral from counterparties that experience financial difficulty, disputes may arise as to the amount of collateral we are entitled to receive and the value of pledged assets. The termination of contracts and the foreclosure on collateral may subject us to claims for the improper exercise of our rights, including that the foreclosure was not permitted under the legal documents, was conducted in an improper manner or caused a client or counterparty to go out of business. Default rates, downgrades and disputes with counterparties as to the valuation of collateral typically increase significantly in times of market stress, increased volatility and illiquidity.

We rely on information furnished by or on behalf of clients and counterparties in deciding whether to extend credit or enter into other transactions. This information could include financial statements, credit reports and other financial information. We also rely on representations of those clients, counterparties or other third parties, such as independent auditors, as to the accuracy and completeness of that information. Reliance on inaccurate or misleading financial statements, credit reports or other financial information could have a material adverse impact on our businesses, financial condition and results of operations.

Although we have limits and regularly review credit exposures to specific clients and counterparties and to specific industries, countries and regions that we believe may present credit concerns, default risk may arise from events or circumstances that are difficult to detect or foresee.

Concentration of risk increases the potential for significant losses in our lending, market-making, underwriting and other activities.

Concentration of risk increases the potential for significant losses in our lending, market-making, underwriting and other activities. The number and size of these transactions has affected and may in the future affect our results of operations in a given period. In particular, we extend large commitments as part of our lending activities. Because of concentrated risk, we may suffer losses even when economic and market conditions are generally favorable for our competitors. Disruptions in the credit markets can make it difficult to hedge these credit exposures effectively or economically. Disruptions in the credit markets have in the past substantially curtailed or eliminated, and may in the future substantially curtail or eliminate, the trading markets for loans we originate. These disruptions may make it difficult for us to sell or value such assets, which may result in losses for us from time to time.

Rules adopted under the Dodd-Frank Act, and similar rules adopted in other jurisdictions, require issuers of certain asset-backed securities and any person who organizes and initiates certain asset-backed securities transactions to retain economic exposure to the asset, which has affected the cost of and structures used in connection with these securitization activities. See “Regulation — Securitizations” in Part I of this Annual Report and Note 16 to the consolidated financial statements in Part III of this Annual Report for further information about our securitization activities. Our inability to reduce our credit risk by selling, syndicating or securitizing these positions, including during periods of market stress, could negatively affect our results of operations due to a decrease in the fair value of the positions, including due to the insolvency or bankruptcy of borrowers, as well as the loss of revenues associated with selling such securities or loans.

In the ordinary course of business, we may be subject to a concentration of credit risk to a particular counterparty, borrower, issuer (including sovereign issuers) clearinghouse or exchange, geographic area or group of related countries, such as the E.U., or industry. A failure or downgrade of, or default by, an entity to which we have a concentration of credit risk could negatively impact our businesses, perhaps materially, and the systems by which we set limits and monitor the level of our credit exposure to individual entities, industries, countries and regions may not function as we have anticipated. Regulatory reform, including the Dodd-Frank Act, has led to increased centralization of trading activity through particular clearinghouses, central agents or exchanges, which has significantly increased our concentration of risk with respect to these entities. While our activities expose us to many different industries, counterparties and countries, we routinely execute a high volume of transactions with counterparties engaged in financial services activities, including brokers and dealers, commercial banks, clearinghouses, exchanges and investment funds. This has resulted in significant credit concentration with respect to these counterparties. See “Management’s Discussion and Analysis of Financial Condition and Results of Operations — Risk Management — Credit Risk Management — Credit Exposures” in Part II of this Annual Report and Note 23 to the consolidated financial statements in Part III of this Annual Report for further information about our credit concentration and exposure.

Derivative transactions and delayed documentation or settlements may expose us to credit risk, unexpected risks and potential losses.

We are party to a large number of derivative transactions, including interest rate, currency, credit and other derivatives. Many of these derivative instruments are individually negotiated and non-standardized, which can make exiting, transferring or settling positions difficult. Many credit derivatives require that we deliver to the counterparty the underlying security, loan or other obligation in order to receive payment. In a number of cases, we do not hold the underlying security, loan or other obligation and may not be able to obtain the underlying security, loan or other obligation. This could cause us to forfeit the payments due to us under these contracts or result in settlement delays with the attendant credit and operational risk, as well as increased costs to us.

Derivative transactions also involve the risk that documentation has not been properly executed, that executed agreements may not be enforceable against the counterparty, or that obligations under such agreements may not be able to be “netted” against other obligations with such counterparty. In addition, counterparties may claim that such transactions were not appropriate or authorized.

As a signatory to the ISDA Universal Protocol or U.S. ISDA Protocol (ISDA Protocols) and being subject to the FRB's and FDIC's rules on QFCs and similar rules in other jurisdictions, we may not be able to exercise remedies against counterparties and, as this regime has not yet been tested, we may suffer risks or losses that we would not have expected to suffer if we could immediately close out transactions upon a termination event. The ISDA Protocols and these rules and regulations extend to repurchase agreements and other instruments that are not derivative contracts.

Derivative contracts and other transactions, including secondary bank loan purchases and sales, entered into with third parties are not always confirmed by the counterparties or settled on a timely basis. While the transaction remains unconfirmed or during any delay in settlement, we are subject to heightened credit and operational risk and in the event of a default may find it more difficult to enforce our rights.

In addition, as new complex derivative products are created, covering a wider array of underlying credit and other instruments, disputes about the terms of the underlying contracts could arise, which could impair our ability to effectively manage our risk exposures from these products and subject us to increased costs. The provisions of the Dodd-Frank Act requiring central clearing of credit derivatives and other OTC derivatives, or a market shift toward standardized derivatives, could reduce the risk associated with these transactions, but under certain circumstances could also limit our ability to develop derivatives that best suit the needs of our clients and to hedge our own risks, and could adversely affect our profitability. In addition, these provisions have increased our credit exposure to central clearing platforms.

A failure by Group Inc. to guarantee certain of our obligations could adversely affect our financial condition.

Group Inc. has guaranteed GS Bank USA's payment obligations, other than nonrecourse payment obligations and payment obligations arising in connection with CDs issued by us (unless the applicable governing documents of the CD expressly state otherwise) and outstanding notes evidencing senior unsecured debt. If Group Inc. terminates the guarantee, we may have difficulty entering into future contractual arrangements with other counterparties who may request or require such guarantees.

We might underestimate the credit losses inherent in our loan portfolio and have credit losses in excess of the amount reserved.

The credit quality of our loan portfolio can have a significant impact on its earnings. The Current Expected Credit Losses accounting standard requires that companies, such as us, reflect their estimate of credit losses over the life of the financial assets. We must consider all relevant information when estimating expected credit losses, including details about past events, current conditions, and reasonable and supportable forecasts.

This process requires difficult, subjective and complex judgments by management in order to estimate credit losses over the life of the financial assets. As is the case with any such assessments, there is always the chance that we will fail to identify the proper factors or that we will fail to accurately estimate the impacts of factors that we do identify. In addition, the accuracy of management's estimations of expected credit losses may be affected by macroeconomic factors such as those described in "Management's Discussion and Analysis of Financial Condition and Results of Operations — Business Environment" in Part II of this Annual Report.

Through the process of estimating credit losses over the life of our loans, we might underestimate the credit losses inherent in our loan portfolio and have credit losses in excess of the amount reserved. While management uses the best information available to determine this estimate, we have made and may make future adjustments to the allowance based on, among other things, changes in the economic environment, the quality of the loan portfolio or the values of the underlying collateral.

Operational

A failure in our or our affiliates' operational systems or human error, malfeasance or other misconduct, could impair our liquidity, disrupt our businesses, result in the disclosure of confidential information, damage our reputation and cause losses.

Our businesses are highly dependent on our ability to process and monitor, on a daily basis, a very large number of transactions, many of which are highly complex and occur at high volumes and frequencies, across numerous and diverse markets in many currencies. These transactions, as well as the information technology services we provide to clients, often must adhere to client-specific guidelines, as well as legal and regulatory standards.

Many rules and regulations govern our obligations to execute transactions and report such transactions and other information to regulators and exchanges. Compliance with these legal and reporting requirements can be challenging, and GS Group has been and may in the future be subject to regulatory fines and penalties for failing to follow these rules or to report timely, accurate and complete information in accordance with these rules. As reporting requirements expand, compliance with these rules and regulations has become more challenging.

As our client base, including through our consumer and transaction banking activities, and our geographical reach expand and the volume, speed, frequency and complexity of transactions, especially electronic transactions (as well as the requirements to report such transactions on a real-time basis to clients, regulators and exchanges) increase, developing and maintaining our operational systems and infrastructure has become more challenging, and the risk of systems or human error in connection with such transactions has increased, as have the potential consequences of such errors due to the speed and volume of transactions involved and the potential difficulty associated with discovering errors quickly enough to limit the resulting consequences. These risks are exacerbated in times of increased volatility. As with other similarly situated institutions, we utilize credit underwriting models in connection with our businesses, including our consumer-oriented activities. Allegations or publicity, whether or not accurate, that our underwriting decisions do not treat consumers or clients fairly, or comply with the applicable law or regulation, can result in negative publicity, reputational damage and governmental and regulatory scrutiny, investigations and enforcement actions.

Our financial, accounting, data processing or other operational systems and facilities, or operational systems or facilities of affiliates on which we depend, may fail to operate properly or become disabled as a result of events that are wholly or partially beyond our control, such as a spike in transaction volume, adversely affecting our ability to process these transactions or provide these services. We and our affiliates must continuously update these systems to support our operations and growth and to respond to changes in regulations and markets, and invest heavily in systemic controls and training to pursue our objective of ensuring that such transactions do not violate applicable rules and regulations or, due to errors in processing such transactions, adversely affect markets, our clients and counterparties or us. Enhancements and updates to systems, as well as the requisite training, including in connection with the integration of new businesses, entail significant costs and create risks associated with implementing new systems and integrating them with existing ones.

The use of computing devices and phones is critical to the work done by our employees and the operation of our systems and businesses and those of our clients and our third-party service providers and vendors. Their importance has continued to increase, in particular in light of work-from-home arrangements. Computers and computer networks are subject to various risks, including, among others, cyber attacks, inherent technological defects, system failures and human error. For example, fundamental security flaws in computer chips found in many types of these computing devices and phones have been reported in the past and may occur in the future. The use of personal devices by our employees or by our vendors for work-related activities also presents risks related to potential violations of record retention and other requirements. Cloud technologies are also critical to the operation of our systems and platforms and our reliance on cloud technologies is growing. Service disruptions have resulted, and may result in the future, in delays in accessing, or the loss of, data that is important to our businesses and may hinder our clients' access to our platforms. There have been a number of widely publicized cases of outages in connection with access to cloud computing providers. Addressing these and similar issues could be costly and affect the performance of these businesses and systems. Operational risks may be incurred in applying fixes and there may still be residual security risks.

Notwithstanding the proliferation of technology and technology-based risk and control systems, our businesses ultimately rely on people as our greatest resource, and, from time to time, they have in the past and may in the future make mistakes or engage in violations of applicable policies, laws, rules or procedures that are not always caught immediately by our technological processes or by our controls and other procedures, which are intended to prevent and detect such errors or violations. These have in the past and may in the future include calculation errors, mistakes in addressing emails, errors in software or model development or implementation, or simple errors in judgment, as well as intentional efforts to ignore or circumvent applicable policies, laws, rules or procedures. Human errors, malfeasance and other misconduct, including the intentional misuse of client information in connection with insider trading or for other purposes, even if promptly discovered and remediated, has in the past resulted and may in the future result in reputational damage and losses and liabilities for us.

Many of our and other GS Group employees work in close proximity to one another in GS Group's facilities in New York and New Jersey. GS Group's headquarters is located in the New York metropolitan area, and GS Group has its largest employee concentration occupying two principal office buildings near the Hudson River waterfront. They are subject to potential catastrophic events, including, but not limited to, terrorist attacks, extreme weather, or other hostile events that could negatively affect our business. Notwithstanding GS Group's efforts to maintain business continuity, business disruptions impacting GS Group's offices and our employees could lead to our employees' inability to occupy the offices, communicate with or travel to other office locations or work remotely. As a result, our ability to service and interact with clients may be adversely impacted, due to our failure or inability to successfully implement business contingency plans.

A failure or disruption in our infrastructure, or in the operational systems or infrastructure of third parties, could impair our liquidity, disrupt our businesses, damage our reputation and cause losses.

We face the risk of operational failure or significant operational delay, termination or capacity constraints of any of the clearing agents, exchanges, clearinghouses or other financial intermediaries we use to facilitate our derivatives transactions and transaction banking activities, and as our interconnectivity with our clients grows, we increasingly face the risk of operational failure or significant operational delay with respect to our clients' systems.

There has been significant consolidation among clearing agents, exchanges and clearinghouses and an increasing number of derivative transactions are cleared on exchanges, which has increased our exposure to operational failure or significant operational delay, termination or capacity constraints of the particular financial intermediaries that we use and could affect our ability to find adequate and cost-effective alternatives in the event of any such failure, delay, termination or constraint. Industry consolidation, whether among market participants or financial intermediaries, increases the risk of operational failure or significant operational delay as disparate complex systems need to be integrated, often on an accelerated basis.

The interconnectivity of multiple financial institutions with central agents, exchanges and clearinghouses, and the increased centrality of these entities, increases the risk that an operational failure at one institution or entity may cause an industry-wide operational failure that could materially impact our ability to conduct business. Interconnectivity of financial institutions with other companies through, among other things, application programming interfaces or APIs presents similar risks. Any such failure, termination or constraint could adversely affect our ability to effect transactions, service our clients, manage our exposure to risk or expand our businesses or result in financial loss or liability to our clients, impairment of our liquidity, disruption of our businesses, regulatory intervention or reputational damage.

We also rely on third-party vendors and are ultimately responsible for activities conducted by any third-party service provider and adverse regulatory consequences. Although we take actions to manage the risks associated with activities conducted through third-party relationships, any problems caused by a third-party service provider could adversely affect our ability to deliver products and services to our customers and to conduct our businesses.

Despite our resiliency plans and facilities, our ability to conduct business may be adversely impacted by a disruption in the infrastructure that supports our businesses and the communities where we are located. This may include a disruption involving electrical, satellite, undersea cable or other communications, internet, transportation or other facilities used by us, our employees or third parties with which we conduct business, including cloud service providers. These disruptions may occur as a result of events that affect only GS Group's buildings or systems or those of such third parties, or as a result of events with a broader impact globally, regionally or in the cities where those buildings or systems are located, including, but not limited to, natural disasters, war, civil unrest, terrorism, economic or political developments, pandemics and weather events.

In addition, although we seek to diversify our third-party vendors to increase our resiliency, we are exposed to risks if our vendors operate in the same area and are also exposed to the risk that a disruption or other information technology event at a common service provider to our vendors could impede their ability to provide products or services to us. We may not be able to effectively monitor or mitigate operational risks relating to our vendors' use of common service providers.

Additionally, although the prevalence and scope of applications of distributed ledger technology, cryptocurrency and similar technologies is growing, the technology is nascent and may be vulnerable to cyber attacks or have other inherent weaknesses that may or may not have been identified, such as the risk that underlying encryption measures may be defeated. We are exposed to risks, and may become exposed to additional risks, related to distributed ledger technology, including through the receipt of cryptocurrencies or other digital assets as collateral. We may be, or may become, exposed to technological, legal, regulatory, third-party and other risks related to distributed ledger technology, including through GS Group's facilitation of clients' activities involving financial products that use distributed ledger technology, such as blockchain, cryptocurrencies or other digital assets, and the use of distributed ledger technology in GS Group's systems, as well as by third-party vendors, clients, counterparties, clearinghouses and other financial intermediaries and the receipt of cryptocurrencies or other digital assets as collateral. The market volatility that financial products using distributed ledger technology have recently experienced may increase these risks.

A failure to protect our computer systems, networks and information, and our clients' information, against cyber attacks and similar threats could impair our ability to conduct our businesses, result in the disclosure, theft or destruction of confidential information, damage our reputation and cause losses.

Our operations rely on the secure processing, storage and transmission of confidential and other information in GS Group's computer systems and networks and those of its vendors, and our technology risk function uses and benefits from the processes and resources of the GS Group technology risk function. There have been a number of highly publicized cases involving financial services companies, consumer-based companies, software and information technology service providers, governmental agencies and other organizations reporting the unauthorized access or disclosure of client, customer or other confidential information in recent years, as well as cyber attacks involving the dissemination, theft and destruction of corporate information or other assets, as a result of inadequate procedures or the failure to follow procedures by employees or contractors or as a result of actions by third parties, including actions by foreign governments. There have also been several highly publicized cases where hackers have requested "ransom" payments in exchange for not disclosing customer information or for restoring access to information or systems.

We and our affiliates are regularly the targets of attempted cyber attacks, including denial-of-service attacks, and must continuously monitor and develop systems to protect the integrity and functionality of our technology infrastructure and access to and the security of our data. We and our affiliates have faced a high volume of cyber attacks as we and our affiliates expand our mobile- and other internet-based products and services, as well as usage of mobile and cloud technologies, and as we provide more of these services to a greater number of individual consumers. The migration of our communication from devices we provide to employee-owned devices presents additional risks of cyber attacks, as do work-from-home arrangements. In addition, due to our interconnectivity with other GS Group entities, third-party vendors (and their respective service providers), central agents, exchanges, clearinghouses and other financial institutions, we could be adversely impacted if any of them is subject to a successful cyber attack or other information security event. These impacts could include the loss of access to information or services from the third party subject to the cyber attack or other information security event or could result in unauthorized access to or disclosure of client, customer or other confidential information, which could, in turn, interrupt our businesses or adversely affect our results of operations and reputation.

Despite our efforts to ensure the integrity of our systems and information, we and our affiliates may not be able to anticipate, detect or implement effective preventive measures against all cyber threats, including because the techniques used are increasingly sophisticated, change frequently and are often not recognized until launched. Cyber attacks can originate from a variety of sources, including third parties who are affiliated with or sponsored by foreign governments or are involved with organized crime or terrorist organizations. Third parties may also attempt to place individuals within GS Group or induce employees, clients or other users of GS Group's systems to disclose sensitive information or provide access to GS Group's data or that of GS Group's clients, and these types of risks may be difficult to detect or prevent.

Although we and GS Group take protective measures proactively and endeavor to modify them as circumstances warrant, our and GS Group's computer systems, software and networks may be vulnerable to unauthorized access, misuse, computer viruses or other malicious code, cyber attacks on our vendors and other events that could have a security impact. Risks relating to cyber attacks on our vendors have been increasing given the greater frequency and severity in recent years of supply chain attacks affecting software and information technology service providers. Due to the complexity and interconnectedness of GS Group's systems, the process of enhancing GS Group's protective measures can itself create a risk of systems disruptions and security issues. In addition, protective measures that GS Group employs to compartmentalize its data may reduce its visibility into, and adversely affect its ability to respond to, cyber threats and issues with its systems.

If one or more of these types of events occur, it potentially could jeopardize GS Group's, its clients', its counterparties' or third parties' confidential and other information processed, stored in, or transmitted through its computer systems and networks, or otherwise cause interruptions or malfunctions in GS Group's operations or those of its clients, counterparties or third parties, which could impact their ability to transact with us or otherwise result in legal or regulatory action, significant losses or reputational damage. In addition, such an event could persist for an extended period of time before being properly detected or escalated, and, following detection or escalation, it could take considerable time for us to obtain full and reliable information about the extent, amount and type of information compromised. During the course of an investigation, we may not know the full impact of the event and how to remediate it, and actions, decisions and mistakes that are taken or made may further increase the negative effects of the event on our businesses, results of operations and reputation. Moreover, potential new regulations may require Group Inc. to disclose information about a material cybersecurity incident before it has been resolved or fully investigated.

GS Group has expended, and expects to continue to expend, significant resources on an ongoing basis to modify its protective measures and to investigate and remediate vulnerabilities or other exposures, but these measures may be ineffective and GS Group, including us, may be subject to legal or regulatory action, as well as financial losses that are either not insured against or not fully covered through any insurance that it maintains.

GS Group's clients' confidential information may also be at risk from the compromise of clients' personal electronic devices or as a result of a data security breach at an unrelated company. Losses due to unauthorized account activity could harm our reputation and may have adverse effects on our businesses, financial condition and results of operations.

The increased use of mobile and cloud technologies can heighten these and other operational risks, as can work-from-home arrangements. Certain aspects of the security of such technologies are unpredictable or beyond GS Group's control, and the failure by mobile technology and cloud service providers to adequately safeguard their systems and prevent cyber attacks could disrupt GS Group's operations and result in misappropriation, corruption or loss of confidential and other information. In addition, there is a risk that encryption and other protective measures, despite their sophistication, may be defeated, particularly to the extent that new computing technologies vastly increase the speed and computing power available.

In addition, the issue of cybersecurity has been the subject of heightened regulatory scrutiny. NYDFS cybersecurity regulations require that covered entities, including us, among other things, implement and maintain written cybersecurity policies and procedures covering a wide range of areas, including ensuring the security of sensitive data or systems accessible to third-party service providers, and provide notice to the NYDFS of certain material cybersecurity incidents.

We routinely transmit and receive personal, confidential and proprietary information by email and other electronic means. GS Group has discussed and worked with clients, vendors, service providers, counterparties and other third parties to develop secure transmission capabilities and protect against cyber attacks, but it does not have, and may be unable to put in place, secure capabilities with all of its clients, vendors, service providers, counterparties and other third parties and GS Group may not be able to ensure that these third parties have appropriate controls in place to protect the confidentiality of the information. An interception, misuse or mishandling of personal, confidential or proprietary information being sent to or received from a client, vendor, service provider, counterparty or other third party could result in legal liability, regulatory action and reputational harm.

We may incur losses as a result of ineffective risk management processes and strategies.

We seek to monitor and control our risk exposure through a risk and control framework encompassing a variety of separate but complementary financial, credit, operational, compliance and legal reporting systems, internal controls, management review processes and other mechanisms that cover risks associated with our own activities, as well as activities conducted through third-party relationships. In doing so, we use and benefit from the risk management processes of GS Group. Our risk management process seeks to balance our ability to profit from lending, market-making, underwriting or other positions with our exposure to potential losses. While we employ a broad and diversified set of risk monitoring and risk mitigation techniques, those techniques and the judgments that accompany their application cannot anticipate every economic and financial outcome or the specifics and timing of such outcomes. Thus, in the course of our activities, we have incurred and may in the future incur losses. Market conditions in recent years have involved unprecedented dislocations and highlight the limitations inherent in using historical data to manage risk.

The models that we use to assess and control our risk exposures reflect assumptions about the degrees of correlation or lack thereof among prices of various asset classes or other market indicators. In times of market stress or other unforeseen circumstances, previously uncorrelated indicators may become correlated, or conversely previously correlated indicators may move in different directions. These types of market movements have at times limited the effectiveness of our hedging strategies and have caused us to incur significant losses, and they may do so in the future. These changes in correlation have been and may in the future be exacerbated where other market participants are using models with assumptions or algorithms that are similar to ours. In these and other cases, it may be difficult to reduce our risk positions due to the activity of other market participants or widespread market dislocations, including circumstances where asset values are declining significantly or no market exists for certain assets.

In addition, the use of models in connection with risk management and numerous other critical activities presents risks that the models may be ineffective, either because of poor design, ineffective testing, or improper or flawed inputs, as well as unpermitted access to the models resulting in unapproved or malicious changes to the model or its inputs.

To the extent that we have positions through our lending, market-making or other activities that do not have an established liquid trading market or are otherwise subject to restrictions on sale or hedging, we may not be able to reduce our positions and therefore reduce our risk associated with those positions.

Prudent risk management, as well as regulatory restrictions, may cause us to limit our exposure to counterparties, geographic areas or markets, which may limit our business opportunities and increase the cost of our funding or hedging activities.

As we have expanded and intend to continue to expand the product and geographic scope of our offerings of credit, deposit and investment products and services to consumers, we are presented with different risks and must expand and adapt our risk monitoring and mitigation activities to account for these business activities. A failure to adequately assess and control such risk exposures could result in losses to us.

For further information about our risk management structure and processes, see “Management’s Discussion and Analysis of Financial Condition and Results of Operations — Risk Management — Overview and Structure of Risk Management” in Part II of this Annual Report.

We are a wholly-owned subsidiary of Group Inc. and are dependent on Group Inc. and certain of our affiliates for client business, various services and capital.

We are a wholly-owned subsidiary of Group Inc. As a wholly-owned subsidiary, we rely on various business relationships of Group Inc. and our affiliates generally, including the ability to receive various services, as well as, in part, the capital and liquidity of our parent, Group Inc., as well as the liquidity of Funding IHC. Although we have taken steps to reduce our reliance on our affiliates, we remain an operating subsidiary of a larger organization and therefore our interconnectedness within the organization will continue. Because our businesses rely upon Group Inc. and our affiliates to a significant extent, risks that could affect these entities could also have a significant impact on us.

We are the primary lender of GS Group, and many of the individuals and corporations to which we lend become our clients based on their other relationships with our affiliates. Similarly, clients of our affiliates, as well as the affiliates themselves, often serve as our counterparties to derivative transactions.

Furthermore, we rely upon certain of our affiliates for various support services, including, but not limited to, trade execution, relationship management, loan origination, settlement and clearing, loan servicing, risk management and other technical, operational and administrative services. Such services are provided to us pursuant to the Master Services Agreement, which is generally terminable upon mutual agreement of Group Inc. and its subsidiaries, subject to certain exceptions, including material breach of the agreement. For example, Group Inc. provides foreign exchange services to us. If Group Inc. were to cease to provide such services, we would be required to seek alternative sources, which could be difficult to obtain on the same terms or result in increased foreign exchange rates paid by us.

As a consequence of the foregoing, in the event our relationships with our affiliates are not maintained, for any reason, including as a result of possible strategic decisions that Group Inc. may make from time-to-time or as a result of material adverse changes in Group Inc.'s performance, our interest and non-interest revenues may decline, the cost of operating and funding our businesses may increase and our businesses, financial condition and earnings may be materially and adversely affected.

As of December 2022, 23% of our total deposits consisted of deposits from private bank clients of GS&Co. If clients terminate their relationships with GS&Co. or such relationships become impaired, we may lose the funding benefits of such relationships as well. Furthermore, we receive a portion of our funding in the form of unsecured funding from Group Inc. and from Funding IHC, and collateralized financings from other affiliates. To the extent such funding is not available to us, our growth could be constrained and/or our cost of funding could increase.

Legal and Regulatory

Our businesses, and the businesses of our clients, are subject to extensive and pervasive regulation around the world.

As a participant in the financial services industry, we are subject to extensive regulation in jurisdictions around the world. We face the risk of significant intervention by law enforcement, regulatory and taxing authorities, as well as private litigation, in all jurisdictions in which we conduct our businesses and we may continue to be subject to overlapping and divergent regulation in different jurisdictions. As an FDIC-insured New York State-chartered bank, member of the Federal Reserve System, regulated swap dealer and subsidiary of a systemically important financial institution subject to "Category I" requirements under the tailoring framework, we are subject to extensive regulation. Among other things, as a result of regulators, taxing authorities, law enforcement authorities or private parties challenging GS Group's compliance with existing laws and regulations, GS Group or its employees have been and could be, fined, criminally charged or sanctioned; prohibited from engaging in some of our activities; prevented from engaging in new activities; subjected to limitations or conditions on activities, including higher capital requirements; or subjected to new or substantially higher taxes or other governmental charges in connection with the conduct of its business or with respect to our and GS Group's other employees. These limitations or conditions may limit our business activities and negatively impact our profitability.

In addition to the impact on the scope and profitability of our business activities, day-to-day compliance with existing laws and regulations has involved and will continue to involve significant amounts of time, including that of our senior leaders and that of a large number of dedicated compliance and other reporting and operational personnel, all of which may negatively impact our profitability.

Our revenues and profitability and those of our competitors have been and will continue to be impacted by requirements relating to capital, leverage, minimum liquidity and long-term funding levels, requirements related to resolution and recovery planning, derivatives clearing and margin rules and levels of regulatory oversight, as well as limitations on which and, if permitted, how certain business activities may be carried out by financial institutions. The laws and regulations that apply to our businesses are often complex and, in many cases, we must make interpretive decisions regarding the application of those laws and regulations to our business activities. Changes in interpretations, whether in response to regulatory guidance, industry conventions, our own reassessments or otherwise, could adversely affect our businesses, results of operations or ability to satisfy applicable regulatory requirements, such as capital or liquidity requirements.

If there are new laws or regulations or changes in the interpretation or enforcement of existing laws or regulations applicable to us specifically, GS Group generally or the business activities of either of our or GS Group's clients, including capital, liquidity, leverage and margin requirements, restrictions on leveraged lending or other business practices, reporting requirements, requirements relating to recovery and resolution planning, higher FDIC deposit insurance assessments, tax burdens and compensation restrictions, that are imposed on a limited subset of financial institutions (whether based on size, method of funding, activities, geography or other criteria), compliance with these new laws or regulations, or changes in the enforcement of existing laws or regulations, could adversely affect our or GS Group's ability to compete effectively with other institutions that are not affected in the same way. In addition, regulation imposed on financial institutions or market participants generally, such as taxes on stock transfers and other financial transactions, could adversely impact levels of market activity more broadly, and thus impact our business.

U.S. and non-U.S. regulatory developments, in particular the Dodd-Frank Act and Basel III, have significantly altered the regulatory framework within which we operate and have adversely affected and may in the future adversely affect our profitability.

Among the aspects of the Dodd-Frank Act that have affected or may in the future affect our businesses are: increased capital, liquidity and reporting requirements; limitations on activities in which we may engage; increased regulation of and restrictions on OTC derivatives markets and transactions; limitations on incentive compensation; limitations on affiliate transactions; limitations on credit exposure to any unaffiliated company; requirements to reorganize or limit activities in connection with recovery and resolution planning; and increased deposit insurance assessments. The implementation of higher capital requirements, more stringent requirements relating to liquidity and requirements relating to the prohibition on proprietary trading and lending to covered funds by the Volcker Rule may adversely affect our profitability and competitive position, particularly if these requirements do not apply equally to our and GS Group's competitors or are not implemented uniformly across jurisdictions. Such requirements could reduce the amount of funds available to meet our obligations, including debt obligations.

The requirements for us to develop and submit resolution plans to the FDIC, and the incorporation of feedback received from the FDIC, may require us to increase our capital or liquidity levels or otherwise incur additional costs, and may reduce our ability to raise additional debt. Resolution planning may also impair GS Group's ability to structure its intercompany and external activities in a manner that it may otherwise deem most operationally efficient, which may affect our business.

In addition, the imposition by the Dodd-Frank Act of various regulatory provisions applicable to our derivatives activities have in the past adversely affected and may in the future adversely affect our derivatives business by increasing costs, reducing counterparty demand for derivative products and reducing general market liquidity, which could in turn lead to greater volatility. In addition, regulations applicable to derivatives have in the past made it more difficult and more costly and may in the future make it more difficult or more costly to establish and maintain hedging or trading strategies, thereby increasing the risk, and reducing the profitability, of our derivatives business.

We are also subject to laws and regulations, such as the GDPR, the NYDFS cybersecurity rules and the CCPA, relating to the privacy of the information of clients, employees or others, and any failure to comply with these laws and regulations could expose us to liability and/or reputational damage. As new privacy-related laws and regulations are implemented, the time and resources needed for us to comply with such laws and regulations, as well as our potential liability for non-compliance and reporting obligations in the case of data breaches, may significantly increase.

Further, the CRD requires certain non-E.U. groups with more than €40 billion of assets in the E.U., such as GS Group, to establish an E.U. IHC by December 30, 2023. A non-E.U. group may have two E.U. IHCs if a request for a second is approved. If GS Group is unable to obtain approval to have two E.U. IHCs, GS Group would be required to limit its European subsidiary activities to those that are permissible for GSBE.

In addition, our businesses are increasingly subject to laws and regulations relating to surveillance, encryption and data on-shoring. Compliance with these and other laws and regulations may require us to change our policies, procedures and technology for information security, which could, among other things, make us more vulnerable to cyber attacks and misappropriation, corruption or loss of information or technology.

We have entered into consumer-oriented deposit-taking, lending, and market-making activities and other businesses, and we may expand the product and geographic scope of our offerings. Entering into these businesses subjects us to numerous additional regulations in the jurisdictions in which these businesses operate. Not only are these regulations extensive, but they involve types of regulations and supervision, as well as regulatory compliance risks that have not historically applied to us. The level of regulatory scrutiny and the scope of regulations affecting financial interactions with consumers is often much greater than that associated with doing business with institutions and high-net-worth individuals. Complying with these regulations is time-consuming, costly and presents new and increased risks.

Any failure to implement or maintain associated enhancements to our existing regulatory and legal compliance programs and policies or to comply with these laws and regulations could expose us to liability and/or reputational damage.

Increasingly, regulators and courts have sought to hold financial institutions liable for the misconduct of their clients where they have determined that the financial institution should have detected that the client was engaged in wrongdoing, even though the financial institution had no direct knowledge of the activities engaged in by its client. In addition, regulators and courts continue to seek to establish “fiduciary” obligations to counterparties to which no such duty had been assumed to exist. To the extent that such efforts are successful, the cost of, and liabilities associated with, engaging in market-making and other similar activities could increase significantly. To the extent that we have fiduciary obligations in connection with acting as a financial adviser, any breach, or even an alleged breach, of such obligations could have materially negative legal, regulatory and reputational consequences.

For information about the extensive regulation to which our businesses are subject, see “Regulation” in Part I of this Annual Report.

A failure to appropriately identify and address potential conflicts of interest could adversely affect our business.

Due to the broad scope of GS Group’s businesses and client base, we regularly address potential conflicts of interest within the organization, including situations where our products or services to a particular client or GS Group’s investments or other interests conflict, or are perceived to conflict, with the interests of that client or another client, as well as situations where one or more of GS Group’s businesses have access to material non-public information that may not be shared within GS Group and situations where we may be a creditor of an entity with which we or one of our affiliates also has an advisory or other relationship.

In addition, in certain areas we or one or more of our affiliates may act as a fiduciary which could give rise to a conflict if we also act as a principal in the same business.

We have extensive procedures and controls that are designed to identify and address conflicts of interest, including those designed to prevent the improper sharing of information among us and our affiliates. However, appropriately identifying and dealing with conflicts of interest is complex and difficult, particularly as we expand our activities, and our reputation, which is one of our most important assets, could be damaged and the willingness of clients to enter into transactions with us may be adversely affected if we or our affiliates fail, or appear to fail, to identify, disclose and deal appropriately with conflicts of interest. In addition, potential or perceived conflicts could give rise to litigation or regulatory enforcement actions. Additionally, GS Group's One Goldman Sachs initiative aims to increase collaboration among its businesses, including ours, which may increase the potential for actual or perceived conflicts of interest and improper information sharing. The realignment of GS Group's businesses, reflected in its new segments beginning with the fourth quarter of 2022, presents similar risks.

We may be adversely affected by increased governmental and regulatory scrutiny or negative publicity.

Governmental scrutiny from regulators, legislative bodies and law enforcement agencies with respect to matters relating to our or GS Group's business practices, past actions, compensation and other matters remains at high levels. Political and public sentiment regarding financial institutions has in the past resulted and may in the future result in a significant amount of adverse press coverage, as well as adverse statements or charges by regulators or other government officials. Press coverage and other public statements that assert some form of wrongdoing (including, in some cases, press coverage and public statements that do not directly involve us, Group Inc. or GS Group's other subsidiaries) often result in some type of investigation by regulators, legislators and law enforcement officials or in lawsuits.

Responding to these investigations and lawsuits, regardless of the ultimate outcome of the proceeding, is time-consuming and expensive and can divert the time and effort of our senior management from our business. Penalties and fines sought by regulatory authorities have increased substantially and certain regulators have been more likely in recent years to commence enforcement actions or to support legislation targeted at the financial services industry. Governmental authorities may also be more likely to pursue criminal or other actions, including seeking admissions of wrongdoing or guilty pleas, in connection with the resolution of an inquiry or investigation to the extent a company is viewed as having previously engaged in criminal, regulatory or other misconduct. Adverse publicity, governmental scrutiny and legal and enforcement proceedings can also have a negative impact on our reputation and on the morale and performance of our employees, which could adversely affect our businesses and results of operations. Further, GS Group (including us) is subject to regulatory settlements, orders and feedback that require significant remediation activities, which require the commitment of significant resources, including hiring, as well as testing the operation and effectiveness of new controls, policies and procedures.

The financial services industry generally and our businesses in particular have been subject to negative publicity. Our reputation and businesses may be adversely affected by negative publicity or information regarding our businesses and personnel, whether or not accurate or true, that may be posted on social media or other internet forums or published by news organizations. Postings on these types of forums may also adversely impact risk positions of our clients and other parties that owe us money, securities or other assets and increase the chance that they will not perform their obligations to us or reduce the revenues we receive from their use of our services. The speed and pervasiveness with which information can be disseminated through these channels, in particular social media, may magnify risks relating to negative publicity.

Substantial civil or criminal liability or significant regulatory action against us or our affiliates could have material adverse financial effects or cause us significant reputational harm, which in turn could seriously harm our business prospects.

We are involved in a number of judicial, regulatory and other proceedings concerning matters arising in connection with the conduct of our business. See Notes 18 and 24 to the consolidated financial statements in Part III of this Annual Report for information about certain legal and regulatory proceedings and investigations that impact us. In addition, GS Group is involved in a number of judicial, regulatory and other proceedings, as well as investigations and reviews by various governmental and regulatory bodies and self-regulatory organizations, including the matters referred to in Note 24. Proceedings by regulatory or other governmental authorities could result in the imposition of significant fines, penalties and other sanctions against GS Group, including restrictions on GS Group's activities. As a subsidiary of Group Inc., any such fines, penalties or other sanctions, including any that could be imposed on us directly, could adversely affect us, possibly materially.

We face the risk of investigations and proceedings by governmental and self-regulatory organizations in all jurisdictions in which we conduct our business. Interventions by authorities may result in adverse judgments, settlements, fines, penalties, injunctions or other relief. In addition to the monetary consequences, these measures could, for example, impact our ability to engage in, or impose limitations on, certain aspects of our business. Litigation or regulatory action at the level of other GS Group entities may also have an impact on us, including limitations on activities and reputational harm. The number of these investigations and proceedings, as well as the amount of penalties and fines sought, has increased substantially in recent years with regard to many firms in the financial services industry, including GS Group.

The trend of large settlements with governmental entities may adversely affect the outcomes for other financial institutions, including, in some cases, GS Group, in similar actions, especially where governmental officials have announced that the large settlements will be used as the basis or a template for other settlements. The uncertain regulatory enforcement environment makes it difficult to estimate probable liabilities, and settlements of matters therefore frequently exceed the amount of any reserve established.

Claims of collusion or anti-competitive conduct have become more common. Financial institutions (including us) have been subject to civil cases and investigatory demands relating to alleged bid-rigging, group boycotts or other anti-competitive practices. Antitrust laws generally provide for joint and several liability and treble damages. These claims have resulted in significant settlements and fines in the past and may do so in the future.

We are subject to laws and regulations relating to corrupt and illegal payments, hiring practices and money laundering, as well as laws relating to doing business with certain individuals, groups and countries, such as the FCPA and the U.K. Bribery Act. While we and GS Group have invested and continue to invest significant resources in training and in compliance monitoring, the geographical diversity of GS Group's operations, employees, clients and consumers, as well as the vendors and other third parties that we deal with, greatly increases the risk that we may be found in violation of such rules or regulations and any such violation could subject us to significant penalties or adversely affect our reputation.

In addition, there have been a number of highly publicized cases around the world, involving actual or alleged fraud or other misconduct by employees in the financial services industry in recent years, and GS Group has had and may in the future have employee misconduct. This misconduct has included and may also in the future include intentional efforts to ignore or circumvent applicable policies, rules or procedures or misappropriation of funds and the theft of proprietary information, including proprietary software. It is not always possible to deter or prevent employee misconduct and the precautions we and GS Group take to prevent and detect this activity have not been and may not be effective in all cases.

Certain law enforcement authorities have recently required admissions of wrongdoing, and, in some cases, criminal pleas, as part of the resolutions of matters brought against financial institutions or their employees. Any such resolution of a criminal matter involving us or our employees, or GS Group or its employees could lead to increased exposure to civil litigation, could adversely affect our reputation, could result in penalties or limitations on our ability to conduct our activities generally or in certain circumstances and could have other negative effects.

In conducting our businesses around the world, we are subject to political, legal, regulatory and other risks that are inherent in operating in many countries.

In conducting our business, we are subject to risks of possible nationalization, expropriation, price controls, capital controls, exchange controls, communications and other content restrictions, and other restrictive governmental actions. In many countries, the laws and regulations applicable to the securities and financial services industries and many of the transactions in which we are involved are uncertain and evolving, and it may be difficult for us to determine the exact requirements of local laws in every market. We have been, in some cases, subject to divergent and conflicting laws and regulations across markets, and we are increasingly subject to the risk that the jurisdictions in which we operate have implemented or may implement laws and regulations that directly conflict with those of another jurisdiction. Any determination by local regulators that we have not acted in compliance with the application of local laws in a particular market or our failure to develop effective working relationships with local regulators could have a significant and negative effect not only on our businesses in that market, but also on our reputation generally. Further, in some jurisdictions a failure, or alleged failure, to comply with laws and regulations has subjected and may in the future subject us and our personnel not only to civil actions, but also criminal actions and other sanctions. We are also subject to the enhanced risk that transactions we structure might not be legally enforceable in all cases.

The application of regulatory strategies and requirements in the U.S. and non-U.S. jurisdictions to facilitate the orderly resolution of large financial institutions could create greater risk of loss for our security holders.

As described further in “Regulation — Insolvency of an IDI” above, if the FDIC is appointed as receiver under the FDIA, the rights of our creditors would be determined under the FDIA, and the claims of our creditors (other than our depositors) generally will be subordinated in right of payment to the claims of deposit holders.

In addition, rules adopted by the FRB and the FDIC under the Dodd-Frank Act require us, as well as Group Inc., to submit periodic resolution plans. If the FDIC finds our resolution plan not credible, the FDIC will notify us in writing, and we then have 90 days to submit a revised resolution plan that corrects the deficiencies identified by the FDIC.

If the FRB and the FDIC find that Group Inc.’s resolution plan is not credible or would not facilitate an orderly resolution under the U.S. Bankruptcy Code, they may jointly require Group Inc. to hold more capital, change its business structure or dispose of businesses, any of which could have a negative impact on our financial condition, results of operations or competitive position.

The ability-to-repay requirement for residential mortgage loans may limit our ability to sell certain of our mortgage loans and give borrowers potential claims against us.

The Dodd-Frank Act amended the Truth in Lending Act to require that mortgage lenders show that they have verified the borrower’s ability to repay a residential mortgage loan.

Borrowers could possibly claim statutory damages against us for violations of this requirement. Lenders of mortgages that meet a “qualified mortgage” standard have a safe harbor or a presumption of compliance with the requirement. Under CFPB rules, qualified mortgages cannot have negative amortization, interest-only payments, or balloon payments, terms over 30 years, or points and fees over certain thresholds. If institutional mortgage investors limit their mortgage purchases, demand for our non-qualifying mortgages in the secondary market may be significantly limited in the future.

In addition, we may be liable to borrowers under non-qualifying mortgages for violations of the ability-to-repay requirement.

Demand for our non-qualifying mortgages in the secondary market may therefore decline significantly in the future, which would limit the amount of loans we can originate and in turn limit our ability to create new relationships and opportunities to offer other products, manage our growth and earn revenue from loan sales and servicing, all of which could adversely affect our financial condition and net earnings.

Increases in FDIC insurance premiums may adversely affect our earnings.

Our U.S. deposits are insured by the FDIC to the extent provided by law and, accordingly, we are subject to FDIC deposit insurance assessments. We generally cannot control the amount of premiums we will be required to pay for FDIC insurance. If there are financial institution failures or future losses that the DIF may suffer, we may be required to pay higher FDIC premiums, or the FDIC may charge special assessments or require future prepayments. Further, the FDIC increased the DIF’s long-term target reserve ratio to 2.0% of insured deposits following the Dodd-Frank Act’s elimination of the 1.5% cap on the DIF’s reserve ratio, and redefined the assessment base used to calculate deposit insurance premiums as the depository institution’s average consolidated assets minus tangible equity, instead of the previous deposit-based assessment base.

The FDIC has previously applied an annual surcharge on all banks with at least \$10 billion in assets as a method of increasing its DIF reserve ratio. In October 2022, the FDIC adopted a rule that will increase initial base deposit insurance assessment rates by 2 basis points, beginning with the first quarterly assessment period of 2023.

Additional increases in our assessment rate may be required in the future to achieve the targeted reserve ratio. These increases in deposit assessments and any future increases, required prepayments or special assessments of FDIC insurance premiums may adversely affect our business, financial condition or results of operations. See “Regulation — Deposit Insurance” in Part I of this Annual Report for further information about FDIC insurance.

Competition

The financial services industry is highly competitive.

The financial services industry and our activities are intensely competitive, and we expect them to remain so. We compete on the basis of a number of factors, including our products and services, innovation, reputation, creditworthiness and price. As we have expanded into new business areas and new geographic regions, we have faced competitors with more experience and more established relationships with clients, regulators and industry participants in the relevant market, which could adversely affect our ability to expand our businesses.

Governments and regulators have adopted regulations, imposed taxes, adopted compensation restrictions or otherwise put forward various proposals that have impacted or may impact our ability to conduct certain of our businesses in a cost-effective manner or at all in certain or all jurisdictions, including proposals relating to restrictions on the type of activities in which financial institutions are permitted to engage. These or other similar rules, many of which do not apply to all our U.S. or non-U.S. competitors, could impact our ability to compete effectively.

Pricing and other competitive pressures in our businesses have continued to increase, particularly in situations where some of our competitors may seek to increase market share by reducing prices. For example, in connection with investment banking and other assignments, in response to competitive pressure we have experienced, we have extended and priced credit at levels that in some cases have not fully compensated us for the risks we undertook.

The financial services industry is highly interrelated in that a significant volume of transactions occur among a limited number of members of that industry. Many of our and GS Group’s transactions are syndicated to other financial institutions, and financial institutions are often counterparties in transactions. This has led to claims by other market participants and regulators that such institutions have colluded in order to manipulate markets or market prices, including allegations that antitrust laws have been violated. While GS Group has extensive procedures and controls that are designed to identify and prevent such activities, they may not be effective. Allegations of such activities, particularly by regulators, can have a negative reputational impact and can subject us to large fines and settlements, and potentially significant penalties, including treble damages.

The growth of electronic trading and the introduction of new products and technologies, including trading and distributed ledger technologies, including cryptocurrencies, has increased competition.

Technology is fundamental to our businesses and our industry. The growth of electronic trading and the introduction of new technologies is changing our businesses and presenting us with new challenges. Securities, futures and options transactions are increasingly occurring electronically, both on our own systems and through other alternative trading systems, and it appears that the trend toward alternative trading systems will continue. Some of these alternative trading systems compete with us, particularly our exchange-based market-making activities, and we may experience continued competitive pressures in these and other areas. In addition, the increased use by our clients of low-cost electronic trading systems and direct electronic access to trading markets could cause a reduction in commissions and spreads. As our clients increasingly use our systems to trade directly in the markets, we may incur liabilities as a result of their use of our order routing and execution infrastructure.

We have invested significant resources into the development of electronic trading systems and expect to continue to do so, but there is no assurance that the revenues generated by these systems will yield an adequate return, particularly given the generally lower commissions arising from electronic trades.

In addition, the emergence, adoption and evolution of new technologies, including distributed ledgers, such as digital assets and blockchain, have required us to invest resources to adapt our existing products and services, and we expect to continue to make such investments, which could be material. The adoption and evolution of such new technologies may also increase our compliance and regulatory costs. Further, technologies, such as those based on distributed ledgers, that do not require intermediation could also significantly disrupt payments processing and other financial services. Regulatory limitations on our involvement in products and platforms involving digital assets and distributed ledger technologies may not apply equally or in some cases at all to certain of our competitors. We may not be as timely or successful in developing or integrating, or even able to develop or integrate, new products and technologies, such as those built on distributed ledgers, into our existing products and services, adapting to changes in consumer preferences or achieving market acceptance of our products and services, any of which could affect our ability to attract or retain clients, cause us to lose market share or result in service disruptions and in turn reduce our revenues or otherwise adversely affect us.

Our businesses would be adversely affected if we are unable to hire and retain qualified employees.

Our performance is largely dependent on the talents and efforts of highly skilled people; therefore, our continued ability to compete effectively in our business, to manage our businesses effectively and to expand into new lines of business depends on our ability, and GS Group's ability, to attract new talented and diverse employees and to retain and motivate existing employees. Factors that affect our and GS Group's ability to attract and retain such employees include the level and composition of GS Group's compensation and benefits, and GS Group's reputation as a successful business with a culture of fairly hiring, training and promoting qualified employees. As a significant portion of the compensation that GS Group pays to its employees is in the form of year-end discretionary compensation, a significant portion of which is in the form of deferred equity-related awards, declines in GS Group's profitability, or in the outlook for its future profitability, as well as regulatory limitations on compensation levels and terms, can negatively impact our and GS Group's ability to hire and retain highly qualified employees. Although we have our own employees, employees of affiliates also provide services to us under the Master Services Agreement. Accordingly, negative impacts on GS Group's general ability to hire and retain qualified employees can adversely impact us both directly and indirectly.

Competition from within the financial services industry and from businesses outside the financial services industry, including the technology industry, for qualified employees has often been intense. GS Group (including us) has experienced increased competition in hiring and retaining employees to address the demands of its expanding consumer-oriented businesses and technology initiatives.

Laws or regulations in jurisdictions in which our operations are located that affect taxes on our employees' income or the amount or composition of compensation, or that require us to disclose GS Group's or its competitors' compensation practices, may also adversely affect our ability to hire and retain qualified employees in those jurisdictions.

As described further in "Regulation — Compensation Practices" above, GS Group's compensation practices are subject to review by, and the standards of, the FRB. As a large global financial and banking institution, GS Group is subject to limitations on compensation practices (which may or may not affect the companies with which GS Group competes for talent) by the FRB, the PRA, the FCA, the FDIC and other regulators worldwide. These limitations have shaped GS Group's compensation practices, which has in some cases adversely affected GS Group's ability to attract and retain talented employees, in particular in relation to companies not subject to these limitations, and future legislation or regulation may have similar adverse effects.

Market Developments and General Business Environment

Our businesses, financial condition, liquidity and results of operations have been and may in the future be adversely affected by unforeseen or catastrophic events, including pandemics, terrorist attacks, extreme weather events or other natural disasters.

The occurrence of unforeseen or catastrophic events, including pandemics, such as COVID-19, or other widespread health emergencies (or concerns over the possibility of such an emergency), terrorist attacks, extreme weather events, solar events or other natural disasters, could adversely affect our business, financial condition, liquidity and results of operations. These events could have such effects through economic or financial market disruptions or challenging economic or market conditions more generally, the deterioration of our creditworthiness or that of our counterparties, changes in consumer sentiment and consumer borrowing, spending and savings patterns, liquidity stress, or operational difficulties (such as travel limitations and limitations on occupancy in GS Group's offices) that could impair our ability to manage our businesses.

The COVID-19 pandemic created economic and financial disruptions that have in the past adversely affected and may in the future adversely affect our businesses, financial condition, liquidity and results of operations. The extent to which the COVID-19 pandemic will negatively affect our businesses, financial condition, liquidity and results of operations will depend on, among other things, future developments, including, any resurgence of COVID-19 cases, the emergence of new variants of COVID-19 and the effectiveness of vaccines and treatments over the long term and against new variants, which are highly uncertain and cannot be predicted.

