UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☒ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2022

OR

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from____________to____________

Commission File No. 001-36609

NORTHERN TRUST CORPORATION
(Exact name of registrant as specified in its charter)

Delaware	36-2723087
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
50 South La Salle Street	
Chicago, Illinois	60603
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: (312) 630-6000

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Trading Symbol	Name of Each Exchange On Which Registered
Common Stock, $1.66 2/3 Par Value	NTRS	The NASDAQ Stock Market LLC
Depositary Shares, each representing 1/1,000th interest in a share of Series E Non-Cumulative Perpetual Preferred Stock	NTRSO	The NASDAQ Stock Market LLC

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☒	Accelerated filer	☐	Emerging growth company	☐
Non-accelerated filer	☐	Smaller reporting company	☐		

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

Indicate by check mark whether the registrant is a shell company (as defined in Exchange Act Rule 12b-2). Yes ☐ No ☒

The aggregate market value of the registrant's common stock as of June 30, 2022 (the last business day of the registrant's most recently completed second quarter), based upon the last sale price of the common stock at June 30, 2022 as reported by The NASDAQ Stock Market LLC, held by non-affiliates was approximately $20.0 billion. Determination of stock ownership by non-affiliates was made solely for the purpose of responding to this requirement and the registrant is not bound by this determination for any other purpose.

At January 31, 2023, 208,196,935 shares of common stock, $1.66 2/3 par value, were outstanding.

Portions of the registrant's Proxy Statement for its 2023 Annual Meeting of Stockholders are incorporated by reference into Part III hereof.

NORTHERN TRUST CORPORATION
FORM 10-K
ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

GLOSSARY OF TERMS

When the following terms and abbreviations appear in the text of this report, they have the meanings indicated below:

AFS	Available for Sale
AIFMD	Alternative Investment Fund Managers Directive
ALCO	Asset and Liability Management Committee
AMA	Basel Advanced Measurement Approach
AML	Anti-Money Laundering
AOCI	Accumulated Other Comprehensive Income
ARRC	Alternative Reference Rate Committee
AS	Asset Servicing
ASC	Accounting Standards Codification
ASU	Accounting Standards Update
AUC/A	Assets Under Custody/Administration
Bank	The Northern Trust Company
Banking book	Northern Trust's structural assets, liabilities, net investments, and off-balance sheet instruments subject to interest rate risk and/or foreign currency risk. It is distinct from the trading book.
Basel Committee	International Basel Committee on Banking Supervision
Basel III	Industry-standard guidelines published by the Basel Committee
BMR	European Union Benchmarks Regulation
BRRD	Bank Recovery and Resolution Directive (EU)
CCAR	Comprehensive Capital Analysis and Review
CCPA	California Consumer Privacy Act
CDFIs	Community Development Financial Institutions
CEOC	Compliance & Ethics Oversight Committee
CFA	Criminal Finances Act (UK)
CFPB	Consumer Financial Protection Bureau
CFTC	U.S. Commodity Futures Trading Commission
Commission	European Commission
Corporation	Northern Trust Corporation
CPRA	California Privacy Rights Act of 2020
CRA	Community Reinvestment Act
CRC	Credit Risk Committee
CRD	Capital Requirements Directive of June 26, 2013 (EU)
CRD V	European Commission revisions to the CRD, effective December 29, 2020
CRO	Chief Risk Officer
CRR	Capital Requirements Regulation of June 26, 2013 (EU)
CRR II	European Commission revisions to the CRR, effective June 28, 2021
CSD	Central Securities Depositories
CSDR	Central Securities Depositories Regulation (EU)
CSSF	Commission de Surveillance du Secteur Financier (Luxembourg)
DE&I	Diversity, Equity, and Inclusion
DFAST	Dodd-Frank Act Stress Tests
DGS	Deposit Guarantee Schemes
DGSD	Deposit Guarantee Schemes Directive
Dodd-Frank Act	Dodd-Frank Wall Street Reform and Consumer Protection Act
EBA	European Banking Authority
ECB	European Central Bank
EEA	European Economic Area

GLOSSARY OF TERMS (continued)

EMIR	European Market Infrastructure Regulation 648/2012
EOP	End of Period
ESG	Environmental, Social and Governance
EU	European Union
Exchange Act	Securities Exchange Act of 1934, as amended
FASB	Financial Accounting Standards Board
FCA	Financial Conduct Authority
FDIA	Federal Deposit Insurance Act
FDIC	Federal Deposit Insurance Corporation
Federal Reserve Board	The Board of Governors of the Federal Reserve System
FICC	Fixed Income Clearing Corporation
FinCEN	Financial Crimes Enforcement Network
FINRA	Financial Industry Regulatory Authority
FRC	Fiduciary Risk Committee
FTE	Fully Taxable Equivalent
FTP	Funds Transfer Pricing
FX	Foreign Exchange
GAAP	Generally Accepted Accounting Principles
GDPR	General Data Protection Regulation
GERC	Global Enterprise Risk Committee
GFX	Global Foreign Exchange
GILTI	Global Intangible Low-Taxed Income
GSIB	Global Systemically Important Banks
HTM	Held to Maturity
HQLAs	High-Quality Liquid Assets
IBA	ICE Benchmark Administration
IBOR	Interbank Offered Rates
IR	Interest Rate
ITRC	Information Technology Risk Committee
LCR	Liquidity Coverage Ratio
LCR Final Rule	Regulation promulgated by U.S. federal banking regulators to implement LCR requirements in the United States for certain banking organizations.
LGD	Loss Given Default
LIBOR	London Interbank Offered Rate
LIBOR Act	Adjustable Interest Rate (LIBOR) Act
MD&A	Management’s Discussion and Analysis
MIFID	Market in Financial Instruments Directive
MIFIR	Markets in Financial Instruments Regulation
MLD5	Fifth EU Money Laundering Directive
MLRC	Market & Liquidity Risk Committee
MREL	Minimum requirements for own funds and eligible liabilities (EU)
MROC	Model Risk Oversight Committee
MSDC	Macroeconomic Scenario Development Committee
MVE	Market Value of Equity
NAICS	North American Industry Classification System
NAV	Net Asset Value
NFA	National Futures Association
NFTS	Northern Trust Fiduciary Services (Guernsey) Limited

GLOSSARY OF TERMS (continued)

NII	Net Interest Income
N/M	Not Meaningful
NSFR	Net Stable Funding Ratio requirement in the United States
NSFR Final Rule	Regulation promulgated by U.S. federal banking regulators to implement NSFR requirements in the United States for certain banking organizations.
ORC	Operational Risk Committee
OREO	Other Real Estate Owned
OTC	Over-the-Counter
OTTI	Other-Than-Temporary Impairment
PD	Probability of Default
PIPL	Personal Information Protection Law (China)
PPP	Paycheck Protection Program
PRA	Prudential Regulation Authority
Regulatory Relief Act	Economic Growth, Regulatory Relief, and Consumer Protection Act
ROU	Right-of-use
RWA	Risk-Weighted Assets
SBA	U.S. Small Business Administration
SEC	U.S. Securities and Exchange Commission
Series D Preferred Stock	Series D Non-Cumulative Perpetual Preferred Stock
Series E Preferred Stock	Series E Non-Cumulative Perpetual Preferred Stock
SOFR	Secured Overnight Finance Rate
SFDR	Sustainable Finance Disclosure Regulations (EU)
SRD II	Shareholder Rights Directive (EU)
SFTR	Securities Financing Transactions and Reuse of Collateral
Taxonomy Regulations	Regulation (EU) 2020/852
TDR	Troubled Debt Restructuring
Trading book	Foreign (non-U.S.) currency trading positions subject to foreign currency risk, as well as trading securities and interest rate derivative transactions, both subject to interest rate risk.
UCITS	Undertakings for the Collective Investment in Transferable Securities
UK	United Kingdom
USD LIBOR	U.S. Dollar LIBOR
VaR	Value-at-Risk
VIE	Variable Interest Entity
WM	Wealth Management
WRC	Workforce Risk Committee

PART I

ITEM 1 – BUSINESS

Northern Trust Corporation

Northern Trust Corporation (Corporation) is a leading provider of wealth management, asset servicing, asset management and banking solutions to corporations, institutions, families and individuals. The Corporation is a financial holding company conducting business through various U.S. and non-U.S. subsidiaries, including The Northern Trust Company (Bank).

The Bank is an Illinois banking corporation headquartered in Chicago and the Corporation's principal subsidiary. Founded in 1889, the Bank conducts its business through its U.S. operations and its various U.S. and non-U.S. branches and subsidiaries. At December 31, 2022, the Bank had consolidated assets of $154.5 billion and common bank equity capital of $10.9 billion.

The Corporation was formed as a holding company for the Bank in 1971. The Corporation has a global presence with offices in 25 U.S. states and Washington, D.C., and across 23 locations in Canada, Europe, the Middle East and the Asia-Pacific region. At December 31, 2022, the Corporation had consolidated total assets of $155.0 billion and stockholders' equity of $11.3 billion.

The Corporation expects that the Bank will continue in the foreseeable future to be the major source of the Corporation's consolidated assets, revenues, and net income. Except where the context otherwise requires, references to "Northern Trust," "we," "us," "our," "its," or similar terms mean Northern Trust Corporation and its subsidiaries on a consolidated basis.

Business Overview

Northern Trust focuses on managing and servicing client assets through its two client-focused reporting segments: Asset Servicing and Wealth Management. During the first quarter of 2022, the Corporation changed the name of its Corporate & Institutional Services segment to "Asset Servicing." Accordingly, the disclosures herein will refer to this segment as Asset Servicing. Asset management and related services are provided to Asset Servicing and Wealth Management clients primarily by the Asset Management business. The revenue and expenses of Asset Management and certain other support functions are allocated fully to Asset Servicing and Wealth Management. Northern Trust reports certain income and expense items not allocated to Asset Servicing and Wealth Management in a third reporting segment, Other.

ASSET SERVICING

Asset Servicing is a leading global provider of asset servicing and related services to corporate and public retirement funds, foundations, endowments, fund managers, insurance companies, sovereign wealth funds, and other institutional investors around the globe. Asset servicing and related services encompass a full range of capabilities including but not limited to: custody; fund administration; investment operations outsourcing; investment management; investment risk and analytical services; employee benefit services; securities lending; foreign exchange; treasury management; brokerage services; transition management services; banking; and cash management. Client relationships are managed through the Bank and the Bank's and the Corporation's other subsidiaries, including support from locations in North America, Europe, the Middle East, and the Asia-Pacific region. At December 31, 2022, total Asset Servicing assets under custody/administration (AUC/A), assets under custody, and assets under management were $12.71 trillion, $9.71 trillion, and $898.1 billion, respectively.

WEALTH MANAGEMENT

Wealth Management focuses on high-net-worth individuals and families, business owners, executives, professionals, retirees, and established privately-held businesses in its target markets. In supporting these targeted segments, Wealth Management provides trust, investment management, custody, and philanthropic services; financial consulting; guardianship and estate administration; family business consulting; family financial education; brokerage services; and private and business banking. Wealth Management also includes Global Family Office, which provides customized services, including but not limited to: investment consulting; global custody; fiduciary; and private banking; family office consulting, and technology solutions, to meet the complex financial and reporting needs of ultra-high-net-worth individuals and family offices across the globe.

Wealth Management is one of the largest providers of advisory services in the United States, with AUC/A, assets under custody, and assets under management of $898.5 billion, $892.3 billion, and $351.4 billion, respectively, at December 31, 2022. Wealth Management services are delivered by multidisciplinary teams through a network of offices in 19 U.S. states and Washington, D.C., as well as offices in London, Guernsey, and Abu Dhabi.

ASSET MANAGEMENT

Asset Management, through the Corporation's various subsidiaries, supports the Asset Servicing and Wealth Management reporting segments by providing a broad range of asset management and related services and other products to clients around the world. Investment solutions are delivered through separately managed accounts, bank common and collective funds, registered investment companies, exchange traded funds, non-U.S. collective investment funds, and unregistered private investment funds. Asset Management's capabilities include active and passive equity; active and passive fixed income; cash management; multi-asset and alternative asset classes (such as private equity and hedge funds of funds); and multi-manager advisory services and products. Asset Management's activities also include overlay services and other risk management services. Asset Management operates internationally through subsidiaries and distribution arrangements and its revenue and expense are fully allocated to Asset Servicing and Wealth Management. As discussed above, Northern Trust managed $1.25 trillion in assets as of December 31, 2022, including $898.1 billion for Asset Servicing clients and $351.4 billion for Wealth Management clients.

Competition

Northern Trust faces intense competition in all aspects and areas of its business. Competition comes from both regulated and unregulated financial services organizations, whose products and services span the local, national, and global markets in which Northern Trust conducts operations. Our competitors include a broad range of financial institutions and service companies, including other custodial banks, deposit-taking institutions, asset management firms, benefits consultants, trust companies, investment banking firms, insurance companies, investment counseling firms, and various financial technology companies, including software providers and data services firms. As our businesses grow and markets evolve, we may encounter increasing and new forms of competition around the world.

Northern Trust's business strategy is to provide quality financial services to targeted market segments in which it believes it has a competitive advantage and favorable growth prospects. As part of this strategy, Northern Trust seeks to differentiate itself from its competitors with premier, holistic solutions and exceptional experiences tailored to meet clients' needs. In addition, Northern Trust emphasizes the development and growth of recurring sources of fee-based income and continual productivity improvements. Northern Trust also seeks to maintain its foundational strength with a strong, conservative balance sheet and a globally respected brand.

Economic Conditions And Government Policies

The earnings of Northern Trust are affected by numerous external influences. Chief among these are general economic conditions, both domestic and international, and actions that governments and their central banks take in managing their economies. These general conditions affect all of Northern Trust's businesses, as well as the quality, value, and profitability of its loan and investment portfolios.

The Board of Governors of the Federal Reserve System (Federal Reserve Board) implements monetary policy through its open market operations in United States Government securities, its setting of the discount rate at which member banks may borrow from Federal Reserve Banks, and its changes in the reserve requirements for deposits. The policies adopted by the Federal Reserve Board directly affect interest rates and therefore what banks earn on their loans and investments and what they pay on their savings and time deposits and other purchased funds.

Supervision and Regulation

Northern Trust is subject to extensive regulation under state and federal laws in the United States and in each of the jurisdictions in which it does business. The discussion below outlines significant elements of selected laws and regulations applicable to Northern Trust. Changes in laws or regulations applicable to Northern Trust may have a material effect on its businesses and results of operations.

FINANCIAL HOLDING COMPANY REGULATION

Under U.S. law, the Corporation is a bank holding company that has elected to be a financial holding company subject to the supervision, examination, and regulation of the Federal Reserve Board. A financial holding company is permitted to engage in a broader range of financial activities than a bank holding company. The Federal Reserve Board has authority to limit the activities that a financial holding company may conduct if any depository institution controlled by the financial holding company is found to no longer be "well-capitalized" and "well-managed" or has not received at least a "satisfactory" rating in its most recent Community Reinvestment Act (CRA) examination. Failure to meet one or more of these requirements may result in restrictions on the Corporation's ability to exercise powers granted to financial holding companies, to engage in new activities, to continue current activities, or to make acquisitions.

SUBSIDIARY REGULATION

The Bank is a member of the Federal Reserve System, with deposits insured by the Federal Deposit Insurance Corporation (FDIC), and is subject to regulation by both agencies. As an Illinois banking corporation, the Bank is also subject to Illinois state laws and regulations and to examination and supervision by the Division of Banking of the Illinois Department of Financial and Professional Regulation. The Bank is also registered as a transfer agent with the Federal Reserve Board and is registered provisionally as a swap dealer with the U.S. Commodity Futures Trading Commission (CFTC) under the Commodity Exchange Act. As a result, the Bank is subject to supervision, examination and enforcement by certain other regulatory bodies, including the CFTC and the National Futures Association (NFA).

The Corporation's nonbanking affiliates are subject to examination by the Federal Reserve Board and, in certain circumstances, other functional regulators. The Corporation's broker-dealer subsidiary is a member of the Financial Industry Regulatory Authority (FINRA), is registered with the U.S. Securities and Exchange Commission (SEC) as a broker-dealer and investment adviser, is registered with the Municipal Securities Rulemaking Board (MSRB) as a municipal securities dealer, is a member of the NFA and is registered with the CFTC as a commodity trading advisor, and is subject to the rules and regulations of these bodies. Certain nonbanking affiliates are registered with the CFTC as commodity trading advisors and commodity pool operators and subject to supervision and regulation by the CFTC and NFA. Other subsidiaries of the Corporation are registered with the SEC as investment advisers and are subject to regulation by the SEC. Subsidiaries may also be regulated by state regulators in various states.

THE DODD-FRANK ACT, AS AMENDED

The following items provide a brief description of certain provisions of the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act), as implemented through final rules promulgated by the Federal Reserve Board and other agencies and amended by the Economic Growth, Regulatory Relief, and Consumer Protection Act (the Regulatory Relief Act), most relevant to the Corporation and its subsidiaries, including the Bank.

Enhanced Prudential Standards. The Dodd-Frank Act, as implemented by the Federal Reserve Board through various rulemakings and amended by the Regulatory Relief Act, generally imposes enhanced prudential requirements on U.S. bank holding companies with at least $100 billion in total consolidated assets, including the Corporation. The enhanced prudential standards include stringent risk-based capital, leverage, liquidity, risk management, and stress testing requirements and single counterparty credit limits for large bank holding companies, including the Corporation. The Federal Reserve Board also has the discretion to require these large U.S. bank holding companies to limit their short-term debt, to issue contingent capital instruments, and to provide enhanced public disclosures.

In October 2019, the Federal Reserve Board finalized a proposed rule implementing changes made by the Regulatory Relief Act. This rule introduced a new four-category framework to determine which enhanced prudential standards and other requirements are applicable to institutions with total consolidated assets of at least $100 billion, based on asset thresholds and other risk-based factors. Under the new rules, the Corporation is classified as a Category II institution.

The requirements under the new framework that apply to the Corporation are largely unchanged as a result of the Federal Reserve Board's final tailoring rule for enhanced prudential standards. The Corporation must submit annual capital plans to the Federal Reserve Board, conduct supervisory and internal periodic stress tests to evaluate capital adequacy in adverse economic conditions, maintain enhanced risk management procedures, comply with a liquidity risk management framework (discussed below in "Liquidity Standards") and aggregate credit exposure limits, conduct liquidity stress tests, and hold a buffer of liquid assets estimated to meet funding needs during a financial stress event. The Corporation is not subject to the total loss-absorbing capacity requirement, capital surcharge, enhanced supplementary leverage ratio, or aggregate credit exposure limit that apply to U.S. bank holding companies that are global systemically important bank holding companies.

Resolution Planning. As required by Section 165(d) of the Dodd-Frank Act, the Corporation is required to submit periodically to regulators a resolution plan for its rapid and orderly resolution in the event of material financial distress or failure. In addition, under an FDIC rule (the CIDI Resolution Plan Rule) the Bank must submit to the FDIC periodic plans for resolution in the event of its failure.

On December 15, 2022, the Federal Reserve Board and the FDIC provided joint written feedback to the Corporation regarding the resolution plan submitted by the Corporation on December 13, 2021, pursuant to Section 165(d) of the Dodd-Frank Act (the 2021 165(d) Plan). The joint written feedback stated that the Federal Reserve Board and FDIC did not identify shortcomings or deficiencies in the 2021 165(d) Plan. In it, the FDIC and Federal Reserve Board also confirmed that the next resolution plan submission required of the Corporation under Section 165(d) of the Dodd-Frank Act (the 2024 165(d) Plan) would be required to be a full plan (as opposed to a targeted plan) and that guidance would be issued to assist the Corporation in its development of the 2024 165(d) Plan. The 2024 165(d) Plan submission is due to the FDIC and Federal Reserve Board by July 1, 2024.

In addition, on June 27, 2018, the Bank submitted its resolution plan (the 2018 CIDI Plan) to the FDIC under the CIDI Resolution Plan Rule. To date, no formal written feedback or guidance has been received regarding the 2018 CIDI Plan. On January 19, 2021, the FDIC announced that it will resume requiring resolution plan submissions for insured depository institutions with $100 billion or more in assets. The FDIC announcement indicated that no firm will be required to submit a resolution plan without at least 12 months advance notice provided to the firm. On August 27, 2021, the Bank received written notice from the FDIC indicating the next CIDI resolution plan will be due on or before December 1, 2023.

On October 24, 2022, the Federal Reserve Board and FDIC published an advance notice of proposed rulemaking (ANPR) to seek public input regarding resolution-related resource requirements for large banking organizations, potentially including the Corporation. Specifically, the agencies are soliciting comments about how appropriately adapted elements of the resolution-related standards for global systemically important banks (GSIBs)—including a long-term debt requirement—could be applied to non-GSIB large banking organizations, potentially including the Corporation, as well as whether to establish separability requirements in the recovery or resolution contexts. The public comment period on this ANPR ran through January 23, 2023.