Climate change could disrupt our businesses and adversely affect client activity levels and the creditworthiness of our clients and counterparties, and our efforts to address concerns relating to climate change could result in damage to our reputation.

Climate change may cause extreme weather events that disrupt operations at one or more of our or GS Group's primary locations, which may negatively affect our ability to service and interact with our clients, adversely affect the value of our investments, including our real estate investments, and reduce the availability or increase the cost of insurance. Climate change and the transition to a less carbon-dependent economy may also have a negative impact on the operations or financial condition of our clients and counterparties, which may decrease revenues from those clients and counterparties and increase the credit risk associated with loans and other credit exposures to those clients and counterparties. In addition, climate change may impact the broader economy.

We are also exposed to risks resulting from changes in public policy, laws and regulations, or market and public perceptions and preferences in connection with the transition to a less carbon-dependent economy. These changes could adversely affect our business, results of operations and reputation. For example, our reputation and client relationships may be damaged as a result of our or our clients' involvement in, or decision not to participate in, certain industries or projects associated with causing or exacerbating climate change, as well as any decisions we make to continue to conduct or change our activities in response to considerations relating to climate change. If we are unable to achieve our objectives relating to climate change or our response to climate change is perceived to be ineffective, insufficient, or otherwise inappropriate, our business, reputation and efforts to recruit and retain employees may suffer.

New regulations or guidance relating to climate change, as well as the perspectives of government officials, regulators, Group Inc. shareholders, employees and other stakeholders regarding climate change, may affect whether and on what terms and conditions we engage in certain activities or offer certain products. Federal and state, and non-U.S. banking regulators and supervisory authorities, shareholders and other stakeholders have increasingly viewed financial institutions as playing an important role in helping to address risks related to climate change, both directly and with respect to their clients, which may result in financial institutions coming under increased requirements and expectations regarding the disclosure and management of their climate risks and related lending, investment and advisory activities. The FRB has announced that GS Group is among the six U.S. financial institutions participating in a pilot climate scenario analysis exercise in 2023, and is subject to new or heightened regulatory requirements relating to climate change, such as requirements relating to operational resiliency or stress testing for various climate stress scenarios. Any such new or heightened requirements could result in increased regulatory, compliance or other costs or higher capital requirements. The risks associated with, and the perspective of regulators, Group Inc. shareholders, employees and other stakeholders regarding, climate change are continuing to evolve rapidly, which can make it difficult to assess the ultimate impact on us of climate change-related risks and uncertainties, and we expect that climate change-related risks will increase over time.

Our business, financial condition, liquidity and results of operations may be adversely affected by disruptions in the global economy caused by Russia's invasion of Ukraine and related sanctions and other developments.

The war between Russia and Ukraine has negatively affected the global economy. Governments around the world have responded to Russia's invasion by imposing economic sanctions and export controls on certain industry sectors, including price caps on Russian oil, and parties in Russia. Compliance with economic sanctions and restrictions imposed by governments has increased GS Group's costs and otherwise adversely affected GS Group's business and may continue to do so. Russia has responded with its own restrictions against investors and countries outside Russia and has proposed additional measures aimed at non-Russia owned businesses. Businesses in the U.S. and globally have experienced shortages in materials and increased costs for transportation, energy, and raw materials due in part to the negative effects of the war on the global economy. The escalation or continuation of the war between Russia and Ukraine or other hostilities could result in, among other things, further increased risk of cyber attacks, an increased frequency and volume of failures to settle securities transactions, supply chain disruptions, higher inflation, lower consumer demand and increased volatility in commodity, currency and other financial markets.

As of December 2022, our total credit exposure to Russian or Ukrainian counterparties or borrowers and our total market exposure to Russian or Ukrainian issuers was not material. GS Group has curtailed its operations in Russia to those necessary to meet its legal and regulatory obligations. The extent and duration of the war, sanctions and resulting market disruptions are impossible to predict, and the consequences for GS Group's business could be significant.

Certain of our businesses, our funding instruments and financial products may be adversely affected by changes in or the discontinuance of IBORs, in particular USD LIBOR.

On January 1, 2022, the publication of all EUR, CHF, JPY and GBP LIBOR (non-USD LIBOR) settings along with certain USD LIBOR settings ceased. The publication of the most commonly used USD LIBOR settings as representative rates will cease after June 2023. The FCA proposed that certain of those USD LIBOR settings continue to be published on a synthetic basis through September 2024. The FCA has allowed the publication and use of synthetic rates for certain GBP LIBOR settings in legacy GBP LIBOR-based derivative contracts through March 2024.

The International Swaps and Derivatives Association (ISDA) 2020 IBOR Fallbacks Protocol (IBOR Protocol) has provided derivatives market participants with amended fallbacks for legacy and new derivative contracts to mitigate legal or economic uncertainty. Both counterparties have to adhere to the IBOR Protocol or engage in bilateral amendments for the terms to be effective for derivative contracts. ISDA has confirmed that the FCA's formal announcement to cease both non-USD and USD LIBOR settings fixed the spread adjustment for all LIBOR rates and as a result fallbacks applied automatically for non-USD LIBOR settings following December 31, 2021 and will apply automatically for USD LIBOR settings following June 30, 2023. The Adjustable Interest Rate (LIBOR) Act (LIBOR Act), that was enacted in March 2022, provides a statutory framework to replace USD LIBOR with a benchmark rate based on the Secured Overnight Financing Rate (SOFR) for contracts governed by U.S. law that have no fallbacks or fallbacks that would require the use of a poll or LIBOR-based rate. In December 2022, the FRB adopted a final rule that implements the LIBOR Act, which became effective on February 27, 2023. The final rule identifies different SOFR-based replacement rates for derivative contracts, for consumer contracts, for certain government-sponsored enterprise contracts and for certain student loan securitizations that lack a fallback to an alternative rate when USD LIBOR ceases to be published on June 30, 2023. As the transition from LIBOR is ongoing, there continues to be uncertainty as to the ultimate effect of the transition on the financial markets for LIBOR-linked financial instruments. Similar developments have occurred with respect to other IBORs.

The language in our and our affiliates' contracts and financial instruments that define IBORs, in particular LIBOR, have developed over time and have various events that trigger when a successor rate to the designated rate would be selected. Once a trigger is satisfied, contracts and financial instruments often give the calculation agent (which may be one of our affiliates) discretion over the successor rate or benchmark to be selected. Although the LIBOR Act includes safe harbors if the FRB-identified SOFR-based replacement rate is selected, these safe harbors are untested. As a result, and despite the enactment of the LIBOR Act, for the most commonly used USD LIBOR settings, the selection of a successor rate could result in client disputes and litigation surrounding the proper interpretation of our IBOR-based contracts and financial instruments. Discretionary actions taken in connection with the implementation of fallback provisions could also result in client disputes and litigation particularly for derivatives and other synthetic instruments.

Changes in, the discontinuation of, or changes in market acceptance of any IBOR, particularly USD LIBOR, as a reference rate may adversely affect certain of our businesses, our funding instruments and financial products.

Certain of our businesses and our funding instruments may be adversely affected by changes in other reference rates, currencies, indexes or baskets to which products we offer or funding that we raise are linked.

Certain of our funding, including funding raised from affiliates and third parties, is floating rate and pays interest by reference to a rate, such as LIBOR, Federal Funds or SOFR. In addition, certain of the products that we own or that we offer, such as swaps or security-based swaps, pay interest or determine the principal amount to be paid at maturity or in the event of default by reference to rates or by reference to an index, currency, basket or other financial metric (the underlier). In the event that the composition of the underlier is significantly changed, by reference to rules governing such underlier or otherwise, the underlier ceases to exist (for example, in the event that a country withdraws from the Euro or links its currency to or delinks its currency from another currency or benchmark, or an index), the underlier ceases to be recognized as an acceptable market benchmark or there are legal or regulatory constraints on linking a financial instrument to the underlier, we may experience adverse effects.

Our business, financial condition, liquidity and results of operations may be adversely affected by disruptions in the global economy caused by escalating tensions between the U.S. and China.

Continued or escalating tensions between the U.S. and China have resulted in and may result in additional changes to U.S. international trade and investment policies, which could disrupt international trade and investment, adversely affect financial markets, including market activity levels, and adversely impact our revenues. Continued or escalating tensions may also lead to the U.S., China or other countries taking other actions, which could include the implementation of sanctions, tariffs or foreign exchange measures, the large-scale sale of U.S. Treasury securities or restrictions on cross-border trade, investment or transfer of information or technology. Any such developments could adversely affect our or our clients' businesses, as well as our financial condition, liquidity and results of operations, possibly materially.

A conflict, or concerns about a potential conflict, involving China and Taiwan, the U.S. or other countries could negatively impact financial markets and our or our clients' businesses. Trade restrictions by the U.S. or other countries in response to a conflict or potential conflict involving China, including financial and economic sanctions and export controls against certain organizations or individuals, or actions taken by China in response to trade restrictions, could negatively impact our or our clients' ability to conduct business in certain countries or with certain counterparties and could negatively impact regional and global financial markets and economic conditions. Any of the foregoing could adversely affect our business, financial condition, liquidity and results of operations, possibly materially.

We face enhanced risks as new business initiatives and acquisitions lead us to engage in new activities, operate in new locations, transact with a broader array of clients and counterparties, and expose us to new assets, activities and markets.

A number of our recent and planned business initiatives and expansions of existing businesses, including through acquisitions and partnership arrangements, could continue to bring us into contact, directly or indirectly, with consumers and entities that are not within our traditional client and counterparty base, expose us to new asset classes, activities and markets, and present us with integration challenges. We also continue to lend and transact business in new regions, including a wide range of emerging and growth markets. In addition, as a result of the long-term strategy of GS Group to increase the proportion of its businesses and activities conducted in Group Inc.'s bank subsidiaries, including us, certain of these new and expanded businesses and activities may have been previously conducted in one or more of our affiliates, and the transition of such businesses and activities to the Bank could expose us to additional risk, including the risks described below.

We have increased our consumer-oriented deposit-taking and lending activities. For example, we now issue credit cards to consumers and through GreenSky, we expanded our offering of point-of-sale financing. To the extent we engage in those and other consumer-oriented activities, we have faced, and would continue to face, additional compliance, legal and regulatory risk, increased reputational risk and increased operational risk due to, among other things, higher transaction volumes, greater reliance on third-party vendors, increased volume of customer complaints, collections practices in relation to consumer-oriented lending activities, significantly increased retention requirements and transmission of consumer and client information and increased regulatory compliance obligations (including under the CRA as noted below). Acquisitions and new products can also expose us to new or different types of risks. For example, providing point-of-sale financing through GreenSky also subjects us to risks relating to retaining and attracting merchants and servicing loans for other banks, as well as potential liability for remediation costs if merchants fail to fulfill their obligations to consumers. We are also subject to additional legal requirements, including with respect to suitability and consumer protection (for example, fair lending laws and regulations and privacy laws and regulations). Further, identity fraud may increase and credit reporting practices may change in a manner that makes it more difficult for financial institutions, such as us, to evaluate the creditworthiness of consumers.

We have increased and intend to further increase our transaction banking activities. As a result, we expect to face additional compliance, legal and regulatory risk, including with respect to know-your-customer, AML and reporting requirements and prohibitions on transfers of property belonging to countries, entities and individuals subject to sanctions by U.S. or other governmental authorities. See “Risk Factors — Legal and Regulatory — Substantial civil or criminal liability or significant regulatory action against us or our affiliates could have material adverse financial effects or cause us significant reputational harm, which in turn could seriously harm our business prospects,” for further information about legal, regulatory and compliance risks that we face.

Our expansion into consumer-oriented activities will result in a change to our CRA requirements later in 2023, such that we will no longer be assessed as a “wholesale bank” for CRA compliance purposes and, instead, will be assessed pursuant to the framework applicable to large commercial banks or pursuant to an approved strategic plan. Any failure to comply with different or expanded CRA requirements as a result of this change in assessment methods could negatively impact our CRA ratings, cause reputational harm and result in limits on GS Group’s ability to make future acquisitions or engage in certain new activities. See “Regulation — Community Reinvestment Act (CRA)” in Part I of this Annual Report for further information about our CRA requirements.

New business initiatives expose us to new and enhanced risks, including risks associated with dealing with governmental entities, reputational concerns arising from dealing with different types of counterparties, clients, business partners and consumers, greater regulatory scrutiny of these activities, increased credit-related, compliance, fraud, market, sovereign and operational risks, risks arising from accidents or acts of terrorism, and reputational concerns with the manner in which we engage in these activities, interact with these counterparties, clients, business partners and consumers or address the product or service requirements of these new types of clients. Legal, regulatory and reputational risks may also exist in connection with activities and transactions involving new products or markets where there is regulatory uncertainty or where there are different or conflicting regulations depending on the regulator or the jurisdiction involved, particularly where transactions in such products may involve multiple jurisdictions.

We have developed and pursued new business and strategic initiatives, including acquisitions, and expect to continue to do so. If and to the extent we are unable to successfully execute those initiatives, we may incur unanticipated costs and losses, and face other adverse consequences, such as negative reputational effects. In addition, the actual effects of pursuing those initiatives may differ, possibly materially, from the benefits that we expect to realize from them, such as generating additional revenues, achieving expense savings, reducing operational risk exposures or using capital and funding more efficiently. Engaging in new activities exposes us to a variety of risks, including that we may be unable to successfully develop new, competitive, efficient and effective systems and processes, and hire and retain the necessary personnel. Due to our lack of historical experience with unsecured consumer lending (including with respect to credit cards), our loan loss assumptions may prove to be incorrect and we may incur losses significantly above those which we originally anticipated in entering the business or in expanding the product offerings for the business.

In order to develop and be able to offer consumer and transaction banking financial products and services that compete effectively, we have made and may continue to make significant investments in technology and human capital resources in connection with these activities.

We may not be able to fully realize the expected benefits or synergies from acquisitions or other business initiatives in the time frames we expect, or at all.

We have engaged in selective acquisitions and may continue to do so in the future and these acquisitions may, individually or in the aggregate, be material to us. The success of our acquisitions will depend, in part, on our ability to integrate the acquired businesses and realize anticipated synergies, cost savings and growth opportunities. We may face numerous risks and uncertainties in combining and integrating the relevant businesses and systems, including the need to combine or separate accounting and data processing systems and management controls and to integrate relationships with clients, counterparties, regulators and others in connection with acquisitions. Integration of acquired businesses is time-consuming and could disrupt our ongoing businesses, produce unforeseen regulatory or operating difficulties, cause us to incur incremental expenses or require incremental financial, management and other resources. It is also possible that an acquisition, once announced, may not close due to the failure to satisfy applicable closing conditions, such as the receipt of necessary shareholder or regulatory approvals.

There is no assurance that any of our acquisitions will be successfully integrated or yield all of the expected benefits and synergies in the time frames that we expect, or at all. If we are not able to integrate our acquisitions successfully, some of which may be material, our results of operations, financial condition and cash flows could be adversely affected.

There is no assurance that the reorganization of GS Group's business segments will yield all of the expected benefits in the expected time frames, or at all.

PART II. Management’s Discussion and Analysis of Financial Condition and Results of Operations

Introduction

Goldman Sachs Bank USA (GS Bank USA), together with its consolidated subsidiaries (collectively, the Bank), is a New York State-chartered bank and a member of the Federal Reserve System. The Bank is supervised and regulated by the Board of Governors of the Federal Reserve System (FRB), the New York State Department of Financial Services (NYDFS) and the Consumer Financial Protection Bureau. As a member of the Federal Deposit Insurance Corporation (FDIC), GS Bank USA’s deposits are insured by the FDIC up to the maximum amount provided by law. GS Bank USA is registered as a swap dealer with the U.S. Commodity Futures Trading Commission (CFTC) and as a security-based swap dealer with the Securities and Exchange Commission (SEC). GS Bank USA is also a government securities dealer subject to the rules and regulations of the U.S. Department of the Treasury.

When we use the terms “we,” “us” and “our,” we mean GS Bank USA and its consolidated subsidiaries. When we use the term “GS Group” we are referring to The Goldman Sachs Group, Inc. (Group Inc.) and its consolidated subsidiaries, including us.

Our principal office is located in New York, New York. GS Bank USA operates two domestic branches, which are located in Salt Lake City, Utah and Draper, Utah. Both branches are regulated by the Utah Department of Financial Institutions. GS Bank USA also operates two foreign branches, which are located in London, United Kingdom and Tokyo, Japan. The London branch is regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority and the Tokyo branch is regulated by the Japan Financial Services Agency. Goldman Sachs Bank Europe SE (GSBE), headquartered in Frankfurt, Germany, is a wholly-owned subsidiary of GS Bank USA. GSBE is directly supervised by the European Central Bank and additionally by the Federal Financial Supervisory Authority and Deutsche Bundesbank in the context of the E.U. Single Supervisory Mechanism. GSBE has branches in Amsterdam, Athens, Copenhagen, Dublin, London, Luxembourg, Madrid, Milan, Paris, Stockholm and Warsaw that are also regulated by the relevant authorities in each jurisdiction. GSBE’s London branch is regulated by the FCA and GSBE applied for a permanent authorization of its London branch in March 2022.

GS Bank USA is a wholly-owned subsidiary of Group Inc. Group Inc. is a bank holding company under the U.S. Bank Holding Company Act of 1956 (BHC Act), a financial holding company under amendments to the BHC Act effected by the U.S. Gramm-Leach-Bliley Act of 1999, and is subject to supervision and examination by the FRB as its primary regulator.

References to revenue-producing units and control and support functions include activities performed by our employees, by dual employees (who are employees who perform services for both us and another GS Group subsidiary) and by affiliate employees under Bank supervision pursuant to Master Services Agreements supplemented by Service Level Agreements (collectively, the Master Services Agreement) between us and our affiliates.

All references to “this Annual Report” of which this Management’s Discussion and Analysis forms a part, refers to the report dated March 7, 2023 and includes information related to our business, the supervision and regulation to which we are subject, risk factors affecting our businesses, our results of operations and financial condition, as well as our consolidated financial statements.

References to “the consolidated financial statements” or “Supplemental Financial Information” are to Part III of this Annual Report. All references to 2022 and 2021 refer to our years ended, or the dates, as the context requires, December 31, 2022 and December 31, 2021, respectively. Any reference to a future year refers to a year ending on December 31 of that year. Certain reclassifications have been made to previously reported amounts to conform to the current presentation.

In accordance with the reporting requirements for business combinations of entities under common control, prior period amounts are presented as if GS Bank USA’s acquisition of GSBE in July 2021 had occurred at the beginning of 2021.

Management's Discussion and Analysis

We are a financial services provider that engages in banking activities. We are GS Group's primary lending entity, originating loans to corporate and wealth management clients, as well as issuing credit cards and providing point-of-sale financing through GreenSky, Inc. (GreenSky) to consumers. We are also GS Group's primary deposit-taking entity. Our depositors include private bank clients, U.S. consumers, clients of third-party broker-dealers, institutions, corporations and our affiliates. Our consumer deposit-taking activities are conducted through our digital platform, *Marcus by Goldman Sachs* (Marcus). We also provide transaction banking services to institutions, corporations and our affiliates. In addition, we enter into interest rate, currency, credit and other derivatives, and transact in certain related cash products, for the purpose of market making and risk management. Our activities in the E.U. include underwriting and market making in debt and equity securities; advisory services; and asset and wealth management services. See Note 12 to the consolidated financial statements for further information about the acquisition of GreenSky.

In this Annual Report, we have included statements that may constitute "forward-looking statements." Forward-looking statements are not historical facts or statements of current conditions, but instead represent only our beliefs regarding future events, many of which, by their nature, are inherently uncertain and outside our control.

By identifying these statements for you in this manner, we are alerting you to the possibility that our actual results, financial condition, liquidity and capital actions may differ, possibly materially, from the anticipated results, financial condition, liquidity and capital actions in these forward-looking statements. Important factors that could cause our results, financial condition and liquidity to differ from those in these statements include, among others, those described below and in "Risk Factors" in this Annual Report.

These statements may relate to, among other things, (i) our future plans and objectives, (ii) our expense savings initiative, (iii) expenses we may incur, including expenses from investing in our consumer and transaction banking activities and new business initiatives, (iv) the growth of our deposits and other funding, asset liability management and funding strategies, (v) our business initiatives, including transaction banking and new consumer financial products, (vi) our expected provisions for credit losses, (vii) the adequacy of our allowance for credit losses (viii) the projected growth of our consumer activities, (ix) the objectives and effectiveness of our risk management and liquidity policies, (x) our resolution plan and strategy, (xi) the impact of regulatory changes applicable to us, and our future status, activities or reporting under banking and financial regulation, (xii) legal proceedings, governmental investigations or other contingencies, (xiii) the replacement of Interbank Offered Rates (IBORs) and our transition to alternative risk-free reference rates, (xiv) the impact of the coronavirus (COVID-19) pandemic on our businesses, results, financial position and liquidity, (xv) the effectiveness of our management of human capital, (xvi) future inflation and (xvii) the impact of Russia's invasion of Ukraine and related sanctions and other developments on our business, results and financial position.

Executive Overview

We generated net earnings of \$3.28 billion for 2022, essentially unchanged compared with \$3.35 billion for 2021.

Net revenues were \$12.47 billion for 2022, an increase of 32% compared with \$9.48 billion for 2021, primarily reflecting higher net interest income.

Net interest income was \$6.68 billion for 2022, an increase of 72% compared with \$3.88 billion for 2021. This increase was primarily driven by higher interest income, partially offset by higher interest expense.

Non-interest revenues were \$5.78 billion for 2022, essentially unchanged compared with \$5.60 billion for 2021.

Provision for credit losses was \$2.30 billion for 2022, compared with \$457 million for 2021. Provisions for 2022 primarily reflected growth in the credit card portfolio, the impact of macroeconomic and geopolitical concerns and net charge-offs. Provisions for 2021 reflected growth in the credit card and wholesale portfolios, largely offset by reserve reductions as the broader economic environment continued to improve following the initial impact of the COVID-19 pandemic.

Management's Discussion and Analysis

Operating expenses were \$5.65 billion for 2022, an increase of 24% compared with \$4.56 billion for 2021, primarily due to increases across non-compensation expenses.

As of December 2022, our Common Equity Tier 1 capital ratio as calculated in accordance with the Standardized Capital Rules was 13.1% and as calculated in accordance with the Advanced Capital Rules was 17.0%. See Note 19 to the consolidated financial statements for further information about our capital ratios.

Business Environment

In 2022, the global economy was impacted by persistent broad macroeconomic and geopolitical concerns, including Russia's invasion of Ukraine and the ongoing war, and inflationary and labor market pressures. Governments around the world responded to Russia's invasion of Ukraine by imposing economic sanctions, and global central banks sought to address inflation by increasing policy interest rates several times over the course of the year. These factors contributed to increased market volatility during the year, as well as a decrease in global equity and bond prices and wider corporate credit spreads compared with the end of 2021.

The economic outlook remains uncertain, reflecting concerns about the continuation or escalation of the war between Russia and Ukraine and other geopolitical risks, inflation, and supply chain complications.

Critical Accounting Policies

Allowance for Credit Losses

We estimate and record an allowance for credit losses related to our loans held for investment that are accounted for at amortized cost. To determine the allowance for credit losses, we classify our loans accounted for at amortized cost into wholesale and consumer portfolios. These portfolios represent the level at which we have developed and documented our methodology to determine the allowance for credit losses. The allowance for credit losses is measured on a collective basis for loans that exhibit similar risk characteristics using a modeled approach and on an asset-specific basis for loans that do not share similar risk characteristics.

The allowance for credit losses takes into account the weighted average of a range of forecasts of future economic conditions over the expected life of the loans and lending commitments. The expected life of each loan or lending commitment is determined based on the contractual term adjusted for extension options or demand features, or is modeled in the case of revolving credit card loans. The forecasts include baseline, favorable and adverse economic scenarios over a three-year period. For loans with expected lives beyond three years, the model reverts to historical loss information based on a non-linear modeled approach. We apply judgment in weighting individual scenarios each quarter based on a variety of factors, including our internally derived economic outlook, market consensus, recent macroeconomic conditions and industry trends. The forecasted economic scenarios consider a number of risk factors relevant to the wholesale and consumer portfolios. Risk factors for wholesale loans include internal credit ratings, industry default and loss data, expected life, macroeconomic indicators (e.g., unemployment rates and GDP), the borrower's capacity to meet its financial obligations, the borrower's country of risk and industry, loan seniority and collateral type. In addition, for loans backed by real estate, risk factors include loan-to-value ratio, debt service ratio and home price index. Risk factors for installment and credit card loans include Fair Isaac Corporation (FICO) credit scores, delinquency status, loan vintage and macroeconomic indicators.

The allowance for credit losses also includes qualitative components which reflect the uncertain nature of economic forecasting, capture uncertainty regarding model inputs, and account for model imprecision and concentration risk.

Our estimate of credit losses entails judgment about collectability at the reporting dates, and there are uncertainties inherent in those judgments. The allowance for credit losses is subject to a governance process that involves review and approval by senior management within our independent risk oversight and control functions. Personnel within GS Group's independent risk oversight and control functions are responsible for forecasting the economic variables that underlie the economic scenarios that are used in the modeling of expected credit losses. While we use the best information available to determine this estimate, future adjustments to the allowance may be necessary based on, among other things, changes in the economic environment or variances between actual results and the original assumptions used. Loans are charged off against the allowance for loan losses when deemed to be uncollectible.

Management's Discussion and Analysis

We also record an allowance for credit losses on lending commitments which are held for investment that are accounted for at amortized cost. Such allowance is determined using the same methodology as the allowance for loan losses, while also taking into consideration the probability of drawdowns or funding, and whether such commitments are cancellable by us. See Note 9 to the consolidated financial statements for further information about the allowance for credit losses.

To estimate the potential impact of an adverse macroeconomic environment on our allowance for credit losses, we, among other things, compared the expected credit losses under the weighted average forecast used in the calculation of allowance for credit losses as of December 2022 (which was weighted towards the baseline and adverse economic scenarios) to the expected credit losses under a 100% weighted adverse economic scenario. The adverse economic scenario of the forecast model reflects a global recession in 2023 and a more aggressive tightening of monetary policy by central banks, resulting in an economic contraction and rising unemployment rates. A 100% weighting to the adverse economic scenario would have resulted in an approximate \$0.7 billion increase in our allowance for credit losses as of December 2022. This hypothetical increase does not take into consideration any potential adjustments to qualitative reserves. The forecasts of macroeconomic conditions are inherently uncertain and do not take into account any other offsetting or correlated effects. The actual credit loss in an adverse macroeconomic environment may differ significantly from this estimate. See Note 9 to the consolidated financial statements for further information about the allowance for credit losses.

Fair Value

Fair Value Hierarchy. Trading assets and liabilities, certain investments and loans, and certain other financial assets and liabilities, are included in our consolidated balance sheets at fair value (i.e., marked-to-market), with related gains or losses generally recognized in our consolidated statements of earnings.

The fair value of a financial instrument is the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. We measure certain financial assets and liabilities as a portfolio (i.e., based on its net exposure to market and/or credit risks). In determining fair value, the hierarchy under U.S. generally accepted accounting principles (U.S. GAAP) gives (i) the highest priority to unadjusted quoted prices in active markets for identical, unrestricted assets or liabilities (level 1 inputs), (ii) the next priority to inputs other than level 1 inputs that are observable, either directly or indirectly (level 2 inputs), and (iii) the lowest priority to inputs that cannot be observed in market activity (level 3 inputs). In evaluating the significance of a valuation input, we consider, among other factors, a portfolio's net risk exposure to that input. Assets and liabilities are classified in their entirety based on the lowest level of input that is significant to their fair value measurement.

The fair values for substantially all of our financial assets and for the majority of our financial liabilities are based on observable prices and inputs and are classified in levels 1 and 2 of the fair value hierarchy. Certain level 2 and level 3 financial assets and liabilities may require appropriate valuation adjustments that a market participant would require to arrive at fair value for factors, such as counterparty and our or our affiliates' credit quality, funding risk, transfer restrictions, liquidity and bid/offer spreads.

Instruments classified in level 3 of the fair value hierarchy are those which require one or more significant inputs that are not observable. Level 3 financial assets represented 0.5% as of December 2022 and 0.6% as of December 2021 of our total assets. See Notes 4 and 5 to the consolidated financial statements for further information about level 3 financial assets, including changes in level 3 financial assets and related fair value measurements. Absent evidence to the contrary, instruments classified in level 3 of the fair value hierarchy are initially valued at transaction price, which is considered to be the best initial estimate of fair value. Subsequent to the transaction date, we use other methodologies to determine fair value, which vary based on the type of instrument. Estimating the fair value of level 3 financial instruments requires judgments to be made. These judgments include:

- Determining the appropriate valuation methodology and/or model for each type of level 3 financial instrument;
- Determining model inputs based on an evaluation of all relevant empirical market data, including prices evidenced by market transactions, interest rates, credit spreads, volatilities and correlations; and
- Determining appropriate valuation adjustments, including those related to illiquidity or counterparty credit quality.

Management's Discussion and Analysis

Regardless of the methodology, valuation inputs and assumptions are only changed when corroborated by substantive evidence.

Controls Over Valuation of Financial Instruments. We leverage GS Group's control infrastructure over valuation of financial instruments, which is described below. Market makers and investment professionals in revenue-producing units are responsible for pricing our financial instruments. GS Group's control infrastructure is independent of the revenue-producing units and is fundamental to ensuring that all of our financial instruments are appropriately valued at market-clearing levels. In the event that there is a difference of opinion in situations where estimating the fair value of financial instruments requires judgment (e.g., calibration to market comparables or trade comparison, as described below), the final valuation decision is made by senior managers in independent risk oversight and control functions. This independent price verification is critical to ensuring that our financial instruments are properly valued.

Price Verification. All financial instruments at fair value classified in levels 1, 2 and 3 of the fair value hierarchy are subject to an independent price verification process. The objective of price verification is to have an informed and independent opinion with regard to the valuation of financial instruments under review. Instruments that have one or more significant inputs which cannot be corroborated by external market data are classified in level 3 of the fair value hierarchy. Price verification strategies utilized by our independent risk oversight and control functions include:

- **Trade Comparison.** Analysis of trade data (both internal and external, where available) is used to determine the most relevant pricing inputs and valuations.
- **External Price Comparison.** Valuations and prices are compared to pricing data obtained from third parties (e.g., brokers or dealers, S&P Global Services, Bloomberg, ICE Data Services, Pricing Direct, TRACE). Data obtained from various sources is compared to ensure consistency and validity. When broker or dealer quotations or third-party pricing vendors are used for valuation or price verification, greater priority is generally given to executable quotations.
- **Calibration to Market Comparables.** Market-based transactions are used to corroborate the valuation of positions with similar characteristics, risks and components.
- **Relative Value Analyses.** Market-based transactions are analyzed to determine the similarity, measured in terms of risk, liquidity and return, of one instrument relative to another or, for a given instrument, of one maturity relative to another.
- **Collateral Analyses.** Margin calls on derivatives are analyzed to determine implied values, which are used to corroborate our valuations.

- **Execution of Trades.** Where appropriate, market-making desks are instructed to execute trades in order to provide evidence of market-clearing levels.
- **Backtesting.** Valuations are corroborated by comparison to values realized upon sales.

See Note 4 to the consolidated financial statements for further information about fair value measurements.

Review of Net Revenues. Independent risk oversight and control functions ensure adherence to GS Group's pricing policy through a combination of daily procedures, including the explanation and attribution of net revenues based on the underlying factors. Through this process, we independently validate net revenues, identify and resolve potential fair value or trade booking issues on a timely basis and seek to ensure that risks are being properly categorized and quantified.

Review of Valuation Models. A model risk management group (Model Risk), consisting of quantitative professionals who are separate from model developers, performs an independent model review and validation process of valuation models. New or changed models are reviewed and approved prior to implementation. Models are reviewed annually to assess the impact of any changes in the product or market and any market developments in pricing theories. See "Risk Management — Model Risk Management" for further information about the review and validation of valuation models.

Use of Estimates

U.S. GAAP requires us to make certain estimates and assumptions. In addition to the estimates we make in connection with the allowance for credit losses on loans and lending commitments held for investment and accounted for at amortized cost, and fair value measurements, the use of estimates and assumptions is also important in determining the accounting for goodwill and identifiable intangible assets, provisions for losses that may arise from litigation and regulatory proceedings (including governmental investigations), and accounting for income taxes.

Goodwill is assessed qualitatively for impairment annually in the fourth quarter or more frequently if events occur or circumstances change that indicate an impairment may exist. A quantitative goodwill test may be performed if required.

Identifiable intangible assets are tested for impairment when events or changes in circumstances suggest that an asset's or asset group's carrying value may not be fully recoverable.

Management's Discussion and Analysis

Any estimated liability in respect of litigation and regulatory proceedings is determined on a case-by-case basis and represents an estimate of probable losses after considering, among other factors, the progress of each case, proceeding or investigation, our experience and the experience of others in similar cases, proceedings or investigations, and the opinions and views of legal counsel. Significant judgment is required in making these estimates and our final liabilities may ultimately be materially different. See Note 24 to the consolidated financial statements for further information about certain judicial, litigation and regulatory proceedings.

In accounting for income taxes, we recognize tax positions in the financial statements only when it is more likely than not that the position will be sustained on examination by the relevant taxing authority based on the technical merits of the position. We use estimates to recognize current and deferred income taxes in the U.S. federal, state and local and non-U.S. jurisdictions in which we operate. The income tax laws in these jurisdictions are complex and can be subject to different interpretations between taxpayers and taxing authorities. Disputes may arise over these interpretations and can be settled by audit, administrative appeals or judicial proceedings. Our interpretations are reevaluated quarterly based on guidance currently available, tax examination experience and the opinions of legal counsel, among other factors. We recognize deferred taxes based on the amount that will more likely than not be realized in the future based on enacted income tax laws. Our estimate for deferred taxes includes estimates for future taxable earnings, including the level and character of those earnings, and various tax planning strategies. See Note 22 to the consolidated financial statements for further information about income taxes.

Recent Accounting Developments

See Note 3 to the consolidated financial statements for information about Recent Accounting Developments.

Results of Operations

The composition of our net revenues has varied over time as financial markets and the scope of our operations have changed. The composition of net revenues can also vary over the shorter term due to fluctuations in economic and market conditions. In addition to transactions entered into with third parties, we also enter into transactions with affiliates in the normal course of business, primarily as part of our market-making activities. See "Risk Factors" in Part I of this Annual Report for further information about the impact of economic and market conditions on our results of operations.

Financial Overview

The table below presents an overview of our financial results and selected financial ratios.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Net revenues	\$ 12,465	\$ 9,478
Pre-tax earnings	\$ 4,515	\$ 4,458
Net earnings	\$ 3,278	\$ 3,352
Net earnings to average assets	0.7%	0.9%
Return on shareholder's equity	7.3%	8.7%
Average equity to average assets	9.3%	10.4%

In the table above:

- Net earnings to average assets is calculated by dividing net earnings by average total assets.
- Return on shareholder's equity is calculated by dividing net earnings by average monthly shareholder's equity.
- Average equity to average assets is calculated by dividing average total shareholder's equity by average total assets.

Net Revenues

The table below presents our net revenues by line item, as well as net interest margin.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Interest income	\$ 13,997	\$ 5,302
Interest expense	7,313	1,425
Net interest income	6,684	3,877
Non-interest revenues	5,781	5,601
Net revenues	\$ 12,465	\$ 9,478
Net interest margin	1.50%	1.16%

In the table above:

- Interest income includes interest earned from our lending portfolio, consisting of corporate lending, commercial real estate lending, residential real estate lending, securities-based lending, other collateralized lending, installment lending, credit card lending and other lending. Interest income is also earned from cash deposits held primarily at the Federal Reserve. In addition, interest is earned from certain trading assets, investments, collateralized agreements, collateral balances posted to counterparties and foreign currency funding facilities.

Management's Discussion and Analysis

- Interest expense includes interest related to deposit-taking activities. Interest expense also includes interest related to certain trading liabilities, collateralized financings, unsecured borrowings, collateral balances received from counterparties and foreign currency funding facilities. We apply hedge accounting to certain interest rate swaps used to manage the interest rate exposure of certain fixed-rate term certificates of deposit and certain U.S. government securities classified as available-for-sale. For qualifying fair value hedges, gains and losses on derivatives are included in interest expense. See Note 7 to the consolidated financial statements for further information about hedge accounting.
- Non-interest revenues includes gains and losses from financial assets and liabilities related to market-making and risk management activities in interest rate, currency, credit, equity and commodity derivatives and certain related products which are primarily accounted for at fair value. Non-interest revenues also includes net gains and losses from loans and lending commitments primarily accounted for at fair value. In addition, non-interest revenues includes revenues earned from relationships with affiliates, loan syndication fees, fees for financial advisory services relating to mergers and acquisitions and other corporate reorganizations, fees related to our credit card business and other fees.

2022 versus 2021. Net revenues in the consolidated statements of earnings were \$12.47 billion for 2022, an increase of 32% compared with \$9.48 billion for 2021, primarily reflecting higher net interest income.

Net Interest Income

Net interest income in the consolidated statements of earnings was \$6.68 billion for 2022, an increase of 72% compared with \$3.88 billion for 2021, primarily driven by higher interest income, partially offset by higher interest expense. Net interest income was 54% of net revenues in 2022, compared with 41% in 2021.

Net Interest Margin

Net interest margin was 150 basis points for 2022, an increase of 34 basis points compared with 116 basis points for 2021, primarily driven by higher average loan balances.

Non-Interest Revenues

Non-interest revenues were \$5.78 billion for 2022, essentially unchanged compared with \$5.60 billion for 2021.

Interest Income

The table below presents our sources of interest income.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Deposits with banks	\$ 2,772	\$ 87
Collateralized agreements	565	52
Trading assets	824	587
Investments	248	160
Loans	7,503	3,905
Other	2,085	511
Total interest income	\$ 13,997	\$ 5,302

2022 versus 2021. Interest income in the consolidated statements of earnings was \$14.00 billion for 2022, \$8.70 billion higher than 2021. See below and “Supplemental Financial Information — Distribution of Assets, Liabilities and Shareholder’s Equity” for further information about our sources of interest income, including average balances and rates.

Interest income from deposits with banks was \$2.77 billion for 2022, \$2.69 billion higher than 2021, primarily due to higher rates. See Note 3 to the consolidated financial statements for further information about our cash.

Interest income from collateralized agreements was \$565 million for 2022, \$513 million higher than 2021, primarily due to higher rates. See Note 11 to the consolidated financial statements for further information about collateralized agreements.

Interest income from trading assets was \$824 million for 2022, \$237 million higher than 2021, primarily due to higher rates. See Note 6 to the consolidated financial statements for further information about trading assets.

Interest income from investments was \$248 million for 2022, \$88 million higher than 2021, primarily due to higher rates. See Note 8 to the consolidated financial statements for further information about investments.

Interest income from loans was \$7.50 billion for 2022, \$3.60 billion higher than 2021, primarily due to higher average balances. See Note 9 to the consolidated financial statements for further information about loans.

Other interest income was \$2.09 billion for 2022, \$1.57 billion higher than 2021, primarily due to higher rates. Other interest income primarily includes interest income on loans held for sale that are accounted for at the lower of cost or fair value, collateral balances posted to counterparties and foreign currency funding facilities.

Management's Discussion and Analysis

Interest Expense

The table below presents our sources of interest expense.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Deposits	\$ 5,125	\$ 1,112
Collateralized financings	179	(45)
Trading liabilities	294	112
Borrowings	244	130
Other	1,471	116
Total interest expense	\$ 7,313	\$ 1,425

2022 versus 2021. Interest expense in the consolidated statements of earnings was \$7.31 billion for 2022, \$5.89 billion higher than 2021. See below and “Supplemental Financial Information — Distribution of Assets, Liabilities and Shareholder’s Equity” for further information about our sources of interest expense, including average balances and rates.

Interest expense from deposits was \$5.13 billion for 2022, \$4.01 billion higher than 2021, primarily due to higher rates.

Interest expense from collateralized financings was \$179 million for 2022, \$224 million higher than 2021, primarily due to higher rates.

Interest expense from trading liabilities was \$294 million for 2022, \$182 million higher than 2021, primarily due to higher average balances.

Interest expense from borrowings was \$244 million for 2022, \$114 million higher than 2021, primarily due to higher rates.

Other interest expense was \$1.47 billion for 2022, \$1.36 billion higher than 2021, primarily due to higher rates. Other interest expense primarily includes interest expense on collateral balances received from counterparties and interest expense on foreign currency funding facilities.

Provision for Credit Losses

Provision for credit losses consists of provision for credit losses on loans and lending commitments held for investment and accounted for at amortized cost. See Note 9 to the consolidated financial statements for further information about the provision for credit losses.

The table below presents our provision for credit losses.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Provision for credit losses	\$ 2,298	\$ 457

2022 versus 2021. Provision for credit losses was \$2.30 billion for 2022, compared with \$457 million for 2021. Provisions for 2022 primarily reflected growth in the credit card portfolio, the impact of macroeconomic and geopolitical concerns and net charge-offs. Provisions for 2021 reflected growth in the credit card and wholesale portfolios, largely offset by reserve reductions as the broader economic environment continued to improve following the initial impact of the COVID-19 pandemic.

Operating Expenses

Our operating expenses are primarily influenced by compensation, headcount and levels of business activity. Compensation and benefits includes salaries, year-end discretionary compensation, amortization of equity awards and other items such as benefits. Compensation and benefits relate to direct Bank employees. Discretionary compensation is significantly impacted by, among other factors, GS Group’s overall financial performance, prevailing labor markets, business mix, the structure of GS Group’s share-based compensation programs and the external environment. Another component of our operating expenses is service charges, which are employment related costs of dual employees and employees of affiliates pursuant to the Master Services Agreement.

The table below presents our operating expenses by line item and headcount.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Compensation and benefits	\$ 1,537	\$ 1,526
Service charges	787	812
Professional fees	509	336
Transaction based	596	514
Market development	273	179
Communications and technology	389	287
Regulatory and agency fees	316	169
Depreciation and amortization	268	111
Other expenses	977	629
Total operating expenses	\$ 5,652	\$ 4,563
Headcount at period-end	5,162	3,699

In the table above:

- Compensation and benefits and service charges include employee-related expenses. As described above, compensation and benefits are expenses of direct Bank employees. Service charges are expenses related to dual employees and employees of affiliates who provide services to us pursuant to the Master Services Agreement.
- Other expenses primarily includes origination and servicing expenses and certain expenses charged by affiliates.

Management's Discussion and Analysis

2022 versus 2021. Operating expenses in the consolidated statements of earnings were \$5.65 billion for 2022, 24% higher than 2021.

Professional fees in the consolidated statements of earnings were \$509 million for 2022, 51% higher than 2021, primarily due to increased expenses related to our consumer activities.

Transaction based expenses in the consolidated statements of earnings were \$596 million for 2022, 16% higher than 2021, primarily reflecting higher expenses related to increased client activity.

Market development expenses in the consolidated statements of earnings were \$273 million for 2022, 53% higher than 2021, primarily reflecting increased expenses related to our consumer activities.

Communications and technology expenses in the consolidated statements of earnings were \$389 million for 2022, 36% higher than 2021, primarily reflecting increased expenses related to our consumer activities.

Regulatory and agency fees in the consolidated statements of earnings were \$316 million for 2022, 87% higher than 2021, primarily reflecting an increase in regulatory fees in the U.S.

Depreciation and amortization expenses in the consolidated statements of earnings were \$268 million for 2022, 141% higher than 2021, primarily related to our consumer activities (mainly reflecting the inclusion of GreenSky).

Other expenses in the consolidated statements of earnings were \$977 million for 2022, 55% higher than 2021, primarily due to increased expenses related to our consumer activities.

Headcount increased compared with December 2021, primarily reflecting the acquisition of GreenSky.

Provision for Taxes

The effective income tax rate for 2022 was 27.4%, up from the full year income tax rate of 24.8% for 2021, primarily due to changes in the geographic mix of earnings and increases in non-deductible expenses.

In August 2022, the Inflation Reduction Act of 2022 was signed into law. The Inflation Reduction Act of 2022 includes income tax incentives to encourage investments in clean energy and a new 15% corporate alternative minimum tax (CAMT). The CAMT applies to corporations with average annual profits over \$1 billion and is calculated on their financial statement income, with certain adjustments, for years beginning after December 31, 2022. The legislation had no impact on our 2022 annual effective tax rate and based on our current understanding of the CAMT, is not expected to have a material impact on our 2023 annual effective tax rate.

Balance Sheet and Funding Sources

Balance Sheet Management

One of the risk management disciplines for a financial institution is its ability to manage the size and composition of its balance sheet. We leverage GS Group's balance sheet management process. While our asset base changes due to client activity, market fluctuations and business opportunities, the size and composition of the balance sheet also reflects factors, including (i) overall risk tolerance, (ii) the amount of capital held and (iii) the funding profile, among other factors. See "Capital Management and Regulatory Capital — Capital Management" for information about our capital management process.

In order to ensure appropriate risk management, we seek to maintain a sufficiently liquid balance sheet and, together with GS Group, have processes in place to dynamically manage our assets and liabilities, which include (i) balance sheet planning, (ii) balance sheet and funding limits for the businesses of GS Group, which include our activities, (iii) monitoring of key metrics and (iv) scenario analyses.

Balance Sheet Planning. GS Group prepares a balance sheet plan that combines projected total assets and composition of assets with its expected funding sources over a three-year time horizon. This plan is reviewed quarterly and may be adjusted in response to changing business needs or market conditions. Within this process and with the involvement of Treasury, GS Group also considers which businesses operate within the Bank and the availability of Bank-specific funding sources and capital constraints. The balance sheet planning process incorporates the long-term strategy of GS Group to increase the proportion of its businesses and activities conducted in Group Inc.'s bank subsidiaries, including us. The objectives of this planning process are:

- To develop asset and liability projections, taking into account the general state of the financial markets and expected business activity levels, as well as regulatory requirements;
- To allow Treasury and independent risk oversight and control functions to objectively evaluate balance sheet and funding limit requests from revenue-producing units in the context of GS Group's overall balance sheet constraints, including our and GS Group's liability profile and capital levels, and key metrics; and
- To inform the target amount, tenor and type of funding to raise, based on projected assets and contractual maturities.

Management's Discussion and Analysis

Treasury and independent risk oversight and control functions, along with revenue-producing units, review current and prior period information and expectations for the year to prepare our balance sheet plan. The specific information reviewed includes asset and liability size and composition, limit utilization, risk and performance measures, and capital usage. As part of GS Group's process, the consolidated balance sheet plan is reviewed quarterly and approved by the Firmwide Asset Liability Committee and the Firmwide Risk Appetite Committee, which includes Bank representatives. The review includes balance sheet plans by businesses of GS Group, including planned activities in the Bank, funding projections and projected key metrics. See "Risk Management — Overview and Structure of Risk Management" for an overview of our risk management structure.

Balance Sheet Limits. The Firmwide Asset Liability Committee and the Firmwide Risk Appetite Committee, as well as the Bank Risk and Asset Liability Committee where applicable to us, have the responsibility to review and approve balance sheet limits, which include our activities. These limits are set at levels which are close to actual operating levels, rather than at levels which reflect GS Group's or our maximum risk appetite, in order to ensure prompt escalation and discussion among revenue-producing units, Treasury and independent risk oversight and control functions on a routine basis. Requests for changes in limits are evaluated after giving consideration to their impact on key metrics. Compliance with limits is monitored by revenue-producing units and Treasury, as well as independent risk oversight and control functions.

Monitoring of Key Metrics. Key balance sheet metrics are monitored as part of the GS Group process, both by businesses of GS Group, which include our activities, and on a consolidated basis, including limit utilization and risk measures. This includes attributing assets to businesses and reviewing movements resulting from new business activity, as well as market fluctuations.

Scenario Analyses. We conduct scenario analyses as part of stress testing and resolution planning, as well as for other regulatory and business planning purposes. See "Capital Management and Regulatory Capital — Capital Management" for further information about these scenario analyses. These scenarios cover short- and long-term time horizons using various macroeconomic and Bank-specific assumptions, based on a range of economic scenarios. We use these analyses to assist us in developing our longer-term balance sheet management strategy, including the level and composition of assets, funding and capital. Additionally, these analyses help us develop approaches for maintaining appropriate funding, liquidity and capital across a variety of situations, including a severely stressed environment.

Balance Sheet Analysis

As of December 2022, total assets in our consolidated balance sheets were \$485.55 billion, an increase of \$51.58 billion from December 2021, primarily reflecting increases in cash of \$36.74 billion (primarily reflecting a change in the composition of our global core liquid assets (GCLA)) and loans of \$23.47 billion (primarily reflecting increases in other collateralized and consumer loans).

As of December 2022, total liabilities in our consolidated balance sheets were \$437.25 billion, an increase of \$45.16 billion from December 2021, primarily reflecting an increase in deposits of \$40.84 billion (primarily reflecting increases in transaction banking and private bank and consumer deposits).

Funding Sources

Our primary sources of funding are deposits, collateralized financings, unsecured borrowings and shareholder's equity. We seek to maintain broad and diversified funding sources across products, programs, tenors and creditors to avoid funding concentrations.

The table below presents information about our funding sources.

\$ in millions	As of December			
	2022		2021	
Deposits	\$ 362,855	85%	\$ 322,012	83%
Collateralized financings	12,443	3%	16,086	4%
Unsecured borrowings	6,431	1%	6,065	2%
Total shareholder's equity	48,302	11%	41,875	11%
Total	\$ 430,031	100%	\$ 386,038	100%

Substantially all of our funding is raised in U.S. dollars. We generally distribute our funding products through third-party distributors and private wealth advisors, to a depositor base in a variety of markets and directly to U.S. consumers, through our digital deposit platform. We believe that our relationships with our creditors are critical to our liquidity. Our creditors include individuals, financial institutions, nonfinancial institutions, corporations and asset managers. We have imposed various internal guidelines to monitor creditor concentration across our funding programs.

Deposits. Our deposits provide us with a diversified source of funding and reduce our reliance on wholesale funding. We accept deposits, including savings, demand and time deposits, from private bank clients, U.S. consumers, clients of third-party broker-dealers, institutions, corporations and affiliates.

We also accept deposits from Goldman Sachs Funding LLC (Funding IHC) and Group Inc.

The average interest rate on our interest-bearing deposits was 1.53% for 2022 and 0.44% for 2021.

Management's Discussion and Analysis

The table below presents our average interest rate on each type of deposit.

	Year Ended December	
	2022	2021
Savings and demand	1.49%	0.30%
Time	1.67%	0.92%

See “Supplemental Financial Information — Distribution of Assets, Liabilities, and Shareholder’s Equity” and Note 13 to the consolidated financial statements for further information about deposits, including a maturity profile of our time deposits.

Collateralized Financings. We fund certain of our inventory and a portion of investments on a secured basis by entering into collateralized financing agreements, such as securities sold under agreements to repurchase (repurchase agreements). We are also a member of the Federal Home Loan Bank of New York (FHLB). We had no outstanding borrowings from the FHLB as of December 2022 and \$100 million as of December 2021. See Note 11 to the consolidated financial statements for further information about collateralized financings, including its maturity profile. Additionally, we have access to funding through the Federal Reserve discount window. However, we do not rely on this funding in our liquidity planning and stress testing.

Unsecured Borrowings. We may raise funding through unsecured borrowings, primarily from Funding IHC and Group Inc. Group Inc. raises non-deposit unsecured funding and lends to Funding IHC and other affiliates, including consolidated subsidiaries, such as us, to meet those entities’ funding needs. This approach enhances the flexibility with which Funding IHC and Group Inc. can meet our and other Group Inc. subsidiaries’ funding requirements. We may also raise funding through issuing senior unsecured debt. See Note 14 to the consolidated financial statements for further information about our unsecured borrowings.