Separately, the European Union Bank Recovery and Resolution Directive (BRRD) sets out the framework for the recovery and resolution of European Union (EU) credit institutions and investment firms, including certain of the Bank's subsidiaries and branches. The BRRD establishes a set of harmonized rules for early intervention measures, recovery and resolution planning, bail-in powers and requirements for total loss absorbing capital for EU institutions, collectively known as minimum requirements for own funds and eligible liabilities (MREL). The BRRD was materially amended, including with respect to the MREL requirements, effective as of December 28, 2020. Consequential amendments to the BRRD following amendments to the Capital Requirements Regulation (575/2013) relating to MREL and total loss absorbing capacity (TLAC) became effective as of November 14, 2022. Further consequential amendments relating to the indirect subscription of internal MREL eligible instruments within resolution groups must be made effective by EU member states by November 15, 2023. Northern Trust Global Services SE, a Luxembourg-incorporated indirect subsidiary of the Bank, is authorized and supervised by the European Central Bank (ECB) and subject to the prudential supervision of the ECB and the Luxembourg Commission de Surveillance du Secteur Financier (CSSF). As such, Northern Trust Global Services SE falls within the scope of the BRRD and its recovery and resolution planning is overseen by the CSSF and the Single Resolution Board (the resolution authority for ECB-supervised institutions).

The United Kingdom (UK) has established a special resolution regime and a resolvability assessment framework overseen by the Bank of England (as the UK resolution authority) with many similar features to the BRRD, which was substantially incorporated into UK law following the withdrawal of the UK from the EU. A revised Prudential Regulation Authority (PRA) policy on operational continuity in resolution became effective on January 1, 2023, and PRA expectations on trading activity wind-down will become effective on March 23, 2025. The special resolution regime applies to firms that are permitted to accept deposits under Part 4A of the Financial Services and Markets Act 2000. As such, the London branch of the Bank, as a UK branch of a third-country institution that accepts deposits, falls within the scope of the special resolution regime.

Orderly Liquidation Authority. Under the Dodd-Frank Act, certain financial companies, such as the Corporation and certain of its covered subsidiaries, can be subjected to an orderly liquidation authority if in default or danger of default and their resolution under the U.S. Bankruptcy Code would have serious adverse effects on financial stability in the United States, among other requirements set by statute. If the Corporation were subject to orderly liquidation authority, the FDIC would be appointed as its receiver, which would give the FDIC considerable powers to resolve the Corporation. Absent such actions, the Corporation, as a bank holding company, would remain subject to the U.S. Bankruptcy Code.

The Volcker Rule. The Volcker Rule bans proprietary trading subject to exceptions, such as for market-making, hedging, certain trading activities in U.S. and foreign sovereign debt, and trading activities related to liquidity management. The Volcker Rule also imposes significant restrictions on sponsoring or investing in certain "covered funds," such as hedge funds or private equity funds, again subject to exceptions. Northern Trust maintains an enterprise-wide compliance program to comply with the Volcker Rule.

Swaps and Other Derivatives. The Dodd-Frank Act imposed a regulatory structure on the over-the-counter derivatives market, including requirements for clearing, exchange trading, capital, margin, trade reporting, and recordkeeping. The Dodd-Frank Act also requires certain entities to register as a "major swap participant," a "swap dealer," a "major-security-based swap participant" or a "security-based swap dealer." The Bank is registered provisionally as a swap dealer and its swap dealer activities are subject to the CFTC's and NFA's rules and regulations, including those regarding internal and external business conduct standards, transaction reporting and recordkeeping, mandatory clearing for certain swaps, trade documentation and confirmation requirements, risk management, and cross-border swap activities. The Bank is also subject to Federal Reserve Board regulations regarding mandatory posting and collection of margin by certain swap counterparties. The Corporation has not registered and does not expect that it, or any of its affiliates, will be required to register as a security-based swap dealer with the SEC.

HOLDING COMPANY SUPPORT UNDER THE FEDERAL DEPOSIT INSURANCE ACT

The Dodd-Frank Act amended the Federal Deposit Insurance Act (FDIA) to obligate the Federal Reserve Board to require bank holding companies, such as the Corporation, to serve as a source of financial and managerial strength for any subsidiary depository institution. Under this requirement, the Corporation in the future could be required to provide financial assistance to the Bank should the Bank experience financial distress.

PAYMENT OF DIVIDENDS

The Corporation may pay dividends, repurchase stock, and make other capital distributions only in accordance with the capital plan rules and capital adequacy standards of the Federal Reserve Board, including the stress capital buffer requirement, discussed further in "—Capital Adequacy Requirements" below. Dividends from the Bank are a significant source of funds for the Corporation, and the Corporation's ability to pay dividends on its common stock therefore depends in part on the ability of the Bank to pay sufficient dividends to the Corporation.

Various other federal and state laws and regulations limit the amount of dividends that may be paid by the Bank to the Corporation without regulatory consent. The Bank may not pay any dividends if it is undercapitalized, or if the payment of the dividend would cause it to become undercapitalized. In general, the amount of dividends that may be paid in a calendar year is limited to its "recent earnings" (the current year's net income combined with the retained net income of the two preceding years), or its "undivided profits" (generally, accumulated net profits that have not been paid out as dividends or transferred to surplus), whichever is less. The ability of the Bank to pay dividends to the Corporation may also be affected by the capital adequacy standards applicable to the Bank (discussed further below), which include minimum requirements and buffers.

CAPITAL PLANNING AND STRESS TESTING

The Corporation's capital distributions are subject to the Federal Reserve Board's capital plan rules, which require the Corporation to submit annual capital plans to the Federal Reserve Board for review.

The major components of that oversight are the Federal Reserve Board's Comprehensive Capital Analysis and Review (CCAR) and Dodd-Frank Act stress tests (DFAST). These requirements involve both company-run and supervisory-run testing of capital under various scenarios, including baseline and severely adverse scenarios provided by the appropriate banking regulator.

Under the DFAST regulations, the Corporation is required to undergo regulatory stress tests conducted by the Federal Reserve Board annually. The Bank also is required to conduct its own annual internal stress test (although it is permitted to combine certain reporting and disclosure of its stress test results with the results of the Corporation). Results from the Corporation's and the Bank's annual company-run stress tests are reported to the appropriate regulators and made publicly available. Northern Trust published the results of its most recent company-run stress tests on June 23, 2022.

CAPITAL ADEQUACY REQUIREMENTS

The Corporation, as a bank holding company, is subject to risk-based and leverage capital guidelines implemented by the Federal Reserve Board that are based on industry-standard guidelines published by the International Basel Committee on Banking Supervision (Basel Committee), known as Basel III. The Bank, as an FDIC-insured depository institution, is also required to meet risk-based and leverage capital guidelines established by regulators which are generally similar to those established by the Federal Reserve Board for bank holding companies.

Under the Basel III rules, the Corporation, with the Bank, is a "core" banking organization that is required to use the advanced approaches methodologies to calculate and disclose publicly its risk-based capital ratios. The Corporation also is subject to a capital floor that is based on the Basel III standardized approach to calculating risk-based capital ratios. The Corporation is therefore required to calculate its risk-based capital ratios under both the standardized and advanced approaches, and is subject to the more stringent of the two in the assessment of its capital adequacy.

The Bank's risk-based and leverage capital ratios at December 31, 2022, were well above the regulatory requirements established by U.S. banking regulators. The risk-based and leverage capital ratios for the Corporation and the Bank, together with the regulatory minimum ratios and the ratios required for classification as "well-capitalized," are provided in the following chart.

TABLE 1: RISK-BASED AND LEVERAGE CAPITAL RATIOS AS OF DECEMBER 31, 2022

	COMMON EQUITY TIER 1 CAPITAL		TIER 1 CAPITAL		TOTAL CAPITAL		TIER 1 LEVERAGE		SUPPLEMENTARY LEVERAGE
	STANDARDIZED APPROACH	ADVANCED APPROACH	STANDARDIZED APPROACH	ADVANCED APPROACH	STANDARDIZED APPROACH	ADVANCED APPROACH	STANDARDIZED APPROACH	ADVANCED APPROACH	ADVANCED APPROACH
Northern Trust Corporation	10.8 %	11.5 %	11.8 %	12.5 %	13.9 %	14.5 %	7.1 %	7.1 %	7.9 %
The Northern Trust Company	11.6 %	12.4 %	11.6 %	12.4 %	13.5 %	14.2 %	6.9 %	6.9 %	7.7 %
Minimum required ratio	4.5 %	4.5 %	6.0 %	6.0 %	8.0 %	8.0 %	4.0 %	4.0 %	3.0 %
"Well-capitalized" minimum ratios, as applicable									
Northern Trust Corporation	N/A	N/A	6.0 %	6.0 %	10.0 %	10.0 %	N/A	N/A	N/A
The Northern Trust Company	6.5 %	6.5 %	8.0 %	8.0 %	10.0 %	10.0 %	5.0 %	5.0 %	3.0 %

Advanced approaches institutions, such as the Corporation and the Bank, are subject to a minimum supplementary leverage ratio of 3.0%. Advanced approaches institutions that are insured depository institutions, such as the Bank, also must maintain at least a 3.0% supplementary leverage ratio to be considered "well-capitalized." The Corporation is also subject to a stress capital buffer, which integrates forward-looking stress test results with non-stress capital requirements, and the Bank is also subject to a capital conservation buffer, which respectively requires the Corporation and the Bank to hold a buffer of Common Equity Tier 1 capital above the minimum risk-based capital requirements in order to avoid constraints on dividends, equity repurchases and compensation. The minimum capital buffer requirement for advanced approaches banking organizations, such as the Corporation and the Bank, is 2.5%.

A "countercyclical buffer" of 0% to 2.5% of a banking organization's total risk-weighted assets (RWA) for advanced approaches banking organizations, such as the Corporation, is also a component of the capital adequacy framework. In general, the amount of the countercyclical capital buffer is a weighted average of the countercyclical capital buffer established in the various jurisdictions in which the banking organization has credit exposures. The U.S. countercyclical buffer is currently set at 0%.

The results of the 2022 Dodd-Frank Act Stress Test, published by the Federal Reserve Board on June 23, 2022, resulted in Northern Trust's stress capital buffer and effective Common Equity Tier 1 capital ratio minimum requirement remaining constant at 2.5% and 7.0%, respectively, for the 2022 Capital Plan cycle, which began on October 1, 2022.

LIQUIDITY STANDARDS

Northern Trust is subject to the U.S. liquidity coverage ratio (LCR) requirement, which is designed to ensure that covered banking organizations, including the Corporation and the Bank, maintain an adequate level of unencumbered high-quality liquid assets equal to their expected net cash outflow for a 30-day time horizon under a prescribed regulatory liquidity stress scenario. As of December 31, 2022, the Corporation and the Bank were in compliance with applicable LCR requirements.

Northern Trust also is subject to the U.S. net stable funding ratio (NSFR) requirement, designed to promote more medium- and long-term funding of the assets and activities of banking entities over a one-year time horizon. As of December 31, 2022, the Corporation and the Bank were in compliance with applicable NSFR requirements.

The enhanced prudential standards imposed by the Dodd-Frank Act, as amended by the Regulatory Relief Act, specify certain required liquidity risk management practices for large bank holding companies and banks. The Federal Reserve Board's October 2019 final tailoring rule targets certain aspects of these requirements based on banking organizations' business model and risk profile, as delineated into four risk-based categories. The Corporation, a Category II institution under the final tailoring rule, is subject to the liquidity risk management, monthly liquidity stress testing, liquidity buffer, and daily liquidity reporting requirements.

PROMPT CORRECTIVE ACTION

Federal banking regulators are required to take "prompt corrective action" with respect to a depository institution if that institution does not meet certain capital adequacy standards, and are also authorized to take appropriate action against a parent bank holding company of an under-capitalized banking subsidiary. In certain instances, the Corporation could be required to guarantee the performance of a capital restoration plan for the Bank if it were under-capitalized.

RESTRICTIONS ON TRANSACTIONS WITH AFFILIATES

The Bank is subject to restrictions governing transactions between it and affiliated entities, including the Corporation, its affiliates, and its subsidiaries. These transactions must be on terms and conditions that are, or in good faith would be, offered to nonaffiliated companies (i.e., on terms not less favorable to the Bank than market terms). Further, extensions of credit must be secured fully with qualifying collateral and are limited to 10% of the Bank's capital and surplus for transactions with a single affiliate and to 20% of the Bank's capital and surplus for transactions with all affiliates.

ANTI-MONEY LAUNDERING, ANTI-TERRORISM LEGISLATION, AND OFFICE OF FOREIGN ASSETS CONTROL

The Corporation and certain of its subsidiaries are subject to the Bank Secrecy Act of 1970, as amended by the USA PATRIOT Act of 2001 and implemented in the regulation of the federal banking regulators and Financial Crimes Enforcement Network (FinCEN), which contain anti-money laundering (AML) and financial transparency requirements for conducting due diligence, verifying client and beneficial owner identification, and monitoring client transactions and detecting and reporting suspicious activities. AML laws outside the United States contain similar requirements.

On September 30, 2022, FinCEN issued a final rule implementing one of three rulemakings planned in connection with the Corporate Transparency Act, which imposes new beneficial ownership information reporting requirements (Beneficial Ownership Reporting Rule). In order to comply with the Beneficial Ownership Reporting Rule, both domestic reporting companies and foreign reporting companies registered to do business in the United States generally will be required to report information regarding themselves, their beneficial owners, and their company applicants. The Beneficial Ownership Reporting Rule will be effective January 1, 2024 and may affect certain companies that the Corporation invests in, manages, or does business with. Additionally, on December 16, 2022, FinCEN published a Notice of Proposed Rulemaking for its second set of rulemakings in connection with the Corporate Transparency Act, which addresses how authorized recipients can access beneficial ownership information that will be reported to FinCEN and may affect certain activities conducted by the Bank. The public comment period on this proposal ended on February 14, 2023.

Various legal requirements prohibit Northern Trust entities from engaging in business in or with certain jurisdictions and parties, such as organizations and countries suspected of aiding, harboring or engaging in terrorist acts or undermining the sovereignty and territorial integrity of democratic countries. The U.S. Department of the Treasury's Office of Foreign Assets Control publishes lists of these prohibited parties. If the Corporation or the Bank finds a sanctioned name or jurisdiction on any transaction, asset or account, the Corporation or the Bank must reject or block such account or transaction and notify the appropriate authorities.

Failure to comply with these requirements could result in fines, penalties, lawsuits, regulatory sanctions or difficulties in obtaining approvals, restrictions on their business activities or harm to reputation. Many other countries have imposed similar laws and regulations that apply to the Corporation's non-U.S. offices. The Corporation has established policies and procedures to comply with these laws and the related regulations.

DEPOSIT INSURANCE AND ASSESSMENTS

The Bank accepts deposits and eligible deposits have the benefit of FDIC insurance up to the applicable limit, which is currently $250,000 for each depositor account. Under the FDIA, insurance of deposits may be terminated by the FDIC upon a finding that the insured depository institution has engaged in unsafe and unsound practices, is in an unsafe or unsound condition, or has violated laws, regulations, or orders from a regulatory agency. Certain liquid assets are excluded from the deposit insurance assessment base of custody banks that satisfy certain institutional eligibility criteria. This has the effect of reducing the amount of deposit insurance fund insurance premiums payable by custody banks. The Bank qualifies as a custody bank for this purpose.

COMMUNITY REINVESTMENT ACT

The Bank is subject to the Community Reinvestment Act (CRA). The CRA and the regulations issued thereunder are intended to encourage banks to help meet the credit needs of their service areas, including low and moderate income neighborhoods, consistent with the safe and sound operations of the banks. The Bank fulfills its CRA obligations by making qualified investments for the purposes of community development. The Bank received an "outstanding" CRA rating from the Federal Reserve Board in its most recent CRA examination.

PRIVACY AND SECURITY

Federal law establishes a minimum federal standard of financial privacy by, among other provisions, requiring financial institutions to adopt, disclose, and enforce privacy policies with respect to consumer information, setting limitations on disclosure to third parties of consumer information, setting standards for protecting client information and preventing unlawful access to such information, and requiring notice of data breaches in certain circumstances.

Most states, the EU and other non-U.S. jurisdictions also have adopted their own statutes and/or regulations concerning data privacy and security and requiring notification of data breaches—for example, the General Data Protection Regulation (GDPR) in Europe, the Personal Information Protection Law (PIPL) in China, and the California Consumer Privacy Act (CCPA) and California Privacy Rights Act (CPRA) in the United States. GDPR, a European data protection framework, was adopted on April 8, 2016, and became effective in all European Economic Area (EEA) member states on May 25, 2018. GDPR is designed to harmonize data privacy laws across the EEA, to protect EEA citizens' data privacy and to reshape the way organizations across the region approach data privacy. GDPR has extraterritorial effect as its scope includes all data controllers and processors outside the EEA whose processing activities relate to the offering of goods or services to, or monitoring the behavior of, EEA individuals. Organizations that violate certain provisions of GDPR could be fined up to €20 million or 4% of their annual worldwide revenue for the preceding fiscal year, whichever is greater. GDPR also has been implemented into UK law as part of the arrangements following the UK's withdrawal from the EU and operates in conjunction with other local data privacy requirements.

In the United States, the CCPA was adopted by the State of California and became effective January 1, 2020. The CCPA substantially increased the rights of California residents to understand how their personal data is collected and used by commercial businesses. The CCPA includes a private right of action (permitting lawsuits to be brought by private individuals instead of the state Attorney General or other government actor for breaches), and contemplates civil penalties of up to $2,500 for each violation and up to $7,500 for each intentional violation. On November 3, 2020, the CPRA, which amends and supersedes portions of the CCPA, was approved by a majority of California voters. Among other changes, the CPRA establishes the California Privacy Protection Agency to administer, implement, and enforce the CCPA and CPRA. The CPRA took effect on January 1, 2023, and applies to personal information collected on or after January 1, 2022. On July 8, 2022, the California Privacy Protection Agency commenced the formal rulemaking process to adopt regulations to implement the CPRA and published a Notice of Modifications to Text of Proposed Regulations in November 2022. The regulations did not come into effect prior to the CPRA's effective date, with a statement by the California Privacy Protection Agency that the earliest proposed regulations could be in effect is April 2023. The proposed regulations would (1) update existing CCPA regulations to harmonize them with CPRA amendments to the CCPA; (2) operationalize new rights and concepts introduced by the CPRA to provide clarity and specificity to implement the law; and (3) reorganize and consolidate requirements set forth in the law to make the regulations easier to follow and understand. Final regulations are expected to be issued in early 2023.

The Corporation has adopted and disseminated privacy policies and communicates required information relating to financial privacy and data security in accordance with applicable law.

CONSUMER LAWS AND REGULATIONS

The Corporation's banking subsidiaries are subject to certain federal and state laws and regulations designed to protect consumers in transactions with banks. Failure to comply with these laws and regulations could lead to substantial penalties, operating restrictions and reputational damage to the financial institution. Consumer laws and regulations are enforced by the Consumer Financial Protection Bureau (CFPB) and other federal and state regulators.

NON-U.S. REGULATION

Northern Trust is subject to the laws and regulatory authorities of the jurisdictions in which its non-U.S. branches and subsidiaries operate. For example, the Bank is licensed as a foreign authorized deposit-taking institution in Australia under the Banking Act (Australia) and as a wholesale bank in Singapore under the Banking Act (Singapore) and as a result is subject to the supervision of the Australian Prudential Regulation Authority and the Monetary Authority of Singapore, respectively. Additionally, branches and subsidiaries conducting banking and asset servicing businesses in the UK are authorized to do so pursuant to the UK Financial Services and Markets Act 2000. They are authorized by the PRA and/or the Financial Conduct Authority (FCA). The PRA and FCA exercise broad supervisory and disciplinary powers that include the power to revoke temporarily or permanently authorization to conduct a regulated business upon breach of the relevant regulations, impose capital requirements, suspend registered employees, and impose censures and fines on both regulated businesses and their regulated employees.

Northern Trust's European branches and subsidiaries are subject to the laws and regulatory authorities of the EU and the member states in which they are domiciled. For example, Northern Trust Global Services SE, as an EU-domiciled credit institution in Luxembourg, is subject to the prudential supervision of the ECB and the CSSF. Moreover, Northern Trust's non-EU branches and subsidiaries conducting financial services activities in the EU may fall within the scope of the laws of the EU and, given the increasing extraterritorial effect of EU legislation, non-EU branches and subsidiaries may still fall within the scope of EU law if they transact outside of the EU with EU clients.

Since January 31, 2020, the UK has not been a member of the EU. EU legislation as it applied to the UK on December 31, 2020 is a part of UK domestic legislation, under the control of the UK's parliament and assemblies. Most UK law relevant to the Corporation and its subsidiaries is still closely aligned with the EU legislative framework in place in December 2020. However, in 2022, the UK government proposed significant reforms to the UK's financial services regulations. The Financial Services and Markets Bill 2022-23 includes measures revoking retained EU law relating to financial services. In addition, the UK government announced a package of post-Brexit reforms to drive growth and competitiveness in the financial services sector. These legislative proposals may directly and indirectly impact the Corporation.

The following items provide a brief description of certain key regulatory requirements in the EU and the UK relevant to the Corporation and its subsidiaries, in addition to the BRRD and GDPR discussed under "The Dodd-Frank Act, as Amended—Resolution Planning" and "Privacy and Security," respectively, above.

EU and UK Prudential Regulatory Frameworks. The EU Capital Requirements Directive of June 26, 2013 (CRD) and the EU Capital Requirements Regulation of June 26, 2013 (CRR) set out the framework for prudential regulation of credit institutions in the EU, including, among other things, capital and liquidity requirements, leverage, and disclosure and reporting. CRR and CRD have been subject to extensive amendments by a new directive (CRD V) and the revised CRR (CRR II). CRD V and CRR II entered into force on June 27, 2019. CRD V has largely applied since December 29, 2020, and CRD II has largely applied since June 28, 2021. The key changes introduced by CRD V and CRR II include changes to the requirements for the leverage ratio, the net stable funding ratio, large exposures, and market and counterparty credit risk. On October 27, 2021, the European Commission adopted legislative proposals to reform CRD V and CRR II (also known as CRD VI and CRR III, respectively). The measures are designed to ensure that EU banks become more resilient to potential future economic shocks, while contributing to Europe's recovery from the COVID-19 pandemic and the transition to climate neutrality. The package finalizes the implementation of the Basel III agreement in the EU. On November 8, 2022, the Council of the EU reached its position (i.e. general approach) on the proposals amending CRD V and CRR II. Consequential amendments to the BRRD will also become effective on a staggered basis. For more information on the EU BRRD, see "Supervision and Regulation―Resolution Planning." Since June 26, 2021, investment firms under the Markets in Financial Instruments Directive (MIFID) have been subject to a new prudential regime under the EU Investment Firm Directive and Investment Firm Regulation. In April 2021, the Financial Services Act came into force in the UK establishing among other things, (i) a framework for the new investment firm prudential framework to apply in the UK and (ii) the UK implementation of Basel III standards, including amendments to CRR implemented into the UK following the withdrawal from the EU. UK and EU branches and subsidiaries of the Corporation may also be subject to local rules on outsourcing and operational resilience.

Markets Regulation. MIFID (which came into force in 2018), the linked Markets in Financial Instruments Regulation (MIFIR), and the European Market Infrastructure Regulation 648/2012 (EMIR) are the primary pieces of EU legislation which regulate, among other things, trading in derivative and securities markets, transaction reporting, investor protection, clearing and risk mitigation. MIFID, MIFIR and EMIR, with applicable amendments, now form part of UK law under the legislation implemented when the UK left the EU. Reforms to the onshored version of MIFIR have been proposed in the UK Financial Services and Markets Bill 2022-23. The reforms, if implemented, will impact, among other things, the share trading obligation and derivatives trading obligation.

Central Securities Depositories Regulation. On September 17, 2014, the EU Central Securities Depositories Regulation (CSDR) entered into force (subject to a number of transitional provisions). The CSDR aims principally to ensure that transactions between buyers and sellers of dematerialized securities are settled in a safe and timely manner by introducing common securities settlement standards across the EU. Key features of the CSDR include shorter settlement periods, settlement discipline measures (including mandatory cash penalties and "buy-ins" for settlement fails and settlement fails reporting) and an obligation regarding dematerialization for most securities. In March 2022, the European Commission published a legislative proposal for amendments to the CSDR. The proposals include amendments to the settlement discipline regime, cooperation between competent authorities and relevant authorities, wind-down of central securities depositories (CSDs), review and evaluation of CSDs, passporting and third-country CSDs. In October 2022, EU legislators announced a delay to the implementation of the CSDR mandatory buy-in rules under the settlement discipline regime until November 2, 2025. The Financial Services and Markets Bill 2022-23 includes draft amendments to the Financial Services and Markets Act of 2000 which will revise the onshored EU regime applying to CSDs.

Securities Financing Transactions and Reuse of Collateral Regulation. On November 25, 2015, the EU adopted a regulation on securities financing transactions and reuse of collateral (SFTR) as part of its approach to addressing shadow banking. The regulation includes provisions for enhanced transparency and reporting of securities financing transactions.

The SFTR entered into force on January 12, 2016. The reporting obligations under the SFTR were phased in over several periods through January 11, 2021.

UK Criminal Finances Act. On September 30, 2017, the UK Criminal Finances Act (CFA) entered into force. The CFA has extra-territorial effect, introducing certain new corporate criminal offenses in circumstances where a corporate entity or partnership (a relevant body) fails to prevent an “associated person” (broadly meaning an employee, agent or person who performs services for or on behalf of the relevant body) from criminally facilitating the evasion of tax, whether the tax evaded is owed (i) in the UK or (ii) in a foreign country if the relevant body has a nexus, or any conduct constituting part of the foreign tax evasion facilitation offense takes place, in the UK. These corporate offenses are strict liability offenses, such that in circumstances where an associated person of a relevant body criminally facilitates the evasion of tax and such relevant body has failed to prevent the associated person from committing such criminal facilitation of tax evasion, the relevant body will itself be guilty of a criminal offense carrying unlimited fines, unless it can show that it put in place reasonable prevention procedures (or by showing that it was not reasonable in all the circumstances to expect the relevant body to have any prevention procedures in place).

Benchmarks Regulation. On January 1, 2018, the EU Benchmarks Regulation (BMR) became applicable in all EU member states. The principal objectives of the BMR are to restore investor confidence in the accuracy, robustness and integrity of indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds, and the benchmark-setting process itself. The BMR aims to achieve these objectives by ensuring that benchmarks are not subject to conflicts of interest, are used appropriately, and reflect the actual market or economic reality they are intended to measure. BMR has been incorporated into UK law following the withdrawal from the EU, with applicable amendments. In 2017, the FCA and the Bank of England’s Financial Policy Committee raised questions about the future sustainability of the London Interbank Offered Rate (LIBOR) benchmarks and began planning the transition to alternative reference rates beginning December 31, 2021. The UK and EU legislators have each taken legislative steps to manage the transition from LIBOR. In the UK, the FCA has exercised powers under the BMR to effect the publication of a synthetic LIBOR rate for one-month, three-month and six-month sterling and U.S. Dollar LIBOR (USD LIBOR) beyond their respective dates of cessation. In December 2021, the Critical Benchmarks (References and Administrators’ Liability) Act 2021 was passed in the UK. That legislation includes “safe harbor” provisions to mitigate certain litigation risks associated with contractual continuity following the transition to synthetic LIBOR.

Sustainable Finance Disclosure Regulations. On December 29, 2019, the EU Sustainable Finance Disclosure Regulations (SFDR) entered into force. SFDR aims to prevent “greenwashing” (conveying a misleading or false impression a product is more environmentally favorable than it actually is) by requiring disclosure of how sustainability risks and environmental, social and governance (ESG) factors are part of the investment and business processes of asset managers. Mandatory disclosures are required to be published at product and manager levels in a variety of ways, including on websites, in pre-contractual documents (e.g. prospectuses) and in annual reports. Certain significant provisions apply since March 10, 2021. In October 2021, the UK government announced that it will launch its own consultation with stakeholders on sustainable finance disclosures rules for certain UK market participants and certain investment products. On October 25, 2022, the FCA issued a consultation paper on new measures for a UK regime on sustainability disclosure requirements and investment labels. The new measures are expected to be finalized in 2023.

Taxonomy Regulation. On July 12, 2020, Regulation (EU) 2020/852 (Taxonomy Regulations) entered into force. The Taxonomy Regulations are part of the EU’s recent measures designed to encourage environmentally sustainable investment decision making and introduce a technical framework to ascertain how sustainable an economic activity is. The Taxonomy Regulations apply to financial market participants including MiFID firms, Undertakings for the Collective Investment in Transferable Securities (UCITS) management companies, and alternative investment fund managers, and will require them to make further entity, pre-contractual and periodic disclosures. The UK government is in the process of implementing its own “green” taxonomy for guiding companies and investors on “green” investments, similar to the EU regime, and intends to release an update on the new measures as part of its publication of the Green Finance Strategy in early 2023.

Deposit Guarantee Scheme. Eligible deposits held with EU credit institutions and certain other financial entities are subject to the recast Deposit Guarantee Schemes Directive (DGSD) implemented in 2014. It required EU member states to introduce legislation establishing at least one deposit guarantee scheme (DGS). A DGS which is established and recognized in one member state is obliged to cover the depositors (up to certain prescribed amounts) at branches of the same institution in other EU member states. In the UK, the Financial Services Compensation Scheme is the national DGS for the protection and reimbursement of depositors of failed financial institutions.

Fifth EU Money Laundering Directive. On July 9, 2018, the Fifth EU Money Laundering Directive (MLD5) entered into force. MLD5 was required to be transposed into local law by EU member states by January 10, 2020 and introduced the following key changes to the previous EU AML regime: (i) EU member states must ensure that registers of ultimate beneficial owners of companies and other legal entities are accessible to the general public; (ii) the previous AML regime was extended to additional service providers, such as electronic wallet providers, virtual currency exchange service providers, and art dealers, and further specifications regarding the scope of application of MLD5 with respect to tax advisors and estate agents were provided; (iii) the threshold for identifying holders of prepaid cards was lowered to €150; and (iv) EU member states were required to implement enhanced due diligence measures to monitor suspicious transactions involving high-risk countries more strictly. In May 2018, the UK's Sanctions and Anti-Money Laundering Act came into force. The UK government transposed MLD5 into UK law and, therefore, the UK anti-money laundering regime is currently broadly aligned with the EU. On December 7, 2022, the Council of the EU agreed its position on AML regulation through the Sixth EU Money Laundering Directive. The new rules will extend to, among other items, the entire crypto-asset sector, third-party intermediaries, persons trading in precious metals, precious stones and cultural goods. The new measures include limiting of cash payments, EU listing of third countries listed by the Financial Action Task Force, making beneficial ownership rules more transparent and harmonized, the clarification of outsourcing provisions and the powers of supervisors and improved cooperation among authorities.

Shareholder Rights Directive. On May 17, 2017, the recast Shareholder Rights Directive (EU) 2017/828 was published (SRD II). Member states of the EU were required to bring into force the laws, regulations and administrative provisions necessary to comply with the Directive by June 10, 2019. SRD was designed to establish requirements in relation to the exercise of shareholder rights and, recognizing that shares are often held through complex chains of intermediaries, SRD II is designed to improve mechanisms for the identification of shareholders by companies, as well as improve the transmission of information along the chain of intermediaries to facilitate the exercise of shareholder rights. Non-EU intermediaries are required to comply with the requirements if they provide services with respect to shares of companies that have their registered office in the EU. The Commission Implementing Regulation (EU) 2018/1212 of September 3, 2018 set out minimum requirements for implementing SRD II, which have applied since September 3, 2020. SRD II has been incorporated into UK law and remains largely aligned with the EU.

Depositary Books & Records. Following the European Securities and Markets Authority's opinion on asset segregation and application of depositary delegation rules to CSDs published on July 20, 2017, changes were introduced by two EU regulations modifying the existing Alternative Investment Fund Managers Directive (AIFMD) and UCITS Level 2 Regulations: Commission Delegated Regulation (EU) No 2018/1618 relating to the safe-keeping duties of depositaries of alternative investment funds and Commission Delegated Regulation (EU) No 2018/1619 relating to the safe-keeping duties of depositaries of UCITS. The changes aim to better define asset segregation requirements and to add additional safeguards, primarily focusing on information flow between the depositary and any third party to whom safe-keeping functions have been delegated. The key changes (i) impact the frequency of reconciliations between the depositary's internal accounts and records and those of any third party in the custody chain, (ii) require the depositary to maintain an independent record separate from the record maintained by the third party, and (iii) increase due diligence obligations where custody of assets is delegated to third parties outside of the EU. AIFMD and the UCITS directive were incorporated into UK law and remain largely aligned with the EU. The regulations became effective as of April 1, 2020. The changes impact Northern Trust's subsidiaries providing depositary services to European-domiciled fund clients.

In addition to the above, the Bank's and the Corporation's subsidiary banks located outside the United States are subject to regulatory capital requirements in the jurisdictions in which they operate. As of December 31, 2022, each of our non-U.S. banking subsidiaries had capital ratios above their specified minimum requirements.

Human Capital Management

The success of our company relies heavily on the strength of the people we employ. Attracting, engaging, developing and retaining Northern Trust talent is critical. We invest in our employees holistically to continually build a diverse pipeline of future leaders and enable internal professional advancement. The overview below outlines Northern Trust's human capital objectives—talent management, total rewards, and diversity, equity and inclusion.

EMPLOYEES

Northern Trust employed approximately 23,600 full-time equivalent employees as of December 31, 2022. The regional breakout of our employee base is 42% North America, 42% Asia-Pacific, and 16% Europe, Middle East, and Africa.

TALENT ACQUISITION, DEVELOPMENT, AND MANAGEMENT

We pride ourselves in attracting strong talent and have identified the development of our talent as a strategic priority. Our focus on well-being, diversity, and a culture of trust, care and collaboration contribute to our employer brand.

Sourcing and Recruitment. We target our talent identification, sourcing methods, and recruitment strategies to specific locations using various channels such as job boards, colleges, professional networks, associations and online social networks. We base hiring decisions on a variety of factors including relevant experience and accomplishments, educational background, professional licensing, and strong evidence of integrity and ethical behavior.

Onboarding. Northern Trust is committed to helping all new hires succeed from day one. New employees begin their onboarding journey with a comprehensive learning roadmap that orients them to our history, brand, businesses, and culture. Orientation programs also augment the onboarding experience by providing global, regional, and/or local information along with networking activities to help connect new hires to each other and other colleagues.

Learning and Development. An integrated partnership between our enterprise-wide and functional learning and development teams ensures we deliver holistic training solutions. Through our online learning portal, Northern Trust University, all employees can access a portfolio of professional and functional training offerings most helpful to their role. We provide targeted development opportunities for employees transitioning into management and throughout their management and leadership career. Our training content is dynamic as we regularly evaluate its quality and utilization and we refresh and organize courses and resources to enable employees to develop skills most critical to servicing our clients and developing their careers. An emerging area of focus is helping expand digital, analytical and financial acumen and skills across the enterprise. Many of our programs are interactive, include peer networking, and offer direct access to expert facilitators. Training is offered through online libraries of self-study content and in both virtual and classroom instructor-led formats.

Talent Planning and Organizational Effectiveness. Northern Trust is committed to identifying and developing talent with the breadth, depth, and diversity of technical and leadership skills to execute business strategies today and in the future. Managers conduct talent assessments for employees annually and business and regional leadership teams hold regular talent review discussions focused on specific topics, such as workforce needs, retention risks, diversity, top talent, readiness for promotion, readiness-to-move, and succession plans. Senior level talent reviews are also conducted each year by our senior management and Board of Directors, led by our Chairman and Chief Executive Officer and Chief Human Resources Officer.

Performance Management. Northern Trust's annual performance management process includes goal setting, mid-year check-ins, multi-rater feedback, and year-end reviews. Strategic corporate priorities are set by our Chairman and Chief Executive Officer and are applied to each business, department, team and individual. Managers are encouraged to provide regular feedback and real-time coaching to drive performance outcomes and facilitate development.

Engagement and Recognition. Building an inclusive, connected and engaged employee culture is essential to retaining our talent. We collect employee perspectives and ideas through an annual Employee Engagement Survey. Results are evaluated to identify strengths, progress, and opportunities to strengthen employee engagement, and are shared with employees and the Board of Directors. We also offer an online employee recognition platform that strengthens the unity that binds us as a company and connects employees in new and meaningful ways.

TOTAL REWARDS

Our compensation and benefit programs are designed to be market-competitive and enable us to attract and retain talent to deliver on Northern Trust's strategy.

Compensation Programs. Our compensation programs are intended to motivate our employees to deliver the highest-quality service to our clients and achieve the greatest collective business results while appropriately managing risk. They are designed, implemented, and communicated to promote behaviors that are consistent with Northern Trust's desired culture, character and enduring values of service, expertise, and integrity. We also regularly review our compensation processes and programs and take appropriate measures to ensure we can attract and retain talent in relevant markets.

Northern Trust's base salary programs provide a competitive level of fixed pay reflecting each employee's position, experience, qualifications and tenure. Additionally, all employees are eligible for incentive compensation to reward performance that delivers strong team or individual results. Incentive compensation is linked to both financial and non-financial performance criteria, including risk considerations, as determined by our Board of Directors and senior management. Select senior leaders and individual contributors may receive a percentage of their incentive in Northern Trust stock to encourage retention of key talent and to align rewards with company performance.

Employee Benefits. While the exact composition of the employee benefit package varies by country, our benefit programs are designed to be locally competitive, to meet the needs of our employees and their families, and to reflect the cultural values of the organization. Typical benefit programs include retirement, health care, paid time off, income protection such as disability and life insurance, leaves of absence, and access to our Employee Assistance Program. Our expanded employee well-being programs and resources focus on how to manage stress, build resiliency, and be attuned to mental health issues; accessing flexible or voluntary benefits; and enhancements to various parental leave offerings.

DIVERSITY, EQUITY, AND INCLUSION (DE&I)

Northern Trust embraces the benefits of diversity, equity and inclusion and strives to create a work environment in which all individuals are welcomed, respected, supported, and valued so that they can fully participate in, and contribute to, our success and the success of our stakeholders.

Embedding DE&I. Our DE&I strategy is designed to develop a diverse, equitable, and inclusive workplace that represents a broad range of perspectives, attributes, experiences and backgrounds. Our Board of Directors, through its Human Capital and Compensation Committee, engages in active oversight of our DE&I strategies, programs, and principles. Our Head of Corporate Sustainability, Inclusion and Social Impact serves as an Executive Vice President, and reports directly to our Chairman and Chief Executive Officer. The following table presents the gender and ethnic diversity of our Board of Directors and executive officers.

TABLE 2: BOARD OF DIRECTORS AND EXECUTIVE OFFICERS REPRESENTATION

	DECEMBER 31, 2022					
	FEMALE	MALE	WHITE	BLACK	HISPANIC	ASIAN
Board of Directors	25%	75%	59%	25%	8%	8%
Executive Officers	40%	60%	90%	10%	—%	—%

As of December 31, 2022, our global employees were 46% female and 54% male, and 40% of our U.S. employees identified as a member of an underrepresented race or ethnicity.

Progress and Accountability. We utilize a global DE&I dashboard to track the organization’s progress and integrate these metrics as part of our overall corporate strategy and goals. To drive accountability for increasing diverse representation across the organization, we measure representation in three contexts: hiring, retention and promotion. Each business unit evaluates this data and acts as needed to improve overall diversity within its organization. Our executive leaders report their progress through the DE&I Executive Council co-chaired by our Chairman and Chief Executive Officer and our Head of Corporate Sustainability, Inclusion and Social Impact. Our Global Executive DE&I Council is responsible for providing strategic oversight and defining and driving accountability on the global DE&I priorities.

Available Information

Through the Corporation’s website at www.northerntrust.com, the Corporation makes available free of charge its Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and all other reports and all amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended (Exchange Act), as soon as reasonably practicable after it files such material with, or furnishes such material to, the SEC. The contents of the Corporation’s website, the website of the SEC or any other website referenced herein are not a part of this Annual Report on Form 10-K.

ITEM 1A - RISK FACTORS

In the normal course of our business activities, we are exposed to a variety of risks. The following discussion sets forth the risk factors that we have identified as being most significant to Northern Trust. Although we discuss these risk factors primarily in the context of their potential effects on our business, financial condition or results of operations, you should understand that these effects can have further negative implications such as: reducing the price of our common stock and other securities; reducing our capital, which can have regulatory and other consequences; affecting the confidence that clients, counterparties and/or applicable regulators have in us, with a resulting negative effect on our ability to conduct and grow our businesses; and reducing the attractiveness of our securities to rating agencies and potential purchasers, which may affect adversely our ability to raise capital and secure other funding or the cost at which we are able to do so. Additional risks beyond those discussed below, elsewhere in this Annual Report on Form 10-K or in other of our reports filed with, or furnished to, the SEC also could affect us adversely. Further, we cannot assure you that the risk factors herein or elsewhere in our other reports address all potential risks that we may face and you should not interpret discussion of any risk to imply that such risk has not already materialized.

These risk factors also serve to describe factors which may cause our results to differ materially from those described in forward-looking statements included herein or in other documents or statements that make reference to this Annual Report on Form 10-K. Forward-looking statements and other factors that may affect future results are discussed under “Forward-Looking Statements” included in Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations.”