Shareholder’s Equity. Shareholder’s equity is a stable and perpetual source of funding. See the consolidated statements of changes in shareholder’s equity in the consolidated financial statements for further information about our equity transactions.

Capital Management and Regulatory Capital

Capital adequacy is of critical importance to us. We have in place a comprehensive capital management policy that provides a framework, defines objectives and establishes guidelines to assist us in maintaining the appropriate level and composition of capital in both business-as-usual and stressed conditions.

Capital Management

We have established a comprehensive governance structure for capital management, where capital management activity is overseen by our Board of Directors (Board) and the Bank Risk and Asset Liability Committee reviews capital levels monthly. Levels of capital usage are controlled principally by setting limits on our unsecured funding utilization and/or limits on risk at both the Bank and business levels.

We determine the appropriate amount and composition of our capital by considering multiple factors, including our current and future regulatory capital requirements, the results of our capital planning and stress testing processes, capital requirements for resolution planning and other factors, such as rating agency guidelines, the business environment and conditions in the financial markets.

As part of our capital management policy, we maintain a contingency capital plan. Our contingency capital plan provides a framework for evaluating and remediating capital deficiencies, specifying potential drivers, mitigants and actions that can be taken to address such deficiencies. Our contingency capital plan also outlines the communication and escalation procedures for internal and external stakeholders in the event of a capital shortfall.

Restrictions on Payments. Our payment of dividends to Group Inc. is subject to certain restrictions. For example, the amount of dividends that may be paid is limited to the lesser of the amounts calculated under a recent earnings test and an undivided profits test. In addition to limitations on the payment of dividends imposed by federal and state laws, the FRB and the FDIC have the authority to prohibit or limit the payment of dividends by the banking organizations they supervise if, in their opinion, payment of a dividend would constitute an unsafe or unsound practice in light of the financial condition of the banking organization, pursuant to applicable FRB regulations.

During the year ended December 2022, we did not declare or pay any dividends to Group Inc. During the year ended December 2021, we declared and paid approximately \$33 billion of dividends to Group Inc., substantially all of which related to the acquisition of GSBE in July 2021. As a result of the 2021 dividend payments made to Group Inc. in connection with the acquisition of GSBE, we cannot currently declare any dividends without prior regulatory approval.

Capital Planning and Stress Testing Process. As part of capital planning, we project sources and uses of capital given a range of business environments, including stressed conditions. Our stress testing process is designed to identify and measure material risks associated with our business activities, including market risk, credit risk, operational risk and liquidity risk, as well as our ability to generate revenues.

Management's Discussion and Analysis

Our capital planning process incorporates an internal capital adequacy assessment with the objective of ensuring that we are appropriately capitalized relative to the risks in our businesses. We incorporate stress scenarios into our capital planning process with a goal of holding sufficient capital to ensure we remain adequately capitalized in baseline and stressed conditions.

Our stress tests incorporate our internally designed stress scenarios, including our internally developed severely adverse scenario, and are designed to capture our specific vulnerabilities and risks.

We are required to conduct stress tests on an annual basis and publish a summary of certain results. We published a summary of our annual U.S. Dodd-Frank Wall Street Reform and Consumer Protection Act Stress Tests results in June 2022.

GSBE also has its own capital planning and stress testing processes, which incorporates internally designed stress tests developed in accordance with the guidelines of its regulators.

Rating Agency Guidelines

The credit rating agencies assign us long- and short-term issuer ratings, as well as ratings on our long- and short-term bank deposits. They also assign credit ratings to the obligations of Group Inc., which guarantees substantially all of GS Bank USA's senior unsecured obligations and deposits outstanding as of December 2022, excluding most CDs and certain notes evidencing senior unsecured debt.

The level and composition of our capital are among the many factors considered in determining our credit ratings. Each agency has its own definition of eligible capital and methodology for evaluating capital adequacy, and assessments are generally based on a combination of factors rather than a single calculation. See "Risk Management — Liquidity Risk Management — Credit Ratings" for further information about our credit ratings.

Consolidated Regulatory Capital

We are subject to consolidated regulatory capital requirements and calculate our capital ratios in accordance with the regulatory capital requirements applicable to state member banks, which are based on the FRB's regulations (Capital Framework). Under the Capital Framework, we are an "Advanced approach" banking organization.

The capital requirements calculated under the Capital Framework include the capital conservation buffer requirements, comprised of a 2.5% buffer and a countercyclical capital buffer. The countercyclical capital buffer in the future may differ due to additional guidance from our regulators and/or positional changes. See Note 19 to the consolidated financial statements for further information about our risk-based capital ratios and leverage ratios, and the Capital Framework.

Regulatory and Other Matters

Regulatory Matters

See "Regulation" in Part I of this Annual Report for further information about the laws, rules and regulations and proposed laws, rules and regulations that apply to us and our operations. In addition, see Note 19 to the consolidated financial statements for information about our risk-based capital ratios and leverage ratios.

Community Reinvestment Act (CRA). We are subject to the provisions of the CRA and to the provisions of the New York Banking Law that impose continuing and affirmative obligations upon a New York State-chartered bank to serve the credit needs of its local community (NYCRA). Under the terms of the CRA and NYCRA, we have a continuing and affirmative obligation, consistent with safe and sound operation, to help meet the credit needs of our communities. The regulatory agencies' assessment of our CRA and NYCRA record is made available to the public. We received a "Satisfactory" CRA rating from the FRBNY and an "Outstanding" NYCRA rating from the NYDFS in our most recent completed examinations, each covering the period from 2019 to 2021. See "Regulation" in Part I of this Annual Report for further information about the CRA and NYCRA.

Other Matters

Replacement of IBORs, including London Interbank Offered Rate (LIBOR). On January 1, 2022, the publication of all EUR, CHF, JPY and GBP LIBOR (non-USD LIBOR) settings along with certain USD LIBOR settings ceased. The publication of the most commonly used USD LIBOR settings as representative rates will cease after June 2023. The FCA has allowed the publication and use of synthetic rates for certain GBP LIBOR settings in legacy GBP LIBOR-based derivative contracts through March 2024. The FCA has proposed to allow the publication and use of synthetic rates for certain USD LIBOR settings in legacy USD LIBOR-based derivative contracts through September 2024. The U.S. federal banking agencies' guidance strongly encourages banking organizations to cease using USD LIBOR.

Management's Discussion and Analysis

The International Swaps and Derivatives Association (ISDA) 2020 IBOR Fallbacks Protocol (IBOR Protocol) has provided derivatives market participants with amended fallbacks for legacy and new derivative contracts to mitigate legal or economic uncertainty. Both counterparties have to adhere to the IBOR Protocol or engage in bilateral amendments for the terms to be effective for derivative contracts. ISDA has confirmed that the FCA's formal announcement to cease both non-USD and USD LIBOR settings fixed the spread adjustment for all LIBOR rates and as a result fallbacks applied automatically for non-USD LIBOR settings following December 31, 2021 and will apply automatically for USD LIBOR settings following June 30, 2023. The Adjustable Interest Rate (LIBOR) Act, that was enacted in March 2022, provides a statutory framework to replace USD LIBOR with a benchmark rate based on the Secured Overnight Financing Rate (SOFR) for contracts governed by U.S. law that have no fallbacks or fallbacks that would require the use of a poll or LIBOR-based rate. In December 2022, the FRB adopted a final rule that implements the LIBOR Act, which became effective on February 27, 2023. The final rule identifies different SOFR-based replacement rates for derivative contracts, for cash instruments such as floating-rate notes, for consumer contracts, for certain government-sponsored enterprise contracts and for certain student loan securitizations that lack a fallback to an alternative rate when USD LIBOR ceases to be published on June 30, 2023.

Our risk exposure to USD LIBOR is primarily in connection with our derivative contracts and loan portfolio. As of December 2022, the notional amount of our USD LIBOR-based derivative contracts was approximately \$10 trillion, of which approximately \$8 trillion will mature after June 2023 based on their contractual terms. Substantially all of such derivative contracts are with counterparties and affiliates under bilateral agreements subject to the IBOR Protocol, or with central clearing counterparties or exchanges which have incorporated fallbacks consistent with the IBOR Protocol in their rulebooks and have announced that they plan to convert USD LIBOR contracts to alternative risk-free reference rates. In addition, our USD LIBOR-based loans were approximately \$29 billion as of December 2022, of which approximately \$27 billion will mature after June 2023 based on their contractual terms. A vast majority of such loans contain fallback provisions in the related loan agreements, and we are actively engaging with our clients and syndicate partners to remediate the remaining loan agreements.

GS Group has a program in place that focuses on achieving an orderly transition from IBORs to alternative risk-free reference rates for us and our clients, and continues to make progress on its transition program.

Off-Balance Sheet Arrangements

In the ordinary course of business, we enter into various types of off-balance sheet arrangements. Our involvement in these arrangements can take many different forms, including:

- Holding interests in special purpose entities such as mortgage-backed and other asset-backed securitization vehicles;
- Providing guarantees, indemnifications, commitments, and representations and warranties; and
- Entering into interest rate, currency, credit and other derivatives, including total return swaps.

We enter into these arrangements primarily in connection with our lending and market-making activities, and securitizations.

The table below presents where information about our various off-balance sheet arrangements may be found in this Annual Report. In addition, see Note 3 to the consolidated financial statements for information about our consolidation policies.

Off-Balance Sheet Arrangement	Disclosure in Annual Report
Variable interests and other obligations, including contingent obligations, arising from variable interests in nonconsolidated variable interest entities (VIEs)	See Note 17 to the consolidated financial statements.
Guarantees and lending and other commitments	See Note 18 to the consolidated financial statements.
Derivatives	See "Risk Management — Credit Risk Management — Credit Exposures — OTC Derivatives" and Notes 4, 5, 6, 7 and 18 to the consolidated financial statements.

Risk Management

Risks are inherent in our businesses and include liquidity, market, credit, operational, model, legal, compliance, conduct, regulatory and reputational risks. For further information about our risk management processes, see "Overview and Structure of Risk Management," and for information about our areas of risk, see "Liquidity Risk Management," "Market Risk Management," "Credit Risk Management," "Operational Risk Management," "Model Risk Management," "Capital Risk Management" and "Risk Factors" in Part I of this Annual Report.

Management's Discussion and Analysis

Certain risk management processes as described in the “Liquidity Risk Management,” “Market Risk Management,” “Credit Risk Management,” “Operational Risk Management,” “Model Risk Management” and “Capital Risk Management” sections below are performed by GS Group at the level of its businesses, products, and revenue producing units which encompass all our activities. These processes are subject to Bank oversight, either pursuant to a Service Level Agreement between us and certain affiliates, or inclusive of Bank activities. All references in the sections below to businesses, products, and revenue-producing units refer to those of GS Group.

Overview and Structure of Risk Management

Overview

We believe that effective risk management is critical to our success. Accordingly, GS Group has established an enterprise risk management framework that employs a comprehensive, integrated approach to risk management, and is designed to enable comprehensive risk management processes to assess, monitor and manage the risks faced by GS Group, including us. Our risk management structure, consistent with GS Group, is built around three core components: governance, processes and people.

Governance. Risk management governance starts with the Board, which both directly and through its committees, including its Risk Committee, oversees the risk management policies and practices implemented through the enterprise risk management framework. The Board Risk Committee is also responsible for the annual review and approval of our risk appetite statement. The risk appetite statement describes the levels and types of risk we are willing to accept or to avoid, in order to achieve our objectives, included in our strategic business objectives, while remaining in compliance with regulatory requirements. The Board reviews our strategic business objectives and is ultimately responsible for overseeing and providing direction about our strategy and risk appetite.

The Board, either directly or through its committees, receives regular briefings on our risks, including liquidity risk, market risk, credit risk, operational risk and model risk, from our independent risk oversight and control functions, including our chief risk officer and chief financial officer, on compliance risk and conduct risk from our chief compliance officer, on legal and regulatory matters from our general counsel, and on other matters impacting our reputation from our general counsel. Our chief risk officer reports to our chief executive officer and to the Board Risk Committee. As part of the review of our risk portfolio, our chief risk officer regularly advises the Board Risk Committee of relevant risk metrics and material exposures, including risk limits and thresholds established in our risk appetite statement.

The implementation of risk governance structure and core risk management processes is overseen by Enterprise Risk. We utilize the enterprise risk management framework which provides the Board, our risk committees and senior management with a consistent and integrated approach to managing our various risks in a manner consistent with our risk appetite.

Revenue-producing units, as well as Treasury, Engineering, Human Capital Management, Operations, and Corporate and Workplace Solutions, are considered our first line of defense. They are accountable for the outcomes of our risk-generating activities, as well as for assessing and managing those risks within our risk appetite.

Independent risk oversight and control functions are considered our second line of defense and provide independent assessment, oversight and challenge of the risks taken by our first line of defense, as well as lead and participate in risk committees. Independent risk oversight and control functions include Compliance, Conflicts Resolution, Controllers, Legal, Risk and Tax.

Internal Audit is considered our third line of defense and is accountable to the Audit Committee of the Board. Internal Audit includes professionals with a broad range of audit and industry experience, including risk management expertise. Internal Audit is responsible for independently assessing and validating the effectiveness of key controls, including those within the risk management framework, and providing timely reporting to the Audit Committee of the Board, senior management and regulators.

The three lines of defense structure promotes the accountability of first line risk takers, provides a framework for effective challenge by the second line and empowers independent review from the third line.

Processes. We maintain various processes that are critical components of our risk management framework, including (i) risk identification and control assessment, (ii) risk appetite, limit and threshold setting, (iii) risk metrics, reporting and monitoring, and (iv) risk decision-making.

Management's Discussion and Analysis

- **Risk Identification and Control Assessment.** We believe the identification of our risks and related control assessment is a critical step in providing our Board and senior management transparency and insight into the range and materiality of our risks. We have a comprehensive data collection process, including policies and procedures that require all employees to report and escalate risk events. Our approach for risk identification and control assessment is comprehensive across all risk types, is dynamic and forward-looking to reflect and adapt to our changing risk profile and business environment, leverages subject matter expertise, and allows for prioritization of our most critical risks. This approach also encompasses our control assessment, led by our second line of defense, to review and challenge the control environment to ensure it supports our strategic business plan.

An important part of our risk management process is stress testing. It allows us to quantify our exposure to tail risks, highlight potential loss concentrations, undertake risk/reward analysis, and assess and mitigate our risk positions. Stress tests are performed on a regular basis and are designed to ensure a comprehensive analysis of our vulnerabilities and idiosyncratic risks combining financial and nonfinancial risks, including, but not limited to, credit, market, liquidity and funding, operational and compliance, strategic, systemic and emerging risks into a single combined scenario. We also perform ad hoc stress tests in anticipation of market events or conditions. Stress tests are also used to assess capital adequacy as part of our capital planning and stress testing process. See “Capital Management and Regulatory Capital — Capital Management” for further information.

- **Risk Appetite, Limit and Threshold Setting.** We apply a rigorous framework of limits and thresholds to control and monitor risk across transactions, products, businesses and markets. Bank-wide limits are set by the Board and its committees, with certain levels set by the Bank Risk and Asset Liability Committee and monitored on a regular basis. Certain limits, other than regulatory and certain of our Board-level limits, may be set at levels that will require periodic adjustment, rather than at levels that reflect our maximum risk appetite. This fosters an ongoing dialogue about risk among our first and second lines of defense, committees, senior management, and the Board, as well as rapid escalation of risk-related matters. Additionally, through delegated authority from the Bank Risk and Asset Liability Committee, Market Risk sets market risk limits at certain product and desk levels. Credit Risk, also through delegated authority from Bank Risk and Asset Liability Committee, sets limits for individual counterparties and their subsidiaries, including affiliates, industries and countries. Limits are reviewed frequently and amended, with required approvals, on a permanent and temporary basis, as appropriate, to reflect changing market or business conditions.

- **Risk Metrics, Reporting and Monitoring.** Effective risk reporting and risk decision-making depends on our ability to get the right information to the right people at the right time. As such, we focus on the rigor and effectiveness of our risk systems, with the objective of ensuring that our risk management technology systems provide us with complete, accurate and timely information. Our risk metrics, reporting and monitoring processes are designed to take into account information about both existing and emerging risks, thereby enabling our risk committees and senior management to perform their responsibilities with the appropriate level of insight into risk exposures. Furthermore, our limit and threshold breach processes provide means for timely escalation. We evaluate changes in our risk profile and our businesses, including changes in business mix or jurisdictions in which we operate, by monitoring risk factors at a Bank-wide level.

- **Risk Decision-Making.** Our governance structure provides the protocol and responsibility for decision-making on risk management issues and ensures implementation of those decisions. We make extensive use of our risk committees that meet regularly and serve as an important means to facilitate and foster ongoing discussions to manage and mitigate risks.

We maintain strong and proactive communication about risk and we have a culture of collaboration in decision-making among our first and second lines of defense, committees and senior management. While our first line of defense is responsible for management of their risk, we dedicate extensive resources to our second line of defense in order to ensure a strong oversight structure and an appropriate segregation of duties. GS Group regularly reinforces its strong culture of escalation and accountability across GS Group subsidiaries and functions, including us.

People. Even the best technology serves only as a tool for helping to make informed decisions in real time about the risks we are taking. Ultimately, effective risk management requires our people to interpret our risk data on an ongoing and timely basis and adjust risk positions accordingly. The experience of the professionals, and their understanding of the nuances and limitations of each risk measure, guides us in assessing exposures and maintaining them within prudent levels.

Management's Discussion and Analysis

We reinforce a culture of effective risk management, consistent with our risk appetite, through GS Group's training and development programs, inclusive of us, as well as in the way we evaluate performance, and recognize and reward our people. The training and development programs, including certain sessions led by GS Group's most senior leaders, are focused on the importance of risk management, client relationships and reputational excellence. As part of GS Group's performance review process, we assess reputational excellence, including how an employee exercises good risk management and reputational judgment, and adheres to the code of conduct and compliance policies. We are included in GS Group's review and reward processes which are designed to communicate and reinforce to our professionals the link between behavior and how people are recognized, the need to focus on our clients and our reputation, and the need to always act in accordance with the highest standards.

Structure

Ultimate oversight of risk is the responsibility of the Board. The Board oversees risk both directly and through its Audit Committee and its Risk Committee. Our management has established committees for risk oversight and committee membership generally consists of senior managers from both our first and second lines of defense. We have established procedures for these committees to ensure that appropriate information barriers are in place. Our primary risk committees are described below. All chairs of our management-level committees are our employees or dual employees.

We leverage GS Group's firmwide and business-specific committees, where appropriate, for advice on certain of our activities. Bank officers, who are members of such committees, understand their responsibility to review any proposed products, transactions or activities and to act in our interest. In addition, both our committees and GS Group's committees have responsibility for considering the impact of transactions and activities on our reputation.

Membership of our risk committees is reviewed regularly and updated to reflect changes in the responsibilities of the committee members. Accordingly, the length of time that members serve on the respective committees varies as determined by the committee chairs and based on the responsibilities of the members.

Our risk management governance structure includes the Board Risk Committee, which has ultimate risk management oversight for us, our key risk-related committees, which are described in further detail below, and the independence of our three lines of defense. We operate as a subsidiary of Group Inc. and, when applicable, we utilize the structure and expertise of GS Group's committees, including its firmwide, business-specific and regional committees for risk management, such as the Firmwide Enterprise Risk Committee, the Firmwide Risk Appetite Committee (through delegated authority from the Firmwide Enterprise Risk Committee), the Consumer & Small Business Credit Policy Committee (CBCPC – through delegated authority from the Firmwide Risk Appetite Committee), the Private Wealth Management Capital Committee, and related sub-committees.

The CBCPC supervises credit risk exposures for all unsecured consumer loans, consumer credit card loans, small business loans and secured *Goldman Sachs Private Bank Select* (GS Select) loans that are originated by the Bank, and is responsible for establishing the credit risk management underwriting policies and framework for all unsecured consumer lending, credit card lending, small business lending and secured GS Select lending. The CBCPC co-chairs include a deputy chief credit risk officer.

Committee Structure

Our committee structure is described as follows:

Bank Management Committee. The Bank Management Committee oversees our activities, including our risk control functions. It provides this oversight directly and through authority delegated to committees it has established. This committee consists of our most senior leaders, and is chaired by our chief executive officer. The Bank Management Committee is accountable for business standards and practices, including reputational risk management.

The following are the committees that are principally involved in our risk management:

Bank New Activity Committee. The Bank New Activity Committee (BNAC) is responsible for the review and approval of proposed new activities to be conducted in the Bank. In addition, BNAC may review, at its discretion, previously approved activities that are significant and that have changed in complexity and/or structure or present different reputational and suitability concerns over time to consider whether these activities remain appropriate. The review process may utilize the expertise of the Firmwide New Activity Committee and the Regional New Activity Committees.

Management's Discussion and Analysis

Bank Risk and Asset Liability Committee. The Bank Risk and Asset Liability Committee is responsible, directly or through its sub-committees, for the ongoing monitoring and management of our risks, including but not limited to, market risk, credit risk, liquidity and funding risk, foreign currency risk, legal risk, operational risk, settlement risk and investments risk. In addition, the Bank Risk and Asset Liability Committee is responsible, directly or through its sub-committees, for the ongoing monitoring and management of our (i) compliance with the minimum regulatory capital ratios required under FRB regulations applicable to banks, (ii) the Internal Capital Adequacy Assessment Process, (iii) liquidity and funding risk management, (iv) balance sheet planning and asset liability management, (v) interest rate risk monitoring and management and (vi) recovery and resolution planning, in each case subject to information barriers and related policies and procedures as applicable. The risk management methodologies of the Bank Risk and Asset Liability Committee are consistent with those of the Firmwide Risk Appetite Committee, the Firmwide Asset Liability Committee and Bank Management Committee, as appropriate.

Liquidity Risk Management

Overview

Liquidity risk is the risk that we will be unable to fund ourselves or meet our liquidity needs in the event of Bank-specific, GS Group, broader industry or market liquidity stress events. We have in place a comprehensive and conservative set of liquidity and funding policies. Our principal objective is to be able to fund ourselves and to enable our core businesses to continue to serve clients and generate revenues, even under adverse circumstances.

Treasury has primary responsibility for developing, managing and executing our liquidity and funding strategy within our risk appetite.

Liquidity Risk, which is independent of the revenue-producing units and Treasury, and reports to our chief risk officer, has primary responsibility for identifying, monitoring and managing our liquidity risk through oversight across our businesses and the establishment of stress testing and limits frameworks. Liquidity Risk fulfills these responsibilities both directly and through use of a Service Level Agreement with GS Group's Liquidity Risk function, which reports to GS Group's chief risk officer. Services provided by GS Group's Liquidity Risk function are subject to our risk management policies for any work it performs for us under a Service Level Agreement.

Liquidity Risk Management Principles

We manage liquidity risk according to three principles: (i) hold sufficient excess liquidity in the form of GCLA to cover outflows during a stressed period, (ii) maintain appropriate Asset-Liability Management and (iii) maintain a viable Contingency Funding Plan.

GCLA. GCLA is liquidity that we maintain to meet a broad range of potential cash outflows and collateral needs in a stressed environment. A primary liquidity principle is to pre-fund our estimated potential cash and collateral needs during a liquidity crisis and hold this liquidity in the form of unencumbered, highly liquid securities and cash. We believe that the securities held in our GCLA would be readily convertible to cash in a matter of days, through liquidation, by entering into repurchase agreements or from maturities of securities purchased under agreements to resell (resale agreements), and that this cash would allow us to meet immediate obligations without needing to sell other assets or depend on additional funding from credit-sensitive markets.

Our GCLA reflects the following principles:

- The first days or weeks of a liquidity crisis are the most critical to a company's survival;
- Focus must be maintained on all potential cash and collateral outflows, not just disruptions to financing flows. Liquidity needs are determined by many factors, including market movements, collateral requirements and client commitments, all of which can change dramatically in a difficult funding environment;
- During a liquidity crisis, credit-sensitive funding, including unsecured borrowings, certain deposits and some types of secured financing agreements, may be unavailable, and the terms (e.g., interest rates, collateral provisions and tenor) or availability of other types of secured financing may change and certain deposits may be withdrawn; and
- As a result of our policy to pre-fund liquidity that we estimate may be needed in a crisis, we hold more cash and unencumbered securities and have larger funding balances than we would otherwise require. We believe that our liquidity is stronger with greater balances of cash and highly liquid unencumbered securities, even though it increases our total assets and our funding costs.

Asset-Liability Management. Our liquidity risk management policies are designed to ensure we have a sufficient amount of financing, even when funding markets experience persistent stress. We seek to maintain a diversified funding profile with an appropriate tenor, taking into consideration the characteristics and liquidity profile of our assets and modeled tenor of deposits with no stated maturity.

Management's Discussion and Analysis

Our approach to asset-liability management includes:

- Conservatively managing the overall characteristics of our funding book, with a focus on maintaining long-term, diversified sources of funding in excess of our current requirements. See “Balance Sheet and Funding Sources — Funding Sources” for further information;
- Actively managing and monitoring our asset base, with particular focus on the liquidity, holding period and ability to fund assets on a secured basis. We assess our funding requirements and our ability to liquidate assets in a stressed environment while appropriately managing risk. This enables us to determine the most appropriate funding products and tenors. See “Balance Sheet and Funding Sources — Balance Sheet Management” for further information about our balance sheet management process; and
- Raising deposits and obtaining other secured and unsecured funding sources that have a long contractual or modeled tenor relative to the liquidity profile of our assets. This reduces the risk that our liabilities will come due in advance of our ability to generate liquidity from the sale of our assets.

Our goal is to ensure that we maintain sufficient liquidity to fund our assets and meet our contractual and contingent obligations in normal times, as well as during periods of market stress. Funding plans are reviewed and approved by the Bank Risk and Asset Liability Committee and Firmwide Asset Liability Committee. In a liquidity crisis, we would first use our GCLA in order to avoid reliance on asset sales (other than our GCLA). However, we recognize that orderly asset sales may be prudent or necessary in a severe or persistent liquidity crisis.

Contingency Funding Plan. We maintain a contingency funding plan to provide a framework for analyzing and responding to a liquidity crisis situation or periods of market stress. The contingency funding plan outlines a list of potential risk factors, key reports and metrics that are reviewed on an ongoing basis to assist in assessing the severity of, and managing through, a liquidity crisis and/or market dislocation. The contingency funding plan also describes in detail the potential responses if our assessments indicate that we have entered a liquidity crisis, which include pre-funding for what we estimate will be the potential cash and collateral needs, as well as utilizing secondary sources of liquidity. Mitigants and action items to address specific risks which may arise are also described and assigned to individuals responsible for execution.

The contingency funding plan identifies key groups of individuals and their responsibilities, which include fostering effective coordination, control and distribution of information, implementing liquidity maintenance activities and managing internal and external communication, all of which are critical in the management of a crisis or period of market stress.

Stress Tests

In order to determine the appropriate size of our GCLA, we model liquidity outflows over a range of scenarios and time horizons using one of GS Group’s primary internal liquidity risk models, referred to as the Modeled Liquidity Outflow, which quantifies our liquidity risks over a 30-day stress scenario. We also consider other factors, including, but not limited to, an assessment of our potential intraday liquidity needs through an additional internal liquidity risk model, referred to as the Intraday Liquidity Model, the results of GS Group’s long-term stress testing models, our resolution liquidity models and other applicable regulatory requirements and a qualitative assessment of GS Group’s, inclusive of our, condition, as well as the financial markets. The results of the Modeled Liquidity Outflow, the Intraday Liquidity Model, the long-term stress testing models and the resolution liquidity models are reported to senior management on a regular basis. We also perform Bank-wide stress tests. See “Overview and Structure of Risk Management” for information about stress tests.

Modeled Liquidity Outflow. Our Modeled Liquidity Outflow is based on conducting multiple scenarios that include combinations of market-wide and GS Group specific stress, including those scenarios applicable to us. These scenarios are characterized by the following qualitative elements:

- Severely challenged market environments, which include low consumer and corporate confidence, financial and political instability, and adverse changes in market values, including potential declines in equity markets and widening of credit spreads; and
- A GS Group-specific crisis potentially triggered by material losses, reputational damage, litigation and/or a ratings downgrade.

The following are key modeling elements of our Modeled Liquidity Outflow:

- Liquidity needs over a 30-day scenario;
- A two-notch downgrade of our and/or Group Inc.’s long-term senior unsecured credit ratings;
- Changing conditions in funding markets, which limit our access to unsecured and secured funding;
- No support from additional government funding facilities. Although we have access to funding through the Federal Reserve Bank discount window, we do not assume reliance on additional sources of funding in a liquidity crisis; and

Management's Discussion and Analysis

- A combination of contractual outflows and contingent outflows arising from both our on- and off-balance sheet arrangements. Contractual outflows include, among other things, upcoming maturities of unsecured borrowings, term deposits and secured funding. Contingent outflows include, among other things, an increase in variation margin requirements due to adverse changes in the value of our exchange-traded and over-the-counter (OTC) derivatives that are cleared and settled through central counterparties (OTC-cleared), draws on unfunded commitments and withdrawals of deposits that have no contractual maturity. See notes to the consolidated financial statements for further information about contractual outflows, including Note 11 for collateralized financings, Note 13 for deposits, Note 14 for unsecured long-term borrowings and Note 15 for operating lease payments, and “Off-Balance Sheet Arrangements” for further information about our various types of off-balance sheet arrangements.

Intraday Liquidity Model. Our Intraday Liquidity Model measures our intraday liquidity needs using a scenario analysis characterized by the same qualitative elements as our Modeled Liquidity Outflow. The model assesses the risk of increased intraday liquidity requirements during a scenario where access to sources of intraday liquidity may become constrained.

Long-Term Stress Testing. We utilize longer-term stress tests to take a forward view on our liquidity position through prolonged stress periods in which we experience a severe liquidity stress and recover in an environment that continues to be challenging. We are focused on ensuring conservative asset-liability management to prepare for a prolonged period of potential stress, seeking to maintain a diversified funding profile with an appropriate tenor, taking into consideration the characteristics and liquidity profile of our assets.

Limits

We use liquidity risk limits at various levels and across liquidity risk types to manage the size of our liquidity exposures. Limits are measured relative to acceptable levels of risk given our liquidity risk tolerance. See “Overview and Structure of Risk Management” for information about the limit approval process.

Limits are monitored by Treasury and Liquidity Risk. Treasury and Liquidity Risk are responsible for identifying and escalating to senior management and/or the appropriate risk committee, on a timely basis, instances where limits have been exceeded.

GCLA Metrics

Based on the results of our internal liquidity risk models, described above, as well as our consideration of other factors, including, but not limited to, a qualitative assessment of GS Group’s, inclusive of our condition, as well as the financial markets, we believe our liquidity position as of both December 2022 and December 2021 was appropriate. We strictly limit our GCLA to a narrowly defined list of securities and cash because they are highly liquid, even in a difficult funding environment. We do not include other potential sources of excess liquidity in our GCLA, such as less liquid unencumbered securities or committed credit facilities.

The table below presents information about our GCLA by asset class.

	Average for the			
	Three Months Ended December		Year Ended December	
<i>\$ in millions</i>	2022	2021	2022	2021
Overnight cash deposits	\$ 170,798	\$ 128,176	\$ 163,413	\$ 108,103
U.S. government obligations	39,619	38,103	34,477	42,394
U.S. agency obligations	7,859	8,733	7,116	7,916
Non-U.S. government obligations	4,196	4,946	6,853	3,168
Total	\$ 222,472	\$ 179,958	\$ 211,859	\$ 161,581

GCLA consists of (i) certain overnight U.S. and non-U.S. dollar cash deposits, (ii) unencumbered U.S. government and agency obligations (including highly liquid U.S. agency mortgage-backed obligations), all of which are eligible as collateral in Federal Reserve open market operations and (iii) certain non-U.S. dollar-denominated government obligations.

We maintain our GCLA to enable us to meet current and potential liquidity requirements. Our Modeled Liquidity Outflow and Intraday Liquidity Model incorporate our consolidated requirements. Funding IHC is required to provide the necessary liquidity to Group Inc. during the ordinary course of business, and is also obligated to provide capital and liquidity support to certain major subsidiaries, including us, in the event of GS Group’s material financial distress or failure. Liquidity held directly by us is intended for use only by us to meet our liquidity requirements and is assumed not to be available to our affiliates, including Group Inc. or Funding IHC, unless (i) legally provided for and (ii) there are no additional regulatory, tax or other restrictions.

Liquidity Regulatory Framework

We are subject to a minimum Liquidity Coverage Ratio (LCR) under the LCR rule approved by the U.S. federal bank regulatory agencies. The LCR rule requires organizations to maintain an adequate ratio of eligible high-quality liquid assets to expected net cash outflows under an acute short-term liquidity stress scenario. We are required to maintain a minimum LCR of 100%. As of December 2022, our LCR exceeded the minimum requirement.

Management's Discussion and Analysis

We are subject to a net stable funding ratio (NSFR) requirement established by the U.S. federal bank regulatory agencies, which requires large U.S. banking organizations to ensure they have access to stable funding over a one-year time horizon. Our NSFR as of December 2022 exceeded the minimum requirement.

GSBE is subject to a minimum LCR of 100% under the LCR rule approved by the European Parliament and Council. GSBE's average monthly LCR for the trailing twelve-month period ended December 2022 exceeded the minimum requirement. GSBE is subject to the applicable NSFR requirement in the E.U. As of December 2022, GSBE's NSFR exceeded the minimum requirement.

The implementation of these rules and any amendments adopted by the regulatory authorities could impact our liquidity and funding requirements and practices in the future.

Credit Ratings

Credit ratings are important when we are competing in certain markets, such as OTC derivatives, and when we seek to engage in longer-term transactions.

The table below presents the unsecured credit ratings and outlook by Fitch, Inc. (Fitch), Moody's Investors Service (Moody's), and Standard & Poor's Ratings Services (S&P) of GS Bank USA and GSBE.

	As of December 2022		
	Fitch	Moody's	S&P
GS Bank USA			
Short-term debt	F1	P-1	A-1
Long-term debt	A+	A1	A+
Short-term bank deposits	F1+	P-1	N/A
Long-term bank deposits	AA-	A1	N/A
Ratings outlook	Stable	Stable	Stable
GSBE			
Short-term debt	F1	P-1	A-1
Long-term debt	A+	A1	A+
Short-term bank deposits	N/A	P-1	N/A
Long-term bank deposits	N/A	A1	N/A
Ratings outlook	Stable	Stable	Stable

We believe our credit ratings are primarily based on the credit rating agencies' assessment of:

- Our status within GS Group and likelihood of GS Group support;
- Our liquidity, market, credit and operational risk management practices;
- The level and variability of our earnings;
- Our capital base;
- Our primary businesses, reputation and management;
- Our corporate governance; and

- The external operating and economic environment, including, in some cases, the assumed level of government support or other systemic considerations, such as potential resolution.

Certain of our derivatives have been transacted under bilateral agreements with counterparties who may require us to post collateral or terminate the transactions based on changes in our and/or Group Inc.'s credit ratings. We manage our GCLA to ensure we would, among other potential requirements, be able to make the additional collateral or termination payments that may be required in the event of a two-notch reduction in our and/or Group Inc.'s long-term credit ratings, as well as collateral that has not been called by counterparties, but is available to them.

See Note 7 to the consolidated financial statements for further information about derivatives with credit-related contingent features and the additional collateral or termination payments related to our net derivative liabilities under bilateral agreements that could have been called by counterparties in the event of a one- or two-notch downgrade in our and/or Group Inc.'s credit ratings.

Cash Flows

Our cash flows are complex and bear little relation to our net earnings and net assets. Consequently, we believe that traditional cash flow analysis is less meaningful in evaluating our liquidity position than the liquidity and asset-liability management policies described above. Cash flow analysis may, however, be helpful in highlighting certain macro trends and strategic initiatives in our businesses.

Year Ended December 2022. Our cash increased by \$36.74 billion to \$184.95 billion at the end of 2022, primarily due to net cash provided by financing activities and operating activities, partially offset by net cash used for investing activities. The net cash provided by financing activities primarily reflected cash inflows from increases in transaction banking and private bank and consumer deposits. The net cash provided by operating activities primarily reflected cash inflows from trading assets and liabilities, loans held for sale, and collateralized transactions. The net cash used for investing activities primarily reflected an increase in net lending activities (reflecting increases in other collateralized and consumer loans).

Year Ended December 2021. Our cash increased by \$88.69 billion to \$148.21 billion at the end of 2021, primarily due to net cash provided by financing activities, partially offset by net cash used for investing activities. The net cash provided by financing activities primarily reflected increases in transaction banking and private bank and consumer deposits and capital contributions from Group Inc., partially offset by dividends paid to Group Inc. The net cash used for investing activities primarily reflected an increase in lending activities.

Management's Discussion and Analysis

Market Risk Management

Overview

Market risk is the risk of an adverse impact to our earnings due to changes in market conditions. Our assets and liabilities that give rise to market risk primarily include positions held for market making for our clients and for our investing and financing activities, and these positions change based on client demands and our investment opportunities. We employ a variety of risk measures, each described in the respective sections below, to monitor market risk.

Categories of market risk include the following:

- Interest rate risk: results from exposures to changes in the level, slope and curvature of yield curves, the volatilities of interest rates, prepayment speeds and credit spreads;
- Equity price risk: results from exposures to changes in prices and volatilities of individual equities, baskets of equities and equity indices; and
- Currency rate risk: results from exposures to changes in spot prices, forward prices and volatilities of currency rates.

Market Risk, which is independent of the revenue-producing units and reports to our chief risk officer, has primary responsibility for assessing, monitoring and managing our market risk through oversight across our businesses. Market Risk fulfills these responsibilities both directly and through use of a Service Level Agreement with GS Group's Market Risk function, which reports to GS Group's chief risk officer. Services provided by GS Group's Market Risk function are subject to our risk management policies for any work it performs for us under a Service Level Agreement.

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

Market Risk Management Process

Our process for managing market risk includes the critical components of our risk management framework described in the "Overview and Structure of Risk Management," as well as the following:

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

Our market risk management systems enable us to perform an independent calculation of Value-at-Risk (VaR) and stress measures, capture risk measures at individual position levels, attribute risk measures to individual risk factors of each position, report many different views of the risk measures (e.g., by desk, business or product type), and produce ad hoc analyses in a timely manner.

Risk Measures

We produce risk measures and monitor them against established market risk limits. These measures reflect an extensive range of scenarios and the results are aggregated at product, business and Bank levels.

We use a variety of risk measures to estimate the size of potential losses for both moderate and more extreme market moves over both short- and long-term time horizons. Our primary risk measures are VaR and stress tests.

Risk reports detail key risks, drivers and changes for each desk and business, and are distributed daily to senior management of both the revenue-producing units and the independent risk oversight and control functions.

Value-at-Risk. VaR is the potential loss in value due to adverse market movements over a defined time horizon with a specified confidence level. We typically employ a one-day time horizon with a 95% confidence level. We use a single VaR model, which captures risks, including interest rates, currency rates and equity prices. As such, VaR facilitates comparison across portfolios of different risk characteristics. VaR also captures the diversification of aggregated risk at the Bank level.

We are aware of the inherent limitations to VaR and therefore use a variety of risk measures in our market risk management process. Inherent limitations to VaR include:

- VaR does not estimate potential losses over longer time horizons where moves may be extreme;
- VaR does not take account of the relative liquidity of different risk positions; and
- Previous moves in market risk factors may not produce accurate predictions of all future market moves.

Management's Discussion and Analysis

To comprehensively capture our exposures and relevant risks in our VaR calculation, we use historical simulations with full valuation of market factors at the position level by simultaneously shocking the relevant market factors for that position. These market factors include spot prices, credit spreads, funding spreads, yield curves, volatility and correlation, and are updated periodically based on changes in the composition of positions, as well as variations in market conditions. We sample from five years of historical data to generate the scenarios for our VaR calculation. The historical data is weighted so that the relative importance of the data reduces over time. This gives greater importance to more recent observations and reflects current asset volatilities, which improves the accuracy of our estimates of potential loss. As a result, even if our positions included in VaR were unchanged, our VaR would increase with increasing market volatility and vice versa.

Given its reliance on historical data, VaR is most effective in estimating risk exposures in markets in which there are no sudden fundamental changes or shifts in market conditions.

Our VaR measure does not include:

- Positions that are not accounted for at fair value, such as held-to-maturity securities and loans, deposits and unsecured borrowings that are accounted for at amortized cost;
- Available-for-sale securities for which the related unrealized fair value gains and losses are included in accumulated other comprehensive income/(loss);
- Positions that are best measured and monitored using sensitivity measures; and
- The impact of changes in counterparty and our own credit spreads on derivatives, as well as changes in our own credit spreads on financial liabilities for which the fair value option was elected.

We perform daily backtesting of the VaR model (i.e., comparing daily net revenues for positions included in VaR to the VaR measure calculated as of the prior business day) at the Bank and business level.

Stress Testing. Stress testing is a method of determining the effect of various hypothetical stress scenarios. We use stress testing to examine risks of specific portfolios, as well as the potential impact of our significant risk exposures. We use a variety of stress testing techniques to calculate the potential loss from a wide range of market moves on our portfolios, including sensitivity analysis and scenario analysis. The results of our various stress tests are analyzed together for risk management purposes. See “Overview and Structure of Risk Management” for information about Bank-wide stress tests.

Sensitivity analysis is used to quantify the impact of a market move in a single risk factor across all positions (e.g., equity prices or credit spreads) using a variety of defined market shocks, ranging from those that could be expected over a one-day time horizon up to those that could take many months to occur. We also use sensitivity analysis to quantify the impact of the default of any single entity, which captures the risk of large or concentrated exposures.

Scenario analysis is used to quantify the impact of a specified event, including how the event impacts multiple risk factors simultaneously. When conducting scenario analysis, we often consider a number of possible outcomes for each scenario, ranging from moderate to severely adverse market impacts. In addition, these stress tests are constructed using both historical events and forward-looking hypothetical scenarios.

Unlike VaR measures, which have an implied probability because they are calculated at a specified confidence level, there may not be an implied probability that our stress testing scenarios will occur. Instead, stress testing is used to model both moderate and more extreme moves in underlying market factors. When estimating potential loss, we generally assume that our positions cannot be reduced or hedged (although experience demonstrates that we are generally able to do so).

Limits

We use market risk limits at various levels to manage the size of our market exposures. These limits are set based on VaR and on a range of stress tests relevant to our exposures. See “Overview and Structure of Risk Management” for information about the limit approval process.

Market Risk is responsible for monitoring these limits, and identifying and escalating, to senior management and/or the appropriate risk committee, on a timely basis, instances where limits have been exceeded (e.g., due to positional changes or changes in market conditions, such as increased volatilities or changes in correlations). Such instances are remediated by an exposure reduction and/or a temporary or permanent increase to the limit, if warranted.

Metrics

We analyze VaR at the Bank level and a variety of more detailed levels, including by risk category, business and region. Diversification effect in the tables below represents the difference between total VaR and the sum of the VaRs for the three risk categories. This effect arises because the three market risk categories are not perfectly correlated.

Management's Discussion and Analysis

The table below presents our average daily VaR.

\$ in millions	Year Ended December	
	2022	2021
Categories		
Interest rates	\$ 84	\$ 46
Currency rates	15	6
Equity prices	3	1
Diversification effect	(19)	(7)
Total	\$ 83	\$ 46

Our average daily VaR increased to \$83 million in 2022 from \$46 million in 2021, due to higher levels of volatility. The total increase was primarily driven by an increase in the interest rates category.

The table below presents our period-end VaR.

\$ in millions	As of December	
	2022	2021
Categories		
Interest rates	\$ 90	\$ 51
Currency rates	14	8
Equity prices	2	3
Diversification effect	(18)	(11)
Total	\$ 88	\$ 51

Our period-end VaR increased to \$88 million as of December 2022 from \$51 million as of December 2021, due to increased exposures and higher levels of volatility. The total increase was primarily driven by an increase in the interest rates category.

During 2022, our total VaR risk limit was exceeded on three occasions primarily due to higher levels of volatility generally resulting from broad macroeconomic and geopolitical concerns. These limit breaches were resolved by temporary increases in the VaR risk limit and subsequent risk reductions. During 2021, our total VaR limit was exceeded one time, our total VaR limit was raised temporarily on three occasions to facilitate increased client activity and there were no permanent changes to the VaR risk limit.

The table below presents our high and low VaR.

\$ in millions	Year Ended December			
	2022		2021	
	High	Low	High	Low
Categories				
Interest rates	\$ 113	\$ 47	\$ 59	\$ 31
Currency rates	\$ 30	\$ 7	\$ 13	\$ 3
Equity prices	\$ 7	\$ 1	\$ 5	\$ —
Bank				
VaR	\$ 118	\$ 46	\$ 59	\$ 30

Sensitivity Measures

Certain portfolios and individual positions are not included in VaR because VaR is not the most appropriate risk measure. Other sensitivity measures we use to analyze market risk are described below.

10% Sensitivity Measures. The table below presents our market risk by asset category for positions accounted for at fair value that are not included in VaR.

\$ in millions	As of December	
	2022	2021
Debt	\$ 444	\$ 599
Equity	4	6
Total	\$ 448	\$ 605

In the table above:

- The market risk of these positions is determined by estimating the potential reduction in net revenues of a 10% decline in the value of these positions.
- Equity positions relate to investments in qualified affordable housing projects.
- Debt positions include loans backed by commercial and residential real estate, corporate bank loans and other corporate debt.
- Funded equity and debt positions are included in our consolidated balance sheets in investments and loans. See Note 8 to the consolidated financial statements for further information about investments and Note 9 to the consolidated financial statements for further information about loans.
- These measures do not reflect the diversification effect across asset categories or across other market risk measures.

Interest Rate Sensitivity. Loans accounted for at amortized cost were \$141.82 billion as of December 2022 and \$112.28 billion as of December 2021, substantially all of which had floating interest rates. The estimated sensitivity to a 100 basis point increase in interest rates on such loans was \$1.12 billion as of December 2022 and \$887 million as of December 2021 of additional interest income over a twelve-month period, which does not take into account the potential impact of an increase in costs to fund such loans. In addition, we manage our exposure to structural interest rate risk generated by our net asset-liability position, which is primarily a function of our fixed rate term deposits and non-maturity deposits. See Note 9 to the consolidated financial statements for further information about loans that are held for investment and Note 13 for further information about deposits.

Other Market Risk Considerations

We make investments in securities that are accounted for as available-for-sale or held-to-maturity and included in investments in the consolidated balance sheets. See Note 8 to the consolidated financial statements for further information.

Management's Discussion and Analysis

Credit Risk Management

Overview

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

Credit Risk, which is independent of the revenue-producing units and reports to our chief risk officer, has primary responsibility for assessing, monitoring and managing our credit risk through oversight across our businesses. Credit Risk fulfills these responsibilities both directly and through use of a Service Level Agreement with GS Group's Credit Risk function, which reports to GS Group's chief risk officer. Services provided by GS Group's Credit Risk function are subject to our risk management policies for any work it performs for us under a Service Level Agreement.

In addition to Credit Risk approval, all committed loans that are in excess of defined thresholds must also be approved by a Bank risk officer. The Bank Risk and Asset Liability Committee approves our credit policies. In addition, we hold other positions that give rise to credit risk (e.g., bonds and secondary bank loans). These credit risks are captured as a component of market risk measures, which are monitored and managed by Market Risk. We also enter into derivatives to manage market risk exposures. Such derivatives also give rise to credit risk, which is monitored and managed by Credit Risk.

Credit Risk Management Process

Our process for managing credit risk includes the critical components of our risk management framework described in the "Overview and Structure of Risk Management," as well as the following:

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

Credit Risk also performs credit analyses, which incorporate initial and ongoing evaluations of the capacity and willingness of a counterparty to meet its financial obligations. We employ well-defined underwriting standards and policies, which seek to mitigate credit risk through analysis of a borrower's credit history, financial information, cash flow, sustainability of liquidity and collateral quality adequacy, if applicable. For substantially all of our credit exposures, the core of our process is an annual counterparty credit evaluation or more frequently if deemed necessary as a result of events or changes in circumstances. We determine an internal credit rating for the counterparty by considering the results of the credit evaluations and assumptions with respect to the nature of and outlook for the counterparty's industry and the economic environment. The internal credit rating does not take into consideration collateral received or other credit support arrangements. Senior personnel, with expertise in specific industries, inspect and approve credit reviews and internal credit ratings.

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

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

Risk Measures

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

Management's Discussion and Analysis

Stress Tests

We conduct regular stress tests to calculate the credit exposures, including potential concentrations that would result from applying shocks to counterparty credit ratings or credit risk factors (e.g., currency rates, credit spreads, interest rates, equity prices). These shocks cover a wide range of moderate and more extreme market movements, including shocks to multiple risk factors, consistent with the occurrence of a severe market or economic event. Unlike potential exposure, which is calculated within a specified confidence level, stress testing does not generally assume a probability of these events occurring. We also perform Bank-wide stress tests. See “Overview and Structure of Risk Management” for more information about stress tests.

Limits

We use credit risk limits at various levels, as well as underwriting standards to manage the size and nature of our credit exposures. Limits for industries and countries are based on our risk appetite and are designed to allow for regular monitoring, review, escalation and management of credit risk concentrations. See “Overview and Structure of Risk Management” for information about the limit approval process.

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

Risk Mitigants

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

For derivatives and securities financing transactions, we may enter into netting agreements with counterparties that permit us to offset receivables and payables with such counterparties. We may also reduce credit risk with counterparties by entering into agreements that enable us to obtain collateral from them on an upfront or contingent basis and/or to terminate transactions if the counterparty's credit rating falls below a specified level. We monitor the fair value of the collateral to ensure that our credit exposures are appropriately collateralized. We seek to minimize exposures where there is a significant positive correlation between the creditworthiness of our counterparties and the market value of collateral we receive.

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

Credit Exposures

As of December 2022, our aggregate credit exposure increased compared with December 2021, primarily reflecting increases in cash deposits with the Federal Reserve and loans and lending commitments. The percentage of our credit exposures arising from non-investment-grade counterparties (based on our internally determined public rating agency equivalents) decreased slightly compared with December 2021, primarily reflecting an increase in investment-grade credit exposure related to cash deposits with central banks. Our credit exposures are described further below.

Cash. Our credit exposure on cash arises from our unrestricted cash, and includes both interest-bearing and non-interest-bearing deposits. To mitigate the risk of credit loss, we deposit substantially all of our cash at the Federal Reserve and other central banks.

OTC Derivatives. Our credit exposure on OTC derivatives arises primarily from our market-making activities. As a market maker, we enter into derivative transactions to provide liquidity to clients and to facilitate the transfer and hedging of their risks. We also enter into derivatives to manage market risk exposures. We manage our credit exposure on OTC derivatives using the credit risk process, measures, limits and risk mitigants described above.

We generally enter into OTC derivatives transactions under bilateral collateral arrangements that require the daily exchange of collateral. As credit risk is an essential component of fair value, we include a credit valuation adjustment (CVA) in the fair value of derivatives to reflect counterparty credit risk, as described in Note 7 to the consolidated financial statements. CVA is a function of the present value of expected exposure, the probability of counterparty default and the assumed recovery upon default.

Management's Discussion and Analysis

The table below presents our net credit exposure from OTC derivatives and the concentration by industry and region.

\$ in millions	As of December	
	2022	2021
OTC derivative assets	\$ 15,143	\$ 12,172
Collateral (not netted under U.S. GAAP)	(4,881)	(3,336)
Net credit exposure	\$ 10,262	\$ 8,836
Industry		
Consumer & Retail	6%	4%
Diversified Industrials	6%	9%
Financial Institutions	42%	15%
Funds	12%	14%
Healthcare	2%	1%
Municipalities & Nonprofit	7%	20%
Natural Resources & Utilities	9%	19%
Sovereign	1%	5%
Technology, Media & Telecommunications	8%	7%
Other (including Special Purpose Vehicles)	7%	6%
Total	100%	100%
Region		
Americas	34%	59%
EMEA	65%	40%
Asia	1%	1%
Total	100%	100%

In the table above:

- OTC derivative assets, included in the consolidated balance sheets, are reported on a net-by-counterparty basis (i.e., the net receivable for a given counterparty) when a legal right of setoff exists under an enforceable netting agreement (counterparty netting) and are accounted for at fair value, net of cash collateral received under enforceable credit support agreements (cash collateral netting).
- Collateral represents cash collateral and the fair value of securities collateral, primarily U.S. and non-U.S. government and agency obligations, received under credit support agreements, that we consider when determining credit risk, but such collateral is not eligible for netting under U.S. GAAP.
- EMEA represents Europe, Middle East and Africa.

The table below presents the distribution of our net credit exposure from OTC derivatives by tenor.

\$ in millions	Investment-	Non-Investment-	Total
	Grade	Grade / Unrated	
As of December 2022			
Less than 1 year	\$ 11,888	\$ 690	\$ 12,578
1 - 5 years	16,935	535	17,470
Greater than 5 years	53,731	617	54,348
Total	82,554	1,842	84,396
Netting	(73,488)	(646)	(74,134)
Net credit exposure	\$ 9,066	\$ 1,196	\$ 10,262
As of December 2021			
Less than 1 year	\$ 8,086	\$ 980	\$ 9,066
1 - 5 years	7,996	1,054	9,050
Greater than 5 years	38,842	1,191	40,033
Total	54,924	3,225	58,149
Netting	(48,140)	(1,173)	(49,313)
Net credit exposure	\$ 6,784	\$ 2,052	\$ 8,836

In the table above:

- Tenor is based on remaining contractual maturity.
- Netting includes counterparty netting across tenor categories and collateral that we consider when determining credit risk (including collateral that is not eligible for netting under U.S. GAAP). Counterparty netting within the same tenor category is included within such tenor category.

Management's Discussion and Analysis

The tables below present the distribution of our net credit exposure from OTC derivatives by tenor and internally determined public rating agency equivalents.

\$ in millions	Investment-Grade				Total
	AAA	AA	A	BBB	
As of December 2022					
Less than 1 year	\$ 101	\$ 1,434	\$ 8,733	\$ 1,620	\$ 11,888
1 - 5 years	642	4,342	8,117	3,834	16,935
Greater than 5 years	2,015	12,645	31,852	7,219	53,731
Total	2,758	18,421	48,702	12,673	82,554
Netting	(2,188)	(16,928)	(43,787)	(10,585)	(73,488)
Net credit exposure	\$ 570	\$ 1,493	\$ 4,915	\$ 2,088	\$ 9,066

As of December 2021					
Less than 1 year	\$ 121	\$ 1,495	\$ 4,146	\$ 2,324	\$ 8,086
1 - 5 years	535	1,810	2,888	2,763	7,996
Greater than 5 years	7,159	3,921	20,352	7,410	38,842
Total	7,815	7,226	27,386	12,497	54,924
Netting	(7,263)	(5,297)	(24,953)	(10,627)	(48,140)
Net credit exposure	\$ 552	\$ 1,929	\$ 2,433	\$ 1,870	\$ 6,784

\$ in millions	Non-Investment-Grade / Unrated			
	BB or lower	Unrated	Total	
As of December 2022				
Less than 1 year		\$ 575	\$ 115	\$ 690
1 - 5 years		513	22	535
Greater than 5 years		592	25	617
Total		1,680	162	1,842
Netting		(646)	—	(646)
Net credit exposure		\$ 1,034	\$ 162	\$ 1,196

As of December 2021				
Less than 1 year		\$ 961	\$ 19	\$ 980
1 - 5 years		1,048	6	1,054
Greater than 5 years		1,162	29	1,191
Total		3,171	54	3,225
Netting		(1,159)	(14)	(1,173)
Net credit exposure		\$ 2,012	\$ 40	\$ 2,052

Lending Activities. We manage our lending activities using the credit risk process, measures, limits and risk mitigants described above. Other lending positions, including secondary trading positions, are risk-managed as a component of market risk. In the fourth quarter of 2022, we changed the classification of our lending portfolio to better reflect the nature of the underlying collateral. Loans and lending commitments types in the table below include the addition of securities-based and other collateralized, as well as the removal of wealth management. This also resulted in reclassifications of certain loans and lending commitments in corporate and other to other collateralized. Prior periods have been conformed to the current presentation.

The table below presents our loans and lending commitments.

\$ in millions	Loans	Lending Commitments	Total
As of December 2022			
Corporate	\$ 26,414	\$ 124,621	\$ 151,035
Commercial real estate	23,641	3,348	26,989
Residential real estate	21,770	3,117	24,887
Securities-based	13,545	498	14,043
Other collateralized	46,317	12,878	59,195
Consumer:			
Installment	6,326	1,882	8,208
Credit cards	15,820	62,216	78,036
Other	1,533	920	2,453
Total	\$ 155,366	\$ 209,480	\$ 364,846
Allowance for loan losses	\$ (4,252)	\$ (527)	\$ (4,779)
As of December 2021			
Corporate	\$ 23,908	\$ 126,262	\$ 150,170
Commercial real estate	23,747	5,569	29,316
Residential real estate	23,398	3,221	26,619
Securities-based	12,526	453	12,979
Other collateralized	31,650	14,539	46,189
Consumer:			
Installment	3,672	9	3,681
Credit cards	8,212	35,932	44,144
Other	3,014	387	3,401
Total	\$ 130,127	\$ 186,372	\$ 316,499
Allowance for loan losses	\$ (2,481)	\$ (597)	\$ (3,078)

In the table above, lending commitments excluded \$4.10 billion as of December 2022 and \$3.52 billion as of December 2021 relating to issued letters of credit which are classified as guarantees in our consolidated financial statements. See Note 18 to the consolidated financial statements for further information about guarantees.

See Note 9 to the consolidated financial statements for information about net charge-offs on wholesale and consumer loans, as well as past due and nonaccrual loans accounted for at amortized cost.

Corporate. Corporate includes term loans, revolving lines of credit, letter of credit facilities and bridge loans, and are principally used for operating and general corporate purposes, or in connection with acquisitions. Corporate also includes loans originated as part of our CRA activities. Corporate loans are secured (typically by a senior lien on the assets of the borrower) or unsecured, depending on the loan purpose, the risk profile of the borrower and other factors.

Management's Discussion and Analysis

The table below presents our credit exposure from corporate loans and lending commitments, and the concentration by industry, region, internally determined public rating agency equivalents and other credit metrics.

<i>\$ in millions</i>	Loans	Lending Commitments	Total
As of December 2022			
Corporate	\$ 26,414	\$ 124,621	\$ 151,035
Industry			
Consumer & Retail	10%	14%	13%
Diversified Industrials	19%	18%	19%
Financial Institutions	8%	8%	8%
Funds	2%	3%	3%
Healthcare	7%	12%	11%
Natural Resources & Utilities	11%	18%	17%
Real Estate	14%	6%	7%
Technology, Media & Telecommunications	23%	20%	20%
Other (including Special Purpose Vehicles)	6%	1%	2%
Total	100%	100%	100%
Region			
Americas	64%	79%	76%
EMEA	30%	20%	22%
Asia	6%	1%	2%
Total	100%	100%	100%
Credit Quality (Credit Rating Equivalent)			
AAA	—	1%	1%
AA	—	6%	5%
A	7%	22%	20%
BBB	28%	41%	38%
BB or lower	65%	30%	36%
Total	100%	100%	100%
As of December 2021			
Corporate	\$ 23,908	\$ 126,262	\$ 150,170
Industry			
Consumer & Retail	11%	15%	14%
Diversified Industrials	17%	17%	18%
Financial Institutions	8%	7%	7%
Funds	2%	2%	2%
Healthcare	7%	11%	10%
Natural Resources & Utilities	16%	18%	17%
Real Estate	12%	6%	7%
Technology, Media & Telecommunications	20%	23%	23%
Other (including Special Purpose Vehicles)	7%	1%	2%
Total	100%	100%	100%
Region			
Americas	61%	78%	76%
EMEA	34%	20%	22%
Asia	5%	2%	2%
Total	100%	100%	100%
Credit Quality (Credit Rating Equivalent)			
AAA	—	1%	1%
AA	—	6%	5%
A	10%	18%	17%
BBB	22%	39%	36%
BB or lower	68%	36%	41%
Total	100%	100%	100%

Commercial Real Estate. Commercial real estate includes originated loans and lending commitments that are directly or indirectly secured by hotels, retail stores, multifamily housing complexes and commercial and industrial properties. Commercial real estate also includes loans and lending commitments extended to clients who warehouse assets that are directly or indirectly backed by commercial real estate. In addition, commercial real estate includes loans purchased by us and loans originated as part of our CRA activities.

The table below presents our credit exposure from commercial real estate loans and lending commitments, and the concentration by region, internally determined public rating agency equivalents and other credit metrics.

<i>\$ in millions</i>	Loans	Lending Commitments	Total
As of December 2022			
Commercial Real Estate	\$ 23,641	\$ 3,348	\$ 26,989
Region			
Americas	89%	85%	89%
EMEA	11%	15%	11%
Total	100%	100%	100%
Credit Quality (Credit Rating Equivalent)			
Investment-grade	18%	34%	20%
Non-investment-grade	82%	64%	80%
Unrated	—	2%	—
Total	100%	100%	100%
As of December 2021			
Commercial Real Estate	\$ 23,747	\$ 5,569	\$ 29,316
Region			
Americas	95%	93%	94%
EMEA	5%	7%	6%
Total	100%	100%	100%
Credit Quality (Credit Rating Equivalent)			
Investment-grade	22%	24%	22%
Non-investment-grade	78%	76%	78%
Total	100%	100%	100%

In the table above, credit exposure includes loans and lending commitments of \$10.14 billion as of December 2022 and \$11.59 billion as of December 2021 which are extended to clients who warehouse assets that are directly or indirectly backed by commercial real estate.

In addition, we also have credit exposure to commercial real estate loans held for securitization of \$45 million as of December 2022 and \$862 million as of December 2021. Such loans are included in trading assets in our consolidated balance sheets.

Management's Discussion and Analysis

Residential Real Estate. Residential real estate loans and lending commitments are primarily extended to wealth management clients and to clients who warehouse assets that are directly or indirectly secured by residential real estate. In addition, residential real estate includes loans purchased by us.

The table below presents our credit exposure from residential real estate loans and lending commitments, and the concentration by region, internally determined public rating agency equivalents and other credit metrics.

<i>\$ in millions</i>	Loans	Lending Commitments	Total
As of December 2022			
Residential Real Estate	\$ 21,770	\$ 3,117	\$ 24,887
Region			
Americas	100%	94%	99%
EMEA	—	6%	1%
Total	100%	100%	100%
Credit Quality (Credit Rating Equivalent)			
Investment-grade	14%	6%	13%
Non-investment-grade	62%	93%	66%
Other metrics	24%	1%	21%
Total	100%	100%	100%
As of December 2021			
Residential Real Estate	\$ 23,398	\$ 3,221	\$ 26,619
Region			
Americas	100%	100%	100%
Total	100%	100%	100%
Credit Quality (Credit Rating Equivalent)			
Investment-grade	11%	4%	10%
Non-investment-grade	67%	85%	69%
Other metrics	21%	11%	20%
Unrated	1%	—	1%
Total	100%	100%	100%

In the table above:

- Credit exposure includes loans and lending commitments of \$14.31 billion as of December 2022 and \$16.62 billion as of December 2021 which are extended to clients who warehouse assets that are directly or indirectly secured by residential real estate.
- Other metrics category consists of loans where we use other key metrics to assess the borrower's credit quality, such as loan-to-value ratio, delinquency status, collateral value, expected cash flows and other risk factors.

In addition, we also have credit exposure to residential real estate loans held for securitization of \$5.23 billion as of December 2022 and \$8.39 billion as of December 2021. Such loans are included in trading assets in our consolidated balance sheets.

Securities-Based. Securities-based includes loans and lending commitments that are secured by stocks, bonds, mutual funds, and exchange-traded funds. These loans and commitments are primarily extended to wealth management clients and used for purposes other than purchasing, carrying or trading margin stocks. Securities-based loans require borrowers to post additional collateral based on changes in the underlying collateral's fair value. Securities-based also includes loans originated through *GS Select*.

The table below presents our credit exposure from securities-based loans and lending commitments, and the concentration by region, internally determined public rating agency equivalents and other credit metrics.

<i>\$ in millions</i>	Loans	Lending Commitments	Total
As of December 2022			
Securities-based	\$ 13,545	\$ 498	\$ 14,043
Region			
Americas	100%	100%	100%
Total	100%	100%	100%
Credit Quality (Credit Rating Equivalent)			
Investment-grade	74%	19%	73%
Non-investment-grade	4%	—	3%
Other metrics	22%	81%	24%
Total	100%	100%	100%
As of December 2021			
Securities-based	\$ 12,526	\$ 453	\$ 12,979
Region			
Americas	100%	100%	100%
Total	100%	100%	100%
Credit Quality (Credit Rating Equivalent)			
Investment-grade	77%	45%	76%
Non-investment-grade	4%	—	3%
Other metrics	19%	55%	21%
Total	100%	100%	100%

In the table above, other metrics category consists of loans where we use other key metrics to assess the borrower's credit quality, such as collateral value, loan-to-value ratio and delinquency status.

Other Collateralized. Other collateralized includes loans and lending commitments that are backed by specific collateral (other than securities and real estate). Such loans and lending commitments are extended to clients who warehouse assets that are directly or indirectly secured by corporate loans, consumer loans and other assets. Other collateralized also includes loans and lending commitments to investment funds (managed by third parties) that are collateralized by capital commitments of the funds' investors or assets held by the fund, as well as other secured loans and lending commitments extended to wealth management clients.

Management's Discussion and Analysis

The table below presents our credit exposure from other collateralized loans and lending commitments, and the concentration by region, internally determined public rating agency equivalents and other credit metrics.

<i>\$ in millions</i>	Loans	Lending Commitments	Total
As of December 2022			
Other Collateralized	\$ 46,317	\$ 12,878	\$ 59,195
Region			
Americas	92%	96%	93%
EMEA	7%	4%	6%
Asia	1%	—	1%
Total	100%	100%	100%
Credit Quality (Credit Rating Equivalent)			
Investment-grade	65%	70 %	67%
Non-investment-grade	34%	30%	33%
Other metrics	1%	—	—
Total	100%	100%	100%
As of December 2021			
Other Collateralized	\$ 31,650	\$ 14,539	\$ 46,189
Region			
Americas	84%	95%	88%
EMEA	16%	5%	12%
Total	100%	100%	100%
Credit Quality (Credit Rating Equivalent)			
Investment-grade	60%	75%	65%
Non-investment-grade	39%	25%	34%
Other metrics	1%	—	1%
Total	100%	100%	100%

In the table above, credit exposure included loans and lending commitments extended to clients who warehouse assets of \$14.12 billion as of December 2022 and \$11.40 billion as of December 2021.

Installment and Credit Cards. We originate unsecured installment loans (including point-of-sale loans that we began to originate through the GreenSky platform in the third quarter of 2022) and credit card loans (pursuant to revolving lines of credit) to consumers in the Americas. The credit card lines are cancellable by us and therefore do not result in credit exposure.

The tables below present our credit exposure from originated installment and credit card funded loans, and the concentration by the five most concentrated U.S. states.

<i>\$ in millions</i>	Installment
As of December 2022	
Loans, gross	\$ 6,326
California	10%
Texas	9%
Florida	7%
New York	6%
Illinois	4%
Other	64%
Total	100%
As of December 2021	
Loans, gross	\$ 3,672
California	11%
Texas	9%
Florida	7%
New York	7%
Illinois	4%
Other	62%
Total	100%
As of December 2022	
Loans, gross	\$ 15,820
California	16%
Texas	9%
New York	8%
Florida	8%
Illinois	4%
Other	55%
Total	100%
As of December 2021	
Loans, gross	\$ 8,212
California	18%
Texas	9%
New York	8%
Florida	8%
New Jersey	4%
Other	53%
Total	100%

In addition, we had credit exposure of \$1.88 billion as of December 2022 and \$9 million as of December 2021 related to our commitments to provide unsecured installment loans to consumers.

See Note 9 to the consolidated financial statements for further information about the credit quality indicators of installment and credit card loans.

Management's Discussion and Analysis

Other. Other includes unsecured loans extended to wealth management clients and unsecured consumer loans purchased by us.

The table below presents our credit exposure from other loans and lending commitments, and the concentration by region, internally determined public rating agency equivalents and other credit metrics.

<i>\$ in millions</i>	Loans	Lending Commitments	Total
As of December 2022			
Other	\$ 1,533	\$ 920	\$ 2,453
Region			
Americas	100%	100%	100%
Total	100%	100%	100%
Credit Quality (Credit Rating Equivalent)			
Investment-grade	62%	95%	74%
Non-investment-grade	17%	5%	13%
Other metrics	21%	—	13%
Total	100%	100%	100%
As of December 2021			
Other	\$ 3,014	\$ 387	\$ 3,401
Region			
Americas	100%	100%	100%
Total	100%	100%	100%
Credit Quality (Credit Rating Equivalent)			
Investment-grade	27%	89%	34%
Non-investment-grade	15%	11%	15%
Other	57%	—	50%
Unrated	1%	—	1%
Total	100%	100%	100%

In the table above, other metrics primarily includes consumer loans purchased by us. Our risk assessment process for such loans includes reviewing certain key metrics, such as expected cash flows, delinquency status and other risk factors.

In addition, we have credit exposure to other loans held for securitization of \$1.72 billion as of December 2022 and \$453 million as of December 2021. Such loans are included in trading assets in our consolidated balance sheets.

Credit Hedges. To mitigate the credit risk associated with our lending activities, we obtain credit protection on certain loans and lending commitments through credit default swaps, both single-name and index-based contracts, and through the issuance of credit-linked notes.

Securities Financing Transactions. We enter into securities financing transactions in order to, among other things, facilitate client activities, invest excess cash, acquire securities to cover short positions and finance certain activities. We bear credit risk related to resale agreements only to the extent that cash advanced or the value of securities pledged or delivered to the counterparty exceeds the value of the collateral received. We also have credit exposure on repurchase agreements to the extent that the value of securities pledged or delivered to the counterparty for these transactions exceeds the amount of cash or collateral received. Securities collateral for these transactions primarily includes U.S. government and agency obligations. We had credit exposure related to securities financing transactions of \$2.10 billion as of December 2022 and \$1.62 billion as of December 2021, reflecting both netting agreements and collateral that we consider when determining credit risk.

Other Credit Exposures. We are exposed to credit risk from our customer and other receivables. These receivables primarily consist of initial cash margin placed with clearing organizations and receivables related to sales of loans which have traded, but not yet settled. These receivables generally have minimal credit risk due to the low probability of clearing organization default and the short-term nature of receivables related to loan settlements.

The table below presents our other credit exposures and the concentration by industry, region and internally determined public rating agency equivalents.

<i>\$ in millions</i>	As of December	
	2022	2021
Other Credit Exposures	\$ 4,112	\$ 4,198
Industry		
Financial Institutions	76%	83%
Funds	18%	10%
Other (including Special Purpose Vehicles)	6%	7%
Total	100%	100%
Region		
Americas	10%	9%
EMEA	88%	90%
Asia	2%	1%
Total	100%	100%
Credit Quality (Credit Rating Equivalent)		
AAA	5%	4%
AA	59%	68%
A	6%	8%
BBB	22%	17%
BB or lower	8%	3%
Total	100%	100%

The table above reflects collateral that we consider when determining credit risk.

Management's Discussion and Analysis

Operational Risk Management

Overview

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

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

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

Operational Risk, which is independent of the revenue-producing units and reports to our chief risk officer, has primary responsibility for development and implementation of our framework for assessing, monitoring and managing operational risk through oversight across our businesses. Operational Risk fulfills these responsibilities both directly and through use of a Service Level Agreement with GS Group's Operational Risk function, which reports to GS Group's chief risk officer. Services provided by GS Group's Operational Risk function are subject to our risk management policies for any work it performs for us under a Service Level Agreement.

Operational Risk Management Process

Our process for managing operational risk includes the critical components of our risk management framework described in the "Overview and Structure of Risk Management," including a comprehensive data collection process, which is in line with GS Group's policies and procedures, for operational risk events.

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

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

We expanded our existing risk management platform and controls to incorporate the additional employees, vendors, technology, call center and compliance controls, including the expansion of fraud prevention, anti-money laundering and consumer compliance considerations, related to the growing number of consumers as a result of new business initiatives.

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

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

Risk Measurement

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

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

The results from these scenario analyses are used to monitor changes in operational risk and to determine business lines that may have heightened exposure to operational risk. These analyses are used in the determination of the appropriate level of operational risk capital to hold. We also perform Bank-wide stress tests. See "Overview and Structure of Risk Management" for information about stress tests.

Management's Discussion and Analysis

Types of Operational Risks

Increased reliance on technology and third-party relationships has resulted in increased operational risks, such as information and cybersecurity risk, third-party risk and business resilience risk. We manage those risks as follows:

Information and Cybersecurity Risk. Information and cybersecurity risk is the risk of compromising the confidentiality, integrity or availability of our data and systems, leading to an adverse impact to us, our reputation, our clients and/or the broader financial system. We seek to minimize the occurrence and impact of unauthorized access, disruption or use of information and/or information systems. We deploy and operate preventive and detective controls and processes to mitigate emerging and evolving information security and cybersecurity threats, including monitoring our network for known vulnerabilities and signs of unauthorized attempts to access our data and systems. There is increased information risk through diversification of our data across external service providers, including use of a variety of cloud-provided or -hosted services and applications. See “Risk Factors” in Part I of this Annual Report for further information about information and cybersecurity risk.

Third-Party Risk. Third-party risk, including vendor risk, is the risk of an adverse impact due to reliance on third parties performing services or activities on our behalf. These risks may include legal, regulatory, information security, reputational, operational or any other risks inherent in engaging a third party. We identify, manage and report key third-party risks and conduct due diligence across multiple risk domains, including information security and cybersecurity, resilience and additional supply chain dependencies. The Third-Party Risk Program monitors, reviews and reassesses third-party risks on an ongoing basis. See “Risk Factors” in Part I of this Annual Report for further information about third-party risk.

Business Resilience Risk. Business resilience risk is the risk of disruption to our critical processes. We monitor threats and assess risks and seek to ensure our state of readiness in the event of a significant operational disruption to the normal operations of our critical functions or their dependencies, such as critical facilities, systems, third parties, data and/or personnel. Our resilience framework defines the fundamental principles for business continuity planning and crisis management to ensure that critical functions can continue to operate in the event of a disruption. The business continuity program is comprehensive, consistent on a firmwide basis, and up-to-date, incorporating new information, including updated resilience capabilities as and when they become available. Our resilience assurance program encompasses testing of response and recovery strategies on a regular basis with the objective of minimizing and preventing significant operational disruptions.

Model Risk Management

Overview

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

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

Model Risk, which is independent of the revenue-producing units, model developers, model owners and model users, and reports to our chief risk officer, has primary responsibility for assessing, monitoring and managing our model risk through oversight across our businesses. Model Risk fulfills these responsibilities both directly and through use of a Service Level Agreement with GS Group’s Model Risk function, which reports to GS Group’s chief risk officer. Services provided by GS Group’s Model Risk function are subject to our risk management policies for any work it performs for us under a Service Level Agreement.

Model Review and Validation Process

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

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

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

- The model’s conceptual soundness, including the reasonableness of model assumptions, and suitability for intended use;

Management's Discussion and Analysis

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

See "Critical Accounting Policies — Fair Value — Review of Valuation Models," "Liquidity Risk Management," "Market Risk Management," "Credit Risk Management" and "Operational Risk Management" for further information about our use of models within these areas.

Capital Risk Management

Capital risk is the risk that our capital is insufficient to support our business activities under normal and stressed market conditions, or we face capital reductions or risk-weighted asset increases, including from new or revised rules or changes in interpretations of existing rules, and are therefore unable to meet our internal capital targets or external regulatory capital requirements. Capital adequacy is of critical importance to us. Accordingly, we have in place a comprehensive capital management policy that provides a framework, defines objectives and establishes guidelines to maintain an appropriate level and composition of capital in both business-as-usual and stressed conditions. Our capital management framework is designed to provide us with the information needed to identify and comprehensively manage risk, and develop and apply projected stress scenarios that capture idiosyncratic vulnerabilities with a goal of holding sufficient capital to remain adequately capitalized even after experiencing a severe stress event. See "Capital Management and Regulatory Capital" for further information about our capital management process.

We have established a comprehensive governance structure to manage and oversee our day-to-day capital management activities and to ensure compliance with capital rules and related policies. Our capital management activities are overseen by the Board and its committees. The Board is responsible for approving our annual capital plan and the Bank Risk and Asset Liability Committee approves our capital management policy, which details the risk committees and members of senior management who are responsible for the ongoing monitoring of our capital adequacy and evaluation of current and future regulatory capital requirements, the review of the results of our capital planning and stress tests processes and the results of our capital models. In addition, our risk committees and senior management are responsible for the review of our contingency capital plan, key capital adequacy metrics, including regulatory capital ratios, and capital plan metrics, as well as monitoring capital targets and potential breaches of capital requirements.

GS Group's capital management process includes independent review by Risk (which extends to us) that, among other things, assesses regulatory capital policies and related interpretations, escalates certain interpretations to senior management and/or the appropriate risk committee, and performs calculation testing to corroborate alignment with applicable capital rules.



Report of Independent Auditors

To the Board of Directors and Shareholder of
Goldman Sachs Bank USA:

Opinion

We have audited the accompanying consolidated financial statements of Goldman Sachs Bank USA and its subsidiaries (the “Bank”), which comprise the consolidated balance sheets as of December 31, 2022 and 2021, and the related consolidated statements of earnings, of comprehensive income, of changes in shareholder’s equity and of cash flows for the years then ended, including the related notes (collectively referred to as the “consolidated financial statements”).

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the financial position of the Bank as of December 31, 2022 and 2021, and the results of its operations and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

Basis for Opinion

We conducted our audit in accordance with auditing standards generally accepted in the United States of America (US GAAS). Our responsibilities under those standards are further described in the Auditors’ Responsibilities for the Audit of the Consolidated Financial Statements section of our report. We are required to be independent of the Bank and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Responsibilities of Management for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with accounting principles generally accepted in the United States of America, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the Bank’s ability to continue as a going concern for one year after the date the consolidated financial statements are available to be issued.

Auditors’ Responsibilities for the Audit of the Consolidated Financial Statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors’ report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with US GAAS will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error,



as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the consolidated financial statements.

In performing an audit in accordance with US GAAS, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the consolidated financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about the Bank's ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control-related matters that we identified during the audit.

PriceWaterhouseCoopers LLP

New York, New York

March 7, 2023

PART III. Financial Statements and Supplementary Data

Consolidated Financial Statements

GOLDMAN SACHS BANK USA AND SUBSIDIARIES

Consolidated Statements of Earnings

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Revenues		
Interest income	\$ 13,997	\$ 5,302
Interest expense	7,313	1,425
Net interest income	6,684	3,877
Gains and losses from financial assets and liabilities	4,665	4,675
Other revenues	1,116	926
Total non-interest revenues	5,781	5,601
Total net revenues	12,465	9,478
Provision for credit losses	2,298	457
Operating expenses		
Compensation and benefits	1,537	1,526
Service charges	787	812
Professional fees	509	336
Transaction based	596	514
Market development	273	179
Communications and technology	389	287
Regulatory and agency fees	316	169
Depreciation and amortization	268	111
Other expenses	977	629
Total operating expenses	5,652	4,563
Pre-tax earnings	4,515	4,458
Provision for taxes	1,237	1,106
Net earnings	\$ 3,278	\$ 3,352

Consolidated Statements of Comprehensive Income

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Net earnings	\$ 3,278	\$ 3,352
Other comprehensive loss adjustments, net of tax:		
Currency translation	195	32
Debt valuation adjustment	28	12
Pension and postretirement liabilities	37	10
Available-for-sale securities	(1,221)	(508)
Other comprehensive loss	(961)	(454)
Comprehensive income	\$ 2,317	\$ 2,898

The accompanying notes are an integral part of these consolidated financial statements.

Consolidated Balance Sheets

<i>\$ in millions, except par value</i>	As of December	
	2022	2021
Assets		
Cash	\$ 184,947	\$ 148,211
Collateralized agreements:		
Securities purchased under agreements to resell (at fair value)	33,713	36,888
Securities borrowed (includes \$23 and \$6,911 at fair value)	2,676	8,289
Customer and other receivables	27,034	28,420
Trading assets (at fair value and includes \$10,853 and \$5,628 pledged as collateral)	47,246	55,791
Investments (includes \$23,879 and \$24,599 at fair value, and \$54 and \$56 pledged as collateral)	29,789	25,148
Loans (net of allowance of \$4,252 and \$2,481, and includes \$6,251 and \$7,990 at fair value)	151,114	127,646
Other assets (includes \$71 and \$0 at fair value)	9,034	3,577
Total assets	\$ 485,553	\$ 433,970
Liabilities and shareholder's equity		
Deposits (includes \$5,374 and \$5,356 at fair value)	\$ 362,855	\$ 322,012
Collateralized financings:		
Securities sold under agreements to repurchase (at fair value)	5,566	6,006
Securities loaned (includes \$23 and \$6,911 at fair value)	2,847	8,289
Other secured financings (includes \$3,630 and \$1,362 at fair value)	4,030	1,791
Customer and other payables	21,370	19,738
Trading liabilities (at fair value)	29,185	23,852
Unsecured borrowings (includes \$448 and \$322 at fair value)	6,431	6,065
Other liabilities (includes \$71 and \$0 at fair value)	4,967	4,342
Total liabilities	437,251	392,095
Commitments, contingencies and guarantees		
Shareholder's equity		
Shareholder's equity (includes common stock, \$100 par value; 80,000,000 shares authorized, issued and outstanding)	48,302	41,875
Total liabilities and shareholder's equity	\$ 485,553	\$ 433,970

The accompanying notes are an integral part of these consolidated financial statements.

Consolidated Statements of Changes in Shareholder's Equity

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Shareholder's equity		
Beginning balance	\$ 41,875	\$ 34,062
Net earnings	3,278	3,352
Capital contributions from The Goldman Sachs Group, Inc.	4,110	37,995
Dividends paid to The Goldman Sachs Group, Inc.	—	(33,080)
Other comprehensive loss	(961)	(454)
Ending balance	\$ 48,302	\$ 41,875

The accompanying notes are an integral part of these consolidated financial statements.

Consolidated Statements of Cash Flows

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Cash flows from operating activities		
Net earnings	\$ 3,278	\$ 3,352
Adjustments to reconcile net earnings to net cash provided by operating activities:		
Depreciation and amortization	268	111
Deferred income taxes	(521)	(32)
Share-based compensation	277	180
Provision for credit losses	2,298	457
Changes in operating assets and liabilities:		
Customer and other receivables and payables, net	2,688	(2,210)
Collateralized transactions (excluding other secured financings), net	2,906	(12,409)
Trading assets	7,738	15,158
Trading liabilities	5,287	10,756
Loans held for sale, net	4,154	(5,885)
Other, net	(625)	5,837
Net cash provided by operating activities	27,748	15,315
Cash flows from investing activities		
Purchase of property, leasehold improvements and equipment	(306)	(161)
Purchase of investments	(6,371)	(11,313)
Proceeds from sales and paydowns of investments	65	17,270
Loans (excluding loans held for sale), net	(28,882)	(34,485)
Net cash used for investing activities	(35,494)	(28,689)
Cash flows from financing activities		
Deposits, net	41,353	99,582
Unsecured short-term borrowings, net	14	(1,145)
Other secured financings (short-term), net	2,181	100
Proceeds from issuance of unsecured long-term borrowings	1,428	2,595
Repayment of unsecured long-term borrowings, including the current portion	(1,499)	(2,252)
Derivative contracts with a financing element, net	268	140
Capital contributions from The Goldman Sachs Group, Inc.	2,355	37,047
Settlement of share-based awards in satisfaction of withholding tax requirements	(61)	(71)
Dividends paid to The Goldman Sachs Group, Inc.	—	(33,080)
Net cash provided by financing activities	46,039	102,916
Effect of exchange rate changes on cash	(1,557)	(850)
Net increase in cash	36,736	88,692
Cash, beginning balance	148,211	59,519
Cash, ending balance	\$ 184,947	\$ 148,211
Supplemental disclosures:		
Cash payments for interest	\$ 6,452	\$ 1,389
Cash payments for income taxes, net	\$ 1,549	\$ 582

See Note 12, Note 16 and Note 20 for information about non-cash activities.

The accompanying notes are an integral part of these consolidated financial statements.

Notes to Consolidated Financial Statements

Note 1.

Description of Business

Goldman Sachs Bank USA (GS Bank USA), together with its consolidated subsidiaries (collectively, the Bank), is a New York State-chartered bank and a member of the Federal Reserve System. The Bank is supervised and regulated by the Board of Governors of the Federal Reserve System (FRB), the New York State Department of Financial Services (NYDFS) and the Consumer Financial Protection Bureau. As a member of the Federal Deposit Insurance Corporation (FDIC), GS Bank USA's deposits are insured by the FDIC up to the maximum amount provided by law. GS Bank USA is registered as a swap dealer with the U.S. Commodity Futures Trading Commission (CFTC) and as a security-based swap dealer with the Securities and Exchange Commission (SEC). GS Bank USA is also a government securities dealer subject to the rules and regulations of the U.S. Department of the Treasury.

The Bank's principal office is located in New York, New York. GS Bank USA operates two domestic branches, which are located in Salt Lake City, Utah and Draper, Utah. Both branches are regulated by the Utah Department of Financial Institutions. GS Bank USA also operates two foreign branches, which are located in London, United Kingdom and Tokyo, Japan. The London branch is regulated by the Financial Conduct Authority and the Prudential Regulation Authority and the Tokyo branch is regulated by the Japan Financial Services Agency. Goldman Sachs Bank Europe SE (GSBE), headquartered in Frankfurt, Germany, is a wholly-owned subsidiary of GS Bank USA. GSBE is directly supervised by the European Central Bank and additionally by the Federal Financial Supervisory Authority and Deutsche Bundesbank in the context of the E.U. Single Supervisory Mechanism. GSBE has branches in Amsterdam, Athens, Copenhagen, Dublin, London, Luxembourg, Madrid, Milan, Paris, Stockholm and Warsaw that are also regulated by the relevant authorities in each jurisdiction. GSBE's London branch is regulated by the FCA and GSBE applied for a permanent authorization of its London branch in March 2022.

GS Bank USA is a wholly-owned subsidiary of The Goldman Sachs Group, Inc. (Group Inc. and, collectively with its consolidated subsidiaries, GS Group). Group Inc. is a bank holding company under the U.S. Bank Holding Company Act of 1956 (BHC Act), a financial holding company under amendments to the BHC Act effected by the U.S. Gramm-Leach-Bliley Act of 1999, and is subject to supervision and examination by the FRB.

The Bank is a financial services provider that engages in banking activities. The Bank is GS Group's primary lending entity, originating loans to corporate and wealth management clients, as well as issuing credit cards and providing point-of-sale financing through GreenSky, Inc. (GreenSky) to consumers. The Bank is also GS Group's primary deposit-taking entity. The Bank's depositors include private bank clients, U.S. consumers, clients of third-party broker-dealers, institutions, corporations and its affiliates. The Bank's consumer deposit-taking activities are conducted through its digital platform, *Marcus by Goldman Sachs* (Marcus). The Bank also provides transaction banking services to institutions, corporations and its affiliates. In addition, the Bank enters into interest rate, currency, credit and other derivatives, and transacts in certain related cash products, for the purpose of market making and risk management. The Bank's activities in the E.U. include underwriting and market making in debt and equity securities; advisory services; and asset and wealth management services. See Note 12 for further information about the acquisition of GreenSky.

Note 2.

Basis of Presentation

These consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States (U.S. GAAP) and include the accounts of GS Bank USA and all other entities in which the Bank has a controlling financial interest. Intercompany transactions and balances have been eliminated.

In accordance with the reporting requirements for business combinations of entities under common control, prior period amounts are presented as if GS Bank USA's acquisition of GSBE in July 2021 had occurred at the beginning of 2021.

All references to 2022 and 2021 refer to the Bank's years ended, or the dates, as the context requires, December 31, 2022 and December 31, 2021, respectively. Any reference to a future year refers to a year ending on December 31 of that year. Certain reclassifications have been made to previously reported amounts to conform to the current presentation.

Notes to Consolidated Financial Statements

Note 3.

Significant Accounting Policies

The Bank's significant accounting policies include measuring the allowance for credit losses on loans and lending commitments accounted for at amortized cost, when and how to measure the fair value of assets and liabilities, and when to consolidate an entity. See Note 9 for policies on the allowance for credit losses, Note 4 for policies on fair value measurements, and below and Note 17 for policies on consolidation accounting. All other significant accounting policies are either described below or included in the following footnotes:

Fair Value Measurements	Note 4
Fair Value Hierarchy	Note 5
Trading Assets and Liabilities	Note 6
Derivatives and Hedging Activities	Note 7
Investments	Note 8
Loans	Note 9
Fair Value Option	Note 10
Collateralized Agreements and Financings	Note 11
Other Assets	Note 12
Deposits	Note 13
Unsecured Borrowings	Note 14
Other Liabilities	Note 15
Securitization Activities	Note 16
Variable Interest Entities	Note 17
Commitments, Contingencies and Guarantees	Note 18
Regulation and Capital Adequacy	Note 19
Transactions with Related Parties	Note 20
Interest Income and Interest Expense	Note 21
Income Taxes	Note 22
Credit Concentrations	Note 23
Legal Proceedings	Note 24
Employee Incentive and Benefit Plans	Note 25

Consolidation

The Bank consolidates entities in which the Bank has a controlling financial interest. The Bank determines whether it has a controlling financial interest in an entity by first evaluating whether the entity is a voting interest entity or a variable interest entity (VIE).

Voting Interest Entities. Voting interest entities are entities in which (i) the total equity investment at risk is sufficient to enable the entity to finance its activities independently and (ii) the equity holders have the power to direct the activities of the entity that most significantly impact its economic performance, the obligation to absorb the losses of the entity and the right to receive the residual returns of the entity. The usual condition for a controlling financial interest in a voting interest entity is ownership of a majority voting interest. If the Bank has a controlling majority voting interest in a voting interest entity, the entity is consolidated.

Variable Interest Entities. A VIE is an entity that lacks one or more of the characteristics of a voting interest entity. The Bank has a controlling financial interest in a VIE when the Bank has a variable interest or interests that provide it with (i) the power to direct the activities of the VIE that most significantly impact the VIE's economic performance and (ii) the obligation to absorb losses of the VIE or the right to receive benefits from the VIE that could potentially be significant to the VIE. See Note 17 for further information about VIEs.

Use of Estimates

Preparation of these consolidated financial statements requires management to make certain estimates and assumptions, the most important of which relate to the allowance for credit losses on loans and lending commitments accounted for at amortized cost, fair value measurements, accounting for goodwill and identifiable intangible assets, provisions for losses that may arise from litigation and regulatory proceedings (including governmental investigations), and accounting for income taxes. These estimates and assumptions are based on the best available information, but actual results could be materially different.

Notes to Consolidated Financial Statements

Revenue Recognition

Financial Assets and Liabilities at Fair Value. Trading assets and liabilities and certain investments are carried at fair value either under the fair value option or in accordance with other U.S. GAAP. In addition, the Bank has elected to account for certain of its loans and other financial assets and liabilities at fair value by electing the fair value option. The fair value of a financial instrument is the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Financial assets are marked to bid prices and financial liabilities are marked to offer prices. Fair value measurements do not include transaction costs. Fair value gains or losses are included in gains and losses from financial assets and liabilities. See Note 4 for further information about fair value measurements. In addition, the Bank recognizes income related to the syndication of loans and lending commitments and other fees from affiliates in gains and losses from financial assets and liabilities.

Transfers of Financial Assets

Transfers of financial assets are accounted for as sales when the Bank has relinquished control over the assets transferred. For transfers of financial assets accounted for as sales, any gains or losses are recognized in gains and losses from financial assets and liabilities. Assets or liabilities that arise from the Bank's continuing involvement with transferred financial assets are initially recognized at fair value. For transfers of financial assets that are not accounted for as sales, the assets are generally included in trading assets or loans and the transfer is accounted for as a collateralized financing, with the related interest expense recognized over the life of the transaction. See Note 11 for further information about transfers of financial assets accounted for as collateralized financings and Note 16 for further information about transfers of financial assets accounted for as sales.

Cash

Cash included cash and due from banks of \$2.24 billion as of December 2022 and \$1.61 billion as of December 2021. Cash also included interest-bearing deposits of \$182.71 billion as of December 2022 and \$146.60 billion as of December 2021. See Note 20 for further information about cash deposited with an affiliate.

The Bank segregates cash for regulatory and other purposes related to client activity. Cash segregated for regulatory and other purposes was \$1.13 billion as of December 2022 and \$1.03 billion as of December 2021.

Customer and Other Receivables

Customer and other receivables included receivables from customers and counterparties of \$11.76 billion as of December 2022 and \$15.64 billion as of December 2021, and receivables from brokers, dealers and clearing organizations of \$15.27 billion as of December 2022 and \$12.78 billion as of December 2021. Such receivables primarily consist of receivables resulting from unsettled transactions and collateral posted in connection with certain derivative transactions.

Customer and other receivables are accounted for at amortized cost net of any allowance for credit losses, which generally approximates fair value. As these receivables are not accounted for at fair value, they are not included in the Bank's fair value hierarchy in Notes 4 and 5. Had these receivables been included in the Bank's fair value hierarchy, substantially all would have been classified in level 2 as of both December 2022 and December 2021. Interest on customer and other receivables is recognized over the life of the transaction and included in interest income.

Customer and Other Payables

Customer and other payables included payables to customers and counterparties of \$13.66 billion as of December 2022 and \$14.75 billion as of December 2021, and payables to brokers, dealers and clearing organizations of \$7.71 billion as of December 2022 and \$4.99 billion as of December 2021. Such payables primarily consist of payables resulting from unsettled transactions and collateral received in connection with certain derivative transactions. Customer and other payables are accounted for at cost plus accrued interest, which generally approximates fair value. As these payables are not accounted for at fair value, they are not included in the Bank's fair value hierarchy in Notes 4 and 5. Had these payables been included in the Bank's fair value hierarchy, substantially all would have been classified in level 2 as of both December 2022 and December 2021. Interest on customer and other payables is recognized over the life of the transaction and included in interest expense.

Notes to Consolidated Financial Statements

Offsetting Assets and Liabilities

To reduce credit exposures on derivatives and securities financing transactions, the Bank may enter into master netting agreements or similar arrangements (collectively, netting agreements) with counterparties that permit it to offset receivables and payables with such counterparties. A netting agreement is a contract with a counterparty that permits net settlement of multiple transactions with that counterparty, including upon the exercise of termination rights by a non-defaulting party. Upon exercise of such termination rights, all transactions governed by the netting agreement are terminated and a net settlement amount is calculated. In addition, the Bank receives and posts cash and securities collateral with respect to its derivatives and securities financing transactions, subject to the terms of the related credit support agreements or similar arrangements (collectively, credit support agreements). An enforceable credit support agreement grants the non-defaulting party exercising termination rights the right to liquidate the collateral and apply the proceeds to any amounts owed. In order to assess enforceability of the Bank's right of setoff under netting and credit support agreements, the Bank evaluates various factors, including applicable bankruptcy laws, local statutes and regulatory provisions in the jurisdiction of the parties to the agreement.

Derivatives are reported on a net-by-counterparty basis (i.e., the net payable or receivable for derivative assets and liabilities for a given counterparty) in the consolidated balance sheets when a legal right of setoff exists under an enforceable netting agreement. Securities purchased under agreements to resell (resale agreements) and securities sold under agreements to repurchase (repurchase agreements) and securities borrowed and loaned transactions with the same term and settlement date are presented on a net-by-counterparty basis in the consolidated balance sheets when such transactions meet certain settlement criteria and are subject to netting agreements.

In the consolidated balance sheets, derivatives are reported net of cash collateral received and posted under enforceable credit support agreements, when transacted under an enforceable netting agreement. In the consolidated balance sheets, resale and repurchase agreements, and securities borrowed and loaned, are not reported net of the related cash and securities received or posted as collateral. Certain other receivables and payables with affiliates that meet the criteria of offsetting are reported on a net basis in the consolidated balance sheets. See Note 11 for further information about collateral received and pledged, including rights to deliver or repledge collateral. See Notes 7 and 11 for further information about offsetting assets and liabilities.

Foreign Currency Translation

Assets and liabilities denominated in non-U.S. currencies are translated at rates of exchange prevailing on the date of the consolidated balance sheets and revenues and expenses are translated at average rates of exchange for the period. Foreign currency remeasurement gains or losses on transactions in nonfunctional currencies are recognized in earnings. Gains or losses on translation of the financial statements of GSBE, whose functional currency is the Euro, and the Tokyo branch, whose functional currency is the Yen, are included, net of hedges and taxes, in the consolidated statements of comprehensive income.

Recent Accounting Developments

Facilitation of the Effects of Reference Rate Reform on Financial Reporting (ASC 848). In March 2020, the FASB issued ASU No. 2020-04, "Reference Rate Reform – Facilitation of the Effects of Reference Rate Reform on Financial Reporting." This ASU, as amended in 2022, provides optional relief from applying generally accepted accounting principles to contracts, hedging relationships and other transactions affected by reference rate reform. In addition, in January 2021 the FASB issued ASU No. 2021-01, "Reference Rate Reform – Scope," which clarified the scope of ASC 848 relating to contract modifications. The Bank adopted these ASUs upon issuance and elected to apply the relief available to certain modified derivatives. The adoption of these ASUs did not have a material impact on the Bank's consolidated financial statements.

Troubled Debt Restructurings and Vintage Disclosures (ASC 326). In March 2022, the FASB issued ASU No. 2022-02, "Financial Instruments — Credit Losses (Topic 326) — Troubled Debt Restructurings and Vintage Disclosures." This ASU eliminates the recognition and measurement guidance for troubled debt restructurings (TDRs) and requires enhanced disclosures about loan modifications for borrowers experiencing financial difficulty. This ASU also requires enhanced disclosure for loans that have been charged off. The ASU became effective in January 2023 under a prospective approach. Adoption of this ASU did not have a material impact on the Bank's consolidated financial statements.

Notes to Consolidated Financial Statements

Accounting for Obligations to Safeguard Crypto-Assets an Entity Holds for Platform Users (SAB 121).

In March 2022, the SEC staff issued SAB 121 (SAB 121) – “Accounting for obligations to safeguard crypto-assets an entity holds for platform users.” SAB 121 adds interpretive guidance requiring an entity to recognize a liability on its balance sheet to reflect the obligation to safeguard the crypto-assets held for its platform users, along with a corresponding asset. The Bank adopted SAB 121 in June 2022 under a modified retrospective approach and adoption did not have a material impact on the Bank's consolidated financial statements.

Fair Value Measurement of Equity Securities Subject to Contractual Sale Restrictions (ASC 820).

In June 2022, the FASB issued ASU No. 2022-03, “Fair Value Measurement of Equity Securities Subject to Contractual Sale Restrictions.” This ASU clarifies that a contractual restriction on the sale of an equity security should not be considered in measuring its fair value. In addition, the ASU requires specific disclosures related to equity securities that are subject to contractual sale restrictions. The ASU is effective in January 2024 under a prospective approach. Early adoption is permitted. Adoption of this ASU is not expected to have a material impact on the Bank's consolidated financial statements.

Note 4.

Fair Value Measurements

The fair value of a financial instrument is the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Financial assets are marked to bid prices and financial liabilities are marked to offer prices. Fair value measurements do not include transaction costs. The Bank measures certain financial assets and liabilities as a portfolio (i.e., based on its net exposure to market and/or credit risks).

The best evidence of fair value is a quoted price in an active market. If quoted prices in active markets are not available, fair value is determined by reference to prices for similar instruments, quoted prices or recent transactions in less active markets, or internally developed models that primarily use market-based or independently sourced inputs, including, but not limited to, interest rates, volatilities, equity or debt prices, foreign exchange rates, commodity prices, credit spreads and funding spreads (i.e., the spread or difference between the interest rate at which a borrower could finance a given financial instrument relative to a benchmark interest rate).

U.S. GAAP has a three-level hierarchy for disclosure of fair value measurements. This hierarchy prioritizes inputs to the valuation techniques used to measure fair value, giving the highest priority to level 1 inputs and the lowest priority to level 3 inputs. A financial instrument's level in this hierarchy is based on the lowest level of input that is significant to its fair value measurement. In evaluating the significance of a valuation input, the Bank considers, among other factors, a portfolio's net risk exposure to that input. The fair value hierarchy is as follows:

Level 1. Inputs are unadjusted quoted prices in active markets to which the Bank had access at the measurement date for identical, unrestricted assets or liabilities.

Level 2. Inputs to valuation techniques are observable, either directly or indirectly.

Level 3. One or more inputs to valuation techniques are significant and unobservable.

The fair values for substantially all of the Bank's financial assets and the majority of the Bank's financial liabilities are based on observable prices and inputs and are classified in levels 1 and 2 of the fair value hierarchy. Certain level 2 and level 3 financial assets and liabilities may require valuation adjustments that a market participant would require to arrive at fair value for factors, such as counterparty and the Bank or its affiliates' credit quality, funding risk, transfer restrictions, liquidity and bid/offer spreads. Valuation adjustments are generally based on market evidence.

The table below presents financial assets and liabilities carried at fair value.

<i>\$ in millions</i>	As of December	
	2022	2021
Total level 1 financial assets	\$ 37,872	\$ 50,018
Total level 2 financial assets	114,502	113,022
Total level 3 financial assets	2,502	2,618
Investments in funds at NAV	30	26
Counterparty and cash collateral netting	(43,723)	(33,505)
Total financial assets at fair value	\$ 111,183	\$ 132,179
Total assets	\$ 485,553	\$ 433,970
Total level 3 financial assets divided by:		
Total assets	0.5%	0.6%
Total financial assets at fair value	2.3%	2.0%
Total level 1 financial liabilities	\$ 8,717	\$ 11,968
Total level 2 financial liabilities	61,145	58,162
Total level 3 financial liabilities	4,166	5,319
Counterparty and cash collateral netting	(29,731)	(31,640)
Total financial liabilities at fair value	\$ 44,297	\$ 43,809
Total liabilities	\$ 437,251	\$ 392,095
Total level 3 financial liabilities divided by:		
Total liabilities	1.0%	1.4%
Total financial liabilities at fair value	9.4%	12.1%

Notes to Consolidated Financial Statements

In the table above:

- Counterparty netting among positions classified in the same level is included in that level.
- Counterparty and cash collateral netting represents the impact on derivatives of netting across levels.
- NAV represents net asset value.

The table below presents a summary of level 3 financial assets.

\$ in millions	As of December	
	2022	2021
Trading assets:		
Trading cash instruments	\$ 335	\$ 212
Derivatives	1,738	2,151
Investments	29	43
Loans	400	212
Total	\$ 2,502	\$ 2,618

Level 3 financial assets as of December 2022 decreased compared with December 2021, reflecting a decrease in level 3 derivatives, partially offset by increases in level 3 trading cash instruments and loans. See Note 5 for further information about level 3 financial assets (including information about unrealized gains and losses related to level 3 financial assets and transfers in and out of level 3).