Summary

Our business, financial condition or results of operations may be materially and adversely affected by various risk types and considerations, including market risks, operational risks, credit risks, liquidity risks, regulatory and legal risks, strategic risks, and other risks, including as a result of the following:

Market Risks

- We are dependent on fee-based business for a majority of our revenues, which may be affected adversely by market volatility, a downturn in economic conditions, underperformance and/or negative trends in investment preferences.
- Changes in interest rates can affect our earnings negatively.
- Changes in the monetary, trade and other policies of various regulatory authorities, central banks, governments and international agencies may reduce our earnings and affect our growth prospects negatively.
- Macroeconomic conditions and uncertainty in the global economy, including the financial stability of various regions or countries across the globe, including the risk of defaults on sovereign debt and related stresses on financial markets, could have a significant adverse effect on our earnings.
- Declines in the value of securities held in our investment portfolio can affect us negatively.
- Volatility levels and fluctuations in foreign currency exchange rates may affect our earnings.
- Changes in a number of particular market conditions can affect our earnings negatively.

Operational Risks

- Many types of operational risks can affect our earnings negatively.
- Failures of, or disruptions to, our technological systems or breaches of our security measures, including, but not limited to, those resulting from cyber-attacks, may result in losses.
- Errors, breakdowns in controls or other mistakes in the provision of services to clients or in carrying out transactions for our own account can subject us to liability, result in losses or have a negative effect on our earnings in other ways.
- Our dependence on technology, and the need to update frequently our technology infrastructure, exposes us to risks that also can result in losses.
- A failure or circumvention of our controls and procedures could have a material adverse effect on our business, financial condition and results of operations.
- Failure of any of our third-party vendors (or their vendors) to perform can result in losses.
- We are subject to certain risks inherent in operating globally which may affect our business adversely.
- Failure to control our costs and expenses adequately could affect our earnings negatively.
- Pandemics, natural disasters, global climate change, acts of terrorism, geopolitical tensions, and global conflicts may have a negative impact on our business and operations.

Credit Risks

- Failure to evaluate accurately the prospects for repayment when we extend credit or maintain an adequate allowance for credit losses can result in losses or the need to make additional provisions for credit losses, both of which reduce our earnings.
- Market volatility and/or weak economic conditions can result in losses or the need for additional provisions for credit losses, both of which reduce our earnings.
- The failure or perceived weakness of any of our significant counterparties could expose us to loss.
- The transition away from LIBOR or changes in the method pursuant to which other interest rate benchmarks are determined could adversely impact our business and results of operations.

Liquidity Risks

- If we do not manage our liquidity effectively, our business could suffer.
- If the Bank is unable to supply the Corporation with funds over time, the Corporation could be unable to meet its various obligations.
- We may need to raise additional capital in the future, which may not be available to us or may only be available on unfavorable terms.
- Any downgrades in our credit ratings, or an actual or perceived reduction in our financial strength, could affect our borrowing costs, capital costs and liquidity adversely.

Regulatory and Legal Risks

- Failure to comply with regulations and/or supervisory expectations can result in penalties and regulatory constraints that restrict our ability to grow or even conduct our business, or that reduce earnings.
- Changes by the U.S. and other governments to laws, regulations and policies applicable to the financial services industry may heighten the challenges we face and make regulatory compliance more difficult and costly.
- We may be impacted adversely by claims or litigation, including claims or litigation relating to our fiduciary responsibilities.
- We may be impacted adversely by supervisory and/or regulatory enforcement matters.
- We may fail to set aside adequate reserves for, or otherwise underestimate our liability relating to, pending and threatened claims, with a negative effect on our earnings.
- The ultimate impact on us of the United Kingdom’s withdrawal from the European Union remains uncertain.
- If we fail to comply with legal standards, we could incur liability to our clients or lose clients, which could affect our earnings negatively.

Strategic Risks

- If we are not able to attract, retain and motivate personnel, our business could be negatively affected.
- Our operations, businesses and clients could be materially adversely affected by the effects of climate change or concerns related thereto.
- If we do not develop and execute strategic plans successfully, our growth may be impacted negatively.
- We are subject to intense competition in all aspects of our businesses, which could have a negative effect on our ability to maintain satisfactory prices and grow our earnings.
- Damage to our reputation could have a direct and negative effect on our ability to compete, grow and generate revenue.
- We need to invest in innovation constantly, and the inability or failure to do so may affect our businesses and earnings negatively.
- Failure to understand or appreciate fully the risks associated with development or delivery of new product and service offerings may affect our businesses and earnings negatively.
- Our success with large, complex clients requires an understanding of the market and legal, regulatory and accounting standards in various jurisdictions.
- We may take actions to maintain client satisfaction that result in losses or reduced earnings.

Other Risks

- The systems and models we employ to analyze, monitor and mitigate risks, as well as for other business purposes, are inherently limited, may not be effective in all cases and, in any case, cannot eliminate all risks that we face.
- Changes in tax laws and interpretations and tax challenges may affect our earnings negatively.
- Changes in accounting standards may be difficult to predict and could have a material impact on our consolidated financial statements.
- Our ability to return capital to stockholders is subject to the discretion of our Board of Directors and may be limited by U.S. banking laws and regulations, applicable provisions of Delaware law, or our failure to pay full and timely dividends on our preferred stock and the terms of our outstanding debt.

Market Risks

We are dependent on fee-based business for a majority of our revenues, which may be affected adversely by market volatility, a downturn in economic conditions, underperformance and/or negative trends in investment preferences.

Our principal operational focus is on fee-based business, which is distinct from commercial banking institutions that earn most of their revenues from loans and other traditional interest-generating products and services. Fees for many of our products and services are based on the market value of assets under management, custody or administration; the volume of transactions processed; securities lending volume and spreads; fees for other services rendered; and in certain businesses, fees calculated as a percentage of our clients' earnings, all of which may be impacted negatively by market volatility, a downturn in economic conditions, underperformance and/or negative trends in investment preferences. For example, downturns in equity markets and decreases in the value of debt-related investments resulting from market disruption, illiquidity or other factors historically have reduced the valuations of the assets we manage or service for others, which generally impacted our earnings negatively. Further, although we do not hold, invest in, or custody cryptocurrency assets, the markets in which they trade are highly volatile and volatility in these markets may impact the markets for other assets that we hold, invest in, or custody, which could also impact our fees or financial condition. Market volatility and/or weak economic conditions also may affect wealth creation, investment preferences, trading activities, and savings patterns, which impact demand for certain products and services that we provide.

Our earnings also may be affected by poor investment returns or changes in investment preferences driven by factors beyond market volatility or weak economic conditions. Poor absolute or relative investment performance in funds or client accounts that we manage or in investment products that we design or provide may result in declines in the market values of portfolios that we manage and/or administer and may affect our ability to retain existing assets and to attract new clients or additional assets from existing clients. For example, in 2022, outflows we experienced in certain of our products as a result of the impact of weaker markets and relative investment performance adversely impacted our overall fees derived from assets that we manage. Broader changes in investment preferences that lead to less investment in mutual funds or other collective funds, such as the shift in investor preference to lower fee products, could also impact our earnings negatively.

Changes in interest rates can affect our earnings negatively.

The direction and level of interest rates are important factors in our earnings. Interest rate changes could affect the interest earned on assets differently than interest paid on liabilities. In response to rising inflation, the Federal Reserve Board has increased interest rates from historically low levels. While a rising interest rate environment generally has a positive effect on our net interest margin, in some circumstances, a rise in interest rates also may affect us negatively. For example, the recent rapid increases in interest rates has adversely impacted the value of certain of our investment securities, with resultant impacts on our capital, liquidity, and earnings. Additionally, recent higher interest rates have caused, and may in the future cause: market volatility and downturns in equity markets, resulting in a decrease in the valuations of the assets we manage or service for others, which generally impact our earnings negatively; our clients to transfer funds into investments with higher rates of return, resulting in decreased deposit levels and higher fund or account redemptions; our borrowers to experience difficulties in making higher interest payments, resulting in increased credit costs, provisions for loan and lease losses and charge-offs; reduced bond and fixed income fund liquidity, resulting in lower performance, yields and fees; or higher funding costs.

Conversely, low-interest-rate environments generally result in a compressed net interest margin and also have a negative impact on our fees earned on certain of our products. For example, in the past we waived certain fees associated with money market funds due to the low level of short-term interest rates. Low net interest margins and fee waivers each negatively impact our earnings.

Although we have policies and procedures in place to assess and mitigate potential impacts of interest rate risks, if our assumptions about any number of variables are incorrect, these policies and procedures to mitigate risk may be ineffective, which could impact earnings negatively.

Please see "Market Risk" in the "Risk Management" section included in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations," for a more detailed discussion of interest rate and market risks we face.

Changes in the monetary, trade and other policies of various regulatory authorities, central banks, governments and international agencies may reduce our earnings and affect our growth prospects negatively.

The monetary, trade and other policies of U.S. and international governments, agencies and regulatory bodies have a significant impact on economic conditions and overall financial market performance. For example, the Federal Reserve Board regulates the supply of money and credit in the United States, and its policies determine in large part the level of interest rates and our cost of funds for lending and investing, and play a role in contributing to or moderating levels of inflation, all of which meaningfully impact our earnings. Recent actions of the Federal Reserve Board and other regulatory authorities have reduced the value of financial instruments we hold and may continue to do so in the future. Further, their policies can affect our borrowers by increasing interest rates or making sources of funding less available, which may increase the risk that borrowers fail to repay their loans from us. Changes in monetary, trade and other governmental policies are beyond our control and can be difficult to predict, and we cannot determine the ultimate effect that any such changes would have upon our business, financial condition or results of operations.

Macroeconomic conditions and uncertainty in the global economy, including the financial stability of various regions or countries across the globe, including the risk of defaults on sovereign debt and related stresses on financial markets, could have a significant adverse effect on our earnings.

Risks and concerns about the financial stability of various regions or countries across the globe could have a detrimental impact on economic and market conditions in these or other markets across the world. Foreign market and economic disruptions have affected, and may in the future affect, consumer confidence levels and spending, international trade policy, personal bankruptcy rates, levels of incurrence of and default on consumer debt, and home prices. Additionally, financial markets may be adversely affected by the current or anticipated impact of military conflict (including the continuing military conflict involving Ukraine and the Russian Federation), terrorism, political or civil unrest, sovereign debt downgrades or debt crises (including any uncertainty over the U.S. government debt ceiling), public health epidemics or pandemics, the exit or potential exit of one or more countries from the EU, or other geopolitical events. The cumulative effect of uncertain business conditions or economic challenges faced in various foreign markets, including fiscal or monetary concerns, rising inflation and interest rates, economic downturns and the possibility of a recession in some jurisdictions, other economic factors (including changes in foreign currency exchange rates and changes to tax laws or the application or enforcement practices of such laws), or volatility or lack of confidence in the financial markets may adversely affect certain portions of our business, financial condition, and results of operations.

Declines in the value of securities held in our investment portfolio can affect us negatively.

Our investment securities portfolio represents a greater proportion, and our loan and lease portfolios represent a smaller proportion, of our total consolidated assets in comparison to many other financial institutions. The value of securities available for sale and held to maturity within our investment portfolio, which is generally determined based upon market values available from third-party sources, have fluctuated, and may continue in the future to fluctuate, as a result of market volatility and economic or financial market conditions. Declines in the value of securities held in our investment portfolio negatively impact our levels of capital, liquidity, and, to the extent we realize losses, earnings. Although we have policies and procedures in place to assess and mitigate potential impacts of market risks, including hedging-related strategies, those policies and procedures are inherently limited because they cannot anticipate the existence or future development of currently unanticipated or unknown risks. Accordingly, market risks have, from time to time, negatively affected the value of securities held in our investment portfolio and in the future we could suffer additional adverse effects as a result of our failure to anticipate and manage these risks properly.

Volatility levels and fluctuations in foreign currency exchange rates may affect our earnings.

We provide foreign exchange services to our clients, primarily in connection with our global custody business. Foreign currency volatility influences our foreign exchange trading income as does the level of client activity. Foreign currency volatility and changes in client activity may result in reduced foreign exchange trading income. Fluctuations in exchange rates may raise the potential for losses resulting from foreign currency trading positions where aggregate obligations to purchase and sell a currency other than the U.S. dollar do not offset each other or offset each other in different time periods. We also are exposed to non-trading foreign currency risk as a result of our holdings of non-U.S. dollar denominated assets and liabilities, investments in non-U.S. subsidiaries, and future non-U.S. dollar denominated revenue and expense.

We have policies and procedures in place to assess and mitigate potential impacts of foreign exchange risks, including hedging-related strategies. Any failure or circumvention of our procedures to mitigate risk may impact earnings negatively. Please see “Market Risk” in the “Risk Management” section included in Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” for a more detailed discussion of market risks we face.

Changes in a number of particular market conditions can affect our earnings negatively.

In past periods, reductions in the volatility of currency-trading markets, the level of cross-border investing activity, and the demand for borrowing securities or willingness to lend such securities have affected our earnings from activities such as foreign exchange trading and securities lending negatively. If these conditions occur in the future, our earnings from these activities may be affected negatively. In certain of our businesses, such as securities lending, our fee is calculated as a percentage of our clients’ earnings, such that market and other factors that reduce our clients’ earnings from investments or trading activities also reduce our revenues.

Operational Risks

Many types of operational risks can affect our earnings negatively.

We regularly assess and monitor operational risk in our businesses. Despite our efforts to assess and monitor operational risk, our risk management program may not be effective in all cases. Factors that can impact operations and expose us to risks varying in size, scale and scope, some or all of which may be exacerbated by the increase in hybrid and remote working arrangements in recent years, include:

- failures of technological systems or breaches of security measures, including, but not limited to, those resulting from computer viruses or cyber-attacks;
- human errors or omissions, including failures to comply with applicable laws or corporate policies and procedures;
- theft, fraud or misappropriation of assets, whether arising from the intentional actions of internal personnel or external third parties;
- defects or interruptions in computer or communications systems;
- breakdowns in processes; over-reliance on manual processes, which are less scalable, and inherently more prone to error, than automated processes; breakdowns in internal controls or failures of the systems and facilities that support our operations;
- unsuccessful or difficult implementation of computer systems upgrades;
- defects in product design or delivery;
- difficulty in accurately pricing assets, which can be aggravated by market volatility and illiquidity and lack of reliable pricing from third-party vendors;
- negative developments in relationships with key counterparties, third-party vendors, employees or associates in our day-to-day operations; and
- external events that are wholly or partially beyond our control, such as pandemics, geopolitical events, political or social unrest, natural disasters or acts of terrorism.

While we have in place many controls and business continuity plans designed to address many of these factors, these plans may not operate successfully to mitigate these risks effectively. We also may fail to identify or fully understand the implications and risks associated with changes in the financial markets or our businesses—particularly as our geographic footprint, product pipeline and client needs and expectations evolve—and consequently fail to enhance our controls and business continuity plans to address those changes in an adequate or timely fashion. If our controls and business continuity plans do not address the factors noted above and operate to mitigate the associated risks successfully, such factors may have a negative impact on our business (including operational resilience), financial condition or results of operations. In addition, an important aspect of managing our operational risk is creating a risk culture in which all employees fully understand the inherent risk in our business and the importance of managing risk as it relates to their job functions. We continue to enhance our risk management program to support our risk culture, ensuring that it is sustainable and appropriate for our role as a major financial institution. Nonetheless, if we fail to provide the appropriate environment that sensitizes all of our employees to managing risk, our business could be impacted adversely. Please see “Other Risks” in this “Risk Factors” section for further description of risks associated with the systems and models we employ to analyze, monitor and mitigate risks.

Failures of, or disruptions to, our technological systems or breaches of our security measures, including, but not limited to, those resulting from cyber-attacks, may result in losses.

Our business is dependent on our and third parties’ information technology systems. Despite our implementation of a variety of security measures, our computer systems, networks, and data could be subject to cyber-attacks and unauthorized access, use, alteration, or destruction, such as from physical and electronic break-ins or unauthorized tampering, malware and computer virus attacks, or system failures and disruptions. Any failure, interruption or breach in the security of our systems could severely disrupt our operations and could subject us to liability claims, harm our reputation, interrupt our operations, or otherwise adversely affect our business, financial condition or results of operations.

Our systems involve the processing, storage and transmission of clients’ and our proprietary and confidential information, and security breaches, including cyber-attacks, could expose us to a risk of theft, loss or other misappropriation of this information. Our security measures may be breached due to the actions of outside parties, employee error, failure of our controls with respect to access to our systems, malfeasance or otherwise, and, as a result, an unauthorized party may obtain access to our or our clients’ proprietary and confidential information, resulting in the theft, loss, destruction, gathering, monitoring, dissemination, or other misappropriation of this information. Additionally, our computer, communications, data processing, networks, backup, business continuity or other operating, information or technology systems, including those that we outsource to other providers, may fail to operate properly or become disabled, overloaded or damaged as a result of a number of factors, including events that are wholly or partially beyond our control, which could have a negative effect on our ability to conduct our business activities.

Additionally, we are subject to complex and evolving laws and regulations governing cybersecurity, data privacy and data protection, which may differ and potentially conflict, in various jurisdictions. Regulators globally are introducing the potential for greater monetary fines on institutions that suffer from breaches leading to the misappropriation of such information. Most states, the EU and other non-U.S. jurisdictions also have adopted their own statutes and/or regulations concerning data privacy and security and notification of data breaches. These and other changes in laws or regulations associated with the enhanced protection of personal and other types of information could greatly increase compliance costs and the size of potential fines related to the protection of such information.

Information security and data privacy risks for large financial institutions like us are significant in part because of the evolving proliferation of new technologies, the use of internet-based solutions, mobile devices, and cloud technologies to conduct financial transactions and the increased sophistication and rapidly evolving techniques of hackers, terrorists, organized crime and other external parties, including foreign state actors. If we fail to continue to upgrade our technology infrastructure to ensure effective information security and data privacy relative to the type, size and complexity of our operations, we could become more vulnerable to cyber-attack and, consequently, subject to significant regulatory penalties and reputational damage. Also, like many large enterprises, in response to the COVID-19 pandemic in recent years, a significant portion of our workforce has shifted to a hybrid work environment that includes a combination of in-office and remote work. The increase in remote work and remote access to our systems, initially driven by the COVID-19 pandemic, also introduces potential vulnerabilities to cyber threats.

The third parties with which we do business also are susceptible to the foregoing risks (including regarding the third parties with which they are similarly interconnected or on which they otherwise rely), and our or their business operations and activities may therefore be affected adversely, perhaps materially, by failures, terminations, errors or malfeasance by, or attacks or constraints on, one or more financial, technology, infrastructure or government institutions or intermediaries with whom we or they are interconnected or conduct business. While we conduct security assessments on third-party vendors, we cannot be certain that their information security protocols are sufficient to withstand a cyber-attack or other security breach. In addition, our clients often use personal devices, such as computers, smart phones and tablets, which are particularly vulnerable to loss and theft, as well as third parties with whom they share information used for authentication, to access our systems and manage their accounts, which may heighten the risk of system failures, interruptions or security breaches.

Moreover, the increased use of mobile and cloud technologies could heighten these and other operational risks. Reliance on mobile or cloud technology or any failure by mobile technology and cloud service providers to adequately safeguard their systems and prevent cyber-attacks could disrupt our operations or the operations of our or their service providers and result in misappropriation, corruption or loss of personal, confidential or proprietary information or the inability to conduct ordinary business operations. In addition, there is a risk that encryption and other protective measures may be circumvented, particularly to the extent that new computing technologies increase the speed and computing power available.

In recent years, several financial services firms suffered successful cyber-attacks launched both domestically and from abroad, resulting in the disruption of services to clients, loss or misappropriation of sensitive or private information, and reputational harm. We and our clients have been, and expect to continue to be, subject to a wide variety of cyber-attacks and threats, including computer viruses, ransomware and other malicious code, distributed denial of service attacks, and phishing and vishing attacks, and it is possible that we could suffer material losses resulting from a breach. Because the techniques used to obtain unauthorized access, disable or degrade service or sabotage systems change frequently and often are not recognized until launched against a target, we may be unable to anticipate these techniques, to implement adequate preventative measures, or to address them until they are discovered. In addition, successful cyber-attacks may persist for an extended period of time before being detected. Because any investigation of an information security incident would be inherently unpredictable, the extent of a particular information security incident and the path of investigating the incident may not be immediately clear. It may take a significant amount of time before such an investigation can be completed and full and reliable information about the incident is known. While such an investigation is ongoing, we may not necessarily know the extent of the harm or how best to remediate it, certain errors or actions could be repeated or compounded before they are discovered and remediated, and communication to the public, regulators, clients and other stakeholders may be inaccurate, any or all of which could further increase the costs and consequences of an information security incident.