The valuation techniques and nature of significant inputs used to determine the fair value of the Bank's financial instruments are described below. See Note 5 for further information about significant unobservable inputs used to value level 3 financial instruments.

Valuation Techniques and Significant Inputs for Trading Cash Instruments, Investments and Loans

Level 1. Level 1 instruments include U.S. government obligations, most non-U.S. government obligations, certain agency obligations and actively traded listed equities. These instruments are valued using quoted prices for identical unrestricted instruments in active markets. The Bank defines active markets for equity instruments based on the average daily trading volume both in absolute terms and relative to the market capitalization for the instrument. The Bank defines active markets for debt instruments based on both the average daily trading volume and the number of days with trading activity.

Level 2. Level 2 instruments include certain non-U.S. government obligations, most agency obligations, substantially all loans and securities backed by real estate, most corporate debt instruments, money market instruments, most other debt obligations and commodities.

Valuations of level 2 instruments can be verified to quoted prices, recent trading activity for identical or similar instruments, broker or dealer quotations or alternative pricing sources with reasonable levels of price transparency. Consideration is given to the nature of the quotations (e.g., indicative or executable) and the relationship of recent market activity to the prices provided from alternative pricing sources.

Valuation adjustments are typically made to level 2 instruments (i) if the instrument is subject to transfer restrictions and/or (ii) for other premiums and liquidity discounts that a market participant would require to arrive at fair value. Valuation adjustments are generally based on market evidence.

Level 3. Level 3 instruments have one or more significant valuation inputs that are not observable. Absent evidence to the contrary, level 3 instruments are initially valued at transaction price, which is considered to be the best initial estimate of fair value. Subsequently, the Bank uses other methodologies to determine fair value, which vary based on the type of instrument. Valuation inputs and assumptions are changed when corroborated by substantive observable evidence, including values realized on sales.

Valuation techniques of level 3 instruments vary by instrument, but are generally based on discounted cash flow techniques. The valuation techniques and the nature of significant inputs used to determine the fair values of each type of level 3 instrument are described below:

Loans and Securities Backed by Commercial Real Estate

Loans and securities backed by commercial real estate are directly or indirectly collateralized by a single property or a portfolio of properties, and may include tranches of varying levels of subordination. Significant inputs are generally determined based on relative value analyses and include:

- Market yields implied by transactions of similar or related assets and/or current levels and changes in market indices, such as the CMBX (an index that tracks the performance of commercial mortgage bonds);
- Transaction prices in both the underlying collateral and instruments with the same or similar underlying collateral; and
- Timing of expected future cash flows (duration) which, in certain cases, may incorporate the impact of any loan forbearances and other unobservable inputs (e.g., prepayment speeds).

Notes to Consolidated Financial Statements

Corporate Debt Instruments

Corporate debt instruments includes corporate loans and debt securities. Significant inputs for corporate debt instruments are generally determined based on relative value analyses, which incorporate comparisons both to prices of credit default swaps that reference the same or similar underlying instrument or entity and to other debt instruments for the same or similar issuer for which observable prices or broker quotations are available. Significant inputs include:

- Market yields implied by transactions of similar or related assets and/or current levels and trends of market indices, such as the CDX (an index that tracks the performance of corporate credit);
- Current performance and recovery assumptions and, where the Bank uses credit default swaps to value the related instrument, the cost of borrowing the underlying reference obligation; and
- Duration.

Equity Securities

Equity securities consists of private equities, including investments made as part of the Bank's Community Reinvestment Act (CRA) activities. Recent third-party completed or pending transactions (e.g., merger proposals, debt restructurings, tender offers) are considered the best evidence for any change in fair value. When these are not available, the following valuation methodologies are used, as appropriate:

- Industry multiples and public comparables;
- Transactions in similar instruments; and
- Discounted cash flow techniques.

The Bank also considers changes in the outlook for the relevant industry and financial performance of the issuer as compared to projected performance. Significant inputs include discount rates and capitalization rates.

Valuation Techniques and Significant Inputs for Derivatives

The Bank's level 2 and level 3 derivatives are valued using derivative pricing models (e.g., discounted cash flow models, correlation models and models that incorporate option pricing methodologies, such as Monte Carlo simulations). Price transparency of derivatives can generally be characterized by product type, as described below.

- **Interest Rate.** In general, the key inputs used to value interest rate derivatives are transparent, even for most long-dated contracts. Interest rate swaps and options denominated in the currencies of leading industrialized nations are characterized by high trading volumes and tight bid/offer spreads. Interest rate derivatives that reference indices, such as an inflation index, or the shape of the yield curve (e.g., 10-year swap rate vs. 2-year swap rate) are more complex, but the key inputs are generally observable.
- **Currency.** Prices for currency derivatives based on the exchange rates of leading industrialized nations, including those with longer tenors, are generally transparent. The primary difference between the price transparency of developed and emerging market currency derivatives is that emerging markets tend to be only observable for contracts with shorter tenors.
- **Credit.** Price transparency for credit default swaps, including both single names and baskets of credits, varies by market and underlying reference entity or obligation. Credit default swaps that reference indices, large corporates and major sovereigns generally exhibit the most price transparency. For credit default swaps with other underliers, price transparency varies based on credit rating, the cost of borrowing the underlying reference obligations, and the availability of the underlying reference obligations for delivery upon the default of the issuer. Credit default swaps that reference loans, asset-backed securities and emerging market debt instruments tend to have less price transparency than those that reference corporate bonds. In addition, more complex credit derivatives, such as those sensitive to the correlation between two or more underlying reference obligations, generally have less price transparency.
- **Equity.** Price transparency for equity derivatives varies by market and underlier. Options on indices and the common stock of corporates included in major equity indices exhibit the most price transparency. Equity derivatives generally have observable market prices, except for contracts with long tenors or reference prices that differ significantly from current market prices. More complex equity derivatives, such as those sensitive to the correlation between two or more individual stocks, generally have less price transparency.

Notes to Consolidated Financial Statements

- **Commodity.** Commodity derivatives include transactions referenced to energy (e.g., oil and natural gas) and metals (e.g., precious and base). Price transparency varies based on the underlying commodity, delivery location, tenor and product quality (e.g., diesel fuel compared to unleaded gasoline). In general, price transparency for commodity derivatives is greater for contracts with shorter tenors and contracts that are more closely aligned with major and/or benchmark commodity indices.

Liquidity is essential to the observability of all product types. If transaction volumes decline, previously transparent prices and other inputs may become unobservable. Conversely, even highly structured products may at times have trading volumes large enough to provide observability of prices and other inputs.

Level 1. Level 1 derivatives include short-term contracts for future delivery of securities when the underlying security is a level 1 instrument, and exchange-traded derivatives if they are actively traded and are valued at their quoted market price.

Level 2. Level 2 derivatives include over-the-counter (OTC) derivatives for which all significant valuation inputs are corroborated by market evidence and exchange-traded derivatives that are not actively traded and/or that are valued using models that calibrate to market-clearing levels of OTC derivatives.

The selection of a particular model to value a derivative depends on the contractual terms of and specific risks inherent in the instrument, as well as the availability of pricing information in the market. For derivatives that trade in liquid markets, model selection does not involve significant management judgment because outputs of models can be calibrated to market-clearing levels.

Valuation models require a variety of inputs, such as contractual terms, market prices, yield curves, discount rates (including those derived from interest rates on collateral received and posted as specified in credit support agreements for collateralized derivatives), credit curves, measures of volatility, prepayment rates, loss severity rates and correlations of such inputs. Significant inputs to the valuations of level 2 derivatives can be verified to market transactions, broker or dealer quotations or other alternative pricing sources with reasonable levels of price transparency. Consideration is given to the nature of the quotations (e.g., indicative or executable) and the relationship of recent market activity to the prices provided from alternative pricing sources.

Level 3. Level 3 derivatives are valued using models which utilize observable level 1 and/or level 2 inputs, as well as unobservable level 3 inputs. The significant unobservable inputs used to value the Bank's level 3 derivatives are described below.

- For level 3 interest rate and currency derivatives, significant unobservable inputs include correlations of certain currencies and interest rates (e.g., the correlation between Euro inflation and Euro interest rates) and specific interest rate and currency volatilities.
- For level 3 credit derivatives, significant unobservable inputs include illiquid credit spreads, which are unique to specific reference obligations and reference entities.
- For level 3 equity derivatives, significant unobservable inputs generally include correlation inputs, such as the correlation of the price performance of two or more individual stocks or the correlation of the price performance for a basket of stocks to another asset class.

Subsequent to the initial valuation of a level 3 derivative, the Bank updates the level 1 and level 2 inputs to reflect observable market changes and any resulting gains and losses are classified in level 3. Level 3 inputs are changed when corroborated by evidence, such as similar market transactions, third-party pricing services and/or broker or dealer quotations or other empirical market data. In circumstances where the Bank cannot verify the model value by reference to market transactions, it is possible that a different valuation model could produce a materially different estimate of fair value. See Note 5 for further information about significant unobservable inputs used in the valuation of level 3 derivatives.

Valuation Adjustments. Valuation adjustments are integral to determining the fair value of derivative portfolios and are used to adjust the mid-market valuations produced by derivative pricing models to the exit price valuation. These adjustments incorporate bid/offer spreads, the cost of liquidity, and credit and funding valuation adjustments, which account for the credit and funding risk inherent in the uncollateralized portion of derivative portfolios. The Bank also makes funding valuation adjustments to collateralized derivatives where the terms of the agreement do not permit the Bank to deliver or repledge collateral received. Market-based inputs are generally used when calibrating valuation adjustments to market-clearing levels.

Notes to Consolidated Financial Statements

In addition, for derivatives that include significant unobservable inputs, the Bank makes model or exit price adjustments to account for the valuation uncertainty present in the transaction.

Valuation Techniques and Significant Inputs for Other Financial Instruments at Fair Value

In addition to trading cash instruments, derivatives, and certain investments and loans, the Bank accounts for certain of its other financial assets and liabilities at fair value under the fair value option. Such instruments include resale and repurchase agreements; certain securities borrowed and loaned transactions; certain time deposits, including structured certificates of deposit, which are hybrid financial instruments; most other secured financings, including transfers of assets accounted for as financings rather than sales and advances from the Federal Home Loan Bank of New York (FHLB); certain unsecured borrowings, including certain hybrid financial instruments; and certain other assets and liabilities. These instruments are generally valued based on discounted cash flow techniques, which incorporate inputs with reasonable levels of price transparency, and are generally classified in level 2 because the inputs are observable. Valuation adjustments may be made for liquidity and for counterparty and the Bank's credit quality. The significant inputs used to value the Bank's other financial instruments are described below.

Resale and Repurchase Agreements and Securities Borrowed and Loaned. The significant inputs to the valuation of resale and repurchase agreements and securities borrowed and loaned are funding spreads, the amount and timing of expected future cash flows and interest rates.

Deposits. The significant inputs to the valuation of time deposits are interest rates and the amount and timing of future cash flows. The inputs used to value the embedded derivative component of hybrid financial instruments are consistent with the inputs used to value the Bank's other derivative instruments described above. See Note 7 for further information about derivatives and Note 13 for further information about deposits.

Other Secured Financings. The significant inputs to the valuation of other secured financings are the amount and timing of expected future cash flows, interest rates, funding spreads and the fair value of the collateral delivered by the Bank (determined using the amount and timing of expected future cash flows, market prices, market yields and recovery assumptions). See Note 11 for further information about other secured financings.

Unsecured Borrowings. The significant inputs to the valuation of unsecured borrowings are the amount and timing of expected future cash flows and interest rates. The inputs used to value the embedded derivative component of hybrid financial instruments are consistent with the inputs used to value the Bank's other derivative instruments described above. See Note 7 for further information about derivatives and Note 14 for further information about borrowings.

Other Assets and Liabilities. The significant inputs to the valuation of other assets and liabilities are the amount and timing of expected future cash flows, interest rate and market yields.

Note 5.

Fair Value Hierarchy

Financial assets and liabilities at fair value includes trading cash instruments, derivatives, and certain investments, loans and other financial assets and liabilities at fair value.

Notes to Consolidated Financial Statements

Fair Value of Trading Cash Instruments by Level

The table below presents trading cash instruments by level within the fair value hierarchy.

<i>\$ in millions</i>	Level 1	Level 2	Level 3	Total
As of December 2022				
Assets				
Government and agency obligations:				
U.S.	\$ 9,894	\$ 2,275	\$ —	\$ 12,169
Non-U.S.	3,270	2,842	45	6,157
Loans and securities backed by:				
Commercial real estate	—	46	—	46
Residential real estate	—	5,229	—	5,229
Corporate debt instruments	—	4,052	277	4,329
Other debt obligations	—	1,732	13	1,745
Equity securities	898	—	—	898
Total	\$ 14,062	\$ 16,176	\$ 335	\$ 30,573
Liabilities				
Government and agency obligations:				
U.S.	\$ (3,203)	\$ (1)	\$ —	\$ (3,204)
Non-U.S.	(5,230)	(390)	—	(5,620)
Loans and securities backed by:				
residential real estate	—	(2)	—	(2)
Corporate debt instruments	—	(1,106)	(33)	(1,139)
Other debt obligations	—	(30)	—	(30)
Equity securities	(236)	—	(1)	(237)
Total	\$ (8,669)	\$ (1,529)	\$ (34)	\$(10,232)
As of December 2021				
Assets				
Government and agency obligations:				
U.S.	\$ 18,693	\$ 735	\$ —	\$ 19,428
Non-U.S.	5,256	1,012	17	6,285
Loans and securities backed by:				
Commercial real estate	—	862	—	862
Residential real estate	—	8,630	—	8,630
Corporate debt instruments	—	4,876	195	5,071
Other debt obligations	—	460	—	460
Equity securities	1,580	—	—	1,580
Commodities	—	1,049	—	1,049
Total	\$ 25,529	\$ 17,624	\$ 212	\$ 43,365
Liabilities				
Government and agency obligations:				
U.S.	\$(10,562)	\$ —	\$ —	\$(10,562)
Non-U.S.	(1,290)	(23)	—	(1,313)
Loans and securities backed by:				
residential real estate	—	(5)	—	(5)
Corporate debt instruments	—	(1,161)	(42)	(1,203)
Equity securities	(116)	—	—	(116)
Total	\$(11,968)	\$(1,189)	\$ (42)	\$(13,199)

Trading cash instruments consists of instruments held in connection with the Bank's market-making or risk management activities. These instruments are carried at fair value and the related fair value gains and losses are recognized in the consolidated statements of earnings.

In the table above:

- Trading cash instrument assets are shown as positive amounts and trading cash instrument liabilities are shown as negative amounts.
- Corporate debt instruments includes corporate loans and debt securities.
- Other debt obligations includes other loans, other asset-backed securities and money market instruments.
- Equity securities includes public equities and exchange-traded funds.

See Note 4 for an overview of the Bank's fair value measurement policies, valuation techniques and significant inputs used to determine the fair value of trading cash instruments.

Significant Unobservable Inputs for Trading Cash Instrument Assets

The table below presents the amount of level 3 assets, and ranges and weighted averages of significant unobservable inputs used to value level 3 trading cash instrument assets.

<i>\$ in millions</i>	As of December 2022		As of December 2021	
	Amount or Range	Weighted Average	Amount or Range	Weighted Average
Corporate debt instruments				
Level 3 assets	\$ 277		\$ 195	
Yield	1.1% to 16.6%	3.9%	0.0% to 8.7%	4.2%
Duration (years)	1.2 to 20.3	4.9	N/A	N/A

As of December 2022, level 3 non-U.S. government and agency obligations and other debt obligations were not material, and as of December 2021, level 3 non-U.S. government and agency obligations were not material, and therefore are not included in the table above.

Notes to Consolidated Financial Statements

In the table above:

- Ranges represent the significant unobservable inputs that were used in the valuation of each type of trading cash instrument.
- Weighted averages are calculated by weighting each input by the relative fair value of the trading cash instruments.
- The ranges and weighted averages of these inputs are not representative of the appropriate inputs to use when calculating the fair value of any one trading cash instrument. For example, the highest yield for corporate debt instruments is appropriate for valuing a specific corporate debt instrument, but may not be appropriate for valuing any other corporate debt instrument. Accordingly, the ranges of inputs do not represent uncertainty in, or possible ranges of, fair value measurements of level 3 trading cash instruments.
- Increases in yield used in the valuation of level 3 trading cash instruments would have resulted in a lower fair value measurement as of both December 2022 and December 2021. Due to the distinctive nature of each level 3 trading cash instrument, the interrelationship of inputs is not necessarily uniform within each product type.
- Trading cash instruments are valued using discounted cash flows.
- The significant unobservable inputs for duration as of December 2021 did not have a range (and there was no weighted average) as each pertained to a single position. Therefore, such unobservable inputs are not included in the table above.

Level 3 Rollforward for Trading Cash Instruments

The table below presents a summary of the changes in fair value for level 3 trading cash instruments.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Assets		
Beginning balance	\$ 212	\$ 80
Net realized gains/(losses)	3	1
Net unrealized gains/(losses)	(37)	(1)
Purchases	261	211
Sales	(153)	(20)
Settlements	(7)	(7)
Transfers into level 3	84	—
Transfers out of level 3	(28)	(52)
Ending balance	\$ 335	\$ 212
Liabilities		
Beginning balance	\$ (42)	\$ (26)
Net realized gains/(losses)	1	1
Net unrealized gains/(losses)	2	9
Purchases	27	2
Sales	(24)	(31)
Settlements	3	6
Transfers into level 3	(8)	(10)
Transfers out of level 3	7	7
Ending balance	\$ (34)	\$ (42)

In the table above:

- Changes in fair value are presented for all trading cash instruments that are classified in level 3 as of the end of the period.
- Net unrealized gains/(losses) relates to trading cash instruments that were still held at period-end.
- Transfers between levels of the fair value hierarchy are reported at the beginning of the reporting period in which they occur. If a trading cash instrument was transferred to level 3 during a reporting period, its entire gain or loss for the period is classified in level 3.

Notes to Consolidated Financial Statements

- For level 3 trading cash instrument assets, increases are shown as positive amounts, while decreases are shown as negative amounts. For level 3 trading cash instrument liabilities, increases are shown as negative amounts, while decreases are shown as positive amounts.
- Level 3 trading cash instruments are frequently economically hedged with level 1 and level 2 trading cash instruments and/or level 2 or level 3 derivatives. Accordingly, gains or losses that are classified in level 3 can be partially offset by gains or losses attributable to level 1 or level 2 trading cash instruments and/or level 2 or level 3 derivatives. As a result, gains or losses included in the level 3 rollforward below do not necessarily represent the overall impact on the Bank's results of operations, liquidity or capital resources.

The table below presents information, by product type, for assets included in the summary table above.

\$ in millions	Year Ended December	
	2022	2021
Non-U.S. government and agency obligations		
Beginning balance	\$ 17	\$ —
Net unrealized gains/(losses)	(2)	—
Purchases	42	17
Sales	(14)	—
Transfers into level 3	2	—
Ending balance	\$ 45	\$ 17
Corporate debt instruments		
Beginning balance	\$ 195	\$ 80
Net realized gains/(losses)	3	1
Net unrealized gains/(losses)	(30)	(1)
Purchases	201	194
Sales	(139)	(20)
Settlements	(7)	(7)
Transfers into level 3	82	—
Transfers out of level 3	(28)	(52)
Ending balance	\$ 277	\$ 195
Other debt obligations		
Beginning balance	\$ —	\$ —
Net unrealized gains/(losses)	(5)	—
Purchases	18	—
Ending balance	\$ 13	\$ —

Level 3 Rollforward Commentary for Trading Cash Instruments

Year Ended December 2022. The net realized and unrealized losses on level 3 trading cash instrument assets of \$34 million (reflecting \$3 million of net realized gains and \$37 million of net unrealized losses) for 2022 were reported in gains and losses from financial assets and liabilities.

The drivers of net unrealized losses on level 3 trading cash instrument assets for 2022 were not material.

Transfers into level 3 trading cash instrument assets during 2022 primarily reflected transfers of certain corporate debt instruments from level 2 (principally due to reduced price transparency as a result of a lack of market evidence, including fewer market transactions in these instruments).

The drivers of transfers out of level 3 trading cash instrument assets during 2022 were not material.

Year Ended December 2021. Net realized and unrealized gains and losses on level 3 trading cash instrument assets for 2021 consisted of net realized gains of \$1 million, offset by net unrealized losses of \$1 million. Such net realized gains and net unrealized losses were reported in gains and losses from financial assets and liabilities.

There were no transfers into level 3 trading cash instrument assets during 2021.

Transfers out of level 3 trading cash instrument assets during 2021 primarily reflected transfers of certain corporate debt instruments to level 2 (principally due to certain unobservable yield and duration inputs no longer being significant to the valuation of these instruments).

Notes to Consolidated Financial Statements

Fair Value of Derivatives by Level

The table below presents derivatives on a gross basis by level and product type, as well as the impact of netting.

<i>\$ in millions</i>	Level 1	Level 2	Level 3	Total
As of December 2022				
Assets				
Interest rates	\$ 48	\$ 691,938	\$ 376	\$ 692,362
Currencies	—	112,318	910	113,228
Credit	—	5,735	871	6,606
Equities	—	7,767	159	7,926
Commodities	—	3,084	—	3,084
Gross fair value	48	820,842	2,316	823,206
Counterparty netting in levels	—	(762,232)	(578)	(762,810)
Subtotal	\$ 48	\$ 58,610	\$ 1,738	\$ 60,396
Cross-level counterparty netting				(321)
Cash collateral netting				(43,402)
Net fair value				\$ 16,673
Liabilities				
Interest rates	\$ (48)	\$ (670,410)	\$ (894)	\$ (671,352)
Currencies	—	(122,613)	(45)	(122,658)
Credit	—	(6,492)	(758)	(7,250)
Equities	—	(7,055)	(96)	(7,151)
Commodities	—	(3,082)	(1)	(3,083)
Gross fair value	(48)	(809,652)	(1,794)	(811,494)
Counterparty netting in levels	—	762,232	578	762,810
Subtotal	\$ (48)	\$ (47,420)	\$ (1,216)	\$ (48,684)
Cross-level counterparty netting				321
Cash collateral netting				29,410
Net fair value				\$ (18,953)
As of December 2021				
Assets				
Interest rates	\$ —	\$ 530,805	\$ 723	\$ 531,528
Currencies	—	85,224	360	85,584
Credit	—	8,212	1,389	9,601
Equities	—	3,659	557	4,216
Commodities	—	2,515	3	2,518
Gross fair value	—	630,415	3,032	633,447
Counterparty netting in levels	—	(586,635)	(881)	(587,516)
Subtotal	\$ —	\$ 43,780	\$ 2,151	\$ 45,931
Cross-level counterparty netting				(1,359)
Cash collateral netting				(32,146)
Net fair value				\$ 12,426
Liabilities				
Interest rates	\$ —	\$ (527,607)	\$ (877)	\$ (528,484)
Currencies	—	(84,670)	(169)	(84,839)
Credit	—	(9,465)	(1,391)	(10,856)
Equities	—	(3,110)	(4)	(3,114)
Commodities	—	(2,515)	(1)	(2,516)
Gross fair value	—	(627,367)	(2,442)	(629,809)
Counterparty netting in levels	—	586,635	881	587,516
Subtotal	\$ —	\$ (40,732)	\$ (1,561)	\$ (42,293)
Cross-level counterparty netting				1,359
Cash collateral netting				30,281
Net fair value				\$ (10,653)

In the table above:

- Gross fair values exclude the effects of both counterparty netting and collateral netting, and therefore are not representative of the Bank's exposure.
- Counterparty netting is reflected in each level to the extent that receivable and payable balances are netted within the same level and is included in counterparty netting in levels. Where the counterparty netting is across levels, the netting is included in cross-level counterparty netting.
- Derivative assets are shown as positive amounts and derivative liabilities are shown as negative amounts.

See Note 4 for an overview of the Bank's fair value measurement policies, valuation techniques and significant inputs used to determine the fair value of derivatives.

Significant Unobservable Inputs for Derivatives

The table below presents the amount of level 3 derivative assets (liabilities), and ranges, averages and medians of significant unobservable inputs used to value level 3 derivatives.

<i>\$ in millions</i>	As of December 2022		As of December 2021	
	Amount or Range	Average/Median	Amount or Range	Average/Median
Interest rates, net	\$ (518)		\$ (154)	
Correlation	60% to 81%	69%/67%	60% to 81%	69%/67%
Volatility (bps)	31 to 101	66/55	31 to 100	65/55
Currencies, net	\$ 865		\$ 191	
Correlation	48% to 71%	62%/63%	41% to 71%	54%/58%
Credit, net	\$ 113		\$ (2)	
Credit spreads (bps)	11 to 935	158/121	9 to 568	130/101
Equities, net	\$ 63		\$ 553	
Correlation	(39)% to 99%	67%/73%	15% to 98%	66%/88%

As of both December 2022 and December 2021, level 3 commodities, net, were not material and therefore are not included in the table above.

In the table above:

- Derivative assets are shown as positive amounts and derivative liabilities are shown as negative amounts.
- Ranges represent the significant unobservable inputs that were used in the valuation of each type of derivative.
- Averages represent the arithmetic average of the inputs and are not weighted by the relative fair value or notional amount of the respective financial instruments. An average greater than the median indicates that the majority of inputs are below the average. For example, the difference between the average and the median for credit spreads indicates that the majority of the inputs fall in the lower end of the range.

Notes to Consolidated Financial Statements

- The ranges, averages and medians of these inputs are not representative of the appropriate inputs to use when calculating the fair value of any one derivative. For example, the highest correlation for interest rate derivatives is appropriate for valuing a specific interest rate derivative but may not be appropriate for valuing any other interest rate derivative. Accordingly, the ranges of inputs do not represent uncertainty in, or possible ranges of, fair value measurements of level 3 derivatives.
- Interest rates, currencies and equities derivatives are valued using option pricing models, and credit derivatives are valued using option pricing, correlation and discounted cash flow models.
- The fair value of any one instrument may be determined using multiple valuation techniques. For example, option pricing models and discounted cash flow models are typically used together to determine fair value. Therefore, the level 3 balance encompasses both of these techniques.
- Correlation within currencies and equities includes cross-product type correlation.

Range of Significant Unobservable Inputs for Derivatives

The following provides information about the ranges of significant unobservable inputs used to value the Bank's level 3 derivative instruments:

- **Correlation.** Ranges for correlation cover a variety of underliers both within one product type (e.g., foreign exchange rates) and across product types (e.g., correlation of an interest rate and a currency), as well as across regions. Generally, cross-product type correlation inputs are used to value more complex instruments and are lower than correlation inputs on assets within the same derivative product type.
- **Volatility.** Ranges for volatility cover numerous underliers across a variety of markets, maturities and strike prices.
- **Credit spreads.** The ranges for credit spreads cover a variety of underliers (index and single names), regions, sectors, maturities and credit qualities (high-yield and investment-grade). The broad range of this population gives rise to the width of the ranges of significant unobservable inputs.

Sensitivity of Fair Value Measurement to Changes in Significant Unobservable Inputs for Derivatives

The following is a description of the directional sensitivity of the Bank's level 3 fair value measurements to changes in significant unobservable inputs, in isolation, as of each period-end:

- **Correlation.** In general, for contracts where the holder benefits from the convergence of the underlying asset or index prices (e.g., interest rates, foreign exchange rates and equity prices), an increase in correlation results in a higher fair value measurement.
- **Volatility.** In general, for purchased options, an increase in volatility results in a higher fair value measurement.
- **Credit spreads.** In general, the fair value of purchased credit protection increases as credit spreads increase. Credit spreads are strongly related to distinctive risk factors of the underlying reference obligations, which include reference entity-specific factors, such as leverage, volatility and industry, market-based risk factors, such as borrowing costs or liquidity of the underlying reference obligation, and macroeconomic conditions.

Due to the distinctive nature of each of the Bank's level 3 derivatives, the interrelationship of inputs is not necessarily uniform within each product type.

Level 3 Rollforward for Derivatives

The table below presents a summary of the changes in fair value for level 3 derivatives.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Total level 3 derivatives, net		
Beginning balance	\$ 590	\$ 377
Net realized gains/(losses)	(31)	(25)
Net unrealized gains/(losses)	799	807
Purchases	140	187
Sales	(626)	(388)
Settlements	(17)	(71)
Transfers into level 3	(9)	(30)
Transfers out of level 3	(324)	(267)
Ending balance	\$ 522	\$ 590

Notes to Consolidated Financial Statements

In the table above:

- Changes in fair value are presented for all derivative assets and liabilities that are classified in level 3 as of the end of the period.
- Net unrealized gains/(losses) relates to instruments that were still held at period-end.
- Transfers between levels of the fair value hierarchy are reported at the beginning of the reporting period in which they occur. If a derivative was transferred into level 3 during a reporting period, its entire gain or loss for the period is classified in level 3.
- Positive amounts for transfers into level 3 and negative amounts for transfers out of level 3 represent net transfers of derivative assets. Negative amounts for transfers into level 3 and positive amounts for transfers out of level 3 represent net transfers of derivative liabilities.
- A derivative with level 1 and/or level 2 inputs is classified in level 3 in its entirety if it has at least one significant level 3 input.
- If there is one significant level 3 input, the entire gain or loss from adjusting only observable inputs (i.e., level 1 and level 2 inputs) is classified in level 3.
- Gains or losses that have been classified in level 3 resulting from changes in level 1 or level 2 inputs are frequently offset by gains or losses attributable to level 1 or level 2 derivatives and/or level 1, level 2 and level 3 trading cash instruments. As a result, gains/(losses) included in the level 3 rollforward below do not necessarily represent the overall impact on the Bank's results of operations, liquidity or capital resources.

The table below presents information, by product type, for derivatives included in the summary table above.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Interest rates, net		
Beginning balance	\$ (154)	\$ (92)
Net realized gains/(losses)	43	26
Net unrealized gains/(losses)	269	385
Purchases	58	124
Sales	(597)	(359)
Settlements	145	29
Transfers into level 3	(2)	(36)
Transfers out of level 3	(280)	(231)
Ending balance	\$ (518)	\$ (154)
Currencies, net		
Beginning balance	\$ 191	\$ (63)
Net realized gains/(losses)	(27)	(52)
Net unrealized gains/(losses)	660	220
Purchases	11	15
Sales	(4)	(2)
Settlements	29	59
Transfers into level 3	1	(5)
Transfers out of level 3	4	19
Ending balance	\$ 865	\$ 191
Credit, net		
Beginning balance	\$ (2)	\$ (68)
Net realized gains/(losses)	(9)	(24)
Net unrealized gains/(losses)	123	81
Purchases	12	23
Sales	(12)	(9)
Settlements	13	(6)
Transfers into level 3	(10)	(1)
Transfers out of level 3	(2)	2
Ending balance	\$ 113	\$ (2)
Equities, net		
Beginning balance	\$ 553	\$ 598
Net realized gains/(losses)	(38)	25
Net unrealized gains/(losses)	(252)	117
Purchases	58	23
Sales	(12)	(16)
Settlements	(202)	(149)
Transfers into level 3	2	12
Transfers out of level 3	(46)	(57)
Ending balance	\$ 63	\$ 553
Commodities, net		
Beginning balance	\$ 2	\$ 2
Net unrealized gains/(losses)	(1)	4
Purchases	1	2
Sales	(1)	(2)
Settlements	(2)	(4)
Ending balance	\$ (1)	\$ 2

Notes to Consolidated Financial Statements

Level 3 Rollforward Commentary for Derivatives

Year Ended December 2022. The net realized and unrealized gains on level 3 derivatives of \$768 million (reflecting \$31 million of net realized losses and \$799 million of net unrealized gains) for 2022 were reported in gains and losses from financial assets and liabilities.

The net unrealized gains on level 3 derivatives for 2022 were primarily attributable to gains on certain currency derivatives (primarily reflecting the impact of changes in foreign exchange rates and an increase in interest rates), gains on certain interest rate and credit derivatives (primarily reflecting the impact of an increase in interest rates), partially offset by losses on certain equity derivatives (primarily reflecting the impact of a decrease in equity prices).

The drivers of transfers into level 3 derivatives during 2022 were not material.

Transfers out of level 3 derivatives during 2022 primarily reflected transfers of certain interest rate derivative assets to level 2 (principally due to certain unobservable volatility inputs no longer being significant to the valuation of these derivatives).

Year Ended December 2021. The net realized and unrealized gains on level 3 derivatives of \$782 million (reflecting \$25 million of net realized losses and \$807 million of net unrealized gains) for 2021 were reported in gains and losses from financial assets and liabilities.

The net unrealized gains on level 3 derivatives for 2021 were primarily attributable to gains on certain interest rate derivatives (primarily reflecting the impact of an increase in interest rates), gains on certain currency derivatives (primarily reflecting the impact of changes in foreign exchange rates) and gains on certain equity derivatives (primarily reflecting the impact of an increase in equity prices).

The drivers of transfers into level 3 derivatives during 2021 were not material.

Transfers out of level 3 derivatives during 2021 primarily reflected transfers of certain interest rate derivative assets to level 2 (principally due to increased transparency of certain volatility inputs used to value these derivatives).

Fair Value of Investments by Level

The table below presents investments accounted for at fair value by level within the fair value hierarchy.

<i>\$ in millions</i>	Level 1	Level 2	Level 3	Total
As of December 2022				
U.S. government obligations	\$ 23,762	\$ —	\$ —	\$ 23,762
Corporate debt securities	—	40	—	40
Securities backed by real estate	—	—	2	2
Equity securities	—	18	27	45
Subtotal	\$ 23,762	\$ 58	\$ 29	\$ 23,849
Investments in funds at NAV				30
Total investments				\$ 23,879
As of December 2021				
U.S. government obligations	\$ 24,489	\$ —	\$ —	\$ 24,489
Corporate debt securities	—	41	—	41
Securities backed by real estate	—	—	6	6
Equity securities	—	—	37	37
Subtotal	\$ 24,489	\$ 41	\$ 43	\$ 24,573
Investments in funds at NAV				26
Total investments				\$ 24,599

See Note 4 for an overview of the Bank's fair value measurement policies, valuation techniques and significant inputs used to determine the fair value of investments.

Significant Unobservable Inputs for Investments

The table below presents the amount of level 3 investments, and ranges and weighted averages of significant unobservable inputs used to value such investments.

<i>\$ in millions</i>	As of December 2022		As of December 2021	
	Amount or Range	Weighted Average	Amount or Range	Weighted Average
Equity securities				
Level 3 assets	\$ 27		\$ 37	
Discount rate/yield	5.4% to 8.0%	7.0%	N/A	N/A

As of both December 2022 and December 2021, level 3 securities backed by real estate were not material.

In the table above:

- Ranges represent the significant unobservable inputs that were used in the valuation of each type of investment.
- Weighted averages are calculated by weighting each input by the relative fair value of the investment.
- The ranges and weighted averages of these inputs are not representative of the appropriate inputs to use when calculating the fair value of any one investment. For example, the highest discount rate for private equity securities is appropriate for valuing a specific private equity security but may not be appropriate for valuing any other private equity security. Accordingly, the ranges of inputs do not represent uncertainty in, or possible ranges of, fair value measurements of level 3 investments.

Notes to Consolidated Financial Statements

- Equity securities are valued using market comparables and discounted cash flows.
- The fair value of any one instrument may be determined using multiple valuation techniques. For example, market comparables and discounted cash flows may be used together to determine fair value. Therefore, the level 3 balance encompasses both of these techniques.
- The significant unobservable inputs for discount rate as of December 2021 did not have a range (and there was no weighted average) as each pertained to a single position. Therefore, such unobservable inputs are not included in the table above.

Level 3 Rollforward for Investments

The table below presents a summary of the changes in fair value for level 3 investments.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Beginning balance	\$ 43	\$ 66
Net realized gains/(losses)	2	1
Net unrealized gains/(losses)	(3)	(1)
Purchases	—	9
Sales	(9)	—
Settlements	(4)	(1)
Transfers into level 3	—	7
Transfers out of level 3	—	(38)
Ending balance	\$ 29	\$ 43

In the table above:

- Changes in fair value are presented for all investments that are classified in level 3 as of the end of the period.
- Net unrealized gains/(losses) relates to investments that were still held at period-end.
- Transfers between levels of the fair value hierarchy are reported at the beginning of the reporting period in which they occur. If an investment was transferred to level 3 during a reporting period, its entire gain or loss for the period is classified in level 3.
- For level 3 investments, increases are shown as positive amounts, while decreases are shown as negative amounts.

The table below presents information, by product type, for investments included in the summary table above.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Securities backed by real estate		
Beginning balance	\$ 6	\$ —
Net realized gains/(losses)	2	—
Net unrealized gains/(losses)	(2)	5
Purchases	—	1
Settlements	(4)	—
Ending balance	\$ 2	\$ 6
Equity securities		
Beginning balance	\$ 37	\$ 28
Net realized gains/(losses)	—	1
Net unrealized gains/(losses)	(1)	(6)
Purchases	—	8
Sales	(9)	—
Settlements	—	(1)
Transfers into level 3	—	7
Ending balance	\$ 27	\$ 37
Corporate debt securities		
Beginning balance	\$ —	\$ 38
Transfers out of level 3	—	(38)
Ending balance	\$ —	\$ —

Level 3 Rollforward Commentary for Investments

Year Ended December 2022. The net realized and unrealized losses on level 3 investments of \$1 million (reflecting \$2 million of net realized gains and \$3 million of net unrealized losses) for 2022 were reported in gains and losses from financial assets and liabilities.

The drivers of net unrealized losses on level 3 investments for 2022 were not material.

There were no transfers into or out of level 3 investments during 2022.

Year Ended December 2021. Net realized and unrealized gains and losses on level 3 investments for 2021 consisted of net realized gains of \$1 million, offset by net unrealized losses of \$1 million. Such net realized gains and net unrealized losses were reported in gains and losses from financial assets and liabilities.

The drivers of transfers into level 3 investments during 2021 were not material.

Transfers out of level 3 investments during 2021 reflected transfers of certain corporate debt securities to level 2 (principally due to certain unobservable yield and duration inputs no longer being significant to the valuation of these instruments).

Notes to Consolidated Financial Statements

Fair Value of Loans by Level

The table below presents loans held for investment accounted for at fair value under the fair value option by level within the fair value hierarchy.

<i>\$ in millions</i>	Level 1	Level 2	Level 3	Total
As of December 2022				
Loan Type				
Corporate	\$ —	\$ 1,099	\$ 236	\$ 1,335
Real estate:				
Commercial	—	164	99	263
Residential	—	4,301	—	4,301
Other collateralized	—	287	65	352
Total	\$ —	\$ 5,851	\$ 400	\$ 6,251
As of December 2021				
Loan Type				
Corporate	\$ —	\$ 1,238	\$ 90	\$ 1,328
Real estate:				
Commercial	—	381	59	440
Residential	—	5,867	—	5,867
Other collateralized	—	292	63	355
Total	\$ —	\$ 7,778	\$ 212	\$ 7,990

The losses as a result of changes in the fair value of loans held for investment for which the fair value option was elected were \$307 million for 2022 and \$130 million for 2021. These losses were included in gains and losses from financial assets and liabilities.

Significant Unobservable Inputs for Loans

The table below presents the amount of level 3 loans, and ranges and weighted averages of significant unobservable inputs used to value such loans.

<i>\$ in millions</i>	As of December 2022		As of December 2021	
	Amount or Range	Weighted Average	Amount or Range	Weighted Average
Corporate				
Level 3 assets	\$ 236		\$ 90	
Yield	4.1% to 12.2%	9.6%	1.5% to 9.7%	5.6%
Duration (years)	1.9 to 3.3	2.9	2.9 to 4.3	3.7
Real estate				
Level 3 assets	\$ 99		\$ 59	
Yield	3.0% to 20.6%	11.4%	3.2% to 10.2%	4.4%
Duration (years)	0.6 to 1.8	1.6	1.1 to 3.0	2.7

The significant unobservable inputs for yield and duration related to other collateralized loans as of both December 2022 and December 2021 did not have a range (and there was no weighted average) as each pertained to a single position. Therefore, such unobservable inputs are not included in the table above.

In the table above:

- Ranges represent the significant unobservable inputs that were used in the valuation of each type of loan.
- Weighted averages are calculated by weighting each input by the relative fair value of the loan.
- The ranges and weighted averages of these inputs are not representative of the appropriate inputs to use when calculating the fair value of any one loan. For example, the highest yield for real estate loans is appropriate for valuing a specific real estate loan but may not be appropriate for valuing any other real estate loan. Accordingly, the ranges of inputs do not represent uncertainty in, or possible ranges of, fair value measurements of level 3 loans.
- Loans are valued using discounted cash flows.

Level 3 Rollforward for Loans

The table below presents a summary of the changes in fair value for level 3 loans.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Beginning balance	\$ 212	\$ 601
Net realized gains/(losses)	24	12
Net unrealized gains/(losses)	(10)	(4)
Purchases	4	42
Settlements	(82)	(193)
Transfers into level 3	252	20
Transfers out of level 3	—	(266)
Ending balance	\$ 400	\$ 212

In the table above:

- Changes in fair value are presented for loans that are classified in level 3 as of the end of the period.
- Net unrealized gains/(losses) relates to loans that were still held at period-end.
- Purchases includes originations and secondary purchases.

Notes to Consolidated Financial Statements

The table below presents information, by loan type, for loans included in the summary table above.

\$ in millions	Year Ended December	
	2022	2021
Corporate		
Beginning balance	\$ 90	\$ 366
Net realized gains/(losses)	8	2
Net unrealized gains/(losses)	1	1
Purchases	—	42
Settlements	(63)	(174)
Transfers into level 3	200	—
Transfers out of level 3	—	(147)
Ending balance	\$ 236	\$ 90
Real estate		
Beginning balance	\$ 59	\$ 172
Net realized gains/(losses)	16	10
Net unrealized gains/(losses)	(12)	(5)
Purchases	3	—
Settlements	(19)	(19)
Transfers into level 3	52	20
Transfers out of level 3	—	(119)
Ending balance	\$ 99	\$ 59
Other collateralized		
Beginning balance	\$ 63	\$ 63
Net unrealized gains/(losses)	1	—
Purchases	1	—
Ending balance	\$ 65	\$ 63

Level 3 Rollforward Commentary for Loans

Year Ended December 2022. The net realized and unrealized gains on level 3 loans of \$14 million (reflecting \$24 million of net realized gains and \$10 million of net unrealized losses) for 2022 were reported in gains and losses from financial assets and liabilities.

The drivers of net unrealized losses on level 3 loans for 2022 were not material.

Transfers into level 3 loans during 2022 primarily reflected transfers of certain corporate loans from level 2 (principally due to certain unobservable yield and duration inputs becoming significant to the valuation of these instruments).

There were no transfers out of level 3 loans during 2022.

Year Ended December 2021. The net realized and unrealized gains on level 3 loans of \$8 million (reflecting \$12 million of net realized gains and \$4 million of net unrealized losses) for 2021 were reported in gains and losses from financial assets and liabilities.

The drivers of net unrealized losses on level 3 loans for 2021 were not material.

The drivers of transfers into level 3 loans during 2021 were not material.

Transfers out of level 3 loans during 2021 primarily reflected transfers of certain corporate loans and loans backed by real estate to level 2 (principally due to certain unobservable yield and duration inputs no longer being significant to the valuation of these instruments).

Fair Value of Other Financial Assets and Liabilities by Level

The table below presents, by level within the fair value hierarchy, other financial assets and liabilities at fair value, substantially all of which are accounted for at fair value under the fair value option.

\$ in millions	Level 1	Level 2	Level 3	Total
As of December 2022				
Assets				
Resale agreements	\$ —	\$ 33,713	\$ —	\$ 33,713
Securities borrowed	—	23	—	23
Other assets	—	71	—	71
Total	\$ —	\$ 33,807	\$ —	\$ 33,807
Liabilities				
Deposits	\$ —	\$ (2,606)	\$ (2,768)	\$ (5,374)
Repurchase agreements	—	(5,566)	—	(5,566)
Securities loaned	—	(23)	—	(23)
Other secured financings	—	(3,482)	(148)	(3,630)
Unsecured borrowings	—	(448)	—	(448)
Other liabilities	—	(71)	—	(71)
Total	\$ —	\$ (12,196)	\$ (2,916)	\$ (15,112)

As of December 2021

Assets				
Resale agreements	\$ —	\$ 36,888	\$ —	\$ 36,888
Securities borrowed	—	6,911	—	6,911
Total	\$ —	\$ 43,799	\$ —	\$ 43,799
Liabilities				
Deposits	\$ —	\$ (1,711)	\$ (3,645)	\$ (5,356)
Repurchase agreements	—	(6,006)	—	(6,006)
Securities loaned	—	(6,911)	—	(6,911)
Other secured financings	—	(1,291)	(71)	(1,362)
Unsecured borrowings	—	(322)	—	(322)
Total	\$ —	\$ (16,241)	\$ (3,716)	\$ (19,957)

In the table above, other financial assets are shown as positive amounts and other financial liabilities are shown as negative amounts.

See Note 4 for an overview of the Bank's fair value measurement policies, valuation techniques and significant inputs used to determine the fair value of other financial assets and liabilities.

Notes to Consolidated Financial Statements

Significant Unobservable Inputs for Other Financial Instruments at Fair Value

See below for information about the significant unobservable inputs used to value level 3 other financial liabilities at fair value as of both December 2022 and December 2021.

Other Secured Financings. The ranges and weighted averages of significant unobservable inputs used to value level 3 other secured financings are presented below. These ranges and weighted averages exclude unobservable inputs that are only relevant to a single instrument, and therefore are not meaningful.

As of December 2022:

- Yield: 5.8% to 8.9% (weighted average: 6.4%)
- Duration: 1.1 to 4.1 years (weighted average: 3.4 years)

The significant unobservable inputs for yield and duration as of December 2021 did not have a range (and there was no weighted average) as each pertained to a single position.

Generally, increases in yield or duration, in isolation, would have resulted in a lower fair value measurement as of period-end. Due to the distinctive nature of each of level 3 other secured financings, the interrelationship of inputs is not necessarily uniform across such financings. See Note 11 for further information about other secured financings.

Deposits. The Bank's deposits that are classified in level 3 are hybrid financial instruments. As the significant unobservable inputs used to value such instruments primarily relate to the embedded derivative component of these deposits, these unobservable inputs are incorporated in the Bank's derivative disclosures.

Level 3 Rollforward for Other Financial Instruments at Fair Value

The table below presents a summary of the changes in fair value for level 3 other financial liabilities accounted for at fair value.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Beginning balance	\$ (3,716)	\$ (4,362)
Net realized gains/(losses)	(5)	(37)
Net unrealized gains/(losses)	386	(108)
Issuances	(1,032)	(411)
Settlements	1,359	1,168
Transfers into level 3	(27)	(36)
Transfers out of level 3	119	70
Ending balance	\$ (2,916)	\$ (3,716)

In the table above:

- Changes in fair value are presented for all other financial liabilities that are classified in level 3 as of the end of the period.
- Net unrealized gains/(losses) relates to other financial liabilities that were still held at period-end.
- Transfers between levels of the fair value hierarchy are reported at the beginning of the reporting period in which they occur. If a financial liability was transferred to level 3 during a reporting period, its entire gain or loss for the period is classified in level 3.
- For level 3 other financial liabilities, increases are shown as negative amounts, while decreases are shown as positive amounts.
- Level 3 other financial liabilities are frequently economically hedged with trading assets and liabilities. Accordingly, gains or losses that are classified in level 3 can be partially offset by gains or losses attributable to level 1, 2 or 3 trading assets and liabilities. As a result, gains or losses included in the level 3 rollforward below do not necessarily represent the overall impact on the Bank's results of operations, liquidity or capital resources.

The table below presents information, by the consolidated balance sheet line items, for liabilities included in the summary table above.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Deposits		
Beginning balance	\$ (3,645)	\$ (4,362)
Net realized gains/(losses)	(3)	(37)
Net unrealized gains/(losses)	392	(108)
Issuances	(903)	(340)
Settlements	1,285	1,168
Transfers into level 3	(13)	(36)
Transfers out of level 3	119	70
Ending balance	\$ (2,768)	\$ (3,645)
Other secured financings		
Beginning balance	\$ (71)	\$ —
Net realized gains/(losses)	(2)	—
Net unrealized gains/(losses)	(6)	—
Issuances	(129)	(71)
Settlements	74	—
Transfers into level 3	(14)	—
Ending balance	\$ (148)	\$ (71)

Notes to Consolidated Financial Statements

Level 3 Rollforward Commentary for Other Financial Instruments at Fair Value

Year Ended December 2022. The net realized and unrealized gains on level 3 other financial liabilities of \$381 million (reflecting \$5 million of net realized losses and \$386 million of net unrealized gains) for 2022 included gains of \$359 million reported in gains and losses from financial assets and liabilities in the consolidated statements of earnings, and gains of \$22 million reported in debt valuation adjustment in the consolidated statements of comprehensive income.

The net unrealized gains on level 3 other financial liabilities for 2022 primarily reflected gains on certain hybrid financial instruments included in deposits (principally due to the impact of a decrease in the market value of the underlying assets).

The drivers of transfers into level 3 other financial liabilities during 2022 were not material.

Transfers out of level 3 other financial liabilities during 2022 primarily reflected transfers of certain hybrid financial instruments included in deposits to level 2 (principally due to increased transparency of certain correlation and volatility inputs used to value these instruments).

Year Ended December 2021. The net realized and unrealized losses on level 3 other financial liabilities of \$145 million (reflecting \$37 million of net realized losses and \$108 million of net unrealized losses) for 2021 included losses of \$154 million reported in gains and losses from financial assets and liabilities in the consolidated statements of earnings, and gains of \$9 million reported in debt valuation adjustment in the consolidated statements of comprehensive income.

The net unrealized losses on level 3 other financial liabilities for 2021 primarily reflected losses on certain hybrid financial instruments included in deposits (principally due to the impact of an increase in the market value of the underlying assets).

The drivers of transfers into level 3 other financial liabilities during 2021 were not material.

Transfers out of level 3 other financial liabilities during 2021 primarily reflected transfers of certain hybrid financial instruments included in deposits to level 2 (principally due to increased transparency of certain correlation and volatility inputs used to value these instruments).

Note 6.

Trading Assets and Liabilities

Trading assets and liabilities include trading cash instruments and derivatives held in connection with the Bank's market-making or risk management activities. These assets and liabilities are carried at fair value either under the fair value option or in accordance with other U.S. GAAP, and the related fair value gains and losses are generally recognized in the consolidated statements of earnings.

The table below presents a summary of trading assets and liabilities.

<i>\$ in millions</i>	Trading Assets	Trading Liabilities
As of December 2022		
Trading cash instruments	\$ 30,573	\$ 10,232
Derivatives	16,673	18,953
Total	\$ 47,246	\$ 29,185
As of December 2021		
Trading cash instruments	\$ 43,365	\$ 13,199
Derivatives	12,426	10,653
Total	\$ 55,791	\$ 23,852

See Note 5 for further information about trading cash instruments and Note 7 for further information about derivatives.

Gains and Losses from Financial Assets and Liabilities

The table below presents gains and losses from financial assets and liabilities by major product type.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Interest rates	\$ (1,340)	\$ (1,483)
Currencies	4,333	3,066
Credit	1,148	2,077
Equities	458	966
Commodities	66	49
Total	\$ 4,665	\$ 4,675

In the table above:

- Gains/(losses) include both realized and unrealized gains and losses. Gains/(losses) exclude related interest income and interest expense. See Note 21 for further information about interest income and interest expense.

Notes to Consolidated Financial Statements

- Gains/(losses) are primarily related to the Bank's financial assets and liabilities, including both derivative and non-derivative financial instruments, and the syndication of loans and lending commitments. Gains/(losses) are not representative of the manner in which the Bank manages its business activities because many of the Bank's market-making, lending and other activities utilize financial instruments across various product types. Accordingly, gains or losses in one product type frequently offset gains or losses in other product types. For example, certain of the Bank's interest rate derivatives are sensitive to changes in foreign currency exchange rates and may be economically hedged with foreign currency contracts.

Note 7.

Derivatives and Hedging Activities

Derivative Activities

Derivatives are instruments that derive their value from underlying asset prices, indices, reference rates and other inputs, or a combination of these factors. Derivatives may be traded on an exchange (exchange-traded) or they may be privately negotiated contracts, which are usually referred to as OTC derivatives. Certain of the Bank's OTC derivatives are cleared and settled through central clearing counterparties (OTC-cleared), while others are bilateral contracts between two counterparties (bilateral OTC).

Market Making. As a market maker, the Bank enters into derivative transactions to provide liquidity to clients and to facilitate the transfer and hedging of their risks. In this role, the Bank typically acts as principal and is required to commit capital to provide execution, and maintains market-making positions in response to, or in anticipation of, client demand.

Risk Management. The Bank also enters into derivatives to actively manage risk exposures that arise from its market-making and financing activities. The Bank's holdings and exposures are hedged, in many cases, on either a portfolio or risk-specific basis, as opposed to an instrument-by-instrument basis. In addition, the Bank may enter into derivatives designated as hedges under U.S. GAAP. These derivatives are used to manage interest rate exposure of certain deposits, certain U.S. government securities classified as available-for-sale, and the net investment in certain non-U.S. operations, and the price risk of certain commodities.

The Bank enters into various types of derivatives, including:

- **Futures and Forwards.** Contracts that commit counterparties to purchase or sell financial instruments or currencies in the future.
- **Swaps.** Contracts that require counterparties to exchange cash flows, such as currency or interest payment streams. The amounts exchanged are based on the specific terms of the contract with reference to specified rates, financial instruments, currencies or indices.
- **Options.** Contracts in which the option purchaser has the right, but not the obligation, to purchase from or sell to the option writer financial instruments or currencies within a defined time period for a specified price.

Derivatives are reported on a net-by-counterparty basis (i.e., the net payable or receivable for derivative assets and liabilities for a given counterparty) when a legal right of setoff exists under an enforceable netting agreement (counterparty netting). Derivatives are accounted for at fair value, net of cash collateral received or posted under enforceable credit support agreements (cash collateral netting). Derivative assets are included in trading assets and derivative liabilities are included in trading liabilities. Realized and unrealized gains and losses on derivatives not designated as hedges are included in gains and losses from financial assets and liabilities in the consolidated statements of earnings.

Notes to Consolidated Financial Statements

The tables below present the gross fair value and the notional amounts of derivative contracts by major product type, the amounts of netting in the consolidated balance sheets, as well as collateral posted and received under enforceable credit support agreements that do not meet the criteria for netting under U.S. GAAP.

\$ in millions	As of December 2022		As of December 2021	
	Derivative Assets	Derivative Liabilities	Derivative Assets	Derivative Liabilities
Not accounted for as hedges				
Exchange-traded	\$ 525	\$ 1,139	\$ 124	\$ 411
OTC-cleared	29,931	29,303	2,968	2,527
Bilateral OTC	661,906	640,910	528,429	525,546
Total interest rates	692,362	671,352	531,521	528,484
Exchange-traded	8	16	—	1
OTC-cleared	21	—	—	13
Bilateral OTC	113,197	121,897	85,584	84,771
Total currencies	113,226	121,913	85,584	84,785
OTC-cleared	320	300	1,092	1,171
Bilateral OTC	6,286	6,950	8,509	9,685
Total credit	6,606	7,250	9,601	10,856
Exchange-traded	997	589	130	769
Bilateral OTC	6,929	6,562	4,086	2,345
Total equities	7,926	7,151	4,216	3,114
Commodities – bilateral OTC	3,084	3,083	2,518	2,516
Subtotal	823,204	810,749	633,440	629,755
Accounted for as hedges				
Interest rates – bilateral OTC	—	—	7	—
Currencies – bilateral OTC	2	745	—	54
Subtotal	2	745	7	54
Total gross fair value	\$ 823,206	\$ 811,494	\$ 633,447	\$ 629,809
Offset in the consolidated balance sheets				
OTC-cleared	\$ (29,602)	\$ (29,602)	\$ (3,663)	\$ (3,663)
Bilateral OTC	(733,529)	(733,529)	(585,212)	(585,212)
Counterparty netting	(763,131)	(763,131)	(588,875)	(588,875)
OTC-cleared	(592)	—	(345)	(42)
Bilateral OTC	(42,810)	(29,410)	(31,801)	(30,239)
Cash collateral netting	(43,402)	(29,410)	(32,146)	(30,281)
Total amounts offset	\$ (806,533)	\$ (792,541)	\$ (621,021)	\$ (619,156)
Included in the consolidated balance sheets				
Exchange-traded	\$ 1,530	\$ 1,744	\$ 254	\$ 1,181
OTC-cleared	78	1	52	6
Bilateral OTC	15,065	17,208	12,120	9,466
Total	\$ 16,673	\$ 18,953	\$ 12,426	\$ 10,653
Not offset in the consolidated balance sheets				
Cash collateral	\$ (111)	\$ (827)	\$ (414)	\$ (477)
Securities collateral	(4,739)	(1,851)	(2,855)	(2,978)
Total	\$ 11,823	\$ 16,275	\$ 9,157	\$ 7,198

\$ in millions	Notional Amounts as of December	
	2022	2021
Not accounted for as hedges		
Exchange-traded	\$ 4,147,415	\$ 2,321,011
OTC-cleared	7,394,683	10,022,810
Bilateral OTC	34,340,560	28,209,606
Total interest rates	45,882,658	40,553,427
Exchange-traded	3,534	607
OTC-cleared	108,244	138,251
Bilateral OTC	6,313,472	7,112,924
Total currencies	6,425,250	7,251,782
OTC-cleared	60,860	45,130
Bilateral OTC	591,121	472,092
Total credit	651,981	517,222
Exchange-traded	40,154	16,135
Bilateral OTC	153,916	119,457
Total equities	194,070	135,592
Commodities – bilateral OTC	40,098	38,493
Subtotal	53,194,057	48,496,516
Accounted for as hedges		
OTC-cleared	13,104	15,607
Bilateral OTC	—	284
Total interest rates	13,104	15,891
Currencies – bilateral OTC	12,428	8,559
Commodities – exchange-traded	—	1,050
Subtotal	25,532	25,500
Total notional amounts	\$ 53,219,589	\$ 48,522,016

In the tables above:

- Gross fair values exclude the effects of both counterparty netting and collateral, and therefore are not representative of the Bank's exposure.
- Where the Bank has received or posted collateral under credit support agreements, but has not yet determined such agreements are enforceable, the related collateral has not been netted.
- Notional amounts, which represent the sum of gross long and short derivative contracts, provide an indication of the volume of the Bank's derivative activity and do not represent anticipated losses.
- Total gross fair value of derivatives included derivative assets of \$1.81 billion as of December 2022 and \$2.79 billion as of December 2021, and derivative liabilities of \$2.01 billion as of December 2022 and \$2.11 billion as of December 2021, which are not subject to an enforceable netting agreement or are subject to a netting agreement that the Bank has not yet determined to be enforceable.

See Note 4 for an overview of the Bank's fair value measurement policies, valuation techniques and significant inputs used to determine the fair value of derivatives, and Note 5 for information about derivatives within the fair value hierarchy.

Notes to Consolidated Financial Statements

Credit Derivatives

The Bank enters into a broad array of credit derivatives to facilitate client transactions and to manage the credit risk associated with market-making and financing activities. Credit derivatives are actively managed based on the Bank's net risk position. Credit derivatives are generally individually negotiated contracts and can have various settlement and payment conventions. Credit events include failure to pay, bankruptcy, acceleration of indebtedness, restructuring, repudiation and dissolution of the reference entity.

The Bank enters into the following types of credit derivatives:

- **Credit Default Swaps.** Single-name credit default swaps protect the buyer against the loss of principal on one or more bonds, loans or mortgages (reference obligations) in the event the issuer of the reference obligations suffers a credit event. The buyer of protection pays an initial or periodic premium to the seller and receives protection for the period of the contract. If there is no credit event, as defined in the contract, the seller of protection makes no payments to the buyer. If a credit event occurs, the seller of protection is required to make a payment to the buyer, calculated according to the terms of the contract.
- **Credit Options.** In a credit option, the option writer assumes the obligation to purchase or sell a reference obligation at a specified price or credit spread. The option purchaser buys the right, but does not assume the obligation, to sell the reference obligation to, or purchase it from, the option writer. The payments on credit options depend either on a particular credit spread or the price of the reference obligation.
- **Credit Indices, Baskets and Tranches.** Credit derivatives may reference a basket of single-name credit default swaps or a broad-based index. If a credit event occurs in one of the underlying reference obligations, the protection seller pays the protection buyer. The payment is typically a pro-rata portion of the transaction's total notional amount based on the underlying defaulted reference obligation. In certain transactions, the credit risk of a basket or index is separated into various portions (tranches), each having different levels of subordination. The most junior tranches cover initial defaults and once losses exceed the notional amount of these junior tranches, any excess loss is covered by the next most senior tranche.

- **Total Return Swaps.** A total return swap transfers the risks relating to economic performance of a reference obligation from the protection buyer to the protection seller. Typically, the protection buyer receives a floating rate of interest and protection against any reduction in fair value of the reference obligation, and the protection seller receives the cash flows associated with the reference obligation, plus any increase in the fair value of the reference obligation.

The Bank economically hedges its exposure to written credit derivatives primarily by entering into offsetting purchased credit derivatives with identical underliers. Substantially all of the Bank's purchased credit derivative transactions are with financial institutions and are subject to stringent collateral thresholds. In addition, upon the occurrence of a specified trigger event, the Bank may take possession of the reference obligations underlying a particular written credit derivative, and consequently may, upon liquidation of the reference obligations, recover amounts on the underlying reference obligations in the event of default.

As of December 2022, written credit derivatives had a total gross notional amount of \$300.57 billion and purchased credit derivatives had a total gross notional amount of \$351.41 billion, for total net notional purchased protection of \$50.84 billion. As of December 2021, written credit derivatives had a total gross notional amount of \$231.25 billion and purchased credit derivatives had a total gross notional amount of \$285.97 billion, for total net notional purchased protection of \$54.72 billion. The Bank's written and purchased credit derivatives primarily consist of credit default swaps.

Notes to Consolidated Financial Statements

The table below presents information about credit derivatives.

\$ in millions	Credit Spread on Underlier (basis points)				Total
	0 - 250	251 - 500	501 - 1,000	Greater than 1,000	
As of December 2022					
Maximum Payout/Notional Amount of Written Credit Derivatives by Tenor					
Less than 1 year	\$ 28,833	\$ 2,757	\$ 860	\$ 555	\$ 33,005
1 – 5 years	209,876	17,903	10,011	5,942	243,732
Greater than 5 years	22,469	1,163	131	73	23,836
Total	\$ 261,178	\$ 21,823	\$ 11,002	\$ 6,570	\$ 300,573
Maximum Payout/Notional Amount of Purchased Credit Derivatives					
Offsetting	\$ 250,567	\$ 20,581	\$ 10,435	\$ 6,272	\$ 287,855
Other	\$ 58,121	\$ 3,187	\$ 1,441	\$ 804	\$ 63,553
Fair Value of Written Credit Derivatives					
Asset	\$ 3,554	\$ 438	\$ 231	\$ 146	\$ 4,369
Liability	1,173	289	167	477	2,106
Net asset/(liability)	\$ 2,381	\$ 149	\$ 64	\$ (331)	\$ 2,263
As of December 2021					
Maximum Payout/Notional Amount of Written Credit Derivatives by Tenor					
Less than 1 year	\$ 37,967	\$ 268	\$ 195	\$ 382	\$ 38,812
1 – 5 years	160,271	9,265	3,464	1,454	174,454
Greater than 5 years	14,743	952	2,040	248	17,983
Total	\$ 212,981	\$ 10,485	\$ 5,699	\$ 2,084	\$ 231,249
Maximum Payout/Notional Amount of Purchased Credit Derivatives					
Offsetting	\$ 201,923	\$ 9,167	\$ 3,398	\$ 1,752	\$ 216,240
Other	\$ 63,757	\$ 2,793	\$ 2,662	\$ 521	\$ 69,733
Fair Value of Written Credit Derivatives					
Asset	\$ 6,584	\$ 906	\$ 288	\$ 97	\$ 7,875
Liability	347	30	721	340	1,438
Net asset/(liability)	\$ 6,237	\$ 876	\$ (433)	\$ (243)	\$ 6,437

In the table above:

- Fair values exclude the effects of both netting of receivable balances with payable balances under enforceable netting agreements, and netting of cash received or posted under enforceable credit support agreements, and therefore are not representative of the Bank's credit exposure.
- Tenor is based on remaining contractual maturity.
- The credit spread on the underlier, together with the tenor of the contract, are indicators of payment/performance risk. The Bank is less likely to pay or otherwise be required to perform where the credit spread and the tenor are lower.
- Offsetting purchased credit derivatives represent the notional amount of purchased credit derivatives that economically hedge written credit derivatives with identical underliers.
- Other purchased credit derivatives represent the notional amount of all other purchased credit derivatives not included in offsetting.

Impact of Credit and Funding Spreads on Derivatives

The Bank realizes gains or losses on its derivative contracts. These gains or losses include credit valuation adjustments (CVA) relating to uncollateralized derivative assets and liabilities, which represent the gains or losses (including hedges) attributable to the impact of changes in credit exposure, counterparty and GS Group's credit spreads, liability funding spreads (which include GS Group's credit), probability of default and assumed recovery. These gains or losses also include funding valuation adjustments (FVA) relating to uncollateralized derivative assets, which represent the gains or losses (including hedges) attributable to the impact of changes in expected funding exposures and funding spreads.

The table below presents information about CVA and FVA.

\$ in millions	Year Ended December	
	2022	2021
CVA, net of hedges	\$ 101	\$ 200
FVA, net of hedges	(117)	(5)
Total	\$ (16)	\$ 195

Bifurcated Embedded Derivatives

The table below presents the fair value and the notional amount of derivatives that have been bifurcated from their related borrowings.

\$ in millions	As of December	
	2022	2021
Fair value of assets	\$ 47	\$ 2
Fair value of liabilities	(24)	(35)
Net asset/(liability)	\$ 23	\$ (33)
Notional amount	\$ 1,577	\$ 1,205

In the table above, derivatives that have been bifurcated from their related borrowings are recorded at fair value and primarily consist of credit default swaps. These derivatives are included in unsecured long-term borrowings, as well as other secured financings, with the related borrowings.

Derivatives with Credit-Related Contingent Features

Certain of the Bank's derivatives have been transacted under bilateral agreements with counterparties who may require the Bank to post collateral or terminate the transactions based on changes in the Bank's and/or Group Inc.'s credit ratings. Typically, such requirements are based on the credit ratings of Group Inc. The Bank assesses the impact of these bilateral agreements by determining the collateral or termination payments that would occur assuming a downgrade by all rating agencies. A downgrade by any one rating agency, depending on the agency's relative ratings of the Bank and/or Group Inc. at the time of the downgrade, may have an impact which is comparable to the impact of a downgrade by all rating agencies.

Notes to Consolidated Financial Statements

The table below presents information about net derivative liabilities under bilateral agreements (excluding collateral posted), the fair value of collateral posted and additional collateral or termination payments that could have been called by counterparties in the event of a one- or two-notch downgrade in the Bank's and/or Group Inc.'s credit ratings.

\$ in millions	As of December	
	2022	2021
Net derivative liabilities under bilateral agreements	\$ 13,833	\$ 10,336
Collateral posted	\$ 10,336	\$ 9,403
Additional collateral or termination payments:		
One-notch downgrade	\$ 44	\$ 69
Two-notch downgrade	\$ 188	\$ 227

Hedge Accounting

The Bank applies hedge accounting for (i) interest rate swaps used to manage the interest rate exposure of certain fixed-rate certificates of deposit and certain U.S. government securities classified as available-for-sale, (ii) commodity futures contracts used to manage the price risk of certain commodities and (iii) certain foreign currency forward contracts used to manage foreign exchange risk on the Bank's net investments in GSBE and the Tokyo branch.

To qualify for hedge accounting, the hedging instrument must be highly effective at reducing the risk from the exposure being hedged. Additionally, the Bank must formally document the hedging relationship at inception and assess the hedging relationship at least on a quarterly basis to ensure the hedging instrument continues to be highly effective over the life of the hedging relationship.

Fair Value Hedges

The Bank designates interest rate swaps as fair value hedges of certain fixed-rate certificates of deposit and, beginning in the second quarter of 2022, of certain U.S. government securities classified as available-for-sale. These interest rate swaps hedge changes in fair value attributable to the designated benchmark interest rate (e.g., London Interbank Offered Rate or Secured Overnight Financing Rate), effectively converting a substantial portion of these fixed-rate financial instruments into floating-rate financial instruments.

The Bank applies a statistical method that utilizes regression analysis when assessing the effectiveness of these hedging relationships in achieving offsetting changes in the fair values of the hedging instrument and the risk being hedged (i.e., interest rate risk). An interest rate swap is considered highly effective in offsetting changes in fair value attributable to changes in the hedged risk when the regression analysis results in a coefficient of determination of 80% or greater and a slope between 80% and 125%.

For qualifying interest rate fair value hedges, gains or losses on derivatives are included in interest income/expense. The change in fair value of the hedged items attributable to the risk being hedged is reported as an adjustment to its carrying value (hedging adjustment) and is also included in interest income/expense. When a derivative is no longer designated as a hedge, any remaining difference between the carrying value and par value of the hedged item is amortized in interest income/expense over the remaining life of the hedged item using the effective interest method. See Note 21 for further information about interest income and interest expense.

The table below presents the gains/(losses) from interest rate derivatives accounted for as hedges and the related hedged items.

\$ in millions	Year Ended December	
	2022	2021
Investments		
Interest rate hedges	\$ 108	\$ —
Hedged investments	(100)	—
Gains/(losses)	\$ 8	\$ —
Deposits		
Interest rate hedges	\$ (490)	\$ (413)
Hedged deposits	478	396
Gains/(losses)	\$ (12)	\$ (17)

The table below presents the carrying value of investments and deposits that are designated in an interest rate hedging relationship and the related cumulative hedging adjustment (increase/(decrease)) from current and prior hedging relationships included in such carrying values.

\$ in millions	Carrying Value	Cumulative Hedging Adjustment
As of December 2022		
Assets		
Investments	\$ 3,721	\$ (100)
Liabilities		
Deposits	\$ 5,892	\$ (237)
As of December 2021		
Liabilities		
Deposits	\$ 13,491	\$ 227

In the table above:

- Cumulative hedging adjustment included \$13 million as of December 2022 and \$45 million as of December 2021 of hedging adjustments from prior hedging relationships that were de-designated.
- The amortized cost of investments was \$4.08 billion as of December 2022.

Notes to Consolidated Financial Statements

In addition, cumulative hedging adjustments for items no longer designated in a hedging relationship were \$18 million as of December 2022 and \$(4) million as of December 2021.

The Bank designates commodity futures contracts as fair value hedges of the price risk of certain precious metals included in commodities within trading assets. As of December 2022, there were no such hedges outstanding, and as of December 2021, the carrying value of such commodities was \$1.05 billion and the amortized cost was \$1.02 billion. Changes in spot rates of such commodities are reflected as an adjustment to their carrying value, and the related gains/(losses) on both the commodities and the designated futures contracts are included in gains and losses from financial assets and liabilities. The contractual forward points on the designated futures contracts are amortized into earnings ratably over the life of the contract and other gains/(losses) as a result of changes in the forward points are included in other comprehensive loss. The cumulative hedging adjustment was not material as of both December 2022 and December 2021, and the related gains/(losses) were not material for both 2022 and 2021.

Net Investment Hedges

The Bank seeks to reduce the impact of fluctuations in foreign exchange rates on its net investments in GSBE and the Tokyo branch through the use of foreign currency forward contracts. For foreign currency forward contracts designated as hedges, the effectiveness of the hedge is assessed based on the overall changes in the fair value of the forward contracts (i.e., based on changes in forward rates). For qualifying net investment hedges, all gains or losses on the hedging instruments are included in currency translation.

The gains from net investment hedging were \$889 million for 2022 and \$577 million for 2021.

For 2022 and 2021, there were no gains or losses reclassified to earnings from accumulated comprehensive income/(loss) related to the Bank's net investments. Gains or losses on the Bank's net investments would be reclassified to earnings from accumulated other comprehensive income/(loss) upon liquidation of its net investment.

Note 8.

Investments

Investments includes debt instruments and equity securities that are accounted for at fair value and are generally held by the Bank in connection with its long-term investing activities. In addition, investments includes debt securities classified as available-for-sale and held-to-maturity that are generally held in connection with the Bank's asset-liability management activities.

The table below presents information about investments.

<i>\$ in millions</i>	As of December	
	2022	2021
Equity securities, at fair value	\$ 75	\$ 63
Debt instruments, at fair value	42	47
Available-for-sale securities, at fair value	23,762	24,489
Investments, at fair value	23,879	24,599
Held-to-maturity securities	5,910	549
Total investments	\$ 29,789	\$ 25,148

See Note 4 for an overview of the Bank's fair value measurement policies, valuation techniques and significant inputs used to determine the fair value of investments, and Note 5 for information about investments within the fair value hierarchy.

Equity Securities and Debt Instruments, at Fair Value

Equity securities and debt instruments, at fair value are accounted for at fair value either under the fair value option or in accordance with other U.S. GAAP, and the related fair value gains and losses are recognized in the consolidated statements of earnings.

Equity Securities, at Fair Value. Equity securities, at fair value consists of the Bank's private equity investments in corporate and real estate entities, including investments made as part of the Bank's CRA activities. Equity securities, at fair value includes \$30 million as of December 2022 and \$26 million as of December 2021 that are measured at NAV.

Debt Instruments, at Fair Value. Debt instruments, at fair value includes money market instruments, securities backed by real estate and corporate debt securities.

The table below presents information about debt instruments, at fair value.

<i>\$ in millions</i>	As of December	
	2022	2021
Corporate debt securities	\$ 40	\$ 41
Securities backed by real estate	2	6
Total	\$ 42	\$ 47

Notes to Consolidated Financial Statements

Available-for-Sale Securities

Available-for-sale securities are accounted for at fair value, and the related unrealized fair value gains and losses are included in accumulated other comprehensive income/(loss).

The table below presents information about available-for-sale securities by tenor.

<i>\$ in millions</i>	Amortized Cost	Fair Value	Weighted Average Yield
As of December 2022			
Less than 1 year	\$ 1,401	\$ 1,347	0.23%
1 year to 5 years	24,139	22,218	0.60%
5 years to 10 years	223	197	1.93%
Total	\$ 25,763	\$ 23,762	0.59%
As of December 2021			
1 year to 5 years	\$ 20,889	\$ 20,634	0.54%
5 years to 10 years	3,967	3,855	0.77%
Total	\$ 24,856	\$ 24,489	0.57%

In the table above:

- Available-for-sale securities consists of U.S. government obligations that were classified in level 1 of the fair value hierarchy as of both December 2022 and December 2021.
- The weighted average yield for available-for-sale securities is presented on a pre-tax basis and computed using the effective interest rate of each security at the end of the period, weighted based on the fair value of each security.
- There were no gross unrealized gains included in accumulated other comprehensive income/(loss) and the gross unrealized losses included in accumulated other comprehensive income/(loss) were \$2.00 billion as of December 2022 and primarily related to U.S. government obligations in a continuous unrealized loss position for more than a year. The gross unrealized gains included in accumulated other comprehensive income/(loss) were \$69 million and the gross unrealized losses included in accumulated other comprehensive income/(loss) were \$436 million as of December 2021 and primarily related to U.S. government obligations in a continuous unrealized loss position for more than a year. Net unrealized losses included in other comprehensive loss were \$1.63 billion (\$1.22 billion, net of tax) for 2022 and \$677 million (\$508 million, net of tax) for 2021.

- If the fair value of available-for-sale securities is less than amortized cost, such securities are considered impaired. If the Bank has the intent to sell the debt security, or if it is more likely than not that the Bank will be required to sell the debt security before recovery of its amortized cost, the difference between the amortized cost (net of allowance, if any) and the fair value of the securities is recognized as an impairment loss in earnings. The Bank did not record any such impairment losses during either 2022 or 2021. Impaired available-for-sale debt securities that the Bank has the intent and ability to hold are reviewed to determine if an allowance for credit losses should be recorded. The Bank considers various factors in such determination, including market conditions, changes in issuer credit ratings and severity of the unrealized losses. The Bank did not record any provision for credit losses on such securities during either 2022 or 2021.

The table below presents gross realized gains and the proceeds from the sales of available-for-sale securities.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Gross realized gains	\$ —	\$ 85
Proceeds from sales	\$ —	\$ 16,353

Held-to-Maturity Securities

Held-to-maturity securities are accounted for at amortized cost.

The table below presents information about held-to-maturity securities by tenor.

<i>\$ in millions</i>	Amortized Cost	Fair Value	Weighted Average Yield
As of December 2022			
Less than 1 year	\$ 501	\$ 495	3.08%
1 year to 5 years	4,383	4,234	2.74%
5 years to 10 years	1,026	967	2.89%
Total U.S. government obligations	5,910	5,696	2.79%
Total held-to-maturity securities	\$ 5,910	\$ 5,696	2.79%
As of December 2021			
1 year to 5 years	\$ 501	\$ 522	3.08%
Total U.S. government obligations	501	522	3.08%
Greater than 10 years	48	47	0.11%
Total securities backed by real estate	48	47	0.11%
Total held-to-maturity securities	\$ 549	\$ 569	2.82%

Notes to Consolidated Financial Statements

In the table above:

- Substantially all of the securities backed by real estate consist of securities backed by residential real estate.
- As these securities are not accounted for at fair value, they are not included in the Bank's fair value hierarchy in Notes 4 and 5. Had these securities been included in the Bank's fair value hierarchy, U.S. government obligations would have been classified in level 1 of the fair value hierarchy as of both December 2022 and December 2021. Securities backed by real estate would have been primarily classified in level 2 of the fair value hierarchy as of December 2021.
- The weighted average yield for held-to-maturity securities is presented on a pre-tax basis and computed using the effective interest rate of each security at the end of the period, weighted based on the amortized cost of each security.
- There were no gross unrealized gains as of December 2022 and the gross unrealized gains were \$21 million as of December 2021. The gross unrealized losses were \$214 million as of December 2022 and there were no gross unrealized losses as of December 2021.
- Held-to-maturity securities are reviewed to determine if an allowance for credit losses should be recorded in the consolidated statements of earnings. The Bank considers various factors in such determination, including market conditions, changes in issuer credit ratings, historical credit losses and sovereign guarantees. The Bank did not record any provision for credit losses on such securities during either 2022 or 2021.

Note 9.

Loans

Loans includes (i) loans held for investment that are accounted for at amortized cost net of allowance for loan losses or at fair value under the fair value option and (ii) loans held for sale that are accounted for at the lower of cost or fair value. Interest on loans is recognized over the life of the loan and is recorded on an accrual basis.

The table below presents information about loans.

<i>\$ in millions</i>	Amortized Cost	Fair Value	Held For Sale	Total
As of December 2022				
Loan Type				
Corporate	\$ 23,550	\$ 1,335	\$ 1,529	\$ 26,414
Commercial real estate	22,569	263	809	23,641
Residential real estate	17,468	4,301	1	21,770
Securities-based	13,545	—	—	13,545
Other collateralized	45,460	352	505	46,317
Consumer:				
Installment	6,326	—	—	6,326
Credit cards	15,820	—	—	15,820
Other	1,329	—	204	1,533
Total loans, gross	146,067	6,251	3,048	155,366
Allowance for loan losses	(4,252)	—	—	(4,252)
Total loans	\$ 141,815	\$ 6,251	\$ 3,048	\$ 151,114

As of December 2021

Loan Type				
Corporate	\$ 21,303	\$ 1,328	\$ 1,277	\$ 23,908
Commercial real estate	20,252	440	3,055	23,747
Residential real estate	17,431	5,867	100	23,398
Securities-based	12,526	—	—	12,526
Other collateralized	30,081	355	1,214	31,650
Consumer:				
Installment	3,672	—	—	3,672
Credit cards	8,212	—	—	8,212
Other	1,288	—	1,726	3,014
Total loans, gross	114,765	7,990	7,372	130,127
Allowance for loan losses	(2,481)	—	—	(2,481)
Total loans	\$ 112,284	\$ 7,990	\$ 7,372	\$ 127,646

In the fourth quarter of 2022, the Bank changed the classification of loans to better reflect the nature of the underlying collateral. This includes the addition of the securities-based and other collateralized loan types, as well as the removal of the wealth management loan type. This also resulted in reclassifications of certain loans in the corporate and other loan types to the other collateralized loan type. Prior periods have been conformed to the current presentation.

In the table above:

- The increase in credit cards from December 2021 to December 2022 included approximately \$2.0 billion relating to the Bank's acquisition of the General Motors co-branded credit card portfolio.
- Loans held for investment that are accounted for at amortized cost include net deferred fees and costs, and unamortized premiums and discounts, which are amortized over the life of the loan. These amounts were less than 1% of loans accounted for at amortized cost as of both December 2022 and December 2021.

Notes to Consolidated Financial Statements

The following is a description of the loan types in the table above:

- **Corporate.** Corporate loans includes term loans, revolving lines of credit, letter of credit facilities and bridge loans, and are principally used for operating and general corporate purposes, or in connection with acquisitions. Corporate loans also includes loans originated as part of the Bank's CRA activities. Corporate loans are secured (typically by a senior lien on the assets of the borrower) or unsecured, depending on the loan purpose, the risk profile of the borrower and other factors.
- **Commercial Real Estate.** Commercial real estate loans includes originated loans that are directly or indirectly secured by hotels, retail stores, multifamily housing complexes and commercial and industrial properties. Commercial real estate loans also includes loans extended to clients who warehouse assets that are directly or indirectly backed by commercial real estate. In addition, commercial real estate includes loans purchased by the Bank and loans originated as part of the Bank's CRA activities.
- **Residential Real Estate.** Residential real estate loans primarily includes loans extended to wealth management clients and to clients who warehouse assets that are directly or indirectly secured by residential real estate. In addition, residential real estate includes loans purchased by the Bank.
- **Securities-Based.** Securities-based loans includes loans that are secured by stocks, bonds, mutual funds, and exchange-traded funds. These loans are primarily extended to wealth management clients and used for purposes other than purchasing, carrying or trading margin stocks. Securities-based loans require borrowers to post additional collateral based on changes in the underlying collateral's fair value. Securities-based also includes loans originated through *Goldman Sachs Private Bank Select*.
- **Other Collateralized.** Other collateralized loans includes loans that are backed by specific collateral (other than securities and real estate). Such loans are extended to clients who warehouse assets that are directly or indirectly secured by corporate loans, consumer loans and other assets. Other collateralized loans also includes loans to investment funds (managed by third parties) that are collateralized by capital commitments of the funds' investors or assets held by the fund, as well as other secured loans extended to wealth management clients.

- **Installment.** Installment loans are unsecured loans originated by the Bank (including point-of-sale loans that the Bank began to originate through the GreenSky platform in the third quarter of 2022).
- **Credit Cards.** Credit card loans are loans made pursuant to revolving lines of credit issued to consumers by the Bank.
- **Other.** Other loans includes unsecured loans extended to wealth management clients and unsecured consumer loans purchased by the Bank.

See Note 4 for an overview of the Bank's fair value measurement policies, valuation techniques and significant inputs used to determine the fair value of loans, and Note 5 for information about loans within the fair value hierarchy.

Credit Quality

Risk Assessment. The Bank's risk assessment process includes evaluating the credit quality of its loans by GS Group's independent risk oversight and control function. For corporate loans and a majority of securities-based, real estate, other collateralized and other loans, such credit analyses incorporate initial and ongoing evaluations of the capacity and willingness of a borrower to meet its financial obligations. These credit evaluations are performed on an annual basis or more frequently if deemed necessary as a result of events or changes in circumstances. The internal credit rating for the borrower is determined by considering the results of the credit evaluations and assumptions with respect to the nature of and outlook for the borrower's industry and the economic environment. The internal credit rating does not take into consideration collateral received or other credit support arrangements. For consumer loans and for loans that are not assigned an internal credit rating, certain key metrics, including, but not limited to, the Fair Isaac Corporation (FICO) credit scores, delinquency status, collateral value and other risk factors, are reviewed.

Notes to Consolidated Financial Statements

The table below presents gross loans by an internally determined public rating agency equivalent or other credit metrics and the concentration of secured and unsecured loans.

<i>\$ in millions</i>	Investment-Grade	Non-Investment-Grade	Other Metrics/Unrated	Total
As of December 2022				
Accounting Method				
Amortized cost	\$ 56,143	\$ 61,293	\$ 28,631	\$146,067
Fair value	1,112	2,970	2,169	6,251
Held for sale	462	2,542	44	3,048
Total	\$ 57,717	\$ 66,805	\$ 30,844	\$155,366
Loan Type				
Corporate	\$ 9,316	\$ 17,098	—	\$ 26,414
Real estate:				
Commercial	4,242	19,399	—	23,641
Residential	2,961	13,678	5,131	21,770
Securities-based	10,049	490	3,006	13,545
Other collateralized	30,195	15,877	245	46,317
Consumer:				
Installment	—	—	6,326	6,326
Credit cards	—	—	15,820	15,820
Other	954	263	316	1,533
Total	\$ 57,717	\$ 66,805	\$ 30,844	\$155,366
Secured	85%	95%	26%	77%
Unsecured	15%	5%	74%	23%
Total	100%	100%	100%	100%

As of December 2021

<i>\$ in millions</i>	Investment-Grade	Non-Investment-Grade	Other Metrics/Unrated	Total
Accounting Method				
Amortized cost	\$ 42,279	\$ 55,675	\$ 16,811	\$114,765
Fair value	1,359	3,510	3,121	7,990
Held for sale	1,541	4,339	1,492	7,372
Total	\$ 45,179	\$ 63,524	\$ 21,424	\$130,127
Loan Type				
Corporate	\$ 7,695	\$ 16,204	9	\$ 23,908
Real estate:				
Commercial	5,273	18,396	78	23,747
Residential	2,653	15,696	5,049	23,398
Securities-based	9,683	439	2,404	12,526
Other collateralized	19,065	12,336	249	31,650
Consumer:				
Installment	—	—	3,672	3,672
Credit cards	—	—	8,212	8,212
Other	810	453	1,751	3,014
Total	\$ 45,179	\$ 63,524	\$ 21,424	\$130,127
Secured	83%	94%	35%	81%
Unsecured	17%	6%	65%	19%
Total	100%	100%	100%	100%

In the table above:

- Residential real estate, securities-based, other collateralized and other loans included in the other metrics/unrated category consists of loans where the Bank uses other key metrics to assess the borrower's credit quality, such as loan-to-value ratio, delinquency status, collateral value, expected cash flows, FICO credit score (which measures a borrower's creditworthiness by considering factors such as payment and credit history) and other risk factors.
- For installment and credit card loans included in the other metrics/unrated category, the evaluation of credit quality incorporates the borrower's FICO credit score. FICO credit scores are periodically refreshed by the Bank to assess the updated creditworthiness of the borrower. See "Vintage" below for information about installment and credit card loans by FICO credit scores.

The Bank also assigns a regulatory risk rating to its loans based on the definitions provided by the U.S. federal bank regulatory agencies. Total loans included 96% of loans as of both December 2022 and December 2021 that were rated pass/non-criticized.

Notes to Consolidated Financial Statements

Vintage. The tables below present gross loans accounted for at amortized cost (excluding installment and credit card loans) by an internally determined public rating agency equivalent or other credit metrics and origination year for term loans.

\$ in millions	As of December 2022			
	Investment-Grade	Non-Investment-Grade	Other Metrics/Unrated	Total
2022	\$ 2,572	\$ 2,225	\$ —	\$ 4,797
2021	1,477	1,458	—	2,935
2020	682	956	—	1,638
2019	160	905	—	1,065
2018	738	773	—	1,511
2017 or earlier	508	1,729	—	2,237
Revolving	3,146	6,221	—	9,367
Corporate	9,283	14,267	—	23,550
2022	730	3,475	—	4,205
2021	701	2,678	—	3,379
2020	316	1,244	—	1,560
2019	296	936	—	1,232
2018	86	323	—	409
2017 or earlier	927	461	—	1,388
Revolving	1,186	9,210	—	10,396
Commercial real estate	4,242	18,327	—	22,569
2022	712	1,361	1,314	3,387
2021	743	1,211	1,349	3,303
2020	—	8	89	97
2019	—	—	88	88
2018	—	1	127	128
2017 or earlier	—	9	—	9
Revolving	495	9,961	—	10,456
Residential real estate	1,950	12,551	2,967	17,468
2022	5	—	—	5
2017 or earlier	—	22	—	22
Revolving	10,044	468	3,006	13,518
Securities-based	10,049	490	3,006	13,545
2022	4,065	1,041	96	5,202
2021	1,815	1,497	105	3,417
2020	370	1,272	24	1,666
2019	106	298	12	416
2018	504	97	6	607
2017 or earlier	294	299	—	593
Revolving	22,511	11,046	2	33,559
Other collateralized	29,665	15,550	245	45,460
2022	—	57	—	57
2021	17	4	—	21
2020	—	—	262	262
2017 or earlier	—	—	5	5
Revolving	937	47	—	984
Other	954	108	267	1,329
Total	\$ 56,143	\$ 61,293	\$ 6,485	\$123,921
Percentage of total	46%	49%	5%	100%

\$ in millions	As of December 2021			
	Investment-Grade	Non-Investment-Grade	Other Metrics/Unrated	Total
2021	\$ 2,772	\$ 3,342	\$ —	\$ 6,114
2020	649	1,244	7	1,900
2019	252	1,265	—	1,517
2018	1,288	918	—	2,206
2017	430	812	—	1,242
2016 or earlier	274	1,052	—	1,326
Revolving	1,830	5,167	1	6,998
Corporate	7,495	13,800	8	21,303
2021	799	3,184	—	3,983
2020	473	1,510	—	1,983
2019	402	960	—	1,362
2018	344	620	—	964
2017	744	353	—	1,097
2016 or earlier	286	356	—	642
Revolving	1,850	8,371	—	10,221
Commercial real estate	4,898	15,354	—	20,252
2021	678	2,744	1,510	4,932
2020	260	557	103	920
2019	—	—	161	161
2018	—	2	152	154
2017	—	61	—	61
Revolving	438	10,765	—	11,203
Residential real estate	1,376	14,129	1,926	17,431
2017	—	22	—	22
Revolving	9,683	423	2,398	12,504
Securities-based	9,683	445	2,398	12,526
2021	1,758	2,762	204	4,724
2020	946	623	33	1,602
2019	107	232	19	358
2018	595	121	—	716
2017	303	14	—	317
2016 or earlier	15	47	—	62
Revolving	14,293	8,009	—	22,302
Other collateralized	18,017	11,808	256	30,081
2021	68	99	—	167
2020	—	—	331	331
2017	—	—	8	8
Revolving	742	40	—	782
Other	810	139	339	1,288
Total	\$ 42,279	\$ 55,675	\$ 4,927	\$102,881
Percentage of total	41%	54%	5%	100%

In the tables above, revolving loans which converted to term loans were \$725 million and primarily included other collateralized loans as of December 2022. Such loans were not material as of December 2021.

Notes to Consolidated Financial Statements

The table below presents gross installment loans by refreshed FICO credit scores and origination year and gross credit card loans by refreshed FICO credit scores.

<i>\$ in millions</i>	Greater than or equal to 660	Less than 660	Total
As of December 2022			
2022	\$ 4,349	\$ 242	\$ 4,591
2021	1,080	109	1,189
2020	251	23	274
2019	160	23	183
2018	70	13	83
2017 or earlier	5	1	6
Installment	5,915	411	6,326
Credit cards	10,762	5,058	15,820
Total	\$ 16,677	\$ 5,469	\$ 22,146

Percentage of total:			
Installment	94%	6%	100%
Credit cards	68%	32%	100%
Total	75%	25%	100%

<u>As of December 2021</u>			
2021	\$ 2,017	\$ 42	\$ 2,059
2020	665	40	705
2019	508	61	569
2018	257	42	299
2017	32	7	39
2016	1	—	1
Installment	3,480	192	3,672
Credit cards	6,100	2,112	8,212
Total	\$ 9,580	\$ 2,304	\$ 11,884

Percentage of total:			
Installment	95%	5%	100%
Credit cards	74%	26%	100%
Total	81%	19%	100%

In the table above, credit card loans consist of revolving lines of credit.

Credit Concentrations. The table below presents the concentration of gross loans by region.

<i>\$ in millions</i>	Carrying Value	Americas	EMEA	Asia	Total
As of December 2022					
Corporate	\$ 26,414	64%	30%	6%	100%
Commercial real estate	23,641	89%	11%	—	100%
Residential real estate	21,770	100%	—	—	100%
Securities-based	13,545	100%	—	—	100%
Other collateralized	46,317	92%	7%	1%	100%
Consumer:					
Installment	6,326	100%	—	—	100%
Credit cards	15,820	100%	—	—	100%
Other	1,533	100%	—	—	100%
Total	\$155,366	90%	9%	1%	100%

<u>As of December 2021</u>					
Corporate	\$ 23,908	61%	34%	5%	100%
Commercial real estate	23,747	95%	5%	—	100%
Residential real estate	23,398	100%	—	—	100%
Securities-based	12,526	100%	—	—	100%
Other collateralized	31,650	84%	16%	—	100%
Consumer:					
Installment	3,672	100%	—	—	100%
Credit cards	8,212	100%	—	—	100%
Other	3,014	100%	—	—	100%
Total	\$130,127	88%	11%	1%	100%

In the table above:

- EMEA represents Europe, Middle East and Africa.
- The top five industry concentrations for corporate loans as of December 2022 were 23% for technology, media & telecommunications, 19% for diversified industrials, 14% for real estate, 11% for natural resources and utilities and 10% for consumer and retail.
- The top five industry concentrations for corporate loans as of December 2021 were 20% for technology, media & telecommunications, 17% for diversified industrials, 16% for natural resources and utilities, 12% for real estate and 11% for consumer and retail.

Notes to Consolidated Financial Statements

Nonaccrual and Past Due Loans. Loans accounted for at amortized cost (other than credit card loans) are placed on nonaccrual status when it is probable that the Bank will not collect all principal and interest due under the contractual terms, regardless of the delinquency status or if a loan is past due for 90 days or more, unless the loan is both well collateralized and in the process of collection. At that time, all accrued but uncollected interest is reversed against interest income and interest subsequently collected is recognized on a cash basis to the extent the loan balance is deemed collectible. Otherwise, all cash received is used to reduce the outstanding loan balance. A loan is considered past due when a principal or interest payment has not been made according to its contractual terms. Credit card loans are not placed on nonaccrual status and accrue interest until the loan is paid in full or is charged off.

In certain circumstances, the Bank may modify the original terms of a loan agreement by granting a concession to a borrower experiencing financial difficulty, typically in the form of a modification of loan covenants, but may also include forbearance of interest or principal, payment extensions or interest rate reductions. These modifications, to the extent significant, are considered TDRs. Loan modifications that extend payment terms for a period of less than 90 days are generally considered insignificant and therefore not reported as TDRs.

The table below presents information about past due loans.

<i>\$ in millions</i>	30-89 days	90 days or more	Total
As of December 2022			
Commercial real estate	\$ 30	\$ 30	\$ 60
Residential real estate	2	3	5
Securities-based	1	—	1
Other collateralized	10	5	15
Consumer:			
Installment	46	17	63
Credit cards	291	265	556
Other	8	2	10
Total	\$ 388	\$ 322	\$ 710
Total divided by gross loans at amortized cost	0.5%		
As of December 2021			
Corporate	\$ 5	\$ 30	\$ 35
Commercial real estate	6	37	43
Residential real estate	1	2	3
Securities-based	—	5	5
Consumer:			
Installment	20	7	27
Credit cards	86	71	157
Other	3	—	3
Total	\$ 121	\$ 152	\$ 273
Total divided by gross loans at amortized cost	0.2%		

The table below presents information about nonaccrual loans.

<i>\$ in millions</i>	As of December	
	2022	2021
Corporate	\$ 529	\$ 594
Commercial real estate	619	494
Residential real estate	66	4
Securities-based	—	5
Other collateralized	—	1
Installment	41	43
Total	\$ 1,255	\$ 1,141
Total divided by gross loans at amortized cost	0.9%	1.0%

In the table above:

- Nonaccrual loans included \$78 million as of December 2022 and \$89 million as of December 2021 of loans that were 30 days or more past due.
- Loans that were 90 days or more past due and still accruing were not material as of both December 2022 and December 2021.
- Nonaccrual loans that were modified in a TDR were not material as of December 2022 and included \$29 million of commercial real estate loans as of December 2021. The Bank's lending commitments related to these loans were not material as of both December 2022 and December 2021. Installment loans that were modified in a TDR were not material as of both December 2022 and December 2021.
- Allowance for loan losses as a percentage of total nonaccrual loans was 338.8% as of December 2022 and 217.4% as of December 2021.

Allowance for Credit Losses

The Bank's allowance for credit losses consists of the allowance for losses on loans and lending commitments accounted for at amortized cost. Loans and lending commitments accounted for at fair value or accounted for at the lower of cost or fair value are not subject to an allowance for credit losses.

To determine the allowance for credit losses, the Bank classifies its loans and lending commitments accounted for at amortized cost into wholesale and consumer portfolios. These portfolios represent the level at which the Bank has developed and documented its methodology to determine the allowance for credit losses. The allowance for credit losses is measured on a collective basis for loans that exhibit similar risk characteristics using a modeled approach and on an asset-specific basis for loans that do not share similar risk characteristics.

Notes to Consolidated Financial Statements

The allowance for credit losses takes into account the weighted average of a range of forecasts of future economic conditions over the expected life of the loan and lending commitments. The expected life of each loan or lending commitment is determined based on the contractual term adjusted for extension options or demand features, or is modeled in the case of revolving credit card loans. The forecasts include baseline, favorable and adverse economic scenarios over a three-year period. For loans with expected lives beyond three years, the model reverts to historical loss information based on a non-linear modeled approach. The forecasted economic scenarios consider a number of risk factors relevant to the wholesale and consumer portfolios described below. The Bank applies judgment in weighing individual scenarios each quarter based on a variety of factors, including the Bank's internally derived economic outlook, market consensus, recent macroeconomic conditions and industry trends.

The allowance for credit losses also includes qualitative components which allow management to reflect the uncertain nature of economic forecasting, capture uncertainty regarding model inputs, and account for model imprecision and concentration risk.

Management's estimate of credit losses entails judgment about the expected life of the loan and loan collectability at the reporting dates, and there are uncertainties inherent in those judgments. The allowance for credit losses is subject to a governance process that involves review and approval by senior management within the Bank's independent risk oversight and control functions. Personnel within GS Group's independent risk oversight and control functions are responsible for forecasting the economic variables that underlie the economic scenarios that are used in the modeling of expected credit losses. While management uses the best information available to determine this estimate, future adjustments to the allowance may be necessary based on, among other things, changes in the economic environment or variances between actual results and the original assumptions used.

The table below presents gross loans and lending commitments accounted for at amortized cost by portfolio.

<i>\$ in millions</i>	As of December			
	2022		2021	
	Loans	Lending Commitments	Loans	Lending Commitments
Wholesale				
Corporate	\$ 23,550	\$ 121,895	\$ 21,303	\$ 116,811
Commercial real estate	22,569	3,170	20,252	4,249
Residential real estate	17,468	3,014	17,431	3,140
Securities-based	13,545	498	12,526	453
Other collateralized	45,460	12,417	30,081	13,181
Other	1,329	920	1,288	386
Consumer				
Installment	6,326	1,882	3,672	9
Credit cards	15,820	62,216	8,212	35,932
Total	\$146,067	\$ 206,012	\$114,765	\$ 174,161

In the table above:

- Wholesale loans included \$1.21 billion as of December 2022 and \$1.10 billion as of December 2021 of nonaccrual loans for which the allowance for credit losses was measured on an asset-specific basis. The allowance for credit losses on these loans was \$204 million as of December 2022 and \$201 million as of December 2021. These loans included \$343 million as of December 2022 and \$119 million as of December 2021 of loans which did not require a reserve as the loan was deemed to be recoverable.
- Credit card lending commitments included \$62.22 billion as of December 2022 and \$33.97 billion as of December 2021 related to credit card lines issued by the Bank to consumers. These credit card lines are cancellable by the Bank. The increase in credit card lending commitments from December 2021 to December 2022 reflected approximately \$15.0 billion relating to the Bank's acquisition of the General Motors co-branded credit card portfolio. In addition, credit card lending commitments as of December 2021 included a commitment of approximately \$2.0 billion to acquire the outstanding credit card loans related to the General Motors co-branded credit card portfolio. See Note 18 for further information about lending commitments.
- The increase in installment lending commitments from December 2021 to December 2022 primarily relates to commitments extended in connection with point-of-sale financing through GreenSky. See Note 18 for further information about lending commitments.

Notes to Consolidated Financial Statements

The following is a description of the methodology used to calculate the allowance for credit losses:

Wholesale. The allowance for credit losses for wholesale loans and lending commitments that exhibit similar risk characteristics is measured using a modeled approach. These models determine the probability of default and loss given default based on various risk factors, including internal credit ratings, industry default and loss data, expected life, macroeconomic indicators, the borrower's capacity to meet its financial obligations, the borrower's country of risk and industry, loan seniority and collateral type. For lending commitments, the methodology also considers the probability of drawdowns or funding. In addition, for loans backed by real estate, risk factors include the loan-to-value ratio, debt service ratio and home price index. The most significant inputs to the forecast model for wholesale loans and lending commitments include unemployment rates, GDP, credit spreads, commercial and industrial delinquency rates, short- and long-term interest rates, and oil prices.

The allowance for loan losses for wholesale loans that do not share similar risk characteristics, such as nonaccrual loans or loans in a TDR, is calculated using the present value of expected future cash flows discounted at the loan's original effective rate, the observable market price of the loan or the fair value of the collateral.

Wholesale loans are charged off against the allowance for loan losses when deemed to be uncollectible.

Consumer. The allowance for credit losses for consumer loans that exhibit similar risk characteristics is calculated using a modeled approach which classifies consumer loans into pools based on borrower-related and exposure-related characteristics that differentiate a pool's risk characteristics from other pools. The factors considered in determining a pool are generally consistent with the risk characteristics used for internal credit risk measurement and management and include key metrics, such as FICO credit scores, delinquency status, loan vintage and macroeconomic indicators. The most significant inputs to the forecast model for consumer loans include unemployment rates and delinquency rates. The expected life of revolving credit card loans is determined by modeling expected future draws and the timing and amount of repayments allocated to the funded balance. The Bank also recognizes an allowance for credit losses on commitments to acquire loans and commitments extended in connection with point-of-sale financing. However, no allowance for credit losses is recognized on credit card lending commitments as they are cancellable by the Bank.

The allowance for credit losses for consumer loans that do not share similar risk characteristics, such as loans in a TDR, is calculated using the present value of expected future cash flows discounted at the loan's original effective rate.

Installment loans are charged off when they are 120 days past due. Credit card loans are charged off when they are 180 days past due.

Allowance for Credit Losses Rollforward

The table below presents information about the allowance for credit losses.