We could be the subject of legal claims or proceedings related to security incidents, including regulatory investigations and actions. Further, the market perception of the effectiveness of our security measures could be harmed, our reputation could suffer and we could lose clients in conjunction with security incidents, each of which could have a negative effect on our business, financial condition and results of operations. A breach of our security also may affect adversely our ability to effect transactions, service our clients, manage our exposure to risk or expand our business. An event that results in the loss of information also may require us to reconstruct lost data or reimburse clients for data and credit monitoring services, which could be costly and have a negative impact on our business and reputation. Although we maintain insurance coverage in the event of information theft, damage, or destruction from cyber breach incidents, there can be no assurance that liabilities or losses we may incur will be covered under such policies or that the amount of insurance will be adequate to cover such losses.

Further, even if not directed at us, attacks on financial or other institutions important to the overall functioning of the financial system or on our counterparties could affect, directly or indirectly, aspects of our business.

Errors, breakdowns in controls or other mistakes in the provision of services to clients or in carrying out transactions for our own account can subject us to liability, result in losses or have a negative effect on our earnings in other ways.
In our asset servicing, investment management, fiduciary administration and other business activities, we effect or process transactions for clients and for ourselves that involve very large amounts of money. Failure to manage or mitigate operational risks properly can have adverse consequences, and increased volatility in the financial markets may increase the magnitude of resulting losses. Further, remote working and other modified business practices initiated in response to the COVID-19 pandemic, combined with the increasing sophistication and frequency of potential cyber incidents, have heightened our operational and execution risk. Given the high volume of transactions we process, errors that affect earnings may be repeated or compounded before they are discovered and corrected.

Our dependence on technology, and the need to update frequently our technology infrastructure, exposes us to risks that also can result in losses.
Our businesses depend on information technology infrastructure, both internal and external, to record and process, among other things, a large volume of increasingly complex transactions and other data, in many currencies, on a daily basis, across numerous and diverse markets and jurisdictions. Due to our dependence on technology and the important role it plays in our business operations, combined with the increasing sophistication and frequency of potential cyber incidents, we must constantly improve and update our information technology infrastructure. Upgrading, replacing, and modernizing these systems can require significant resources and often involves implementation, integration and security risks that could cause financial, reputational, and operational harm. In some cases, the COVID-19 pandemic has accelerated the transition from traditional to digital financial services and heightened customer expectations in this area, and this transition may require us to invest greater resources in technological advancements. Failure to ensure adequate review and consideration of critical business and regulatory issues prior to and during the introduction and deployment of key technological systems or failure to align operational capabilities adequately with evolving client commitments and expectations may have a negative impact on our results of operations. The failure to respond properly to, and invest in, changes and advancements in technology and/or to compete for and retain employees with the necessary technical skills and expertise could limit our ability to attract and retain clients, prevent us from offering products and services comparable to those offered by our competitors, inhibit our ability to meet regulatory requirements or otherwise have a material adverse effect on our operations.

A failure or circumvention of our controls and procedures could have a material adverse effect on our business, financial condition and results of operations.
We regularly review and update our internal controls, disclosure controls and procedures, and corporate governance policies and procedures. Any system of controls, however well designed and operated, is based in part on certain assumptions and can provide only reasonable, not absolute, assurances that the objectives of the system will be met. Any failure or circumvention of our controls and procedures or failure to comply with regulations related to controls and procedures could have a material adverse effect on our business, financial condition and results of operations. If we identify material weaknesses in our internal control over financial reporting or are otherwise required to restate our financial statements, we could be required to implement expensive and time-consuming remedial measures and could lose investor confidence in the accuracy and completeness of our financial reports. In addition, there are risks that individuals, either employees or contractors, consciously circumvent established control mechanisms by, for example, exceeding trading or investment management limitations, or committing fraud.

Failure of any of our third-party vendors (or their vendors) to perform can result in losses.
Third-party vendors provide key components of our business operations such as data processing, recording and monitoring transactions, online banking interfaces and services, and network access. Our use of third-party vendors exposes us to the risk that such vendors (or their vendors) may not comply with their servicing and other contractual obligations, including with respect to indemnification and information security, and to the risk that we may not satisfy applicable regulatory responsibilities regarding the management and oversight of third parties and outsourcing providers. While we have established risk management processes and continuity plans, any disruptions in service from a key vendor for any reason or poor performance of services could have a negative effect on our ability to deliver products and services to our clients and conduct our business. Replacing these third-party vendors or performing the tasks they perform for ourselves could create significant delay and expense.

We are subject to certain risks inherent in operating globally which may affect our business adversely.
In conducting our U.S. and non-U.S. business, we are subject to risks of loss from various unfavorable political, economic, legal, public health, or other developments, including social or political instability, changes in governmental policies or policies of central banks, expropriation, nationalization, confiscation of assets, price controls, capital controls, exchange controls, unfavorable tax rates and tax court rulings and changes in laws and regulations. Less mature and often less regulated business and investment environments heighten these risks in various emerging markets. Our non-U.S. operations accounted for 34% of our revenue in 2022. Our non-U.S. businesses are subject to extensive regulation by various non-U.S. regulators, including governments, securities exchanges, central banks and other regulatory bodies in the jurisdictions in which those businesses operate. In many countries, the laws and regulations applicable to the financial services industry are uncertain and evolving and may be applied with extra scrutiny to foreign companies. Moreover, the regulatory and supervisory standards and expectations in one jurisdiction may not conform with standards or expectations in other jurisdictions. Even within a particular jurisdiction, the standards and expectations of multiple supervisory agencies exercising authority over our affairs may not be harmonized fully. Accordingly, it may be difficult for us to determine the exact requirements of local laws in every market or manage our relationships with multiple regulators in various jurisdictions. Our inability to remain in compliance with local laws in a particular market and manage our relationships with regulators could have an adverse effect not only on our businesses in that market but also on our reputation generally. The failure to mitigate properly such risks or the failure of our operating infrastructure to support such international activities could result in operational failures and regulatory fines or sanctions, which could affect our business and results of operations adversely.

We actively strive to optimize our geographic footprint. This optimization may occur by establishing operations in lower-cost locations or by outsourcing to third-party vendors in various jurisdictions. These efforts expose us to the risk that we may not maintain service quality, control or effective management within these operations. In addition, we are exposed to the relevant macroeconomic, political, public health, and similar risks generally involved in doing business in those jurisdictions. The increased elements of risk that arise from conducting certain operating processes in some jurisdictions could lead to an increase in reputational risk. During periods of transition, greater operational risk and client concern exist with respect to maintaining a high level of service delivery.

In addition, we are subject in our global operations to rules and regulations relating to corrupt and illegal payments, money laundering, and laws relating to doing business with certain individuals, groups and countries, such as the U.S. Foreign Corrupt Practices Act, the USA PATRIOT Act, the UK Bribery Act, and economic sanctions and embargo programs administered by the U.S. Office of Foreign Assets Control and similar agencies worldwide. While we have invested and continue to invest significant resources in training and in compliance monitoring, the geographic diversity of our operations, employees, clients and customers, as well as the vendors and other third parties with whom we deal, presents the risk that we may be found in violation of such rules, regulations, laws or programs and any such violation could subject us to significant penalties or affect our reputation adversely.

Failure to control our costs and expenses adequately could affect our earnings negatively.
Our success in controlling the costs and expenses of our business operations also impacts operating results. Through various parts of our business strategy, we aim to produce efficiencies in operations that help reduce and control costs and expenses, including the costs of losses associated with operating risks attributable to servicing and managing financial assets. Recently, increased expenses have affected, and a failure to control our costs and expenses in the future as a result of an overall inflationary environment or otherwise could affect, our earnings negatively.

Pandemics, natural disasters, global climate change, acts of terrorism, geopolitical tensions, and global conflicts may have a negative impact on our business and operations.
Pandemics, natural disasters, global climate change, acts of terrorism, geopolitical tensions, global conflicts (including the continuing military conflict involving Ukraine and the Russian Federation) or other similar events have had in the past, or may in the future have, a negative impact on our business and operations. While we have in place business continuity plans, such events may still damage our facilities, disrupt or delay the normal operations of our business (including communications and technology), result in harm to or cause travel limitations on our employees, impose significant compliance costs with new financial and economic sanctions regimes, and have a similar impact on our clients, suppliers, third-party vendors and counterparties. For example, in some jurisdictions such as the Russian Federation, local market restrictions, laws, sanctions programs or government intervention inhibit our clients' and our ability to access or transfer cash or securities held for clients through subcustodians and clearing agencies. When such client deposit liabilities are on our consolidated balance sheet, we maintain a corresponding amount of cash on deposit with the subcustodian or clearing agency, which increases our credit exposure to that entity and can accumulate over time based upon distributions on, or other activities related to, our clients' assets. If the subcustodian or clearing agency were to become insolvent in circumstances not involving expropriation of assets or other sovereign risk events and/or factors or events beyond our reasonable control that excuse performance under force majeure or other contractual provisions, the risk of loss on such

cash on deposit may potentially be incurred by us. As of December 31, 2022, we held cash that accumulates in relation to Russian securities with our subcustodian and/or clearing agencies for the benefit of certain clients in our Asset Servicing business which are subject to restrictions which inhibit our ability to access or transfer such deposits, and which amount is expected to increase significantly over time as long as the sanctions and other relevant restrictions remain in effect.

The foregoing or similar events also could impact us negatively to the extent that they result in reduced capital markets activity, lower asset price levels, or disruptions in general economic activity in the United States or abroad, or in financial market settlement functions. In addition, these or similar events may impact economic growth negatively, which could have an adverse effect on our business and operations, and may have other adverse effects on us in ways that we are unable to predict. Please see "Strategic Risks" in this "Risk Factors" section for further description of risks associated with climate change.

Credit Risks

Failure to evaluate accurately the prospects for repayment when we extend credit or maintain an adequate allowance for credit losses can result in losses or the need to make additional provisions for credit losses, both of which reduce our earnings.

We evaluate extensions of credit before we make them and provide for credit risks based on our assessment of the credit losses inherent in our loan portfolio, including undrawn credit commitments. This process requires us to make difficult and complex judgments. Challenges associated with our credit risk assessments include identifying the proper factors to be used in assessments and accurately estimating the impacts of those factors. Allowances that prove to be inadequate may require us to realize increased provisions for credit losses or write down the value of certain assets on our balance sheet, which result in losses and/or increased provisions for credit losses and in turn would affect earnings negatively.

Market volatility and/or weak economic conditions can result in losses or the need for additional provisions for credit losses, both of which reduce our earnings.

Credit risk levels and our earnings can be affected by market volatility and/or weakness in the economy in general and in the particular locales in which we extend credit, a deterioration in credit quality, or a reduced demand for credit. Adverse changes in the financial performance or condition of our borrowers resulting from market volatility and/or weakened economic conditions could impact the borrowers' abilities to repay outstanding loans, which could in turn impact our financial condition and results of operations negatively.

The failure or perceived weakness of any of our significant counterparties could expose us to loss.

The financial markets are characterized by extensive interconnections among financial institutions, including banks, broker/dealers, collective investment funds and insurance companies. As a result of these interconnections, we and many of our clients have counterparty exposure to other financial institutions. This counterparty exposure presents risks to us and to our clients because the failure or perceived weakness of any of our counterparties has the potential to expose us to risk of loss. Instability in the financial markets has resulted historically in some financial institutions becoming less creditworthy. During such periods of instability, we are exposed to increased counterparty risks, both as principal and in our capacity as agent for our clients. Changes in market perception of the financial strength of particular financial institutions can occur rapidly, are often based upon a variety of factors and can be difficult to predict. In addition, the criteria for and manner of governmental support of financial institutions and other economically important sectors remain uncertain. Further, the consolidation of financial services firms and the failures of other financial institutions has in the past increased, and may in the future increase, the concentration of our counterparty risk. These risks are heightened by the fact that our operating model relies on the use of unaffiliated sub-custodians to a greater degree than certain of our competitors that have banking operations in more jurisdictions than we do. We are not able to mitigate all of our and our clients' counterparty credit risk. If a significant individual counterparty defaults on an obligation to us, we could incur financial losses that have a material and adverse effect on our business, financial condition and results of operations.

The transition away from LIBOR or changes in the method pursuant to which other interest rate benchmarks are determined could adversely impact our business and results of operations.

Global regulators have taken steps to discontinue the publication and use of interbank offered rates (each, an IBOR), encourage the development and use of alternative reference rates, and examine the progress regulated entities such as Northern Trust are making to transition from IBORs to alternative reference rates. Publication of 1-week and 2-month USD LIBOR ceased as of December 31, 2021, and publication of the remaining USD LIBOR tenors are expected to continue until June 30, 2023. USD LIBOR historically has been a widely used interest rate benchmark and the reference rate for our floating-rate funding, certain of the products that we own, various lending and securities transactions in which we are involved, and certain of the derivatives that we use to manage our or our clients' risk.

Some regulators have prohibited the use of any LIBOR benchmarks in new contracts and have required that regulated entities transition existing contracts to another benchmark prior to June 30, 2023. Although the setting of such LIBOR benchmarks may continue to be available, such prohibitions and requirements or any other change in the availability or calculation of LIBOR or other interest rate benchmarks may affect adversely the cost or availability of floating-rate funding; the yield on loans or securities held by us; the amounts received and paid on derivative instruments we have entered into; the value of loans, securities, or derivative instruments held by us or our clients, which, in the case of assets held by our clients, could also negatively impact the amount of fees we earn in relation to such assets; the trading market for securities based on LIBOR or other benchmarks; the terms of new loans being made using different or modified reference rates; or our ability to use derivative instruments to manage risk effectively.

Various regulators, industry bodies and other market participants in the United States and other countries have developed and continue to refine alternative rate benchmarks for various financial products. While there is no consensus on what rate or rates may become accepted by market participants as alternatives to LIBOR for new contracts after LIBOR publication ceases, a group of large banks and the Alternative Reference Rate Committee (ARRC) identified, and the Federal Reserve Bank of New York in May 2018 started to publish, the Secured Overnight Finance Rate (SOFR) as its preferred alternative to LIBOR. The Adjustable Interest Rate (LIBOR) Act (the LIBOR Act) signed into law in March 2022, provides for the use of interest rates based on SOFR in certain contracts currently based on LIBOR and a safe harbor from liability for utilizing SOFR-based interest rates as a replacement for LIBOR. In December 2022, the Federal Reserve Board adopted a final rule implementing the LIBOR Act by identifying benchmark rates based on SOFR that will replace LIBOR in certain financial contracts after June 30, 2023. SOFR has different characteristics than LIBOR and may demonstrate less predictable behavior over time and across different monetary, market, and economic environments; therefore, it is unclear the extent to which SOFR will become a widely accepted replacement for LIBOR.

We are working to facilitate an orderly transition from USD LIBOR to alternative interest rate benchmarks for us and our clients and, in accordance with guidance from U.S. regulators, including the Federal Reserve Board, we stopped offering USD LIBOR in new contracts and began offering SOFR as an alternative to USD LIBOR in 2021. While some existing USD LIBOR loans will mature or be prepaid, a portion of our loans will remain and potentially require us to name a replacement index before June 30, 2023, the date USD LIBOR ceases. We are currently in the process of evaluating all such transitions. The language in our USD LIBOR-based contracts and financial instruments has developed over time and may have various events that trigger when a successor rate to the designated rate would be selected. If a trigger is satisfied, contracts and financial instruments may give a party discretion to determine the substitute index or indices for the calculation of interest rates to be selected. Additionally, the transition to alternative rates may change our market risk profile, requiring changes to risk and pricing models. While some instruments may contemplate a scenario where LIBOR is no longer available by providing an alternative rate setting methodology, not all instruments may have such provisions and there is significant uncertainty regarding the effectiveness of any such alternative methodologies. There continues to be uncertainty regarding the effect that these developments, any discontinuance, modification or other reforms to LIBOR or any other interest rate benchmarks, or the establishment of alternative reference rates may have on LIBOR or other interest rate benchmarks. Further, the transition away from the use of LIBOR and the adoption of alternative interest rate benchmarks, and uncertainty related to any such transition or adoption, has caused, and may in the future cause, us to recognize additional costs. It may also cause us to experience operational disruptions or result in client disputes or litigation, which may negatively impact our business, financial condition or results of operations.

Liquidity Risks

If we do not manage our liquidity effectively, our business could suffer.

Liquidity is essential for the operation of our business. Market conditions, unforeseen outflows of funds or other events could have a negative effect on our level or cost of funding, affecting our ongoing ability to accommodate liability maturities and deposit withdrawals, meet contractual obligations, and fund new business transactions at a reasonable cost and in a timely manner. If our access to stable and low-cost sources of funding, such as customer deposits, is reduced, we may need to use alternative funding, which could be more expensive or of limited availability. Further evolution in the regulatory requirements relating to liquidity and risk management also may impact us negatively. Additional regulations may impose more stringent liquidity requirements for large financial institutions, including the Corporation and the Bank. Given the overlap and complex interactions of these regulations with other regulatory changes, the full impact of the adopted and proposed regulations remains uncertain until their full implementation.

In addition, a significant portion of our business involves providing certain services to large, complex clients, which, by their nature, require substantial liquidity. Our failure to manage successfully the liquidity and balance sheet issues attendant to this portion of our business may have a negative impact on our ability to meet client needs and grow.

For more information on regulations and other regulatory changes relating to liquidity, see “Supervision and Regulation—Liquidity Standards” in Item 1, “Business.” Any substantial, unexpected or prolonged changes in the level or cost of liquidity could affect our business adversely.

If the Bank is unable to supply the Corporation with funds over time, the Corporation could be unable to meet its various obligations.

The Corporation is a legal entity separate and distinct from the Bank and the Corporation's other subsidiaries. The Corporation relies in large part on dividends paid to it by the Bank to meet its obligations and to pay dividends to stockholders of the Corporation. There are various legal limitations on the extent to which the Bank and the Corporation's other subsidiaries can supply funds to the Corporation by dividend or otherwise. Dividend payments by the Bank to the Corporation in the future will require continued generation of earnings by the Bank and could require regulatory approval under certain circumstances. For more information on dividend restrictions, see "Supervision and Regulation—Payment of Dividends" in Item 1, "Business."

We may need to raise additional capital in the future, which may not be available to us or may only be available on unfavorable terms.

We may need to raise additional capital to provide sufficient resources to meet our business needs and commitments, to accommodate the transaction and cash management needs of our clients, to maintain our credit ratings in response to regulatory changes, including capital rules, or for other purposes. However, our ability to access the capital markets, if needed, will depend on a number of factors, including the state of the financial markets. Rising interest rates, disruptions in financial markets, negative perceptions of our business or our financial strength, or other factors may impact our ability to raise additional capital, if needed, on terms acceptable to us. Any diminished ability to raise additional capital, if needed, could subject us to liability, restrict our ability to grow, require us to take actions that would affect our earnings negatively or otherwise affect our business and our ability to implement our business plan, capital plan and strategic goals adversely.

Any downgrades in our credit ratings, or an actual or perceived reduction in our financial strength, could affect our borrowing costs, capital costs and liquidity adversely.

Rating agencies publish credit ratings and outlooks on our creditworthiness and that of our obligations or securities, including long-term debt, short-term borrowings, preferred stock and other securities. Our credit ratings are subject to ongoing review by the rating agencies and thus may change from time to time based on a number of factors, including our own financial strength, performance, prospects and operations as well as factors not under our control, such as rating-agency-specific criteria or frameworks for our industry or certain security types, which are subject to revision from time to time, and conditions affecting the financial services industry generally.

Downgrades in our credit ratings may affect our borrowing costs, our capital costs and our ability to raise capital and, in turn, our liquidity adversely. A failure to maintain an acceptable credit rating also may preclude us from being competitive in certain products. Additionally, our counterparties, as well as our clients, rely on our financial strength and stability and evaluate the risks of doing business with us. If we experience diminished financial strength or stability, actual or perceived, a decline in our stock price or a reduced credit rating, our counterparties may be less willing to enter into transactions, secured or unsecured, with us, our clients may reduce or place limits on the level of services we provide them or seek other service providers, or our prospective clients may select other service providers, all of which may have other adverse effects on our business.

The risk that we may be perceived as less creditworthy relative to other market participants is higher in a market environment in which the consolidation, and in some instances failure, of financial institutions, including major global financial institutions, could result in a smaller number of larger counterparties and competitors. If our counterparties perceive us to be a less viable counterparty, our ability to enter into financial transactions on terms acceptable to us or our clients, on our or our clients' behalf, will be compromised materially. If our clients reduce their deposits with us or select other service providers for all or a portion of the services we provide to them, our revenues will decrease accordingly.

Regulatory and Legal Risks

Failure to comply with regulations and/or supervisory expectations can result in penalties and regulatory constraints that restrict our ability to grow or even conduct our business, or that reduce earnings.