<i>\$ in millions</i>	Wholesale	Consumer	Total
Year Ended December 2022			
Allowance for loan losses			
Beginning balance	\$ 1,043	\$ 1,438	\$ 2,481
Net (charge-offs)/recoveries	(121)	(473)	(594)
Provision	350	2,016	2,366
Other	(1)	—	(1)
Ending balance	\$ 1,271	\$ 2,981	\$ 4,252
Allowance ratio	1.0%	13.5%	2.9%
Net charge-off ratio	0.1%	2.8%	0.4%
Allowance for losses on lending commitments			
Beginning balance	\$ 410	\$ 187	\$ 597
Provision	56	(124)	(68)
Other	(2)	—	(2)
Ending balance	\$ 464	\$ 63	\$ 527
Year Ended December 2021			
Allowance for loan losses			
Beginning balance	\$ 1,233	\$ 1,290	\$ 2,523
Net (charge-offs)/recoveries	1	(203)	(202)
Provision	(113)	351	238
Other	(78)	—	(78)
Ending balance	\$ 1,043	\$ 1,438	\$ 2,481
Allowance ratio	1.0%	12.1%	2.2%
Net charge-off ratio	0.0%	2.3%	0.2%
Allowance for losses on lending commitments			
Beginning balance	\$ 396	\$ —	\$ 396
Provision	32	187	219
Other	(18)	—	(18)
Ending balance	\$ 410	\$ 187	\$ 597

In the table above:

- For the year ended December 2021, other primarily represented the reduction to the allowance related to loans and lending commitments transferred to held for sale.
- The allowance ratio is calculated by dividing the allowance for loan losses by gross loans accounted for at amortized cost.
- The net charge-off ratio is calculated by dividing net (charge-offs)/recoveries by average gross loans accounted for at amortized cost.

Notes to Consolidated Financial Statements

Forecast Model Inputs as of December 2022

When modeling expected credit losses, the Bank employs a weighted, multi-scenario forecast, which includes baseline, adverse and favorable economic scenarios. As of December 2022, this multi-scenario forecast was weighted towards the baseline and adverse economic scenarios.

The table below presents the forecasted U.S. unemployment and U.S. GDP growth rates used in the baseline economic scenario of the forecast model.

As of December 2022	
U.S. unemployment rate	
Forecast for the quarter ended:	
June 2023	4.2%
December 2023	4.6%
June 2024	4.6%
Growth in U.S. GDP	
Forecast for the year:	
2023	0.4%
2024	1.3%
2025	1.7%

The adverse economic scenario of the forecast model reflects a global recession in 2023 and a more aggressive tightening of monetary policy by central banks, resulting in an economic contraction and rising unemployment rates. In this scenario, the U.S. unemployment rate peaks at approximately 7.4% during the first quarter of 2024 and the maximum decline in the quarterly U.S. GDP relative to the fourth quarter of 2022 is approximately 2.7%, which occurs during the fourth quarter of 2023.

In the table above:

- U.S. unemployment rate represents the rate forecasted as of the respective quarter-end.
- Growth in U.S. GDP represents the year-over-year growth rate forecasted for the respective years.
- While the U.S. unemployment and U.S. GDP growth rates are significant inputs to the forecast model, the model contemplates a variety of other inputs across a range of scenarios to provide a forecast of future economic conditions. Given the complex nature of the forecasting process, no single economic variable can be viewed in isolation and independently of other inputs.

Allowance for Credit Losses Commentary

Year Ended December 2022. The allowance for credit losses increased by \$1.70 billion during 2022, reflecting growth in the Bank's consumer lending portfolios (principally in credit cards) and higher modeled expected losses due to broad macroeconomic and geopolitical concerns. In addition, the allowance for credit losses for wholesale loans was impacted by asset-specific provisions and ratings downgrades primarily related to borrowers in the technology, media & telecommunications, real estate, and consumer & retail industries.

Net (charge-offs)/recoveries for 2022 for wholesale loans were primarily related to corporate loans and net (charge-offs)/recoveries for consumer loans were primarily related to credit cards.

Year Ended December 2021. The allowance for credit losses increased by \$159 million during 2021, reflecting growth in the Bank's lending portfolios, primarily in the consumer portfolio related to credit cards, including a provision for credit losses of approximately \$185 million related to the acquisition of the General Motors co-branded credit card portfolio. This was partially offset by reserve reduction driven by an improved broader economic environment.

Net (charge-offs)/recoveries for 2021 for wholesale loans were not material and net (charge-offs)/recoveries for consumer loans were primarily related to credit cards.

Estimated Fair Value

The table below presents the estimated fair value of loans that are not accounted for at fair value and in what level of the fair value hierarchy they would have been classified if they had been included in the Bank's fair value hierarchy.

<i>\$ in millions</i>	Carrying Value	Estimated Fair Value		
		Level 2	Level 3	Total
As of December 2022				
Amortized cost	\$ 141,815	\$ 76,074	\$ 67,264	\$ 143,338
Held for sale	\$ 3,048	\$ 1,462	\$ 1,607	\$ 3,069
As of December 2021				
Amortized cost	\$ 112,284	\$ 72,259	\$ 41,452	\$ 113,711
Held for sale	\$ 7,372	\$ 5,628	\$ 1,804	\$ 7,432

See Note 4 for an overview of the Bank's fair value measurement policies, valuation techniques and significant inputs used to determine the fair value of loans, and Note 5 for information about loans within the fair value hierarchy.

Notes to Consolidated Financial Statements

Note 10.

Fair Value Option

Other Financial Assets and Liabilities at Fair Value

In addition to trading assets and liabilities, and certain investments and loans, the Bank accounts for certain of its other financial assets and liabilities at fair value, the vast majority under the fair value option. The primary reasons for electing the fair value option are to:

- Reflect economic events in earnings on a timely basis;
- Mitigate volatility in earnings from using different measurement attributes (e.g., transfers of financial assets accounted for as financings are recorded at fair value, whereas the related secured financing would be recorded on an accrual basis absent electing the fair value option); and
- Address simplification and cost-benefit considerations (e.g., accounting for hybrid financial instruments at fair value in their entirety versus bifurcation of embedded derivatives and hedge accounting for debt hosts).

Hybrid financial instruments are instruments that contain bifurcable embedded derivatives and do not require settlement by physical delivery of nonfinancial assets. For the vast majority of hybrid financial instruments, the Bank has not elected to bifurcate hybrid financial instruments and accounts for the entire hybrid financial instrument at fair value under the fair value option.

Other financial assets and liabilities accounted for at fair value under the fair value option include:

- Resale and repurchase agreements;
- Certain securities borrowed and loaned transactions;
- Certain time deposits (deposits with no stated maturity are not eligible for a fair value option election), including structured certificates of deposit, which are hybrid financial instruments;
- Most other secured financings, including transfers of assets accounted for as financings rather than sales and advances from the FHLB;
- Certain unsecured borrowings; and
- Certain other assets and liabilities.

See Note 4 for an overview of the Bank's fair value measurement policies, valuation techniques and significant inputs used to determine the fair value of other financial assets and liabilities at fair value, and Note 5 for information about other financial assets and liabilities within the fair value hierarchy.

Gains and Losses on Other Financial Assets and Liabilities Accounted for at Fair Value Under the Fair Value Option

The table below presents the gains and losses recognized in earnings as a result of the election to apply the fair value option to certain financial assets and liabilities.

\$ in millions	Year Ended December	
	2022	2021
Deposits	\$ 509	\$ (294)
Other	(138)	(110)
Total	\$ 371	\$ (404)

In the table above:

- Gains/(losses) are included in gains and losses from financial assets and liabilities.
- Gains/(losses) exclude contractual interest, which is included in interest income and interest expense, for all instruments other than hybrid financial instruments. See Note 21 for further information about interest income and interest expense.
- Gains/(losses) included in deposits were related to the embedded derivative component of hybrid financial instruments. These gains and losses would have been recognized under other U.S. GAAP even if the Bank had not elected to account for the entire hybrid financial instrument at fair value.
- Gains/(losses) included in other were substantially all related to resale and repurchase agreements, certain other secured financings and unsecured borrowings.
- Other financial assets and liabilities at fair value are frequently economically hedged with trading assets and liabilities. Accordingly, gains or losses on such other financial assets and liabilities can be partially offset by gains or losses on trading assets and liabilities. As a result, gains or losses on other financial assets and liabilities do not necessarily represent the overall impact on the Bank's results of operations, liquidity or capital resources.

See Note 8 for information about gains/(losses) on equity securities and Note 9 for information about gains/(losses) on loans which are accounted for at fair value under the fair value option. Gains/(losses) on trading assets and liabilities accounted for at fair value under the fair value option are included in gains and losses from financial assets and liabilities. See Note 6 for further information about gains/(losses) from financial assets and liabilities.

Notes to Consolidated Financial Statements

Long-Term Deposits

The fair value of long-term deposits, for which the fair value option was elected, did not exceed the aggregate contractual principal amount as of December 2022 and exceeded the aggregate contractual principal amount by \$456 million as of December 2021.

Debt Valuation Adjustment

The Bank calculates the fair value of financial liabilities for which the fair value option is elected by discounting future cash flows at a rate which incorporates the Bank's credit spreads.

The table below presents information about the net debt valuation adjustment (DVA) gains/(losses) on financial liabilities for which the fair value option was elected.

\$ in millions	Year Ended December	
	2022	2021
Pre-tax DVA	\$ 37	\$ 17
After-tax DVA	\$ 28	\$ 12

In the table above:

- After-tax DVA is included in debt valuation adjustment in the consolidated statements of comprehensive income.
- The gains/(losses) reclassified to earnings from accumulated other comprehensive income/(loss) upon extinguishment of such financial liabilities were not material for both 2022 and 2021.

Loans and Lending Commitments

The table below presents the difference between the aggregate fair value and the aggregate contractual principal amount for loans (included in trading assets and loans in the consolidated balance sheets) for which the fair value option was elected.

\$ in millions	As of December	
	2022	2021
Performing loans		
Aggregate contractual principal in excess of fair value	\$ 1,410	\$ 435
Loans on nonaccrual status and/or more than 90 days past due		
Aggregate contractual principal in excess of fair value	\$ 70	\$ 56
Aggregate fair value	\$ 118	\$ 228

The fair value of unfunded lending commitments for which the fair value option was elected was a liability of \$33 million as of December 2022 and \$9 million as of December 2021. See Note 18 for further information about lending commitments.

Impact of Credit Spreads on Loans and Lending Commitments

The estimated net gain/(loss) attributable to changes in instrument-specific credit spreads on loans and lending commitments for which the fair value option was elected was \$(36) million for 2022 and \$30 million for 2021. The Bank generally calculates the fair value of loans and lending commitments for which the fair value option is elected by discounting future cash flows at a rate which incorporates the instrument-specific credit spreads. For floating-rate loans and lending commitments, substantially all changes in fair value are attributable to changes in instrument-specific credit spreads, whereas for fixed-rate loans and lending commitments, changes in fair value are also attributable to changes in interest rates.

Note 11.

Collateralized Agreements and Financings

Collateralized agreements are resale agreements and securities borrowed. Collateralized financings are repurchase agreements, securities loaned and other secured financings. The Bank enters into these transactions in order to, among other things, facilitate client activities, invest excess cash, acquire securities to cover short positions and finance certain Bank activities.

Collateralized agreements and financings with the same settlement date are presented on a net-by-counterparty basis when such transactions meet certain settlement criteria and are subject to netting agreements. Interest on collateralized agreements, which is included in interest income, and collateralized financings, which is included in interest expense, is recognized over the life of the transaction. See Note 21 for further information about interest income and interest expense.

See Note 4 for further information about the valuation techniques and significant inputs used to determine fair value.

Resale and Repurchase Agreements

A resale agreement is a transaction in which the Bank purchases financial instruments from a seller, typically in exchange for cash, and simultaneously enters into an agreement to resell the same or substantially the same financial instruments to the seller at a stated price plus accrued interest at a future date.

Notes to Consolidated Financial Statements

A repurchase agreement is a transaction in which the Bank sells financial instruments to a buyer, typically in exchange for cash, and simultaneously enters into an agreement to repurchase the same or substantially the same financial instruments from the buyer at a stated price plus accrued interest at a future date.

Even though repurchase and resale agreements involve the legal transfer of ownership of financial instruments, they are accounted for as financing arrangements because they require the financial instruments to be repurchased or resold before or at the maturity of the agreement. The financial instruments purchased or sold in resale and repurchase agreements typically include U.S. government and agency obligations, and investment-grade sovereign obligations.

The Bank receives financial instruments purchased under resale agreements and makes delivery of financial instruments sold under repurchase agreements. To mitigate credit exposure, the Bank monitors the market value of these financial instruments on a daily basis, and delivers or obtains additional collateral due to changes in the market value of the financial instruments, as appropriate. For resale agreements, the Bank typically requires collateral with a fair value approximately equal to the carrying value of the relevant assets in the consolidated balance sheets.

Securities Borrowed and Loaned Transactions

In a securities borrowed transaction, the Bank borrows securities from a counterparty in exchange for cash or securities. When the Bank returns the securities, the counterparty returns the cash or securities. Interest is generally paid periodically over the life of the transaction.

In a securities loaned transaction, the Bank lends securities to a counterparty in exchange for cash or securities. When the counterparty returns the securities, the Bank returns the cash or securities posted as collateral. Interest is generally paid periodically over the life of the transaction.

The Bank receives securities borrowed and makes delivery of securities loaned. To mitigate credit exposure, the Bank monitors the market value of these securities on a daily basis, and delivers or obtains additional collateral due to changes in the market value of the securities, as appropriate. For securities borrowed transactions, the Bank typically requires collateral with a fair value approximately equal to the carrying value of the securities borrowed transaction.

Certain of the Bank's securities borrowed and loaned are recorded at fair value under the fair value option. See Note 5 for further information about securities borrowed and loaned accounted for at fair value.

All other securities borrowed and loaned are recorded based on the amount of cash collateral advanced or received plus accrued interest. The Bank also reviews such securities borrowed to determine if an allowance for credit losses should be recorded by taking into consideration the fair value of collateral received. As these agreements generally can be terminated on demand, they exhibit little, if any, sensitivity to changes in interest rates. Therefore, the carrying value of such agreements approximates fair value. As these agreements are not accounted for at fair value, they are not included in the Bank's fair value hierarchy in Notes 4 and 5. Had these agreements been included in the Bank's fair value hierarchy, they would have been classified in level 2 as of both December 2022 and December 2021.

Offsetting Arrangements

The table below presents resale and repurchase agreements and securities borrowed and loaned transactions included in the consolidated balance sheets, as well as the amounts not offset in the consolidated balance sheets.

\$ in millions	Assets		Liabilities	
	Resale agreements	Securities borrowed	Repurchase agreements	Securities loaned
As of December 2022				
Included in the consolidated balance sheets				
Gross carrying value	\$ 60,956	\$ 2,676	\$ 32,809	\$ 2,847
Counterparty netting	(27,243)	—	(27,243)	—
Total	33,713	2,676	5,566	2,847
Amounts not offset				
Counterparty netting	(773)	(2,652)	(773)	(2,652)
Collateral	(31,483)	—	(4,471)	(174)
Total	\$ 1,457	\$ 24	\$ 322	\$ 21
As of December 2021				
Included in the consolidated balance sheets				
Gross carrying value	\$ 41,536	\$ 8,289	\$ 10,654	\$ 8,289
Counterparty netting	(4,648)	—	(4,648)	—
Total	36,888	8,289	6,006	8,289
Amounts not offset				
Counterparty netting	(1,018)	(8,267)	(1,018)	(8,267)
Collateral	(34,985)	—	(3,801)	—
Total	\$ 885	\$ 22	\$ 1,187	\$ 22

In the table above:

- Substantially all of the gross carrying values of these arrangements are subject to enforceable netting agreements.
- Where the Bank has received or posted collateral under credit support agreements, but has not yet determined such agreements are enforceable, the related collateral has not been netted.

Notes to Consolidated Financial Statements

- Amounts not offset includes counterparty netting that does not meet the criteria for netting under U.S. GAAP and the fair value of collateral received or posted subject to enforceable credit support agreements.
- Resale agreements and repurchase agreements are carried at fair value under the fair value option.
- Securities borrowed included in the consolidated balance sheets of \$23 million as of December 2022 and \$6.91 billion as of December 2021, and securities loaned of \$23 million as of December 2022 and \$6.91 billion as of December 2021, were at fair value under the fair value option. See Note 5 for further information about securities borrowed and securities loaned accounted for at fair value.

Gross Carrying Value of Repurchase Agreements and Securities Loaned

The table below presents the gross carrying value of repurchase agreements and securities loaned by class of collateral pledged.

<i>\$ in millions</i>	Repurchase agreements	Securities loaned
As of December 2022		
U.S. government and agency obligations	\$ 10,717	\$ —
Non-U.S. government and agency obligations	21,742	48
Securities backed by commercial real estate	—	13
Securities backed by residential real estate	80	—
Corporate debt securities	250	640
Equity securities	20	2,146
Total	\$ 32,809	\$ 2,847
As of December 2021		
U.S. government and agency obligations	\$ 2,409	\$ 6,911
Non-U.S. government and agency obligations	8,145	65
Securities backed by commercial real estate	—	39
Securities backed by residential real estate	26	—
Corporate debt securities	74	16
Equity securities	—	1,258
Total	\$ 10,654	\$ 8,289

The table below presents the gross carrying value of repurchase agreements and securities loaned by maturity.

<i>\$ in millions</i>	As of December 2022	
	Repurchase agreements	Securities loaned
No stated maturity and overnight	\$ 27,096	\$ 2,847
2 - 30 days	4,913	—
31 - 90 days	114	—
91 days - 1 year	686	—
Total	\$ 32,809	\$ 2,847

Other Secured Financings

In addition to repurchase agreements and securities loaned transactions, the Bank funds certain assets through the use of other secured financings and pledges financial instruments and other assets as collateral in these transactions. These other secured financings include:

- Secured borrowings from affiliates;
- FHLB advances;
- Credit-linked notes; and
- Transfers of assets accounted for as financings rather than sales (e.g., collateralized by bank loans and mortgage whole loans).

The Bank has elected to apply the fair value option to most other secured financings because the use of fair value eliminates non-economic volatility in earnings that would arise from using different measurement attributes. See Note 10 for further information about other secured financings that are accounted for at fair value.

Other secured financings that are not recorded at fair value are recorded based on the amount of cash received plus accrued interest, which generally approximates fair value. As these financings are not accounted for at fair value, they are not included in the Bank's fair value hierarchy in Notes 4 and 5. Had these financings been included in the Bank's fair value hierarchy, they would have been primarily classified in level 3 as of both December 2022 and December 2021.

Other secured financings had a weighted average interest rate of 3.89% as of December 2022 and 1.34% as of December 2021.

FHLB Advances. As a member of the FHLB, the Bank can draw under a funding arrangement secured by eligible collateral. There were no outstanding borrowings from the FHLB as of December 2022 and \$100 million as of December 2021, which were all short-term. These borrowings are carried at fair value under the fair value option in the Bank's fair value hierarchy. See Note 10 for further information about borrowings accounted for at fair value.

Collateral Received and Pledged

The Bank receives cash and securities (e.g., U.S. government and agency obligations, other sovereign and corporate obligations) as collateral, primarily in connection with resale agreements, securities borrowed, derivative transactions and customer margin loans. The Bank obtains cash and securities as collateral on an upfront or contingent basis for derivative instruments and collateralized agreements to reduce its credit exposure to individual counterparties.

Notes to Consolidated Financial Statements

In many cases, the Bank is permitted to deliver or repledge financial instruments received as collateral when entering into repurchase agreements and securities loaned transactions. The Bank is also permitted to deliver or repledge these financial instruments in connection with collateralized derivative transactions.

The Bank also pledges certain trading assets, loans and other assets (substantially all of which is cash) in connection with repurchase agreements, securities loaned transactions and other secured financings. These assets are pledged to counterparties who may or may not have the right to deliver or repledge them.

The table below presents financial instruments at fair value received as collateral that were available to be delivered or repledged and were delivered or repledged.

\$ in millions	As of December	
	2022	2021
Collateral available to be delivered or repledged	\$ 72,980	\$ 49,138
Collateral that was delivered or repledged	\$ 59,867	\$ 31,255

The table below presents information about assets pledged.

\$ in millions	As of December	
	2022	2021
Pledged to counterparties that had the right to deliver or repledge		
Trading assets	\$ 10,853	\$ 5,628
Investments	\$ 54	\$ 56
Pledged to counterparties that did not have the right to deliver or repledge		
Trading assets	\$ 2,053	\$ 5,760
Loans	\$ 7,059	\$ 6,702
Other assets	\$ 2,576	\$ 187

Note 12.

Other Assets

The table below presents other assets by type.

\$ in millions	As of December	
	2022	2021
Receivables from affiliates	\$ 2,224	\$ 553
Income tax-related assets	2,220	903
FRB shares	1,318	1,161
Goodwill	1,108	54
Identifiable intangible assets	747	—
Property, leasehold improvements and equipment	586	289
Investments in qualified affordable housing projects	503	453
FHLB shares	33	38
Operating lease right-of-use assets	58	57
Miscellaneous receivables and other	237	69
Total	\$ 9,034	\$ 3,577

During 2022, Group Inc. and GS Bank USA completed the acquisition of GreenSky, a leading technology company facilitating point-of-sale financing for merchants and consumers, in an all-stock transaction valued at approximately \$1.75 billion. Shareholders of GreenSky and unit holders of GreenSky Holdings, LLC (GreenSky Holdings) received 0.03 shares of Group Inc.'s common stock in exchange for each share of GreenSky Class A common stock and each GreenSky Holdings common unit. Upon closing of the transaction, GreenSky became a wholly-owned subsidiary of GS Bank USA. The acquisition was accounted for under the acquisition method of accounting for business combinations. The purchase price has been preliminarily allocated to goodwill of approximately \$1.05 billion, identifiable intangible assets of approximately \$710 million and tangible assets of approximately \$960 million (primarily cash and other assets), and to liabilities assumed of approximately \$990 million (primarily unsecured short-term borrowings and customer and other payables). See below for further information about goodwill and identifiable intangible assets related to the acquisition of GreenSky.

Property, Leasehold Improvements and Equipment

Property, leasehold improvements and equipment, which is primarily software, is net of accumulated depreciation and amortization of \$372 million as of December 2022 and \$207 million as of December 2021. Capitalized costs of software developed or obtained for internal use are amortized on a straight-line basis over three years. Leasehold improvements are amortized on a straight-line basis over the shorter of the useful life of the improvement or the term of the lease. Other property and equipment is depreciated on a straight-line basis over the useful life of the asset.

The Bank tests property, leasehold improvements and equipment for impairment when events or changes in circumstances suggest that an asset's or asset group's carrying value may not be fully recoverable. To the extent the carrying value of an asset or asset group exceeds the projected undiscounted cash flows expected to result from the use and eventual disposal of the asset or asset group, the Bank determines the asset or asset group is impaired and records an impairment equal to the difference between the estimated fair value and the carrying value of the asset or asset group. In addition, the Bank will recognize an impairment prior to the sale of an asset or asset group if the carrying value of the asset or asset group exceeds its estimated fair value.

There were no material impairments during 2022 and 2021.

Notes to Consolidated Financial Statements

Goodwill

Goodwill is the cost of acquired companies in excess of the fair value of net assets, including identifiable intangible assets, at the acquisition date. As of December 2022, the carrying value of the Bank's goodwill was \$1.11 billion and as of December 2021, the carrying value of the Bank's goodwill was \$54 million. The increase in goodwill from December 2021 to December 2022 was related to the acquisition of GreenSky. No impairment was recorded for goodwill during 2022 and 2021.

Goodwill is assessed for impairment annually in the fourth quarter or more frequently if events occur or circumstances change that indicate an impairment may exist.

When assessing goodwill for impairment, first, a qualitative assessment can be made to determine whether it is more likely than not that the estimated fair value of a reporting unit is less than its carrying value. If the results of the qualitative assessment are not conclusive, a quantitative goodwill test is performed. Alternatively, a quantitative goodwill test can be performed without performing a qualitative assessment.

In the fourth quarter of 2022, the Bank performed its annual assessment of goodwill for impairment by performing a qualitative assessment. Multiple factors were assessed to determine whether it was more likely than not that the estimated fair value was less than its carrying value, including performance indicators, macroeconomic indicators, firm and industry events, and fair value indicators.

As a result of the qualitative assessment, the Bank determined that it was more likely than not that the estimated fair value exceeded its carrying value. Therefore, the Bank determined that goodwill was not impaired and that a quantitative goodwill test was not required.

Identifiable Intangible Assets

The table below presents information about identifiable intangible assets.

<i>\$ in millions</i>	As of December	
	2022	2021
Gross carrying value	\$ 826	\$ 21
Accumulated amortization	(79)	(21)
Net carrying value	\$ 747	\$ —

The Bank acquired approximately \$805 million of identifiable intangible assets (with a weighted average amortization period of 11 years) during 2022, the vast majority of which related to GreenSky's merchant relationships. During 2021, the Bank did not acquire any identifiable intangible assets.

All of the Bank's identifiable intangible assets have finite useful lives and are amortized over their estimated useful lives using the straight-line method.

The tables below present information about the amortization of identifiable intangible assets.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Amortization	\$ 58	\$ 6

<i>\$ in millions</i>	As of	
	December 2022	
Estimated future amortization		
2023	\$	69
2024	\$	69
2025	\$	67
2026	\$	67
2027	\$	67

The Bank tests identifiable intangible assets for impairment when events or changes in circumstances suggest that an asset's or asset group's carrying value may not be fully recoverable. To the extent the carrying value of an asset or asset group exceeds the projected undiscounted cash flows expected to result from the use and eventual disposal of the asset or asset group, the Bank determines the asset or asset group is impaired and records an impairment equal to the difference between the estimated fair value and the carrying value of the asset or asset group. In addition, the Bank will recognize an impairment prior to the sale of an asset or asset group if the carrying value of the asset or asset group exceeds its estimated fair value. There were no material impairments during 2022 and 2021.

Operating Lease Right-of-Use Assets

The Bank enters into operating leases for real estate, office equipment and other assets, which are used in connection with its operations. For leases longer than one year, generally based on the contractual maturity, adjusted for certain extension or termination options, the Bank recognizes a right-of-use asset representing the right to use the underlying asset for the lease term, and a lease liability representing the liability to make payments.

An operating lease right-of-use asset is initially determined based on the operating lease liability, and amortized over the lease term. Right-of-use assets and operating lease liabilities in non-cash transactions for leases entered into or assumed was \$16 million for 2022 and not material for 2021. See Note 15 for information about operating lease liabilities.

Notes to Consolidated Financial Statements

Note 13.

Deposits

The table below presents the types and sources of deposits.

<i>\$ in millions</i>	Savings and Demand	Time	Total
As of December 2022			
Private bank and consumer	\$ 149,135	\$ 24,655	\$ 173,790
Brokered certificates of deposit	—	32,036	32,036
Deposit sweep programs	44,819	—	44,819
Transaction banking	92,903	5,068	97,971
Other	6,624	7,615	14,239
Total	\$ 293,481	\$ 69,374	\$ 362,855
As of December 2021			
Private bank and consumer	\$ 131,425	\$ 28,373	\$ 159,798
Brokered certificates of deposit	—	30,054	30,054
Deposit sweep programs	37,965	—	37,965
Transaction banking	74,340	5,689	80,029
Other	3,938	10,228	14,166
Total	\$ 247,668	\$ 74,344	\$ 322,012

In the table above:

- Substantially all deposits are interest-bearing and substantially all are held in the U.S.
- Savings and demand accounts consist of money market deposit accounts, negotiable order of withdrawal accounts and demand deposit accounts that have no stated maturity or expiration date. Savings account holders may be required by the Bank to give written notice of intended withdrawals not less than seven days before such withdrawals are made and may be limited on the number of withdrawals made within a month. Demand account holders are not subject to restrictions with respect to the timing and number of transactions that deposit holders may execute.
- Time deposits include brokered certificates of deposit which have stipulated maturity dates and rates of interest. Early withdrawals of brokered time deposits are generally prohibited.
- Time deposits included \$5.37 billion as of December 2022 and \$5.36 billion as of December 2021 of deposits accounted for at fair value under the fair value option. See below and Note 10 for further information about deposits accounted for at fair value.
- Time deposits had a weighted average maturity of approximately 1.1 years as of December 2022 and 1.0 years as of December 2021.

- Deposit sweep programs include long-term contractual agreements with U.S. broker-dealers who sweep client cash to FDIC-insured deposits. Pursuant to the external deposit sweep program agreements, each third-party broker-dealer agrees, for a prescribed term, to place a certain minimum amount of deposits from their clients with the Bank. Each client's deposit may be withdrawn at any time.
- Transaction banking deposits consists of deposits that the Bank has raised through its cash management services business for corporate, other institutional clients and affiliates.
- Other deposits represent deposits from institutional clients and affiliates. As of both December 2022 and December 2021, other deposits were primarily from Goldman Sachs Funding LLC (Funding IHC) and Group Inc.
- Deposits insured by the FDIC were \$184.88 billion as of December 2022 and \$156.66 billion as of December 2021.
- Deposits insured by non-U.S. insurance programs were \$6.65 billion as of December 2022 and \$3.61 billion as of December 2021.

The table below presents time deposits by contractual maturity.

<i>\$ in millions</i>	As of December 2022
2023	\$ 48,902
2024	11,514
2025	3,851
2026	2,534
2027	1,185
2028 - thereafter	1,388
Total	\$ 69,374

As of December 2022, deposits in U.S. offices included \$20.47 billion and deposits in non-U.S. offices included \$10 million of time deposits in denominations that met or exceeded the applicable insurance limits, or were otherwise not covered by insurance.

Notes to Consolidated Financial Statements

The Bank's savings and demand deposits are recorded based on the amount of cash received plus accrued interest, which approximates fair value. In addition, the Bank designates certain derivatives as fair value hedges to convert a portion of its time deposits not accounted for at fair value from fixed-rate obligations into floating-rate obligations. The carrying value of time deposits not accounted for at fair value approximated fair value as of both December 2022 and December 2021. As these savings and demand deposits and substantially all time deposits are not accounted for at fair value, they are not included in the Bank's fair value hierarchy in Notes 4 and 5. Had these deposits been included in the Bank's fair value hierarchy, they would have been primarily classified in level 2 as of both December 2022 and December 2021.

Note 14.

Unsecured Borrowings

The table below presents information about unsecured borrowings.

<i>\$ in millions</i>	As of December	
	2022	2021
Unsecured short-term borrowings	\$ 594	\$ 264
Unsecured long-term borrowings	5,837	5,801
Total	\$ 6,431	\$ 6,065

Unsecured Short-Term Borrowings

Unsecured short-term borrowings includes the portion of unsecured long-term borrowings maturing within one year of the financial statement date.

The table below presents information about unsecured short-term borrowings.

<i>\$ in millions</i>	As of December	
	2022	2021
Current portion of senior unsecured borrowings	\$ 365	\$ 49
Hybrid financial instruments	98	181
Short-term borrowings from affiliates	117	26
Other unsecured short-term borrowings	14	8
Total	\$ 594	\$ 264

Hybrid Financial Instruments. The Bank accounts for the vast majority of hybrid financial instruments at fair value under the fair value option. See Note 10 for further information about hybrid financial instruments that are accounted for at fair value.

Short-Term Borrowings from Affiliates. As of both December 2022 and December 2021, the Bank had a senior unsecured facility, committed on an intraday basis up to \$4.00 billion with Group Inc. This facility automatically renews each business day and can be terminated with six months' notice. As of December 2022, outstanding borrowings under this facility were \$99 million and as of December 2021, there were no outstanding borrowings.

Short-term borrowings from affiliates also includes accrued interest on long-term subordinated borrowings. Accrued interest on long-term subordinated borrowings was \$18 million as of December 2022 and not material as of December 2021.

Unsecured Long-Term Borrowings

The table below presents information about unsecured long-term borrowings.

<i>\$ in millions</i>	As of December	
	2022	2021
Subordinated borrowings	\$ 4,271	\$ 4,273
Senior unsecured borrowings	1,458	1,214
Long-term borrowings from affiliates	108	314
Total	\$ 5,837	\$ 5,801

Subordinated Borrowings. As of both December 2022 and December 2021, the Bank had a revolving subordinated loan agreement with Funding IHC, which expires in 2039. As of both December 2022 and December 2021, outstanding subordinated borrowings under this agreement included \$2.00 billion maturing in 2028 and \$2.25 billion also maturing in 2028, both of which are redeemable prior to maturity at the option of the Bank. As of both December 2022 and December 2021, outstanding borrowings bear interest at the overnight bank funding rate plus 1.85% per annum. During January 2023, the Bank repaid \$2.00 billion of these subordinated borrowings.

As of both December 2022 and December 2021, the Bank also had a subordinated loan agreement with Group Inc., which is redeemable prior to maturity at the option of the Bank. As of December 2022, the outstanding subordinated borrowings under this agreement were \$21 million maturing in 2028, the earliest date such option becomes exercisable, and as of December 2021, the outstanding subordinated borrowings under this agreement were \$23 million maturing in 2027, the earliest date such option becomes exercisable. As of both December 2022 and December 2021, the interest rate on these borrowings was the three-month Euro Interbank Offered Rate plus 2.10% per annum.

The carrying value of these subordinated borrowings generally approximates fair value. Any amounts payable under these agreements would be subordinate to the claims of certain other creditors of the Bank, including depositors and regulatory agencies.

Notes to Consolidated Financial Statements

Senior Unsecured Borrowings. As of December 2022, the Bank had issued and outstanding senior unsecured borrowings of \$1.82 billion which includes \$1.35 billion of credit-linked notes. As of December 2021, the Bank had issued and outstanding senior unsecured borrowings of \$1.26 billion which includes \$976 million of credit-linked notes. Senior unsecured borrowings also included structured notes. The weighted average interest rate was 0.24% as of December 2022 and 0.50% as of December 2021, and primarily related to floating rate obligations. The carrying value of the Bank's senior unsecured borrowings was \$1.82 billion as of December 2022 and \$1.26 billion as of December 2021, which approximated its fair value. As of December 2022, outstanding borrowings included \$365 million maturing in 2023, \$199 million maturing in 2024, \$759 million maturing in 2025, \$303 million maturing in 2026, \$122 million maturing in 2027, \$11 million maturing in 2028 and \$64 million maturing in 2033.

Long-Term Borrowings from Affiliates. As of December 2022, the Bank had outstanding long-term borrowings from affiliates of \$108 million. As of December 2021, the Bank had outstanding long-term borrowings from affiliates of \$314 million. The weighted average interest rate was 3.40% as of December 2022 and (1.01)% as of December 2021, and related to floating rate obligations. As of December 2022, the maturity of outstanding long-term borrowings from affiliates was 2024.

Note 15.**Other Liabilities**

The table below presents other liabilities by type.

<i>\$ in millions</i>	As of December	
	2022	2021
Income tax-related liabilities	\$ 1,600	\$ 1,007
Payables to affiliates	1,160	1,040
Compensation and benefits	573	882
Operating lease liabilities	61	62
Accrued expenses and other	1,573	1,351
Total	\$ 4,967	\$ 4,342

Operating Lease Liabilities

For leases longer than one year, the Bank recognizes a right-of-use asset representing the right to use the underlying asset for the lease term, and a lease liability representing the liability to make payments. See Note 12 for information about operating lease right-of-use assets.

The table below presents information about operating lease liabilities.

<i>\$ in millions</i>	Operating lease liabilities
As of December 2022	
2023	\$ 12
2024	13
2025	12
2026	9
2027	9
2028 - thereafter	12
Total undiscounted lease payments	67
Imputed interest	(6)
Total operating lease liabilities	\$ 61
Weighted average remaining lease term	6 years
Weighted average discount rate	3.29%
As of December 2021	
2022	\$ 11
2023	12
2024	12
2025	10
2026	7
2027 - thereafter	17
Total undiscounted lease payments	69
Imputed interest	(7)
Total operating lease liabilities	\$ 62
Weighted average remaining lease term	6 years
Weighted average discount rate	3.58%

In the table above, the weighted average discount rate represents the Bank's incremental borrowing rate as of January 2019 for operating leases existing on the date of adoption of ASU No. 2016-02, "Leases (Topic 842)," and at the lease inception date for leases entered into subsequent to the adoption of this ASU.

Operating lease costs were \$17 million for 2022 and \$14 million for 2021. Variable lease costs, which are included in operating lease costs, were not material for both 2022 and 2021. There were no occupancy expenses for space held in excess of the Bank's current requirements for both 2022 and 2021.

There were no lease payments relating to operating lease arrangements that were signed, but had not yet commenced as of December 2022.

Notes to Consolidated Financial Statements

Note 16.

Securitization Activities

The Bank securitizes residential and commercial mortgages and other types of financial assets by selling these assets to securitization vehicles (e.g., trusts, corporate entities and limited liability companies) or through a resecuritization. An affiliate acts as underwriter of the beneficial interests that are sold to investors.

The Bank accounts for a securitization as a sale when it has relinquished control over the transferred financial assets. Prior to securitization, the Bank generally accounts for assets pending transfer at fair value and therefore does not typically recognize significant gains or losses upon the transfer of assets.

The Bank generally receives cash in exchange for the transferred assets but may also have continuing involvement with the transferred financial assets, including ownership of beneficial interests in securitized financial assets, primarily in the form of loans.

The primary risks from the Bank's continuing involvement with securitization vehicles are the performance of the underlying collateral and the position of the Bank's investment in the capital structure of the securitization vehicle. Substantially all of these retained interests are accounted for at amortized cost net of allowance for loan losses. Had these interests been included in the Bank's fair value hierarchy, they would have been primarily classified in level 3 as of both December 2022 and December 2021. See Note 4 for further information about fair value measurements.

The table below presents the amount of financial assets securitized and the cash flows received on retained interests in securitization entities in which the Bank had continuing involvement as of the end of the period.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Residential mortgages	\$ 4,753	\$ 5,835
Commercial mortgages	11,516	13,872
Other financial assets	1,922	3,339
Total financial assets	\$ 18,191	\$ 23,046
Retained interests cash flows	\$ 131	\$ 89

The Bank securitized assets of \$516 million during 2022 and \$761 million during 2021, in a non-cash exchange for loans.

The table below presents information about nonconsolidated securitization entities to which the Bank sold assets and had continuing involvement as of the end of the period.

<i>\$ in millions</i>	Outstanding Principal Amount	Retained Interests
As of December 2022		
Residential mortgage-backed	\$ 15,437	\$ 723
Commercial mortgage-backed	59,408	1,324
Other asset-backed	4,400	237
Total	\$ 79,245	\$ 2,284
As of December 2021		
Residential mortgage-backed	\$ 14,939	\$ 755
Commercial mortgage-backed	49,420	1,072
Other asset-backed	4,778	280
Total	\$ 69,137	\$ 2,107

In the table above:

- The outstanding principal amount is presented for the purpose of providing information about the size of the securitization entities and is not representative of the Bank's risk of loss.
- The Bank's risk of loss from retained interests is limited to the carrying value of these interests.
- Substantially all of the total outstanding principal amount and total retained interests relate to securitizations during 2018 and thereafter.
- The fair value of retained interests was \$2.28 billion as of December 2022 and \$2.12 billion as of December 2021.

In addition to the interests in the table above, the Bank had other continuing involvement in the form of derivative transactions and commitments with certain nonconsolidated VIEs. As of December 2022, the notional amount of these derivatives and commitments was \$106 million and the carrying value was not material. As of December 2021, the notional amount of these derivatives and commitments was \$76 million and the carrying value was not material. The notional amounts of these derivatives and commitments are included in maximum exposure to loss in the nonconsolidated VIE table in Note 17.

Notes to Consolidated Financial Statements

The table below presents information about the weighted average key economic assumptions used in measuring the fair value of mortgage-backed retained interests.

<i>\$ in millions</i>	As of December	
	2022	2021
Fair value of retained interests	\$ 2,045	\$ 1,839
Weighted average life (years)	5.7	4.7
Constant prepayment rate	4.2%	13.6%
Impact of 10% adverse change	\$ (3)	\$ (2)
Impact of 20% adverse change	\$ (6)	\$ (3)
Discount rate	9.7%	7.3%
Impact of 10% adverse change	\$ (55)	\$ (26)
Impact of 20% adverse change	\$ (107)	\$ (51)

In the table above:

- Amounts do not reflect the benefit of other financial instruments that are held to mitigate risks inherent in these retained interests.
- Changes in fair value based on an adverse variation in assumptions generally cannot be extrapolated because the relationship of the change in assumptions to the change in fair value is not usually linear.
- The impact of a change in a particular assumption is calculated independently of changes in any other assumption. In practice, simultaneous changes in assumptions might magnify or counteract the sensitivities disclosed above.
- The constant prepayment rate is included only for positions for which it is a key assumption in the determination of fair value.
- Expected credit loss assumptions are reflected in the discount rate for the retained interests.

The Bank has other retained interests not reflected in the table above with a fair value of \$232 million and a weighted average life of 2.4 years as of December 2022, and a fair value of \$280 million and a weighted average life of 2.0 years as of December 2021. Due to the nature and fair value of certain of these retained interests, the weighted average assumptions for constant prepayment and discount rates and the related sensitivity to adverse changes are not meaningful as of both December 2022 and December 2021. The Bank's maximum exposure to adverse changes in the value of these interests is the carrying value of \$237 million as of December 2022 and \$280 million as of December 2021.

Note 17.**Variable Interest Entities**

A variable interest in a VIE is an investment (e.g., debt or equity) or other interest (e.g., derivatives or loans and lending commitments) that will absorb portions of the VIE's expected losses and/or receive portions of the VIE's expected residual returns.

The Bank's variable interests in VIEs include senior and subordinated debt; loans and lending commitments; limited and general partnership interests; preferred and common equity; derivatives that may include foreign currency, equity and/or credit risk; and guarantees. Certain interest rate, foreign currency and credit derivatives the Bank enters into with VIEs are not variable interests because they create, rather than absorb, risk.

VIEs generally finance the purchase of assets by issuing debt and equity securities that are either collateralized by or indexed to the assets held by the VIE. The debt and equity securities issued by a VIE may include tranches of varying levels of subordination. The Bank's involvement with VIEs includes securitization of financial assets, as described in Note 16, and investments in and loans to other types of VIEs, as described below. See Note 3 for the Bank's consolidation policies, including the definition of a VIE.

VIE Consolidation Analysis

The enterprise with a controlling financial interest in a VIE is known as the primary beneficiary and consolidates the VIE. The Bank determines whether it is the primary beneficiary of a VIE by performing an analysis that principally considers:

- Which variable interest holder has the power to direct the activities of the VIE that most significantly impact the VIE's economic performance;
- Which variable interest holder has the obligation to absorb losses or the right to receive benefits from the VIE that could potentially be significant to the VIE;
- The VIE's purpose and design, including the risks the VIE was designed to create and pass through to its variable interest holders;
- The VIE's capital structure;
- The terms between the VIE and its variable interest holders and other parties involved with the VIE; and
- Related-party relationships.

Notes to Consolidated Financial Statements

The Bank reassesses its evaluation of whether an entity is a VIE when certain reconsideration events occur. The Bank reassesses its determination of whether it is the primary beneficiary of a VIE on an ongoing basis based on current facts and circumstances.

VIE Activities

The Bank is principally involved with VIEs through the following business activities:

Mortgage-Backed VIEs. The Bank sells residential and commercial mortgage loans and securities to mortgage-backed VIEs and may retain beneficial interests in the assets sold to these VIEs. In addition, the Bank may enter into derivatives with certain of these VIEs, primarily interest rate swaps, which are typically not variable interests. The Bank generally enters into derivatives with other counterparties to mitigate its risk.

Corporate Debt and Other Asset-Backed VIEs. The Bank structures VIEs that issue notes to clients and makes loans to VIEs that warehouse corporate debt. Certain of these VIEs synthetically create the exposure for the beneficial interests they issue by entering into credit derivatives with the Bank, rather than purchasing the underlying assets. In addition, the Bank may enter into derivatives, such as total return swaps, with certain corporate debt and other asset-backed VIEs, under which the Bank pays the VIE a return due to the beneficial interest holders and receives the return on the collateral owned by the VIE. The collateral owned by these VIEs is primarily other asset-backed loans and securities. The Bank may be removed as the total return swap counterparty and may enter into derivatives with other counterparties to mitigate its risk related to these swaps. The Bank may sell assets to the corporate debt and other asset-backed VIEs it structures.

Real Estate, Credit-Related and Other Investing VIEs. The Bank primarily purchases debt securities issued by and makes loans to VIEs that hold real estate and distressed loans. The Bank generally does not sell assets to, or enter into derivatives with, these VIEs.

Nonconsolidated VIEs

The table below presents a summary of the nonconsolidated VIEs in which the Bank holds variable interests.

<i>\$ in millions</i>	As of December	
	2022	2021
Total nonconsolidated VIEs		
Assets in VIEs	\$ 90,135	\$ 77,820
Carrying value of variable interests – assets	\$ 4,366	\$ 3,208
Carrying value of variable interests – liabilities	\$ 614	\$ 892
Maximum exposure to loss:		
Retained interests	\$ 2,284	\$ 2,107
Purchased interests	6	—
Commitments and guarantees	1,453	1,032
Derivatives	5,137	5,338
Debt and equity	1,965	971
Total	\$ 10,845	\$ 9,448

In the table above:

- The nature of the Bank's variable interests is described in the rows under maximum exposure to loss.
- The Bank's exposure to the obligations of VIEs is generally limited to its interests in these entities. In certain instances, the Bank provides guarantees, including derivative guarantees, to VIEs or holders of variable interests in VIEs.
- The maximum exposure to loss excludes the benefit of offsetting financial instruments that are held to mitigate the risks associated with these variable interests.
- The maximum exposure to loss from retained interests, purchased interests, and debt and equity is the carrying value of these interests.
- The maximum exposure to loss from commitments and guarantees, and derivatives is the notional amount, which does not represent anticipated losses and has not been reduced by unrealized losses. As a result, the maximum exposure to loss exceeds liabilities recorded for commitments and guarantees, and derivatives.

Notes to Consolidated Financial Statements

The table below presents information, by principal business activity, for nonconsolidated VIEs included in the summary table above.

\$ in millions	As of December	
	2022	2021
Mortgage-backed		
Assets in VIEs	\$ 75,112	\$ 64,378
Carrying value of variable interests – assets	\$ 2,053	\$ 1,827
Maximum exposure to loss:		
Retained interests	\$ 2,047	\$ 1,827
Purchased interests	6	—
Commitments and guarantees	64	34
Derivatives	2	18
Total	\$ 2,119	\$ 1,879
Corporate debt and other asset-backed		
Assets in VIEs	\$ 11,735	\$ 10,764
Carrying value of variable interests – assets	\$ 1,620	\$ 712
Carrying value of variable interests – liabilities	\$ 613	\$ 892
Maximum exposure to loss:		
Retained interests	\$ 237	\$ 280
Commitments and guarantees	184	250
Derivatives	5,135	5,320
Debt and equity	1,273	302
Total	\$ 6,829	\$ 6,152
Real estate, credit-related and other investing		
Assets in VIEs	\$ 3,288	\$ 2,678
Carrying value of variable interests – assets	\$ 693	\$ 669
Carrying value of variable interests – liabilities	\$ 1	\$ —
Maximum exposure to loss:		
Commitments and guarantees	\$ 1,205	\$ 748
Debt and equity	692	669
Total	\$ 1,897	\$ 1,417

As of both December 2022 and December 2021, the carrying values of the Bank's variable interests in nonconsolidated VIEs are included in the consolidated balance sheets as follows:

- Mortgage-backed: Substantially all assets included in loans and investments.
- Corporate debt and other asset-backed: Assets primarily included in loans, and substantially all liabilities included in trading liabilities.
- Real estate, credit-related and other investing: Assets primarily included in other assets and investments, and liabilities included in other liabilities.

Consolidated VIEs

As of both December 2022 and December 2021, the Bank had no consolidated VIEs.

Note 18.

Commitments, Contingencies and Guarantees

Commitments

The table below presents commitments by type.

\$ in millions	As of December	
	2022	2021
Commitment Type		
Commercial lending:		
Investment-grade	\$ 92,546	\$ 86,799
Non-investment-grade	43,896	53,629
Warehouse financing	8,940	10,003
Consumer	64,098	35,941
Total lending	209,480	186,372
Risk participations	7,297	8,099
Collateralized agreement	15,587	213
Collateralized financing	11,494	143
Investment	2,402	1,889
Other	2,891	4,118
Total commitments	\$ 249,151	\$ 200,834

The table below presents commitments by expiration.

\$ in millions	As of December 2022			
	2023	2024 - 2025	2026 - 2027	2028 - Thereafter
Commitment Type				
Commercial lending:				
Investment-grade	\$ 14,206	\$ 25,876	\$ 50,611	\$ 1,853
Non-investment-grade	3,887	14,260	22,613	3,136
Warehouse financing	1,634	6,119	1,187	—
Consumer	64,097	1	—	—
Total lending	83,824	46,256	74,411	4,989
Risk participations	2,244	2,746	2,262	45
Collateralized agreement	15,587	—	—	—
Collateralized financing	11,494	—	—	—
Investment	175	470	395	1,362
Other	2,703	—	—	188
Total commitments	\$ 116,027	\$ 49,472	\$ 77,068	\$ 6,584

Lending Commitments

The Bank's commercial and warehouse financing lending commitments are agreements to lend with fixed termination dates and depend on the satisfaction of all contractual conditions to borrowing. These commitments are presented net of amounts syndicated to third parties. The total commitment amount does not necessarily reflect actual future cash flows because the Bank may syndicate portions of these commitments. In addition, commitments can expire unused or be reduced or cancelled at the counterparty's request. The Bank also provides credit to consumers by issuing credit card lines and through commitments to provide unsecured installment loans.

Notes to Consolidated Financial Statements

The table below presents information about lending commitments.

\$ in millions	As of December	
	2022	2021
Held for investment	\$ 206,012	\$ 174,161
Held for sale	2,714	10,880
At fair value	754	1,331
Total	\$ 209,480	\$ 186,372

In the table above:

- Held for investment lending commitments are accounted for at amortized cost. The carrying value of lending commitments was a liability of \$720 million (including allowance for credit losses of \$527 million) as of December 2022 and \$795 million (including allowance for credit losses of \$597 million) as of December 2021. The estimated fair value of such lending commitments was a liability of \$5.04 billion as of December 2022 and \$3.42 billion as of December 2021. Had these lending commitments been carried at fair value and included in the fair value hierarchy, \$2.78 billion as of December 2022 and \$1.64 billion as of December 2021 would have been classified in level 2, and \$2.26 billion as of December 2022 and \$1.78 billion as of December 2021 would have been classified in level 3.
- Held for sale lending commitments are accounted for at the lower of cost or fair value. The carrying value of lending commitments held for sale was a liability of \$64 million as of December 2022 and \$59 million as of December 2021. The estimated fair value of such lending commitments approximates the carrying value. Had these lending commitments been included in the fair value hierarchy, they would have been primarily classified in level 3 as of both December 2022 and December 2021.
- Gains or losses related to lending commitments at fair value, if any, are generally recorded net of any fees in gains and losses from financial assets and liabilities.

Commercial Lending. The Bank's commercial lending commitments were primarily extended to investment-grade corporate borrowers. Such commitments primarily included relationship lending activities (principally used for operating and general corporate purposes) and other activities (generally extended for contingent acquisition financing and are often intended to be short-term in nature, as borrowers often seek to replace them with other funding sources). The Bank also extends lending commitments in connection with other types of corporate lending, commercial real estate financing and other collateralized lending. See Note 9 for further information about funded loans.

To mitigate the credit risk associated with the Bank's commercial lending activities, the Bank obtains credit protection on certain loans and lending commitments through credit default swaps, both single-name and index-based contracts, and through the issuance of credit-linked notes.

Warehouse Financing. The Bank provides financing to clients who warehouse financial assets. These arrangements are collateralized by the warehoused assets, primarily consisting of residential real estate, consumer and corporate loans.