Virtually every aspect of our business around the world is regulated, generally by domestic and foreign governmental agencies that have broad supervisory powers and the ability to impose sanctions. These regulations cover a variety of matters, including prohibited activities, required capital levels, resolution planning, human trafficking and modern slavery, and privacy and data protection. Some of these requirements are directed specifically at protecting depositors of the Bank, the federal deposit insurance fund and the banking system as a whole, not our stockholders or other security holders. Regulatory violations or the failure to meet formal or informal commitments made to regulators could generate penalties, require corrective actions that increase costs of conducting business, result in limitations on our ability to conduct business, restrict our ability to expand or impact our reputation adversely. Failure to obtain necessary approvals from regulatory agencies, whether formal or based upon supervisory expectations, on a timely basis could affect proposed business opportunities and results of operations adversely. Similarly, changes in laws or failure to comply with new requirements or with future changes in laws or regulations may impact our results of operations and financial condition negatively.

Changes by the U.S. and other governments to laws, regulations and policies applicable to the financial services industry may heighten the challenges we face and make regulatory compliance more difficult and costly.

Various regulatory bodies have demonstrated heightened enforcement scrutiny of financial institutions through many regulatory initiatives. These initiatives have increased compliance costs and regulatory risks and may lead to financial and reputational damage in the event of a compliance violation. While we have programs in place, including policies, training and various forms of monitoring, designed to ensure compliance with legislative and regulatory requirements, these programs and policies may not always protect us from conduct by individual employees. Governments and regulatory agencies may take further actions to change significantly the way financial institutions are regulated, either through new legislation, new regulations, new applications of existing regulations or a combination of all of these methods. We cannot currently predict the impact, if any, of these changes to our business. Additionally, governments and regulators may take actions that increase intervention in the normal operation of our businesses and the businesses of our competitors in the financial services industry, and these likely would involve additional legislative and regulatory requirements imposed on banks and other financial services companies. Any such actions could increase compliance costs and regulatory risks, lead to financial and reputational damage in the event of a violation, affect our ability to compete successfully, and also may impact the nature and level of competition in the industry in unpredictable ways. The full scope and impact of possible legislative or regulatory changes and the extent of regulatory activity is uncertain and difficult to predict.

For example, we are unable to predict what, if any, changes to financial services laws and regulations applicable to the financial services industry may be enacted by the U.S. Congress and what the impact of any such changes will be upon our business, financial condition, and results of operations. Moreover, the current U.S. presidential administration has made, and is expected to make further, changes in the leadership and senior staffs of the federal banking agencies which are likely to impact the rulemaking, supervision, examination and enforcement priorities and policies of such agencies, the potential impacts of which, if any, we cannot predict with certainty at this time.

We may be impacted adversely by claims or litigation, including claims or litigation relating to our fiduciary responsibilities.

Our businesses involve the risk that clients or others may sue us, claiming that we have failed to perform under a contract or otherwise failed to carry out a duty perceived to be owed to them. Our trust, custody and investment management businesses are particularly subject to this risk. This risk is heightened when we act as a fiduciary for our clients and may be further heightened during periods when credit, equity or other financial markets are deteriorating in value or are particularly volatile, or when clients or investors are experiencing losses. In addition, regulators, tax authorities and courts have increasingly sought to hold financial institutions liable for the misconduct of their clients where such regulators and courts 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 wrongdoing.

Claims made or actions brought against us, whether founded or unfounded, may result in injunctions, settlements, damages, fines or penalties, which could have a material adverse effect on our financial condition or results of operations or require changes to our business. Even if we defend ourselves successfully, the cost of litigation is often substantial, and public reports regarding claims made against us may cause damage to our reputation among existing and prospective clients or negatively impact the confidence of counterparties, rating agencies and stockholders, consequently affecting our earnings negatively.

We may be impacted adversely by supervisory and/or regulatory enforcement matters.

In the ordinary course of our business, we are subject to various governmental enforcement inquiries, supervisory examinations, investigations and subpoenas. These may be directed generally to participants in the businesses in which we are involved or may be directed specifically at us. In conjunction with both supervisory and enforcement matters, we may face limits on our ability to conduct or expand our business, be required to implement corrective actions that increase the costs of conducting business, or become subject to civil or criminal penalties or other remedial sanctions, any of which could result in reputational damage or otherwise have an adverse impact on us. For example, the current U.S. presidential administration, or future administrations, could support an enhanced regulatory enforcement agenda or propose new regulations that impose greater costs on financial services companies. Any such heightened enforcement activity or new regulations could have a material adverse effect on our business, financial condition and results of operations.

We may fail to set aside adequate reserves for, or otherwise underestimate our liability relating to, pending and threatened claims, with a negative effect on our earnings.

We estimate our potential liability for pending and threatened claims and record reserves when appropriate pursuant to generally accepted accounting principles (GAAP). The process is inherently subject to risk, including the risks that a judge or jury could decide a case contrary to our evaluation of the law or the facts or that a court could change or modify existing law on a particular issue important to the case. Our earnings will be adversely affected if our reserves are not adequate.

The ultimate impact on us of the United Kingdom's withdrawal from the European Union remains uncertain.
While the UK's withdrawal from the EU, commonly referred to as "Brexit," officially became effective on December 31, 2020, certain items remain to be negotiated; therefore, the final impact remains uncertain. In December 2020, the UK and the EU agreed on a trade and cooperation agreement that entered into force on May 1, 2021. While the trade and cooperation agreement covers the general objectives and framework of the relationship between the UK and the EU, it generally does not address the regulation of financial services. Instead, in March 2021, the UK and the EU agreed upon a framework for voluntary regulatory cooperation and dialogue on financial services issues between the parties in a memorandum of understanding, which is expected to be signed after certain formal steps are completed, although this has not yet occurred.

Consequently, the ultimate impact of Brexit on the Corporation and the Bank remains uncertain and will depend on the terms of the post-Brexit relationships that remain to be negotiated between the UK and other EU nations, particularly in the area of financial services. We have incurred, and may in the future continue to incur, costs associated with Brexit planning measures, while unforeseen political, regulatory, or other developments related to Brexit, or operational issues associated with any organizational restructuring related thereto, may result in additional costs and disruption to our UK and EU businesses. A failure to agree to a sustainable and practical financial services regulatory relationship between the UK and the EU, whether on the basis of equivalence, mutual recognition or otherwise, could harm our business, financial condition and results of operations. Any further exits from the EU, or the possibility of such exits, would likely cause additional market disruption globally and introduce new legal and regulatory uncertainties.

If we fail to comply with legal standards, we could incur liability to our clients or lose clients, which could affect our earnings negatively.
Managing or servicing assets with reasonable prudence in accordance with the terms of governing documents and applicable laws is an important part of our business. Failure to comply with the terms of governing documents and applicable laws, manage adequately the risks or manage appropriately the differing interests often involved in the exercise of fiduciary responsibilities may subject us to liability or cause client dissatisfaction, which may impact negatively our earnings and growth.

Strategic Risks

If we are not able to attract, retain and motivate personnel, our business could be negatively affected.
Our success depends, in large part, on our ability to attract new employees, retain and motivate our existing employees, and continue to compensate our employees competitively. Competition for the best employees in most activities in which we engage can be intense, and there can be no assurance that we will be successful in our efforts to recruit and retain necessary personnel. Factors that affect our ability to attract and retain talented and diverse employees include our compensation and benefits programs, our profitability and our reputation for rewarding and promoting qualified employees. Our ability to attract and retain key executives and other employees may be hindered as a result of existing and potential regulations applicable to incentive compensation and other aspects of our compensation programs. These regulations may not apply to some of our competitors and to other institutions with which we compete for talent. In addition, our current or future approach to in-office and remote work arrangements may not meet the needs or expectations of our current or prospective employees, may not be perceived as favorable as compared to the arrangements offered by competitors and may not be conducive to a collaborative working environment, which could adversely affect our ability to attract, retain and motivate employees. The unexpected loss of services of necessary personnel, both in businesses and corporate functions, could have a material adverse impact on our business because of their skills, knowledge of our markets, operations and clients, years of industry experience and, in some cases, the difficulty of promptly finding qualified replacement personnel. Similarly, the loss of necessary employees, either individually or as a group, could affect our clients' perception of our abilities adversely. The current competitive labor market may also have the effect of heightening many of these risks.

Our operations, businesses and clients could be materially adversely affected by the effects of climate change or concerns related thereto.

Risks related to climate change may impact our business, financial condition, and results of operations adversely. The physical risks of climate change include rising average global temperatures, rising sea levels, and an increase in the frequency and severity of extreme weather events. Such developments could disrupt our operations and resilience capabilities, those of our clients, or third parties on which we rely. Further, the consequences of climate change could negatively impact our clients' ability to pay outstanding loans, reduce the value of collateral, or result in insurance shortfalls.

Climate change could also result in transition risk arising from changes in regulations or market preferences toward a low-carbon economy. Changes in consumer and/or investor preferences, new legislation, and expanded regulatory requirements related to climate risk could adversely impact us or our clients. Our reputation and business prospects may also be damaged if we do not, or are perceived not to, effectively prepare for the potential business and operational opportunities and risks associated with climate change, including through the development and marketing of effective and competitive new products and services designed to address our clients' climate risk-related needs. These risks include negative market perception, diminished sales effectiveness and regulatory and litigation consequences associated with greenwashing claims or a failure to execute on our public climate-related commitments or driven by association with individuals, entities, industries or products that may be inconsistent with our stated positions on climate change issues. At the same time, certain financial institutions have also been subject to significant scrutiny by regulatory agencies and government officials and other criticism and negative publicity as a result of their decisions to reduce their involvement in certain industries or projects perceived to be associated with climate change. If we do not identify, quantify, and mitigate such risks successfully, we may experience financial losses, litigation, reputational harm, and losses of investor and stakeholder confidence.

Even as regulators begin to mandate additional disclosure of climate-related information by companies across sectors, there may continue to be a lack of information for more robust climate-related risk analyses. Third-party exposures to climate-related risks and other data generally are limited in availability and variable in quality. Modeling capabilities across the industry to analyze climate-related risks and interconnections are improving but remain incomplete. Legislative or regulatory uncertainties and changes regarding climate-related risk management and disclosures are likely to result in higher regulatory, compliance, credit, reputational and other risks and costs, and may subject us to evolving and potentially conflicting requirements in the various jurisdictions in which we operate.

If we do not develop and execute strategic plans successfully, our growth may be impacted negatively.

Our growth depends upon successful, consistent development and execution of our business strategies. A failure to develop and execute these strategies may impact growth negatively. A failure to grow organically or to integrate successfully an acquisition could have an adverse effect on our business. The challenges arising from generating organic growth or the integration of an acquired business may include preserving valuable relationships with employees, clients, suppliers and other business partners, delivering enhanced products and services, as well as combining accounting, data processing and internal control systems. To the extent we enter into transactions to acquire complementary businesses and/or technologies, we may not achieve the expected benefits of such transactions, which could result in increased costs, lowered revenues, ineffective deployment of capital, regulatory concerns, exit costs or diminished competitive position or reputation. These risks may be increased if the acquired company operates internationally or in a geographic location where we do not already have significant business operations.

Execution of our business strategies also may require certain regulatory approvals or consents, which may include approvals of the Federal Reserve Board and other domestic and non-U.S. regulatory authorities. These regulatory authorities have the ability to impose conditions on the activities or transactions contemplated by our business strategies which may impact negatively our ability to realize fully the expected benefits of certain opportunities. Further, acquisitions we announce may not be completed, or completed in the time frame anticipated, if we do not receive the required regulatory approvals, if regulatory approvals are significantly delayed or if other closing conditions are not satisfied.

We are subject to intense competition in all aspects of our businesses, which could have a negative effect on our ability to maintain satisfactory prices and grow our earnings.

We provide a broad range of financial products and services in highly competitive markets. We compete against large, well-capitalized, and geographically diverse companies that are capable of offering a wide array of financial products and services at competitive prices. In certain businesses, such as foreign exchange trading, electronic networks present a competitive challenge. Additionally, technological advances and the growth of internet-based commerce have made it possible for other types of institutions to offer a variety of products and services competitive with certain areas of our business. Many of these nontraditional service providers have fewer regulatory constraints and some have lower cost structures. The same may be said for competitors based in non-U.S. jurisdictions, where legal and regulatory environments may be more favorable than those applicable to the Corporation and the Bank as U.S.-domiciled financial institutions. These competitive pressures may have a negative effect on our earnings and ability to grow. Pricing pressures, as a result of the willingness of competitors to offer comparable or improved products or services at a lower price, also may result in a reduction in the price we can charge for our products and services, which could have, and in some cases has had, a negative effect on our ability to maintain or increase our profitability.

Damage to our reputation could have a direct and negative effect on our ability to compete, grow and generate revenue.

The failure or perceived failure to meet or appropriately address client expectations or fiduciary or other obligations, operational failures, legal and regulatory requirements, potential conflicts of interest, cybersecurity and privacy, social and sustainability concerns related to our business activities or any other of the risks discussed in this Item 1A could materially and adversely affect our reputation as well as our ability to attract and retain clients or employees. Additionally, the actual or alleged actions of our affiliates, vendors or other third parties with which we do business, the actual or alleged actions or statements of our employees or adverse publicity could negatively impact our reputation and significantly harm our business prospects. Damage to our reputation for delivery of a high level of service could undermine the confidence of clients and prospects in our ability to serve them and accordingly affect our earnings negatively. Damage to our reputation also could affect the confidence of rating agencies, regulators, stockholders and other parties in a wide range of transactions that are important to our business and the performance of our common stock. Failure to maintain our reputation ultimately could have an adverse effect on our ability to manage our balance sheet or grow our business. Actions by the financial services industry generally or by other members of or individuals in the financial services industry also could impact our reputation negatively or lead to a general loss of confidence in, or impact market perception of, financial institutions that could negatively affect us. Further, whereas negative public opinion once was driven primarily by adverse news coverage in traditional media, the proliferation of social media channels utilized by us and third parties, as well as the personal use of social media by our employees and others, may increase the risk of negative publicity, including through the rapid dissemination of inaccurate, misleading or false information, which could harm our reputation or have other negative consequences.

We need to invest in innovation constantly, and the inability or failure to do so may affect our businesses and earnings negatively.

Our success in the competitive environment in which we operate requires consistent investment of capital and human resources in innovation, particularly in light of the current “FinTech” environment, in which the financial services industry is undergoing rapid technological changes and financial institutions are investing significantly in evaluating new technologies, such as artificial intelligence, machine learning, blockchain and other distributed ledger technologies, and developing potentially industry-changing new products, services and industry standards. Our investment is directed at generating new products and services, and adapting existing products and services to the evolving standards and demands of the marketplace. Among other things, investing in innovation helps us maintain a mix of products and services that keeps pace with our competitors and achieve acceptable margins. Our investment also focuses on enhancing the delivery of our products and services in order to compete successfully for new clients or gain additional business from existing clients, and includes investment in technological innovation as well. Effectively identifying gaps or weaknesses in our product offerings also is important to our success. Failure to keep pace with our competition in any of these areas could affect our business opportunities, growth and earnings adversely. There are substantial risks and uncertainties associated with innovation efforts, including an increased risk that new and emerging technologies may expose us to increased cybersecurity and other information technology threats. We must invest significant time and resources in developing and marketing new products and services, and expected timetables for the introduction and development of new products or services may not be achieved and price and profitability targets may not be met. Further, our revenues and costs may fluctuate because new products and services generally require start-up costs while corresponding revenues take time to develop or may not develop at all.

Failure to understand or appreciate fully the risks associated with development or delivery of new product and service offerings may affect our businesses and earnings negatively.

The success of our innovation efforts depends, in part, on the successful implementation of new product and service initiatives. Not only must we keep pace with competitors in the development of these new offerings, but we must accurately price them (as well as existing products) on a risk-adjusted basis and deliver them to clients effectively. Our identification of risks arising from new products and services, both in their design and implementation, and effective responses to those identified risks, including pricing, is key to the success of our efforts at innovation and investment in new product and service offerings.

Our success with large, complex clients requires an understanding of the market and legal, regulatory and accounting standards in various jurisdictions.

A significant portion of our business involves providing certain services to large, complex clients which requires an understanding of the market and legal, regulatory and accounting standards in various jurisdictions. Any failure to understand, address or comply with those standards appropriately could affect our growth prospects or affect our reputation negatively. We identify and manage risk through our business strategies and plans and our risk management practices and controls. If we fail to identify and manage significant risks successfully, we could incur financial loss, suffer damage to our reputation that could restrict our ability to grow or conduct business profitably, or become subject to regulatory penalties or constraints that could limit some of our activities or make them significantly more expensive. In addition, our businesses and the markets in which we operate are continuously evolving. We may fail to understand fully the implications of changes in legal or regulatory requirements, our businesses or the financial markets or fail to enhance our risk framework to address those changes in a timely fashion. If our risk framework is ineffective, either because it fails to keep pace with changes in the financial markets, legal and regulatory requirements, our businesses, our counterparties, clients or service providers or for other reasons, we could incur losses, suffer reputational damage or find ourselves out of compliance with applicable regulatory or contractual mandates or expectations. These risks are magnified as client requirements become more complex and as our increasingly global business requires end-to-end management of operational and other processes across multiple time zones and many inter-related products and services.

We may take actions to maintain client satisfaction that result in losses or reduced earnings.

We may take action or incur expenses in order to maintain client satisfaction or preserve the usefulness of investments or investment vehicles we manage in light of changes in security ratings, liquidity or valuation issues or other developments, even though we are not required to do so by law or the terms of governing instruments. The risk that we will decide to take actions to maintain client satisfaction that result in losses or reduced earnings is greater in periods when credit or equity markets are deteriorating in value or are particularly volatile and liquidity in markets is disrupted.

Other Risks

The systems and models we employ to analyze, monitor and mitigate risks, as well as for other business purposes, are inherently limited, may not be effective in all cases and, in any case, cannot eliminate all risks that we face.

We use various systems and models in analyzing and monitoring several risk categories, as well as for other business purposes. While we assess and improve these systems and models on an ongoing basis, there can be no assurance that they, along with other related controls, will effectively mitigate risk under all circumstances, or that they will adequately mitigate any risk or loss to us. As with any systems and models, there are inherent limitations because they involve techniques and judgments that cannot anticipate every economic and financial outcome in the markets in which we operate, nor can they anticipate the specifics and timing of such outcomes. Further, these systems and models may fail to quantify accurately the magnitude of the risks we face or they may not be effective against all types of risk, including risks that are unidentified or unanticipated. Our measurement methodologies rely on many assumptions and historical analyses and correlations. These assumptions may be incorrect, and the historical correlations on which we rely may not continue to be relevant. Consequently, the measurements that we make may not adequately capture or express the true risk profiles of our businesses or provide accurate data for other business purposes, each of which ultimately could have a negative impact on our business, financial condition and results of operations. Errors in the underlying model or model assumptions, or inadequate model assumptions, could result in unanticipated and adverse consequences, including material loss or noncompliance with regulatory requirements or expectations.

Changes in tax laws and interpretations and tax challenges may affect our earnings negatively.

Both U.S. and non-U.S. governments and tax authorities, including states and municipalities, from time to time issue new, or modify existing, tax laws and regulations. These authorities may also issue new, or modify existing, interpretations of those laws and regulations. These new laws, regulations or interpretations, and our actions taken in response to, or reliance upon, such changes in the tax laws may impact our tax position in a manner that affects our earnings negatively.

In the course of our business, we are sometimes subject to challenges from U.S. and non-U.S. tax authorities, including states and municipalities, regarding the amount of taxes due. These challenges may result in adjustments to the timing or amount of taxable income, deductions, tax credits, or the allocation of income among tax jurisdictions, all of which may require a greater provision for taxes or otherwise affect earnings negatively.

Changes in accounting standards may be difficult to predict and could have a material impact on our consolidated financial statements.

New accounting standards, changes to existing accounting standards, or changes in the interpretation of existing accounting standards by the Financial Accounting Standards Board, the SEC or bank regulatory agencies, or otherwise reflected in GAAP, potentially could have a material impact on our financial condition and results of operations. These changes are difficult to predict and in some cases we could be required to apply a new or revised standard retroactively, resulting in the revised treatment of certain transactions or activities, or even the restatement of consolidated financial statements for prior periods.

Our ability to return capital to stockholders is subject to the discretion of our Board of Directors and may be limited by U.S. banking laws and regulations, applicable provisions of Delaware law, or our failure to pay full and timely dividends on our preferred stock and the terms of our outstanding debt.

Holders of our common stock are entitled to receive only such dividends and other distributions of capital as our Board of Directors may declare out of funds legally available for such payments under Delaware law. Although we have declared cash dividends on shares of our common stock historically, we are not required to do so. In addition to the approval of our Board of Directors, our ability to take certain actions, including our ability to pay dividends, repurchase stock, and make other capital distributions, is dependent upon, among other things, their payment being made in accordance with the capital plan rules and capital adequacy standards of the Federal Reserve Board.

A significant source of funds for the Corporation is dividends from the Bank. As a result, our ability to pay dividends on the Corporation's common stock will depend in large part on the ability of the Bank to pay dividends to the Corporation. There are various legal limitations on the extent to which the Bank and the Corporation's other subsidiaries can supply funds to the Corporation by dividend or otherwise. Dividend payments by the Bank to the Corporation in the future will require continued generation of earnings by the Bank and could require regulatory approval under certain circumstances. If the Bank is unable to pay dividends to the Corporation in the future, our ability to pay dividends on the Corporation's common stock would be affected adversely.

Our ability to declare or pay dividends on, or purchase, redeem or otherwise acquire, shares of our common stock or any of our shares that rank junior to our preferred stock as to the payment of dividends and/or the distribution of any assets on any liquidation, dissolution or winding-up of the Corporation also generally will be prohibited in the event that we do not declare and pay in full dividends on our Series D Non-Cumulative Perpetual Preferred Stock (Series D Preferred Stock) and Series E Non-Cumulative Perpetual Preferred Stock (Series E Preferred Stock). Further, in the future if we default on certain of our outstanding debt we will be prohibited from making dividend payments on our common stock until such payments have been brought current.

Any reduction or elimination of our common stock dividend, or even our failure to maintain the common stock dividend level in a manner comparable to our competitors, likely would have a negative effect on the market price of our common stock. For more information on dividend restrictions, see "Supervision and Regulation—Payment of Dividends" and "Supervision and Regulation—Capital Planning and Stress Testing" in Item 1, "Business."

Additionally, on October 19, 2021, we announced that our Board authorized a share repurchase program to repurchase up to 25.0 million shares of the Corporation's outstanding common stock. The Corporation retains the ability to repurchase when circumstances warrant and applicable regulation permits. The Inflation Reduction Act of 2022, which was signed into law in August 2022, imposes a 1% excise tax on the fair market value of stock repurchases after December 31, 2022. There have been recent proposals to significantly increase this excise tax rate. Any such material increases may impact our future strategies relating to the return of capital to our shareholders, including the size of, or execution against, current or future repurchase programs related to shares of our common stock.

ITEM 1B – UNRESOLVED STAFF COMMENTS

None.

ITEM 2 – PROPERTIES

The executive offices of the Corporation and the Bank are located at 50 South La Salle Street in Chicago. This Bank-owned building is occupied by various divisions of Northern Trust’s businesses. Adjacent to this building is one office building in which the Bank leases space principally for corporate support functions. Financial services are provided by the Bank and other subsidiaries of the Corporation through a network of offices in 25 U.S. states and Washington, D.C., and across 23 locations in Canada, Europe, the Middle East and the Asia-Pacific region. The majority of those offices are leased. The Bank’s other primary U.S. operations are located in five facilities: a leased facility at 333 South Wabash Avenue in Chicago; a leased facility in Tempe, Arizona; and one leased and two Bank-owned supplementary operations/data center buildings located in the western suburbs of Chicago. A majority of the Bank’s London-based staff is located at a leased facility at Canary Wharf in London. Additional support and operations activity originates from four facilities in India, two facilities in Ireland, and one facility in the Philippines, all of which are leased. The Bank and the Corporation’s other subsidiaries operate from various other facilities in North America, Europe, the Asia-Pacific region, and the Middle East, most of which are leased.

The Corporation believes that its owned and leased facilities are suitable and adequate for its business needs. The Corporation continues to evaluate its owned and leased facilities and may determine from time to time that certain of its facilities are no longer necessary for its operations. There is no assurance that the Corporation will be able to dispose of any excess facilities or that it will not incur costs in connection with such dispositions, which could be material to its operating results in a given period.

For additional information relating to properties and lease commitments, refer to Note 9, “Buildings and Equipment” and Note 10, “Lease Commitments,” included under Item 8, “Financial Statements and Supplementary Data,” and which information is incorporated herein by reference.

ITEM 3 – LEGAL PROCEEDINGS

The information presented under the caption “Legal Proceedings” in Note 25, “Commitments and Contingent Liabilities,” included under Item 8, “Financial Statements and Supplementary Data,” is incorporated herein by reference.

ITEM 4 – MINE SAFETY DISCLOSURES

Not applicable.

SUPPLEMENTAL ITEM – INFORMATION ABOUT OUR EXECUTIVE OFFICERS

The following sets forth certain information with regard to each executive officer of the Corporation.

Michael G. O'Grady - Mr. O'Grady, age 57, joined Northern Trust in 2011 and has served as Chairman of the Board since 2019, as Chief Executive Officer since 2018 and as President since 2017. Prior to that, Mr. O'Grady served as Executive Vice President and President of Corporate & Institutional Services from 2014 to 2016 and as Chief Financial Officer from 2011 to 2014. Before joining Northern Trust, Mr. O'Grady served as a Managing Director in Bank of America Merrill Lynch's Investment Banking Group.

Lauren E. Allnutt - Ms. Allnutt, age 46, joined Northern Trust in 2008 and has served as an Executive Vice President since 2020 and as Controller since 2019. Prior to that, Ms. Allnutt served as manager of Global Financial Control from 2014 to 2019 and led International Accounting Policy and Control from 2013 to 2014.

Peter B. Cherecwich - Mr. Cherecwich, age 58, joined Northern Trust in 2007 and has served as Executive Vice President and President of Asset Servicing since 2017. Prior to that, Mr. Cherecwich served as Executive Vice President and President of Global Fund Services from 2010 to 2017 and as Chief Operating Officer of Corporate & Institutional Services from 2008 to 2014. From 2007 to 2008, he served as Head of Institutional Strategy & Product Development. Before joining Northern Trust, Mr. Cherecwich served in several executive and operational roles at State Street Corporation.

Steven L. Fradkin - Mr. Fradkin, age 61, joined Northern Trust in 1985 and has served as Executive Vice President and President of Wealth Management since 2014. Prior to that, Mr. Fradkin served as President of Corporate & Institutional Services from 2009 to 2014. From 2004 to 2009, he served as Chief Financial Officer.

Mark C. Gossett - Mr. Gossett, age 61, joined Northern Trust in 1983 and has served as Executive Vice President and Chief Risk Officer since 2020. Prior to that, Mr. Gossett served as Chief Credit Officer and Head of Market and Liquidity Risk from 2014 to 2020 and as Co-Head of Global Foreign Exchange from 2012 to 2014. Mr. Gossett also previously served as the Chief Risk Officer of Asset Management from 2009 to 2012 and as the Chief Operating Officer of Asset Management from 2005 to 2009.

Susan C. Levy - Ms. Levy, age 65, joined Northern Trust in 2014 and has served as Executive Vice President and General Counsel since that time. Ms. Levy also previously served as Corporate Secretary from 2018 to 2021. Before joining Northern Trust, Ms. Levy served as Managing Partner of the law firm Jenner & Block from 2008 to 2014, where she was a partner since 1990.

Teresa A. Parker - Ms. Parker, age 62, joined Northern Trust in 1982 and has served as Executive Vice President and President of Europe, Middle East and Africa since 2017. Prior to that, Ms. Parker served as Chief Operating Officer of Corporate & Institutional Services from 2014 to 2017. From 2009 to 2014, she served as Executive Vice President, Corporate & Institutional Services for the Asia-Pacific region.

Thomas A. South - Mr. South, age 53, joined Northern Trust in 1999 and has served as Executive Vice President and Chief Information Officer since 2018. Prior to that, Mr. South served as Chief Business Architect from 2014 to 2018 and as Chief Operating Officer of Operations & Technology from 2013 to 2014.

Alexandria Taylor - Ms. Taylor, age 40, joined Northern Trust as Executive Vice President and Chief Human Resources Officer in October 2022. Prior to joining Northern Trust, Ms. Taylor spent nearly two decades at Bank of America based in New York City where she was the head of Human Resources for corporate, institutional and wealth management businesses. She also oversaw the team responsible for Global Human Resources regulatory relations. Prior to that, Ms. Taylor held positions of increasing responsibility and complexity at Bank of America.

Jason J. Tyler - Mr. Tyler, age 51, joined Northern Trust in 2011 and has served as Executive Vice President and Chief Financial Officer since 2020. Prior to that, Mr. Tyler served as Chief Financial Officer of Wealth Management from 2018 to 2019, as Global Head of Asset Management's Institutional Group from 2014 to 2018, and as Global Head of Strategy from 2011 to 2014. Before joining Northern Trust, Mr. Tyler served in certain executive and operational roles at Ariel Investments and Bank One/American National Bank.

All officers are appointed annually by the Board of Directors. Officers continue to hold office until their successors are duly elected or until their death, resignation or removal by the Board.

PART II

ITEM 5 – MARKET FOR REGISTRANT’S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Our common stock is listed on The NASDAQ Stock Market LLC under the symbol “NTRS.” There were 1,545 shareholders of record as of January 31, 2023.

The following table shows certain information relating to the Corporation’s purchases of common stock for the three months ended December 31, 2022.

TABLE 3: REPURCHASES OF COMMON STOCK IN THE FOURTH QUARTER OF 2022

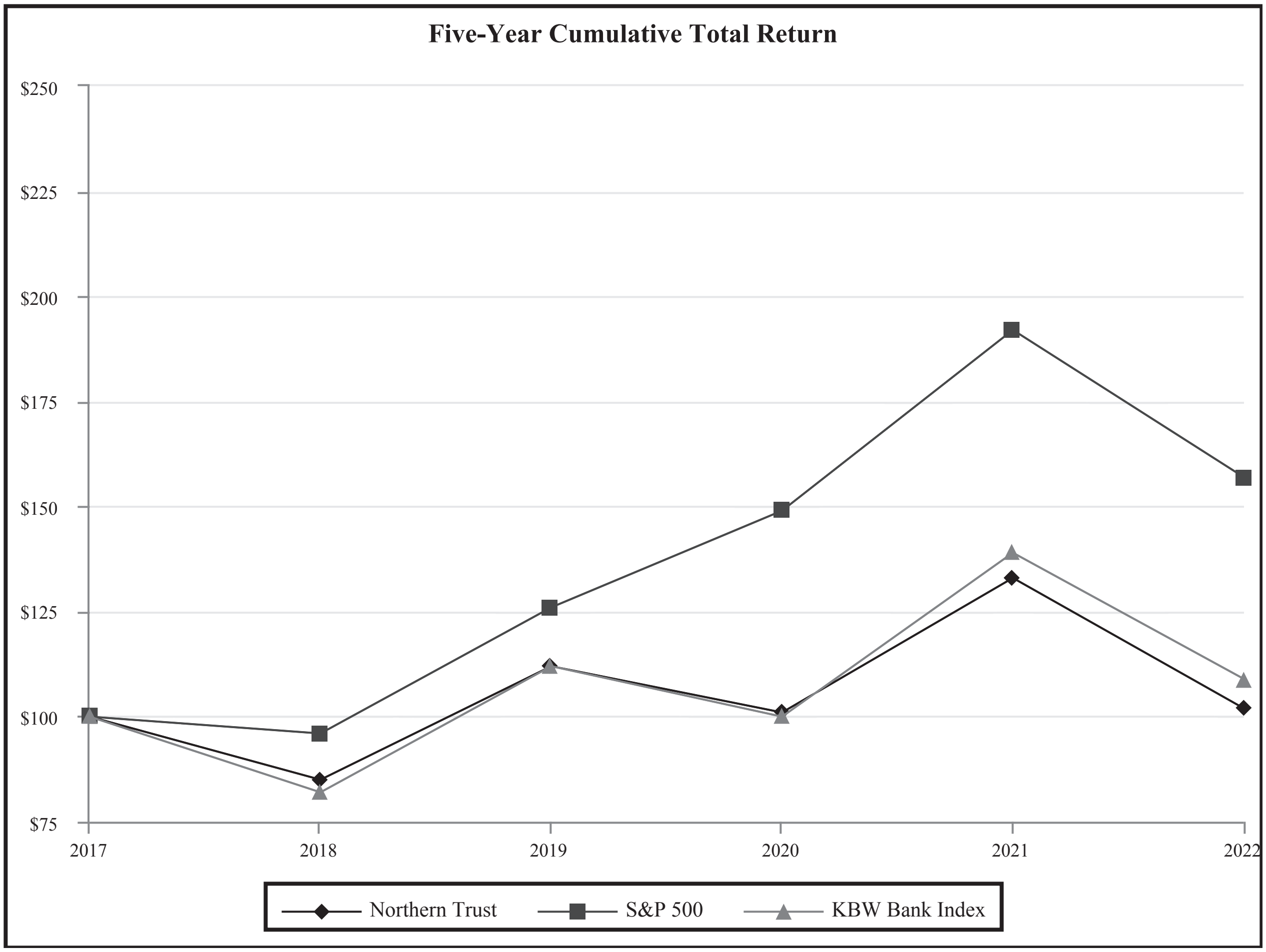
PERIOD	TOTAL NUMBER OF SHARES PURCHASED	AVERAGE PRICE PAID PER SHARE	TOTAL NUMBER OF SHARES PURCHASED AS PART OF A PUBLICLY ANNOUNCED PLAN	MAXIMUM NUMBER OF SHARES THAT MAY YET BE PURCHASED UNDER THE PLAN
October 1 - 31, 2022	—	$ —	—	25,000,000
November 1 - 30, 2022	—	—	—	25,000,000
December 1 - 31, 2022	—	—	—	25,000,000
Total (Fourth Quarter)	—	$ —	—	25,000,000

On October 19, 2021, the Corporation announced a share repurchase program under which the Corporation’s Board of Directors authorized the Corporation to repurchase up to 25.0 million shares of the Corporation’s common stock. The repurchase authorization approved by the Board of Directors has no expiration date, thus the Corporation retains the ability to repurchase when circumstances warrant and applicable regulation permits. For more information, please refer to Note 14, “Stockholders’ Equity,” provided in Item 8, “Financial Statements and Supplementary Data.”

COMPARISON OF FIVE-YEAR CUMULATIVE TOTAL RETURN

The following graph compares the cumulative total stockholder return on the Corporation's common stock to the cumulative total return of the S&P 500 Index and the KBW Bank Index for the five fiscal years ended December 31, 2022. The cumulative total stockholder return assumes the investment of $100 in the Corporation's common stock and in each index on December 31, 2017 and assumes reinvestment of dividends. The KBW Bank Index is a modified-capitalization-weighted index made up of 24 of the largest banking companies in the United States. The Corporation is included in the S&P 500 Index and the KBW Bank Index.

Total Return Assumes $100 Invested on
December 31, 2017 with Reinvestment of Dividends



	DECEMBER 31,					
	2017	2018	2019	2020	2021	**2022**
Northern Trust	$ 100	$ 85	$ 112	$ 101	$ 133	**$ 102**
S&P 500	100	96	126	149	192	**157**
KBW Bank Index	100	82	112	100	139	**109**

ITEM 6 – [RESERVED]

ITEM 7 – MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following is management's discussion and analysis of the financial condition and results of operations (MD&A) of Northern Trust Corporation (Corporation) for the year ended December 31, 2022. The following should be read in conjunction with the consolidated financial statements and related footnotes included in this report. Investors also should read the section entitled "Forward-Looking Statements."

BUSINESS OVERVIEW

The Corporation is a leading provider of wealth management, asset servicing, asset management and banking solutions to corporations, institutions, families and individuals. The Corporation focuses on managing and servicing client assets through its two client-focused reporting segments: Asset Servicing and Wealth Management. During the first quarter of 2022, the Corporation changed the name of its Corporate & Institutional Services segment to "Asset Servicing." Asset management and related services are provided to Asset Servicing and Wealth Management clients primarily by the Asset Management business.

The Corporation conducts business through various U.S. and non-U.S. subsidiaries, including The Northern Trust Company (the Bank). The Corporation was formed as a holding company for the Bank in 1971. The Corporation has a global presence with offices in 25 U.S. states and Washington, D.C., and across 23 locations in Canada, Europe, the Middle East and the Asia-Pacific region. Except where the context requires otherwise, the terms "Northern Trust," "we," "us," "our," "its," or similar terms refers to the Corporation and its subsidiaries on a consolidated basis.

FINANCIAL OVERVIEW

TABLE 4: FINANCIAL HIGHLIGHTS

	FOR THE YEAR ENDED DECEMBER 31,		
($ In Millions)	**2022**	2021	2020
Noninterest Income	**$ 4,874.0**	$ 5,081.8	$ 4,657.6
Net Interest Income	**1,887.2**	1,382.7	1,443.2
Total Revenue	**$ 6,761.2**	$ 6,464.5	$ 6,100.8
Provision for Credit Losses	**12.0**	(81.5)	125.0
Noninterest Expense	**4,982.9**	4,535.9	4,348.2
Income before Income Taxes	**$ 1,766.3**	$ 2,010.1	$ 1,627.6
Provision for Income Taxes	**430.3**	464.8	418.3
Net Income	**$ 1,336.0**	$ 1,545.3	$ 1,209.3
Preferred Stock Dividends	**41.8**	41.8	56.2
Net Income Applicable to Common Stock	**$ 1,294.2**	$ 1,503.5	$ 1,153.1
PER COMMON SHARE			
Net Income – Basic	**$ 6.16**	$ 7.16	$ 5.48
– Diluted	**6.14**	7.14	5.46
Cash Dividends Declared Per Common Share	**2.90**	2.80	2.80
Book Value – End of Period (EOP)	**49.78**	53.58	51.87
Market Price – EOP	**88.49**	119.61	93.14
SELECTED RATIOS AND METRICS			
Return on Average Common Equity	**12.7 %**	13.9 %	11.2 %
Return on Average Assets	**0.88**	0.99	0.88
Dividend Payout Ratio	**47.2**	39.2	51.3
Average Stockholders' Equity to Average Assets	**7.3**	7.5	8.2

Net Income decreased $209.3 million, or 14%, to $1.34 billion in 2022 from $1.55 billion in 2021. Earnings per diluted common share was $6.14 in 2022 compared to $7.14 in 2021. Return on average common equity decreased to 12.7% in 2022 from 13.9% in 2021. Included in Net Income were impacts from the changes in monetary policy implemented by the Federal Reserve Board to address inflation, which positively impacted Net Interest Income while dampening equity market indices, adversely impacting fees earned based on market values. Trust, Investment and Other Servicing Fees increased 2% in 2022, as compared to a 9% increase in 2021. The impacts of tightening in the labor market is reflected in our Compensation expense. Inflationary pressures were also reflected in higher Equipment and Software and Outside Services expense. Results in 2022 also included $213.0 million of pre-tax losses recognized in conjunction with an intent to sell certain available for sale debt securities, $44.1 million of pre-tax pension settlement charges, $32.0 million of pre-tax severance-related charges, and $14.0 million of pre-tax occupancy charges related to early lease exits.

Revenue increased $296.7 million to $6.76 billion in 2022 from $6.46 billion in the prior year, primarily driven by increases in Net Interest Income of 36% and Trust, Investment and Other Servicing Fees of 2%, partially offset by increased investment securities losses and a decrease in Other Operating Income of 22%. Beginning in 2022, Trust, Investment and Other Servicing Fees were impacted by the change in classification of certain fees that were previously recorded in Other Operating Income or as a reduction of Other Operating Expense. This change resulted in no impact to Net Income. The accounting reclassification increased Trust, Investment and Other Servicing Fees in the current year by $65.6 million, with a $25.6 million decrease in Other Operating Income and a $40.0 million increase in Other Operating Expense. The classification changes are considered by the Corporation's management to be a better representation of the underlying nature of the business as they are directly tied to client asset levels and the related services are more akin to our core service offerings. Prior-year amounts have not been reclassified.

Client AUC/A decreased 16% from $16.25 trillion as of December 31, 2021 to $13.60 trillion as of December 31, 2022, primarily reflecting unfavorable markets and unfavorable currency translation. Client assets under custody, a component of AUC/A, decreased 16% from $12.61 trillion as of December 31, 2021 to $10.60 trillion as of December 31, 2022. Client assets under custody included $6.91 trillion of global custody assets as of December 31, 2022, which decreased 16% from $8.24 trillion as of December 31, 2021. Client assets under management decreased 22% to $1.25 trillion as of December 31, 2022 from $1.61 trillion as of December 31, 2021 due to net outflows, unfavorable markets and unfavorable currency translation.

The Provision for Credit Losses in 2022 was $12.0 million as compared to a release of credit reserves of $81.5 million in 2021. The provision during 2022 was primarily due to an increase in the reserve evaluated on a collective basis, which relates to pooled financial assets sharing similar risk characteristics. The increase was driven by weaker macroeconomic conditions and portfolio growth, partially offset by improvements in credit quality. The increase in the collective basis reserve was primarily reflected in the commercial real estate and commercial and institutional portfolios. The prior-year release of credit reserves primarily reflected a decrease in the reserve evaluated on a collective basis, driven by improvements in projected economic conditions at the time and portfolio credit quality, partially offset by portfolio growth. The decrease in the collective basis reserve was primarily reflected in the commercial and institutional portfolio.

Noninterest Expense of $4.98 billion in 2022 increased $447.0 million, or 10%, from $4.54 billion in 2021, primarily reflecting increased Compensation, Equipment and Software, Other Operating Expense and Outside Services.