Consumer. The Bank's consumer lending commitments includes:

- Credit card lines issued by the Bank to consumers were \$62.22 billion as of December 2022 and \$33.97 billion as of December 2021. These credit card lines are cancellable by the Bank. The increase in credit card lending commitments from December 2021 to December 2022 included approximately \$15.0 billion relating to the Bank's acquisition of the General Motors co-branded credit card portfolio in February 2022. In addition, consumer lending commitments as of December 2021 included a commitment of approximately \$2.0 billion to acquire the outstanding credit card loans related to the General Motors co-branded credit card portfolio.
- Commitments to provide unsecured installment loans to consumers were \$1.88 billion as of December 2022 and \$9 million as of December 2021. The increase in these lending commitments from December 2021 to December 2022 primarily related to commitments extended in connection with point-of-sale financing.

Risk Participations

The Bank also risk participates certain of its commercial lending commitments to other financial institutions. In the event of a risk participant's default, the Bank will be responsible to fund the borrower.

Collateralized Agreement Commitments/ Collateralized Financing Commitments

Collateralized agreement commitments includes forward starting resale agreements, and collateralized financing commitments includes forward starting repurchase and secured lending agreements that settle at a future date, generally within three business days. Collateralized agreement commitments also includes transactions where the Bank has entered into commitments to provide contingent financing to its clients and counterparties through resale agreements. The Bank's funding of these commitments depends on the satisfaction of all contractual conditions to the resale agreement and these commitments can expire unused.

Notes to Consolidated Financial Statements

Investment Commitments

Investment commitments includes commitments to invest in securities, real estate and other assets.

Other Commitments

Other commitments as of December 2021 included the following commitments related to the pending acquisition of GreenSky. These commitments were terminated upon the completion of the acquisition in March 2022.

- A commitment to acquire up to \$600 million of loans originated by GreenSky's bank partners prior to the closing of the acquisition (such amount represented the undrawn amount under a total commitment of \$800 million).
- A commitment to acquire up to an additional \$1.0 billion of loans originated by GreenSky's bank partners, to be funded only in the event that the acquisition did not close.

See Note 12 for further information about the acquisition of GreenSky.

Contingencies

Legal Proceedings. See Note 24 for information about legal proceedings.

Guarantees

The table below presents derivatives that meet the definition of a guarantee, securities lending indemnifications and certain other financial guarantees.

<i>\$ in millions</i>	Derivatives	Securities lending indemnifications	Other financial guarantees
As of December 2022			
Carrying Value of Net Liability	\$ 4,485	\$ —	\$ 19
Maximum Payout/Notional Amount by Period of Expiration			
2023	\$ 54,482	\$ 11,818	\$ 1,381
2024 - 2025	103,754	—	1,465
2026 - 2027	8,774	—	1,526
2028 - thereafter	15,575	—	22
Total	\$ 182,585	\$ 11,818	\$ 4,394

As of December 2021			
Carrying Value of Net Liability	\$ 2,315	\$ —	\$ 18
Maximum Payout/Notional Amount by Period of Expiration			
2022	\$ 23,670	\$ 11,832	\$ 665
2023 - 2024	23,982	—	2,015
2025 - 2026	11,075	—	739
2027 - thereafter	16,132	—	2
Total	\$ 74,859	\$ 11,832	\$ 3,421

In the table above:

- The maximum payout is based on the notional amount of the contract and does not represent anticipated losses.
- Amounts exclude certain commitments to issue standby letters of credit that are included in lending commitments. See the tables in "Commitments" above for a summary of the Bank's commitments.
- The carrying value for derivatives included derivative assets of \$191 million as of December 2022 and \$406 million as of December 2021, and derivative liabilities of \$4.68 billion as of December 2022 and \$2.72 billion as of December 2021.

Derivative Guarantees. The Bank enters into various derivatives that meet the definition of a guarantee under U.S. GAAP, including written currency contracts and interest rate caps, floors and swaptions. These derivatives are risk managed together with derivatives that do not meet the definition of a guarantee, and therefore the amounts in the table above do not reflect the Bank's overall risk related to derivative activities. Disclosures about derivatives are not required if they may be cash settled and the Bank has no basis to conclude it is probable that the counterparties held the underlying instruments at the inception of the contract. The Bank has concluded that these conditions have been met for certain large, internationally active commercial and investment bank counterparties, central clearing counterparties, hedge funds and certain other counterparties. Accordingly, the Bank has not included such contracts in the table above. See Note 7 for information about credit derivatives that meet the definition of a guarantee, which are not included in the table above.

Derivatives are accounted for at fair value and therefore the carrying value is considered the best indication of payment/performance risk for individual contracts. However, the carrying values in the table above exclude the effect of counterparty and cash collateral netting.

Securities Lending Indemnifications. The Bank, in its capacity as an agency lender, indemnifies most of its securities lending customers against losses incurred in the event that borrowers do not return securities and the collateral held is insufficient to cover the market value of the securities borrowed. The maximum payout of such indemnifications was \$11.82 billion as of December 2022 and \$11.83 billion as of December 2021. Collateral held by the lenders in connection with securities lending indemnifications was \$12.14 billion as of December 2022 and \$12.12 billion as of December 2021. Because the contractual nature of these arrangements requires the Bank to obtain collateral with a market value that exceeds the value of the securities lent to the borrower, there is minimal performance risk associated with these guarantees.

Notes to Consolidated Financial Statements

Other Financial Guarantees. In the ordinary course of business, the Bank provides other financial guarantees of the obligations of third parties (e.g., standby letters of credit and other guarantees to enable clients to complete transactions). These guarantees represent obligations to make payments to beneficiaries if the guaranteed party fails to fulfill its obligation under a contractual arrangement with that beneficiary.

Indemnities and Guarantees of Service Providers. In the ordinary course of business, the Bank indemnifies and guarantees certain service providers, such as clearing and custody agents, trustees and administrators, against specified potential losses in connection with their acting as an agent of, or providing services to, the Bank.

The Bank may also be liable to some clients or other parties for losses arising from its custodial role or caused by acts or omissions of third-party service providers, including sub-custodians and third-party brokers. In certain cases, the Bank has the right to seek indemnification from these third-party service providers for certain relevant losses incurred by the Bank. In addition, the Bank is a member of a clearing and settlement network, as well as exchanges around the world that may require the Bank to meet the obligations of such networks and exchanges in the event of member defaults and other loss scenarios.

The Bank is unable to develop an estimate of the maximum payout under these guarantees and indemnifications. However, management believes that it is unlikely the Bank will have to make any material payments under these arrangements, and no material liabilities related to these guarantees and indemnifications have been recognized in the consolidated balance sheets as of both December 2022 and December 2021.

Other Representations, Warranties and Indemnifications. The Bank provides representations and warranties to counterparties in connection with a variety of commercial transactions and occasionally indemnifies them against potential losses caused by the breach of those representations and warranties. The Bank may also provide indemnifications protecting against changes in or adverse application of certain U.S. tax laws in connection with ordinary-course transactions, such as borrowings or derivatives.

In addition, the Bank may provide indemnifications to some counterparties to protect them in the event additional taxes are owed or payments are withheld, due either to a change in or an adverse application of certain non-U.S. tax laws.

These indemnifications generally are standard contractual terms and are entered into in the ordinary course of business. Generally, there are no stated or notional amounts included in these indemnifications, and the contingencies triggering the obligation to indemnify are not expected to occur. The Bank is unable to develop an estimate of the maximum payout under these guarantees and indemnifications. However, management believes that it is unlikely the Bank will have to make any material payments under these arrangements, and no material liabilities related to these arrangements have been recognized in the consolidated balance sheets as of both December 2022 and December 2021.

Note 19.

Regulation and Capital Adequacy

The Bank is regulated as described in Note 1, and is subject to consolidated regulatory capital requirements which are calculated in accordance with the regulations of the FRB (Capital Framework).

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

Capital Framework

The regulations under the Capital Framework are largely based on the Basel Committee on Banking Supervision's (Basel Committee) capital framework for strengthening international capital standards (Basel III) and also implement certain provisions of the U.S. Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act). Under the Capital Framework, the Bank is an "Advanced approaches" banking organization.

The Capital Framework includes the minimum risk-based capital and the capital conservation buffer requirements (consisting of a 2.5% buffer and the countercyclical capital buffer). The buffer must consist entirely of capital that qualifies as Common Equity Tier 1 (CET1) capital. In addition, the Capital Framework includes the leverage ratio requirements.

Notes to Consolidated Financial Statements

The Bank calculates its CET1 capital, Tier 1 capital and Total capital ratios in accordance with both the Standardized and Advanced Capital Rules. The lower of each risk-based capital ratio calculated under the Standardized and Advanced Capital Rules is the ratio against which the Bank's compliance with its risk-based capital requirements is assessed.

Under the Capital Framework, the Bank is also subject to leverage requirements which consist of a minimum Tier 1 leverage ratio and a minimum supplementary leverage ratio (SLR).

Consolidated Regulatory Capital Requirements

The U.S. Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA), among other things, requires the federal bank regulatory agencies to take "prompt corrective action" in respect of depository institutions that do not meet specified capital requirements. FDICIA establishes five capital categories for FDIC-insured banks: well-capitalized, adequately capitalized, undercapitalized, significantly undercapitalized and critically undercapitalized.

In addition, under the regulatory framework for prompt corrective action applicable to the Bank, in order to meet the quantitative requirements for a "well-capitalized" depository institution, the Bank must also meet the "well-capitalized" requirements in the table below.

The Bank's capital levels and prompt corrective action classification are also subject to qualitative judgments by the regulators about components of capital, risk weightings and other factors. Failure to comply with the capital requirements, including a breach of the buffers described below, would result in restrictions being imposed by the regulators.

Risk-Based Capital and Leverage Ratios. The table below presents the risk-based capital, leverage and "well-capitalized" requirements.

	Requirements	"Well-capitalized" Requirements
Risk-based capital requirements		
CET1 capital ratio	7.0%	6.5%
Tier 1 capital ratio	8.5%	8.0%
Total capital ratio	10.5%	10.0%
Leverage requirements		
Tier 1 leverage ratio	4.0%	5.0%
SLR	3.0%	6.0%

In the table above:

- The CET1 capital ratio requirement includes a minimum of 4.5%, the Tier 1 capital ratio requirement includes a minimum of 6.0% and the Total capital ratio requirement includes a minimum of 8.0%. These requirements also include the capital conservation buffer requirements, consisting of a 2.5% buffer and the countercyclical capital buffer, which the FRB has set to zero percent.
- The "well-capitalized" requirements are the binding requirements for leverage ratios.

The table below presents information about risk-based capital ratios.

<i>\$ in millions</i>	Standardized	Advanced
As of December 2022		
CET1 capital	\$ 46,845	\$ 46,845
Tier 1 capital	\$ 46,845	\$ 46,845
Tier 2 capital	\$ 8,042	\$ 5,382
Total capital	\$ 54,887	\$ 52,227
RWAs	\$ 357,112	\$ 275,451
CET1 capital ratio	13.1%	17.0%
Tier 1 capital ratio	13.1%	17.0%
Total capital ratio	15.4%	19.0%
As of December 2021		
CET1 capital	\$ 42,535	\$ 42,535
Tier 1 capital	\$ 42,535	\$ 42,535
Tier 2 capital	\$ 6,430	\$ 4,646
Total capital	\$ 48,965	\$ 47,181
RWAs	\$ 312,601	\$ 222,607
CET1 capital ratio	13.6%	19.1%
Tier 1 capital ratio	13.6%	19.1%
Total capital ratio	15.7%	21.2%

In the table above:

- The lower of the Standardized or Advanced ratio is the ratio against which the Bank's compliance with the capital requirements is assessed under the risk-based Capital Rules, and therefore, the Standardized ratios applied to the Bank as of both December 2022 and December 2021.
- Beginning in the fourth quarter of 2022, the Bank updated the probability of default models used in the calculation of Advanced RWAs. The impact of this change was a decrease in the Bank's Advanced CET1 capital ratio of approximately 1 percentage point.

Notes to Consolidated Financial Statements

The table below presents information about leverage ratios.

\$ in millions	For the Three Months Ended or as of December	
	2022	2021
Tier 1 capital	\$ 46,845	\$ 42,535
Average total assets	\$ 500,963	\$ 409,792
Deductions from Tier 1 capital	(1,855)	(53)
Average adjusted total assets	499,108	409,739
Off-balance sheet and other exposures	172,107	218,060
Total leverage exposure	\$ 671,215	\$ 627,799
Tier 1 leverage ratio	9.4%	10.4%
SLR	7.0%	6.8%

In the table above:

- Average total assets represents the average daily assets for the quarter adjusted for the impact of Current Expected Credit Losses (CECL) transition.
- Off-balance sheet and other exposures primarily includes the monthly average of off-balance sheet exposures, consisting of derivatives, securities financing transactions, commitments and guarantees.
- Tier 1 leverage ratio is calculated as Tier 1 capital divided by average adjusted total assets.
- SLR is calculated as Tier 1 capital divided by total leverage exposure.

Risk-Based Capital. The table below presents information about risk-based capital.

\$ in millions	As of December	
	2022	2021
Shareholder's equity	\$ 48,302	\$ 41,875
Impact of CECL transition	588	783
Deduction for goodwill	(1,085)	(53)
Deduction for identifiable intangible assets	(747)	—
Other adjustments	(213)	(70)
CET1 capital	46,845	42,535
Tier 1 capital	\$ 46,845	\$ 42,535
Standardized Tier 2 and Total capital		
Tier 1 capital	\$ 46,845	\$ 42,535
Qualifying subordinated debt	4,271	4,273
Allowance for credit losses	3,771	2,157
Standardized Tier 2 capital	8,042	6,430
Standardized Total capital	\$ 54,887	\$ 48,965
Advanced Tier 2 and Total capital		
Tier 1 capital	\$ 46,845	\$ 42,535
Standardized Tier 2 capital	8,042	6,430
Allowance for credit losses	(3,771)	(2,157)
Other adjustments	1,111	373
Advanced Tier 2 capital	5,382	4,646
Advanced Total capital	\$ 52,227	\$ 47,181

In the table above:

- Beginning in January 2022, the Bank started to phase in the estimated reduction to regulatory capital as a result of adopting the CECL model. Impact of CECL transition in the table above reflects the total amount of reduction of \$783 million as of December 2021 to be phased in through January 2025 (at 25% per year), of which \$195 million was phased in on January 1, 2022. The total amount to be phased in includes the impact of adopting CECL as of January 1, 2020, as well as 25% of the increase in the allowance for credit losses from January 1, 2020 through December 31, 2021.
- Other adjustments within CET1 capital primarily include credit valuation adjustments on derivative liabilities, disallowed deferred tax assets and debt valuation adjustments. Other adjustments within Advanced Tier 2 capital include eligible credit reserves.
- Qualifying subordinated debt is subordinated debt issued by the Bank with an original maturity of five years or greater. The outstanding amount of subordinated debt qualifying for Tier 2 capital is reduced upon reaching a remaining maturity of five years. See Note 14 for further information about the Bank's subordinated debt.

RWAs. RWAs are calculated in accordance with both the Standardized and Advanced Capital Rules.

Credit Risk

Credit RWAs are calculated based on measures of exposure, which are then risk weighted under the Standardized and Advanced Capital Rules:

- The Standardized Capital Rules apply prescribed risk-weights, which depend largely on the type of counterparty. The exposure measures for derivatives and securities financing transactions are based on specific formulas which take certain factors into consideration.
- Under the Advanced Capital Rules, the Bank computes risk-weights for wholesale and retail credit exposures in accordance with the Advanced Internal Ratings-Based approach. The exposure measures for derivatives and securities financing transactions are computed utilizing internal models.
- For both Standardized and Advanced credit RWAs, the risk-weights for securitizations are based on specific required formulaic approaches.

Notes to Consolidated Financial Statements

Market Risk

RWAs for market risk in accordance with the Standardized and Advanced Capital Rules are generally consistent. Market RWAs are calculated based on measures of exposure which include the following:

- Value-at-Risk (VaR) is the potential loss in value of trading assets and liabilities, as well as certain investments, loans, and other financial assets and liabilities accounted for at fair value, due to adverse market movements over a defined time horizon with a specified confidence level.

For both risk management purposes and regulatory capital calculations, the Bank uses a single VaR model which captures risks, including those related to interest rates, equity prices and currency rates. However, VaR used for risk management purposes differs from VaR used for regulatory capital requirements (regulatory VaR) due to differences in time horizons, confidence levels and the scope of positions on which VaR is calculated. For risk management purposes, a 95% one-day VaR is used, whereas for regulatory capital requirements, a 99% 10-day VaR is used to determine Market RWAs and a 99% one-day VaR is used to determine regulatory VaR exceptions.

The Bank's positional losses observed on a single day exceeded its 99% one-day regulatory VaR on one occasion during 2022 and on two occasions during 2021;

- Stressed VaR is the potential loss in value of trading assets and liabilities, as well as certain investments, loans, and other financial assets and liabilities accounted for at fair value, during a period of significant market stress;
- Incremental risk is the potential loss in value of non-securitized positions due to the default or credit migration of issuers of financial instruments over a one-year time horizon;
- Comprehensive risk is the potential loss in value, due to price risk and defaults, within the Bank's credit correlation positions; and
- Specific risk is the risk of loss on a position that could result from factors other than broad market movements, including event risk, default risk and idiosyncratic risk. The standardized measurement method is used to determine specific risk RWAs, by applying supervisory defined risk-weighting factors after applicable netting is performed.

Operational Risk

Operational RWAs are only required to be included under the Advanced Capital Rules. The Bank utilizes an internal risk-based model to quantify Operational RWAs.

The table below presents information about RWAs.

<i>\$ in millions</i>	Standardized	Advanced
As of December 2022		
Credit RWAs		
Derivatives	\$ 53,801	\$ 31,745
Commitments, guarantees and loans	216,261	147,933
Securities financing transactions	8,713	1,649
Equity investments	1,195	1,263
Other	22,317	19,198
Total Credit RWAs	302,287	201,788
Market RWAs		
Regulatory VaR	15,848	15,848
Stressed VaR	34,293	34,293
Incremental risk	1,755	1,755
Comprehensive risk	2,881	2,881
Specific risk	48	48
Total Market RWAs	54,825	54,825
Total Operational RWAs	—	18,838
Total RWAs	\$ 357,112	\$ 275,451

As of December 2021

Credit RWAs		
Derivatives	\$ 54,379	\$ 28,392
Commitments, guarantees and loans	197,002	125,798
Securities financing transactions	9,647	1,751
Equity investments	738	782
Other	12,935	11,546
Total Credit RWAs	274,701	168,269
Market RWAs		
Regulatory VaR	7,395	7,395
Stressed VaR	26,795	26,795
Incremental risk	2,135	2,135
Comprehensive risk	1,512	1,512
Specific risk	63	63
Total Market RWAs	37,900	37,900
Total Operational RWAs	—	16,438
Total RWAs	\$ 312,601	\$ 222,607

In the table above:

- Securities financing transactions represents resale and repurchase agreements and securities borrowed and loaned transactions.
- Other includes receivables, certain debt securities, cash and other assets.

Notes to Consolidated Financial Statements

The table below presents changes in RWAs.

<i>\$ in millions</i>	Standardized	Advanced
Year Ended December 2022		
RWAs		
Beginning balance	\$ 312,601	\$ 222,607
Credit RWAs		
Change in:		
Derivatives	(578)	3,353
Commitments, guarantees and loans	19,259	22,135
Securities financing transactions	(934)	(102)
Equity investments	457	481
Other	9,382	7,652
Change in Credit RWAs	27,586	33,519
Market RWAs		
Change in:		
Regulatory VaR	8,453	8,453
Stressed VaR	7,498	7,498
Incremental risk	(380)	(380)
Comprehensive risk	1,369	1,369
Specific risk	(15)	(15)
Change in Market RWAs	16,925	16,925
Change in Operational RWAs	—	2,400
Ending balance	\$ 357,112	\$ 275,451

RWAs Rollforward Commentary

Year Ended December 2022. Standardized Credit RWAs as of December 2022 increased by \$27.59 billion compared with December 2021, reflecting an increase in commitments, guarantees and loans (principally due to increased lending activity) and an increase in other credit RWAs (principally due to increased other assets and customer and other receivables exposures). Standardized Market RWAs as of December 2022 increased by \$16.93 billion compared with December 2021, primarily reflecting increases in regulatory VaR and stressed VaR (both principally due to increased market volatility and exposure).

Advanced Credit RWAs as of December 2022 increased by \$33.52 billion compared with December 2021, primarily reflecting an increase in commitments, guarantees and loans, and an increase in other credit RWAs (principally due to updates to the probability of default models in the fourth quarter of 2022). Advanced Market RWAs as of December 2022 increased by \$16.93 billion compared with December 2021, primarily reflecting increases in regulatory VaR and stressed VaR (both principally due to increased market volatility and exposure).

GSBE

GSBE calculates its standalone prudential capital requirements in accordance with the E.U. Capital Requirements Directive and E.U. Capital Requirements Regulation, which are largely based on Basel III. As of both December 2022 and December 2021, GSBE was in compliance with its regulatory capital requirements. The deposits of GSBE are covered by the German statutory deposit protection program to the extent provided by law. In addition, GSBE has elected to participate in the German voluntary deposit protection program which provides insurance for certain eligible deposits not covered by the German statutory deposit program.

The table below presents GSBE's risk-based capital requirements.

	As of December	
	2022	2021
Risk-based capital requirements		
CET1 capital ratio	9.2%	8.7%
Tier 1 capital ratio	11.3%	10.8%
Total capital ratio	14.0%	13.5%

The table below presents information about GSBE's risk-based capital ratios.

<i>\$ in millions</i>	As of December	
	2022	2021
Risk-based capital and risk-weighted assets		
CET1 capital	\$ 9,536	\$ 6,527
Tier 1 capital	\$ 9,536	\$ 6,527
Tier 2 capital	\$ 21	\$ 23
Total capital	\$ 9,557	\$ 6,550
RWAs	\$ 30,154	\$ 28,924
Risk-based capital ratios		
CET1 capital ratio	31.6%	22.6%
Tier 1 capital ratio	31.6%	22.6%
Total capital ratio	31.7%	22.6%

In the table above, the risk-based capital ratios as of December 2022 reflected profits after foreseeable charges that are still subject to audit by GSBE's external auditors and approval by GSBE's shareholder (GS Bank USA) for inclusion in risk-based capital. These profits contributed approximately 76 basis points to the CET1 capital ratio as of December 2022.

The table below presents GSBE's leverage ratio requirement and leverage ratios.

	As of December	
	2022	2021
Leverage ratio requirement	3.0%	3.0%
Leverage ratio	10.6%	7.6%

Notes to Consolidated Financial Statements

In the table above, the leverage ratio as of December 2022 reflected profits after foreseeable charges that are still subject to audit by GSBE's external auditors and approval by GSBE's shareholder (GS Bank USA) for inclusion in risk-based capital. These profits contributed approximately 57 basis points to the leverage ratio as of December 2022.

GS Bank USA made a capital contribution of \$3.55 billion to GSBE in January 2023.

Required Reserves

The deposits of GS Bank USA are insured by the FDIC to the extent provided by law. The FRB requires that GS Bank USA maintain cash reserves with the Federal Reserve. See Note 23 for further information about cash deposits held by GS Bank USA at the Federal Reserve.

GSBE is subject to minimum reserve requirements at central banks in certain of the jurisdictions in which it operates. As of both December 2022 and December 2021, GSBE was in compliance with these requirements.

Other

GS Bank USA, and two subsidiaries, GSBE and Goldman Sachs Mitsui Marine Derivative Products, L.P. (MMDP), are registered swap dealers with the CFTC and GS Bank USA and GSBE are registered security-based swap dealers with the SEC. As of both December 2022 and December 2021, GS Bank USA, GSBE and MMDP were subject to and in compliance with applicable capital requirements for swap dealers and security-based swap dealers.

Note 20.

Transactions with Related Parties

Transactions between the Bank and its affiliates are subject to regulations adopted by the FRB and the supervision of both the FRB and the NYDFS. These regulations generally limit the types and amounts of transactions (including credit extensions from the Bank) that may take place and generally require those transactions to be on terms that are at least as favorable to the Bank as prevailing terms for comparable transactions with non-affiliates. These regulations generally do not apply to transactions within the Bank.

The table below presents assets and liabilities with affiliates.

\$ in millions	As of December	
	2022	2021
Assets		
Cash	\$ 459	\$ 504
Collateralized agreements:		
Resale agreements	15,607	19,691
Securities borrowed	2,676	8,278
Customer and other receivables	11,217	8,891
Trading assets	3,487	604
Other assets	2,224	485
Total	\$ 35,670	\$ 38,453
Liabilities		
Deposits	\$ 39,616	\$ 34,316
Collateralized financings:		
Repurchase agreements	4,923	5,531
Securities loaned	2,846	8,266
Other secured financings	3,470	1,191
Customer and other payables	5,523	4,562
Trading liabilities	573	421
Unsecured borrowings	4,498	4,462
Other liabilities	1,180	1,072
Total	\$ 62,629	\$ 59,821

In the table above, trading assets and trading liabilities consist of net outstanding derivative contracts with Group Inc. and affiliates. The Bank enters into derivative contracts with Group Inc. and affiliates in the normal course of business.

Group Inc. Guarantee

Group Inc. has guaranteed the payment obligations of GS Bank USA, subject to certain limitations.

In addition, Group Inc. has provided a guarantee to the Bank related to certain loans that the Bank acquired and lending commitments that the Bank assumed from certain subsidiaries of Group Inc. in March 2020 (as of December 2022, the outstanding amount of such loans and lending commitments were \$180 million and \$312 million, respectively).

Interest Income and Interest Expense

The Bank recognizes interest income and interest expense in connection with various affiliated transactions. These transactions include resale agreements, other assets, repurchase agreements, deposits, collateral posted and received, other liabilities, and unsecured borrowings. The Bank recorded net interest income from affiliates of \$120 million for 2022 and \$2 million for 2021.

Notes to Consolidated Financial Statements

Other Transactions

The Bank has revenue sharing agreements with affiliated entities related to certain activities under which it transfers revenues to, and receives revenues from, such entities. Such shared revenues under these agreements include revenues related to market and credit risk exposures held by the Bank or by affiliated entities which arise from activities covered by these agreements. The Bank received net revenues from affiliates of \$68 million for 2022 and received net revenues from affiliates of \$1.38 billion for 2021. These amounts are included in gains and losses from financial assets and liabilities and other revenues. The Bank also compensated affiliates for providing certain services to customers. Such costs, which were included within operating expenses, were \$290 million for 2022 and \$249 million for 2021.

The Bank is subject to service charges from affiliates. The net charge to the Bank by affiliates was \$787 million for 2022 and \$812 million for 2021. This service charge from affiliates is for employment related costs of dual employees and employees of affiliates pursuant to a Master Services Agreement supplemented by Service Level Agreements (collectively, the Master Services Agreement). These amounts are included in service charges.

The Bank receives operational and administrative support and management services from affiliates and is charged for these services. In addition, the Bank provides similar support and services to affiliates and charges these affiliates for the services provided. These charges from and to affiliates are included net in the applicable expense captions in the consolidated statements of earnings. The Bank incurred a net charge from affiliates of \$850 million for 2022 and \$566 million for 2021 related to such operational and administrative support and management services.

The capital contribution of \$1.79 billion from Group Inc. in the first quarter of 2022 included a non-cash contribution of approximately \$1.75 billion related to the acquisition of GreenSky. See Note 12 for further information about the acquisition of GreenSky.

In connection with the capital contribution from Group Inc. of \$38.0 billion for 2021 approximately \$1.0 billion of the contribution consisted of an outstanding loan that Group Inc. had extended to GSBE.

In connection with its partnership interest in MMDP, the Bank has provided to Mitsui Sumitomo Insurance Co., Ltd. (Mitsui Sumitomo) additional protection in the form of assets held in a VIE which could be liquidated for the benefit of Mitsui Sumitomo under certain circumstances.

Note 21.

Interest Income and Interest Expense

Interest is recorded over the life of the instrument on an accrual basis based on contractual interest rates.

The table below presents sources of interest income and interest expense.

<i>\$ in millions</i>	Year Ended December	
	2022	2021
Deposits with banks	\$ 2,772	\$ 87
Collateralized agreements	565	52
Trading assets	824	587
Investments	248	160
Loans	7,503	3,905
Other interest	2,085	511
Total interest income	13,997	5,302
Deposits	5,125	1,112
Collateralized financings	179	(45)
Trading liabilities	294	112
Borrowings	244	130
Other interest	1,471	116
Total interest expense	7,313	1,425
Net interest income	\$ 6,684	\$ 3,877

In the table above:

- Collateralized agreements consists of resale agreements and securities borrowed.
- Loans excludes interest on loans held for sale that are accounted for at the lower of cost or fair value. Such interest is included within other interest.
- Other interest income primarily includes interest income on loans held for sale that are accounted for at the lower of cost or fair value, collateral balances posted to counterparties and foreign currency funding facilities.
- Collateralized financings consists of repurchase agreements and securities loaned.
- Borrowings includes interest expense from other secured financings and unsecured borrowings, which primarily relates to interest incurred on the Bank's affiliate borrowings from Group Inc. and Funding IHC, as well as FHLB advances.
- Other interest expense primarily includes interest expense on collateral balances received from counterparties and interest expense on foreign currency funding facilities.

Notes to Consolidated Financial Statements

Note 22.

Income Taxes

Provision for Income Taxes

Income taxes are provided for using the asset and liability method under which deferred tax assets and liabilities are recognized for temporary differences between the financial reporting and tax bases of assets and liabilities. The Bank reports interest expense related to income tax matters in provision for taxes and income tax penalties in other expenses.

The Bank's results of operations are included in the consolidated federal and certain state tax returns of GS Group. The Bank computes its tax liability as if it was filing a tax return on a modified separate company basis and settles such liability with Group Inc. pursuant to a tax sharing agreement. To the extent the Bank generates tax benefits from losses, it will be reimbursed by Group Inc. pursuant to a tax sharing agreement at such time as GS Group would have been able to utilize such losses.

The table below presents information about the provision for taxes.

\$ in millions	Year Ended December	
	2022	2021
Current taxes		
U.S. federal	\$ 1,153	\$ 702
State and local	253	154
Non-U.S.	352	282
Total current tax expense	1,758	1,138
Deferred taxes		
U.S. federal	(390)	7
State and local	(106)	12
Non-U.S.	(25)	(51)
Total deferred tax benefit	(521)	(32)
Provision for taxes	\$ 1,237	\$ 1,106

For 2022, the difference between the U.S. federal statutory tax rate and the Bank's effective tax rate of 27.4% primarily relates to state and local and non-U.S. income taxes. For 2021, the difference between the U.S. federal statutory tax rate and the Bank's effective tax rate of 24.8% primarily relates to state and local income taxes.

Deferred Income Taxes

Deferred income taxes reflect the net tax effects of temporary differences between the financial reporting and tax bases of assets and liabilities. These temporary differences result in taxable or deductible amounts in future years and are measured using the tax rates and laws that will be in effect when such differences are expected to reverse. Valuation allowances are established to reduce deferred tax assets to the amount that more likely than not will be realized. Tax assets are included in other assets and tax liabilities are included in other liabilities.

The table below presents information about deferred tax assets and liabilities.

\$ in millions	As of December	
	2022	2021
Deferred tax assets		
Allowance for credit losses	\$ 1,261	\$ 783
Compensation and benefits	147	142
ASC 740 assets related to unrecognized tax benefits	—	4
Depreciation and amortization	95	—
Other comprehensive income/(loss)-related	531	100
Other, net	8	2
Subtotal	2,042	1,031
Valuation allowance	—	(1)
Total deferred tax assets	\$ 2,042	\$ 1,030
Deferred tax liabilities		
Depreciation and amortization	\$ —	\$ 96
Unrealized gains	28	83
Total deferred tax liabilities	\$ 28	\$ 179

The Bank has recorded deferred tax assets of \$32 million in connection with U.S. federal and state and local net operating loss carryforwards (net operating loss carryforwards) and no related valuation allowance as of December 2022. The Bank had no deferred tax assets related to net operating loss carryforwards as of December 2021.

As of December 2022, the U.S. federal net operating loss carryforward was \$130 million, and the state and local net operating loss carryforward was \$110 million. The U.S. federal net operating loss carryforwards do not expire and if not utilized, the state and local net operating loss carryforwards will begin to expire in 2032. If these carryforwards expire, they will not have a material impact on the Bank's results of operations. As of December 2022, the Bank has recorded deferred tax assets of \$0.6 million in connection with general business credit carryforwards and \$1 million in connection with state and local tax credit carryforwards. If not utilized, the general business credit carryforward will begin to expire in 2038 and the state and local tax credit carryforwards will begin to expire in 2028.

Notes to Consolidated Financial Statements

Unrecognized Tax Benefits

The Bank recognizes tax positions in the consolidated financial statements only when it is more likely than not that the position will be sustained on examination by the relevant taxing authority based on the technical merits of the position. A position that meets this standard is measured at the largest amount of benefit that will more likely than not be realized on settlement. A liability is established for differences between positions taken in a tax return and amounts recognized in the consolidated financial statements.

As of December 2022, the Bank had a net asset for uncertain tax provisions of \$27 million including \$2 million of accrued liabilities for interest expense related to income tax matters. As of December 2021, the Bank had a net asset for uncertain tax provisions of \$31 million including \$2 million of accrued liabilities for interest expense related to income tax matters.

Regulatory Tax Examinations

The Bank is subject to examination by the U.S. Internal Revenue Service (IRS), as part of GS Group, and other taxing authorities in jurisdictions where the Bank has significant business operations, such as New York State and City, Germany, and the United Kingdom. The tax years under examination vary by jurisdiction.

GS Group has been accepted into the Compliance Assurance Process program by the IRS for each of the tax years from 2013 through 2023. This program allows GS Group to work with the IRS to identify and resolve potential U.S. federal tax issues before the filing of tax returns. All issues for the 2011 and 2012 tax years have been resolved and completion is pending final review by the Joint Committee on Taxation (JCT). During 2022, GS Group reached an agreement with IRS Appeals on the remaining issues for tax years 2012 through 2019. Subject to final review by the Joint Committee on Taxation, this agreement will not have a material impact on the effective tax rate. During 2022, the fieldwork for the 2020 tax year was completed and the final resolution is not expected to have a material impact on the effective tax rate. The 2021 tax year remains subject to post-filing review.

New York State and City examinations of tax years 2015 through 2018 commenced during 2021. All years, including and subsequent to 2015 for New York State and City and all other significant states, remain open to examination by the taxing authorities.

All years, including and subsequent to 2017 remain open to examination by the German taxing authorities.

All years, including and subsequent to 2019 remain open to examination by the United Kingdom taxing authorities.

All years, including and subsequent to the years detailed above, remain open to examination by the taxing authorities. The Bank believes that the liability for unrecognized tax benefits it has established is adequate in relation to the potential for additional assessments.

Note 23.

Credit Concentrations

The Bank's concentrations of credit risk arise from its lending, market-making, cash management and other activities, and may be impacted by changes in economic, industry or political factors. These activities expose the Bank to many different industries and counterparties, and may also subject the Bank to a concentration of credit risk to a particular central bank, counterparty, borrower or issuer, including sovereign issuers, or to a particular clearinghouse or exchange. The Bank seeks to mitigate credit risk by actively monitoring exposures and obtaining collateral from counterparties as deemed appropriate.

The Bank measures and monitors its credit exposure based on amounts owed to the Bank after taking into account risk mitigants that the Bank considers when determining credit risk. Such risk mitigants include netting and collateral arrangements and economic hedges, such as credit derivatives, futures and forward contracts. Netting and collateral agreements permit the Bank to offset receivables and payables with such counterparties and/or enable the Bank to obtain collateral on an upfront or contingent basis.

The table below presents the credit concentrations included in trading cash instruments and investments.

<i>\$ in millions</i>	As of December	
	2022	2021
U.S. government and agency obligations	\$ 41,841	\$ 44,418
Percentage of total assets	8.6%	10.2%

In addition, GS Bank USA had \$165.79 billion as of December 2022 and \$122.01 billion as of December 2021 of cash deposits held at the Federal Reserve. GSBE had \$13.31 billion as of December 2022 and \$20.36 billion as of December 2021 deposited at central banks, substantially all of which was deposited with Deutsche Bundesbank. These cash deposits are included in cash.

As of both December 2022 and December 2021, the Bank did not have credit exposure to any other external counterparty that exceeded 2% of total assets.

Notes to Consolidated Financial Statements

Collateral obtained by the Bank related to derivative assets is principally cash and is held by the Bank or a third-party custodian. Collateral obtained by the Bank related to resale agreements is primarily U.S. government and agency obligations. See Note 11 for further information about collateralized agreements and financings.

The table below presents U.S. government and agency obligations and non-U.S. government and agency obligations that collateralize resale agreements and securities borrowed transactions.

<i>\$ in millions</i>	As of December	
	2022	2021
U.S. government and agency obligations	\$ 20,309	\$ 26,151
Non-U.S. government and agency obligations	\$ 9,090	\$ 13,495

In the table above:

- Non-U.S. government and agency obligations primarily consists of securities issued by the government of France.
- Given that the Bank's primary credit exposure on such transactions is to the counterparty to the transaction, the Bank would be exposed to the collateral issuer only in the event of counterparty default.

Note 24.

Legal Proceedings

The Bank is involved in a number of judicial, regulatory and arbitration proceedings concerning matters arising in connection with the conduct of the Bank's businesses. Many of these proceedings are in early stages, and many of these cases seek an indeterminate amount of damages.

Management is generally unable to estimate a range of reasonably possible loss for matters in which the Bank is involved due to various factors, including where (i) actual or potential plaintiffs have not claimed an amount of money damages, except in those instances where management can otherwise determine an appropriate amount, (ii) matters are in early stages, (iii) matters relate to regulatory investigations or reviews, except in those instances where management can otherwise determine an appropriate amount, (iv) there is uncertainty as to the likelihood of a class being certified or the ultimate size of the class, (v) there is uncertainty as to the outcome of pending appeals or motions, (vi) there are significant factual issues to be resolved, and/or (vii) there are novel legal issues presented.

Management does not believe, based on currently available information, that the outcomes of any such matters will have a material adverse effect on the Bank's financial condition, though the outcomes could be material to the Bank's operating results for any particular period, depending, in part, upon the operating results for such period.

Consumer Investigation and Review

The Bank is cooperating with the Consumer Financial Protection Bureau and other governmental bodies relating to investigations and/or inquiries concerning the Bank's credit card account management practices and is providing information regarding the application of refunds, crediting of nonconforming payments, billing error resolution, advertisements, reporting to credit bureaus, and any other consumer-related information requested by them.

Regulatory Investigations and Reviews and Related Litigation.

The Bank and certain of its affiliates (including Group Inc.) are subject to a number of investigations and reviews by, and in some cases have received subpoenas and requests for documents and information from, various governmental and regulatory bodies and self-regulatory organizations and litigation relating to such matters in each case relating to the Bank's current and past businesses (including acquired businesses) and operations, including, but not limited to, consumer lending, as well as residential mortgage lending and servicing, and compliance with related consumer laws; the sales, trading, transaction reporting, execution and clearance of derivatives, currencies and other financial products and related communications and activities, including trading activities and communications in connection with the establishment of benchmark rates, such as currency rates, and activities in U.S. Treasury securities; transactions involving government-related financings and other matters; and securities offering processes, underwriting practices and related financial advisory services. The Bank is cooperating with all such regulatory investigations and reviews.

In addition, governmental and other investigations, reviews, actions and litigation involving the Bank's affiliates and such affiliates' businesses and operations, including without limitation various matters referred to above, may have an impact on the Bank's businesses and operations.

Notes to Consolidated Financial Statements

Note 25.

Employee Incentive and Benefit Plans

Employee Incentive Plan

The cost of employee services received in exchange for a share-based award is generally measured based on the grant-date fair value of the award. Share-based awards that do not require future service (i.e., vested awards, including awards granted to retirement-eligible employees) are expensed immediately. Share-based awards that require future service are amortized over the relevant service period. Forfeitures are recorded when they occur. Cash dividend equivalents are paid on outstanding restricted stock units (RSUs).

Stock Incentive Plan

Group Inc. sponsors a stock incentive plan, The Goldman Sachs Amended and Restated Stock Incentive Plan (2021) (2021 SIP), which provides for grants of RSUs, restricted stock, dividend equivalent rights, incentive stock options, nonqualified stock options, stock appreciation rights, and other share-based awards, each of which may be subject to terms and conditions, including performance or market conditions. On April 29, 2021, Group Inc.'s shareholders approved the 2021 SIP. The 2021 SIP is a successor to several predecessor stock incentive plans, the first of which was adopted on April 30, 1999, and each of which was approved by Group Inc.'s shareholders. The 2021 SIP is scheduled to terminate on the date of Group Inc.'s annual meeting of shareholders that occurs in 2025.

Restricted Stock Units

Group Inc. grants RSUs (including RSUs subject to performance or market conditions) to employees, which are generally valued based on the closing price of the underlying shares on the date of grant after taking into account a liquidity discount for any applicable post-vesting and delivery transfer restrictions. The value of equity awards also considers the impact of material non-public information, if any, that Group Inc. expects to make available shortly following grant. RSUs generally vest and underlying shares of common stock deliver (net of required withholding tax) as outlined in the applicable award agreements. Award agreements generally provide that vesting is accelerated in certain circumstances, such as on retirement, death, disability and, in certain cases, conflicted employment. Delivery of the underlying shares of common stock is conditioned on the grantees satisfying certain vesting and other requirements outlined in the award agreements. RSUs not subject to performance or market conditions generally vest and deliver over a three-year period.

RSUs that are subject to performance or market conditions generally deliver after the end of a three- to five-year period. For awards that are subject to performance or market conditions, generally the final award is adjusted from zero up to 150% of the original grant based on the extent to which those conditions are satisfied. Dividend equivalents that accrue on these awards are paid when the awards settle. The subsequent amortization of the cost of these RSUs is allocated to the Bank by Group Inc.

The table below presents the 2022 activity related to stock settled RSUs.

	Restricted Stock Units Outstanding		Weighted Average Grant-Date Fair Value of Restricted Stock Units Outstanding	
	Future Service Required	No Future Service Required	Future Service Required	No Future Service Required
	Beginning balance	424,429	538,914	\$ 282.89
Granted	781,902	685,744	\$ 326.06	\$ 312.20
Forfeited	(98,301)	(6,550)	\$ 298.97	\$ 279.01
Delivered	—	(481,535)	\$ —	\$ 237.34
Vested	(304,274)	304,274	\$ 286.42	\$ 286.42
Transfers	(7,128)	635	\$ 312.48	\$ 294.01
Ending balance	796,628	1,041,482	\$ 321.24	\$ 298.82

In the table above:

- The weighted average grant-date fair value of RSUs granted was \$319.59 during 2022 and \$283.36 during 2021. The grant-date fair value of these RSUs included an average liquidity discount of 4.7% during 2022 and 8.6% during 2021, to reflect post-vesting and delivery transfer restrictions, generally of 1 year for 2022 and up to 4 years for 2021.
- The aggregate fair value of awards that vested was \$311 million during 2022 and \$131 million during 2021.
- The ending balance included restricted stock subject to future service requirements of 326,984 shares as of December 2022. There was no restricted stock subject to future service requirements as of December 2021.
- The ending balance included RSUs not subject to future service requirements but subject to performance conditions of 17,095 RSUs as of December 2022 and 21,680 RSUs as of December 2021, and the maximum amount of such RSUs that may be earned was 25,643 RSUs as of December 2022 and 32,520 RSUs as of December 2021.

Notes to Consolidated Financial Statements

In relation to 2022 year-end, during the first quarter of 2023, Group Inc. granted to the Bank's employees 507 thousand RSUs (of which approximately 246 thousand RSUs require future service as a condition for delivery of the related shares of common stock). These RSUs are subject to additional conditions as outlined in the award agreements. Shares underlying these RSUs, net of required withholding tax, generally deliver over a three-year period. These awards are generally subject to a one-year post-vesting and delivery transfer restriction. These awards are not included in the table above.

As of December 2022, there was \$139 million of total unrecognized compensation cost related to non-vested share-based compensation arrangements. This cost is expected to be recognized over a weighted average period of 1.47 years.

Total employee share-based compensation expense was \$403 million for 2022 and \$180 million for 2021.

Defined Benefit Pension Plan

Employees of certain non-U.S. subsidiaries participate in various Group Inc. defined benefit pension plans. These plans provide benefits based on years of credited service and a percentage of eligible compensation and did not have a material impact on the Bank's consolidated results of operations.

Group Inc. maintains a defined benefit pension plan for substantially all U.S. employees hired prior to November 1, 2003. As of November 2004, this plan was closed to new participants and frozen for existing participants. Group Inc. also maintains unfunded postretirement benefit plans that provide medical and life insurance for eligible retirees and their dependents covered under these programs. The Bank's contribution to these plans did not have a material impact on the Bank's consolidated results of operations.

Defined Contribution Plan

The Bank contributes to Group Inc.'s employer-sponsored U.S. defined contribution plan. The Bank's contribution to this plan did not have a material impact on the Bank's consolidated results of operations.

Note 26.

Subsequent Events

In the first quarter of 2023, the Bank commenced a process to sell approximately \$1.0 billion of unsecured consumer loans that it had originated through the Marcus platform. The sale is not expected to have a material impact on the Bank's results of operations for the first quarter of 2023.

The Bank evaluated subsequent events through March 7, 2023, the date the consolidated financial statements were issued, and determined that, other than disclosed in the notes to the consolidated financial statements, there were no other material events or transactions that would require recognition or additional disclosure in these consolidated financial statements.

Supplemental Financial Information

Distribution of Assets, Liabilities and Shareholder's Equity

The tables below present information about average balances, interest and average interest rates.

\$ in millions	Average Balance for the Year Ended December	
	2022	2021
Assets		
Deposits with banks	\$ 165,216	\$ 111,570
Collateralized agreements	38,216	26,337
Trading assets	39,143	38,256
Investments	27,745	25,292
Loans	136,873	99,385
Other interest-earning assets	37,800	31,985
Interest-earning assets	444,993	332,825
Cash and due from banks	1,261	1,653
Other non-interest-earning assets	38,522	36,032
Assets	\$ 484,776	\$ 370,510
Liabilities		
Interest-bearing deposits	\$ 333,941	\$ 250,983
Collateralized financings	16,536	7,320
Trading liabilities	14,428	9,770
Borrowings	9,881	11,735
Other interest-bearing liabilities	20,190	16,390
Interest-bearing liabilities	394,976	296,198
Non-interest-bearing deposits	4,239	5,234
Other non-interest-bearing liabilities	40,545	30,667
Liabilities	439,760	332,099
Shareholder's equity	45,016	38,411
Liabilities and shareholder's equity	\$ 484,776	\$ 370,510

\$ in millions	Interest for the Year Ended December	
	2022	2021
Assets		
Deposits with banks	\$ 2,772	\$ 87
Collateralized agreements	565	52
Trading assets	824	587
Investments	248	160
Loans	7,503	3,905
Other interest-earning assets	2,085	511
Interest-earning assets	\$ 13,997	\$ 5,302
Liabilities		
Interest-bearing deposits	\$ 5,125	\$ 1,112
Collateralized financings	179	(45)
Trading liabilities	294	112
Borrowings	244	130
Other interest-bearing liabilities	1,471	116
Interest-bearing liabilities	\$ 7,313	\$ 1,425
Net interest income	\$ 6,684	\$ 3,877

	Average Rate for the Year Ended December	
	2022	2021
Assets		
Deposits with banks	1.68%	0.08%
Collateralized agreements	1.48%	0.20%
Trading assets	2.11%	1.53%
Investments	0.89%	0.63%
Loans	5.48%	3.93%
Other interest-earning assets	5.52%	1.60%
Interest-earning assets	3.15%	1.59%
Liabilities		
Interest-bearing deposits	1.53%	0.44%
Collateralized financings	1.08%	(0.61)%
Trading liabilities	2.04%	1.15%
Borrowings	2.47%	1.11%
Other interest-bearing liabilities	7.29%	0.71%
Interest-bearing liabilities	1.85%	0.48%
Net interest margin	1.50%	1.16%

In the tables above:

- Deposits with banks primarily consist of deposits held at the Federal Reserve.
- Collateralized agreements included \$33.42 billion of resale agreements and \$4.80 billion of securities borrowed for 2022, and \$25.45 billion of resale agreements and \$888 million of securities borrowed for 2021. Collateralized financings included \$10.75 billion of repurchase agreements and \$5.79 billion of securities loaned for 2022, and \$6.02 billion of repurchase agreements and \$1.30 billion of securities loaned for 2021. The average balances for both collateralized agreements and collateralized financings reflect the impact of counterparty netting, while the related interest income and interest expense do not reflect the impact of such counterparty netting. See Note 11 to the consolidated financial statements and "Results of Operations" in Part II of this Annual Report for further information about collateralized agreements and collateralized financings and related interest.
- See Notes 4 and 5 to the consolidated financial statements and "Results of Operations" in Part II of this Annual Report for further information about financial assets and liabilities and related interest.

Supplemental Financial Information

- Loans consists of loans held for investment that are accounted for at amortized cost net of allowance for loan losses or at fair value under the fair value option. Loans excludes loans held for sale that are accounted for at the lower of cost or fair value. Such loans are included within other interest-earning assets. Interest on loans is recognized over the life of the loan and is recorded on an accrual basis. See Note 9 to the consolidated financial statements and “Results of Operations” in Part II of this Annual Report for further information about loans and related interest.
- Other interest-earning assets consists of customer and other receivables and loans held for sale that are accounted for at the lower of cost or fair value. Other interest-bearing liabilities consists of customer and other payables. The average balances for both other interest-earning assets and other interest-bearing liabilities reflect the impact of counterparty netting, while the related interest income and interest expense do not reflect the impact of such counterparty netting.
- Derivative instruments are included in other non-interest-earning assets and other non-interest-bearing liabilities. See Note 7 to the consolidated financial statements and “Results of Operations” in Part II of this Annual Report for further information about derivatives.
- Interest-bearing deposits consists of deposits from private bank clients, U.S. consumers, clients of third-party broker-dealers, institutions, corporations and affiliates. See Note 13 to the consolidated financial statements and “Results of Operations” in Part II of this Annual Report for further information about deposits and related interest.
- Borrowings include senior unsecured debt, subordinated borrowings, hybrid financial instruments, borrowings from affiliates and other secured financings. See Notes 11 and 14 to the consolidated financial statements and “Balance Sheet Analysis” in Part II of this Annual Report for further information about short-term and long-term borrowings and related interest.
- See Note 21 to the consolidated financial statements for further information about interest income and interest expense.

Changes in Net Interest Income, Volume and Rate Analysis

The table below presents the effect on net interest income of volume and rate changes. In this analysis, changes due to volume/rate variance have been allocated to volume.

<i>\$ in millions</i>	Year Ended December 2022 versus December 2021		
	Increase (decrease) due to change in:		
	Volume	Rate	Net Change
Interest-earning assets			
Deposits with banks	\$ 900	\$ 1,785	\$ 2,685
Collateralized agreements	176	337	513
Trading assets	19	218	237
Investments	22	66	88
Loans	2,055	1,543	3,598
Other interest-earning assets	321	1,253	1,574
Change in interest income	3,492	5,203	8,695
Interest-bearing liabilities			
Interest-bearing deposits	1,273	2,740	4,013
Collateralized financings	100	124	224
Trading liabilities	95	87	182
Borrowings	(46)	160	114
Other interest-bearing liabilities	277	1,078	1,355
Change in interest expense	1,699	4,189	5,888
Change in net interest income	\$ 1,793	\$ 1,014	\$ 2,807