The Provision for Income Taxes in 2022 totaled $430.3 million, representing an effective tax rate of 24.4%. The Provision for Income Taxes in 2021 totaled $464.8 million, representing an effective tax rate of 23.1%. The increase in the effective tax rate was primarily driven by a higher net impact from international operations, including limitations on the U.S. foreign tax credit and reserves for uncertain tax positions, partially offset by increased tax benefits from tax-credit investments and tax-exempt income.

Northern Trust continued to maintain a strong capital position during 2022, with all capital ratios exceeding those required for classification as "well-capitalized" under federal bank regulatory capital requirements. For additional information, please refer to the "Capital Management" section.

CONSOLIDATED RESULTS OF OPERATIONS

The following information summarizes our consolidated results of operations for 2022 compared to 2021. For a discussion related to the consolidated results of operations for 2021 compared to 2020, refer to Part II, Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations in our Annual Report on Form 10-K for the year ended December 31, 2021 (2021 Form 10-K), which was filed with the United States Securities and Exchange Commission on February 28, 2022.

Revenue

Northern Trust generates the majority of its revenue from Noninterest Income that primarily consists of Trust, Investment and Other Servicing Fees. Net Interest Income comprises the remainder of revenue and consists of Interest Income generated by earning assets, net of Interest Expense on deposits and borrowed funds.

Revenue in 2022 of $6.76 billion increased $296.7 million, or 5%, from $6.46 billion in 2021. Noninterest Income represented 72% and 79% of total revenue in 2022 and 2021, respectively, and totaled $4.87 billion in 2022, which decreased $207.8 million, or 4%, from $5.08 billion in 2021.

Noninterest Income in 2022 decreased primarily due to increased investment securities losses and lower Other Operating Income, partially offset by higher Trust, Investment and Other Servicing Fees. Investment Security Gains (Losses), net of $214.0 million of losses in 2022 increased $213.7 million from $0.3 million of losses in 2021 primarily due to a $213 million loss arising from an intent to sell certain available for sale debt securities, which were sold in January 2023. Other Operating Income of $191.3 million in 2022 decreased $52.6 million, or 22%, from $243.9 million in the prior year, primarily due to lower miscellaneous income, the accounting reclassification, and gains from property sales in the prior-year, partially offset by increased income related to a bank-owned life insurance program. Trust, Investment and Other Servicing Fees of $4.43 billion in 2022 increased $71.5 million, or 2%, from $4.36 billion in 2021, primarily due to lower money market fee waivers, the accounting reclassification and new business, partially offset by unfavorable markets and unfavorable currency translation.

Net Interest Income on a fully taxable equivalent (FTE) basis in 2022 of $1.93 billion increased $514.5 million, or 36%, from $1.42 billion in 2021, due to higher average interest rates and favorable balance sheet mix shift. The net interest margin on an FTE basis increased to 1.39% in 2022 from 0.99% in 2021, primarily due to higher average interest rates and favorable balance sheet mix shift. Average earning assets decreased $5.0 billion, or 3%, from $143.9 billion in 2021 to $138.8 billion in 2022, primarily reflecting lower levels of Securities and short-term interest bearing deposits, partially offset by higher levels of Loans.

Additional information regarding Northern Trust's revenue by type is provided in the following table.

TABLE 5: REVENUE

	FOR THE YEAR ENDED DECEMBER 31,		
($ In Millions)	**2022**	2021	2020
Noninterest Income			
Trust, Investment and Other Servicing Fees	**$ 4,432.6**	$ 4,361.1	$ 3,995.0
Foreign Exchange Trading Income	**288.6**	292.6	290.4
Treasury Management Fees	**39.3**	44.3	45.4
Security Commissions and Trading Income	**136.2**	140.2	133.2
Other Operating Income	**191.3**	243.9	194.0
Investment Security Gains (Losses), net	**(214.0)**	(0.3)	(0.4)
Total Noninterest Income	**$ 4,874.0**	$ 5,081.8	$ 4,657.6
Net Interest Income[1]	**1,887.2**	1,382.7	1,443.2
Total Revenue	**$ 6,761.2**	$ 6,464.5	$ 6,100.8

[1] Net Interest Income stated on a GAAP basis. Net Interest Income on an FTE basis includes FTE adjustments of $45.6 million, $35.6 million, and $34.4 million for 2022, 2021, and 2020, respectively. A reconciliation of total consolidated revenue, Net Interest Income and net interest margin on a GAAP basis to revenue, Net Interest Income and net interest margin on an FTE basis, respectively, (each of which is a non-GAAP financial measure) is provided in "Supplemental Information—Reconciliation to Fully Taxable Equivalent" within this "Management's Discussion and Analysis of Financial Condition and Results of Operations" section.

Trust, Investment and Other Servicing Fees

Trust, Investment and Other Servicing Fees were $4.43 billion in 2022 compared with $4.36 billion in 2021, and are based primarily on the market value of assets held in custody, managed or serviced; the volume of transactions; securities lending volume and spreads; and fees for other services rendered. Certain market value calculations on which fees are based are performed on a monthly or quarterly basis in arrears.

Northern Trust voluntarily waived $64.2 million of money market fund fees in 2022 and $287.8 million of money market fund fees in 2021.

Beginning in 2022, Trust, Investment and Other Servicing Fees were impacted by the change in classification of certain fees that were previously recorded in Other Operating Income or as a reduction of Other Operating Expense. The accounting reclassification increased Trust, Investment and Other Servicing Fees in the current year by $65.6 million, with a $25.6 million decrease in Other Operating Income and a $40.0 million increase in Other Operating Expense. Prior-year amounts have not been reclassified.

The components of Trust, Investment and Other Servicing Fees are provided in the following table.

TABLE 6: TRUST, INVESTMENT AND OTHER SERVICING FEES

	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
($ In Millions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
Asset Servicing Trust, Investment and Other Servicing Fees					
Custody and Fund Administration	**$ 1,700.1**	$ 1,818.8	$ 1,586.1	**(7)%**	15 %
Investment Management	**555.1**	443.5	511.1	**25**	(13)
Securities Lending	**81.4**	76.7	88.0	**6**	(13)
Other	**159.7**	148.3	136.4	**8**	9
Total Asset Servicing Trust, Investment and Other Servicing Fees	**$ 2,496.3**	$ 2,487.3	$ 2,321.6	**— %**	7 %
Wealth Management Trust, Investment and Other Servicing Fees					
Central	**$ 692.6**	$ 698.7	$ 607.3	**(1)%**	15 %
East	**504.0**	509.3	442.1	**(1)**	15
West	**382.1**	380.2	337.7	**—**	13
Global Family Office	**357.6**	285.6	286.3	**25**	—
Total Wealth Management Trust, Investment and Other Servicing Fees	**$ 1,936.3**	$ 1,873.8	$ 1,673.4	**3 %**	12 %
Total Consolidated Trust, Investment and Other Servicing Fees	**$ 4,432.6**	$ 4,361.1	$ 3,995.0	**2 %**	9 %

Asset Servicing

Asset Servicing Trust, Investment and Other Servicing Fees are primarily attributable to services related to custody, fund administration, investment management, and securities lending. Custody and Fund Administration fees, the largest component of Asset Servicing fees, are driven primarily by values of client AUC/A, transaction volumes and the number of accounts. The asset values used to calculate these fees vary depending on the individual fee arrangements negotiated with each client. Custody fees related to asset values are client specific and are priced based on month-end market values, quarter-end market values, or the average of month-end market values for the quarter. The fund administration fees that are asset-value-related are priced using month-end, quarter-end, or average daily balances. Investment Management fees are based generally on market values of client assets under management throughout the period. Typically, the asset values used to calculate fee revenue are based on a one-month or one-quarter lag.

Securities Lending revenue is affected by market values; the demand for securities to be lent, which drives volumes; and the interest rate spread earned on the investment of cash deposited by investment firms as collateral for securities they have borrowed. The Other fee category in Asset Servicing includes such products as investment risk and analytical services, benefit payments, and other services. Revenue from these products is based generally on the volume of services provided or a fixed fee.

Custody and Fund Administration fees decreased in 2022 from 2021 primarily due to unfavorable currency translation and unfavorable markets. Investment Management fees in 2022 increased from 2021 primarily due to lower money market fund fee waivers, partially offset by asset outflows, unfavorable currency translation and unfavorable markets. Other Trust, Investment and Other Servicing Fees increased in 2022 from 2021 primarily due to the accounting reclassification.

The following tables provide a breakdown of the Asset Servicing assets under custody and under management.

TABLE 7: ASSET SERVICING ASSETS UNDER CUSTODY

	DECEMBER 31,			CHANGE	
($ In Billions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
North America	**$ 5,703.1**	$ 6,566.4	$ 5,746.4	**(13)%**	14 %
Europe, Middle East, and Africa	**3,037.6**	3,894.3	3,478.2	**(22)**	12
Asia Pacific	**823.3**	898.5	976.2	**(8)**	(8)
Securities Lending	**148.3**	195.6	186.9	**(24)**	5
Total Assets Under Custody	**$ 9,712.3**	$ 11,554.8	$ 10,387.7	**(16)%**	11 %

TABLE 8: ASSET SERVICING ASSETS UNDER MANAGEMENT

	DECEMBER 31,			CHANGE	
($ In Billions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
North America	**$ 586.0**	$ 789.2	$ 676.8	**(26)%**	17 %
Europe, Middle East, and Africa	**121.3**	148.5	143.5	**(18)**	4
Asia Pacific	**42.5**	57.7	50.3	**(26)**	15
Securities Lending	**148.3**	195.6	186.9	**(24)**	5
Total Assets Under Management	**$ 898.1**	$ 1,191.0	$ 1,057.5	**(25)%**	13 %

Cash and other assets deposited by investment firms as collateral for securities borrowed from custody clients are managed by Northern Trust and are included in assets under custody and under management. This securities lending collateral totaled $148.3 billion and $195.6 billion at December 31, 2022 and 2021, respectively.

Wealth Management

Wealth Management fee income is calculated primarily based on market values and is impacted by both one-month and one-quarter lagged asset values. Fee income in the regions (Central, East and West) decreased in 2022 from 2021 primarily due to unfavorable markets, partially offset by lower money market fund fee waivers. Global Family Office fee income increased primarily due to lower money market fund fee waivers and new business. The following tables provide a summary of Wealth Management assets under custody and under management.

TABLE 9: WEALTH MANAGEMENT ASSETS UNDER CUSTODY

	DECEMBER 31,			CHANGE	
($ In Billions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
Global Family Office	**$ 614.9**	$ 742.6	$ 600.7	**(17)%**	24 %
Central	**124.2**	139.1	120.0	**(11)**	16
East	**92.0**	105.0	89.1	**(12)**	18
West	**61.2**	70.8	65.3	**(13)**	8
Total Assets Under Custody	**$ 892.3**	$ 1,057.5	$ 875.1	**(16)%**	21 %

TABLE 10: WEALTH MANAGEMENT ASSETS UNDER MANAGEMENT

	DECEMBER 31,			CHANGE	
($ In Billions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
Global Family Office	**$ 119.9**	$ 144.9	$ 114.0	**(17)%**	27 %
Central	**110.2**	128.7	109.3	**(14)**	18
East	**71.4**	84.5	73.3	**(16)**	15
West	**49.9**	58.0	51.2	**(14)**	13
Total Assets Under Management	**$ 351.4**	$ 416.1	$ 347.8	**(16)%**	20 %

The Wealth Management regions shown are comprised of the following: Central includes Illinois, Michigan, Minnesota, Missouri, Ohio and Wisconsin; East includes Connecticut, Delaware, Florida, Georgia, Massachusetts, New York, Pennsylvania, and Washington, D.C.; West includes Arizona, California, Colorado, Nevada, Texas, and Washington. Global Family Office provides customized services, including but not limited to investment consulting, global custody, fiduciary, and private banking, to meet the complex financial needs of ultra-high-net-worth individuals and family offices across the globe.

Market Indices

The following tables present selected market indices and the percentage changes year over year to provide context regarding equity and fixed income market impacts on the Corporation's results.

TABLE 11: EQUITY MARKET INDICES

	DAILY AVERAGES			YEAR-END		
	2022	2021	**CHANGE**	**2022**	2021	**CHANGE**
S&P 500	**4,101**	4,271	**(4)%**	**3,840**	4,766	**(19)%**
MSCI EAFE (U.S. dollars)	**1,976**	2,289	**(14)**	**1,944**	2,336	**(17)**
MSCI EAFE (local currency)	**1,249**	1,294	**(4)**	**1,232**	1,362	**(10)**

TABLE 12: FIXED INCOME MARKET INDICES

	AS OF DECEMBER 31,		
	2022	2021	**CHANGE**
Barclays Capital U.S. Aggregate Bond Index	**2,049**	2,355	**(13)%**
Barclays Capital Global Aggregate Bond Index	**446**	532	**(16)**

Client Assets

Northern Trust, in the normal course of business, holds assets under custody/administration and management in a fiduciary or agency capacity for its clients. In accordance with GAAP, these assets are not assets of Northern Trust and are not included in its consolidated balance sheets. AUC/A and assets under management are a driver of our Trust, Investment and Other Servicing Fees. For the purposes of disclosing AUC/A, to the extent that both custody and administration services are provided, the value of the assets is included only once in this amount.

At December 31, 2022, AUC/A decreased from December 31, 2021, primarily reflecting unfavorable markets and unfavorable currency translation. Assets under custody, a component of AUC/A, at December 31, 2022, decreased from December 31, 2021 and included $6.91 trillion of global custody assets compared to $8.24 trillion at December 31, 2021.

The following table presents AUC/A by reporting segment.

TABLE 13: ASSETS UNDER CUSTODY/ADMINISTRATION BY REPORTING SEGMENT

	DECEMBER 31,			CHANGE	
($ In Billions)	**2022**	2021	2020	**2022 /2021**	2021 /2020
Asset Servicing	**$ 12,705.5**	$ 15,183.2	$ 13,653.1	**(16)%**	11 %
Wealth Management	**898.5**	1,065.6	879.4	**(16)**	21
Total Assets Under Custody/Administration	**$ 13,604.0**	$ 16,248.8	$ 14,532.5	**(16)%**	12 %

The following table presents assets under custody, a component of AUC/A, by reporting segment.

TABLE 14: ASSETS UNDER CUSTODY BY REPORTING SEGMENT

	DECEMBER 31,			CHANGE	
($ In Billions)	**2022**	2021	2020	**2022 /2021**	2021 / 2020
Asset Servicing	**$ 9,712.3**	$ 11,554.8	$ 10,387.7	**(16)%**	11 %
Wealth Management	**892.3**	1,057.5	875.1	**(16)**	21
Total Assets Under Custody	**$ 10,604.6**	$ 12,612.3	$ 11,262.8	**(16)%**	12 %

Consolidated assets under custody decreased from the prior year, primarily reflecting unfavorable markets and unfavorable currency translation.

The following table presents the investment allocation of Northern Trust's custodied assets by reporting segment.

TABLE 15: ALLOCATION OF ASSETS UNDER CUSTODY

	DECEMBER 31,								
	2022			2021			2020		
	AS	**WM**	**TOTAL**	AS	WM	TOTAL	AS	WM	TOTAL
Equities	**44 %**	**56 %**	**45 %**	47 %	61 %	48 %	46 %	62 %	47 %
Fixed Income Securities	**33**	**15**	**32**	35	13	33	36	15	34
Cash and Other Assets	**21**	**29**	**22**	16	26	17	16	23	17
Securities Lending Collateral	**2**	**—**	**1**	2	—	2	2	—	2

The following table presents Northern Trust's assets under custody by investment type.

TABLE 16: ASSETS UNDER CUSTODY BY INVESTMENT TYPE

	DECEMBER 31,			CHANGE	
($ In Billions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
Equities	**$ 4,810.7**	$ 6,049.1	$ 5,293.9	(20)%	14 %
Fixed Income Securities	**3,386.1**	4,139.6	3,870.9	(18)	7
Cash and Other Assets	**2,259.5**	2,228.0	1,911.1	1	17
Securities Lending Collateral	**148.3**	195.6	186.9	(24)	5
Total Assets Under Custody	**$ 10,604.6**	$ 12,612.3	$ 11,262.8	(16)%	12 %

The following table presents Northern Trust's assets under management by reporting segment.

TABLE 17: ASSETS UNDER MANAGEMENT BY REPORTING SEGMENT

	DECEMBER 31,			CHANGE	
($ In Billions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
Asset Servicing	**$ 898.1**	$ 1,191.0	$ 1,057.5	**(25)%**	13 %
Wealth Management	**351.4**	416.1	347.8	**(16)**	20
Total Assets Under Management	**$ 1,249.5**	$ 1,607.1	$ 1,405.3	**(22)%**	14 %

Assets under management at the end of 2022 decreased from 2021. The decrease primarily reflected net outflows, unfavorable markets and unfavorable currency translation.

The following tables present the investment allocation and management style of Northern Trust's assets under management by reporting segment.

TABLE 18: ASSETS UNDER MANAGEMENT BY INVESTMENT TYPE

	DECEMBER 31,								
	2022			2021			2020		
	AS	**WM**	**TOTAL**	AS	WM	TOTAL	AS	WM	TOTAL
Equities	**54%**	**53%**	**54%**	53%	55%	53%	52%	52%	52%
Fixed Income Securities	**12**	**23**	**15**	11	20	13	11	25	15
Cash and Other Assets	**17**	**24**	**19**	20	25	22	19	23	20
Securities Lending Collateral	**17**	**—**	**12**	16	—	12	18	—	13

TABLE 19: ASSETS UNDER MANAGEMENT BY MANAGEMENT STYLE

	DECEMBER 31,								
	2022			2021			2020		
	AS	**WM**	**TOTAL**	AS	WM	TOTAL	AS	WM	TOTAL
Index	**62 %**	**23 %**	**51 %**	60 %	24 %	50 %	58 %	24 %	50 %
Active	**35**	**37**	**36**	37	39	38	38	39	38
Multi-Manager	**3**	**10**	**5**	3	9	5	4	8	5
Other	**—**	**30**	**8**	—	28	7	—	29	7

Other Noninterest Income

The components of Other Noninterest Income, and a discussion of significant changes during 2022 and 2021, are provided below.

TABLE 20: OTHER NONINTEREST INCOME

	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
($ In Millions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
Foreign Exchange Trading Income	**$ 288.6**	$ 292.6	$ 290.4	**(1)%**	1 %
Treasury Management Fees	**39.3**	44.3	45.4	**(11)**	(3)
Security Commissions and Trading Income	**136.2**	140.2	133.2	**(3)**	5
Other Operating Income	**191.3**	243.9	194.0	**(22)**	26
Investment Security Gains (Losses), net	**(214.0)**	(0.3)	(0.4)	**N/M**	N/M
Total Other Noninterest Income	**$ 441.4**	$ 720.7	$ 662.6	**(39)%**	9 %

Beginning in 2022, Other Operating Income was impacted by the change in classification of certain fees to Trust, Investment and Other Servicing Fees. The impact to Other Operating Income in the current year was a decrease of $25.6 million relating to amounts now recorded in Trust, Investment and Other Servicing Fees. Prior-year amounts have not been reclassified.

Foreign Exchange Trading Income

Northern Trust provides foreign exchange services in the normal course of business as an integral part of its global custody services. Active management of currency positions, within conservative limits, also contributes to foreign exchange trading income. Foreign Exchange Trading Income in 2022 decreased from 2021, primarily driven by lower foreign exchange swap activity in Treasury, partially offset by higher client volumes.

Treasury Management Fees

Treasury Management Fees, generated from cash and treasury management products and services provided to clients, in 2022 decreased from 2021, primarily due to an increase in the earnings credit rate applied to client balances.

Security Commissions and Trading Income

Security Commissions and Trading Income, generated primarily from securities brokerage services provided by Northern Trust Securities, Inc., in 2022 decreased from 2021, primarily driven by lower interest rate swap activity and lower bond underwriting referral fees, partially offset by higher revenue from core brokerage.

Other Operating Income

Other Operating Income in 2022 decreased from 2021 primarily due to lower miscellaneous income, the accounting reclassification, and gains from property sales in the prior-year, partially offset by increased income related to a bank-owned life insurance program.

Please refer to Note 19, "Other Operating Income" included under Item 8, "Financial Statements and Supplementary Data," for additional details related to other operating income.

Investment Security Gains (Losses), Net

Investment Security Gains (Losses), net included a $213.0 million loss arising from an intent to sell $2.1 billion of available for sale debt securities, which were sold in January 2023 as part of a balance sheet repositioning.

Please refer to Note 34, "Subsequent Event" included under Item 8, "Financial Statements and Supplementary Data," for additional details related to the January 2023 sale of the available for sale debt securities.

Net Interest Income

Net Interest Income is defined as the total of Interest Income and amortized fees on earning assets, less Interest Expense on deposits and borrowed funds, adjusted for the impact of interest-related hedging activity. Earning assets — including Federal Funds Sold, Securities Purchased under Agreements to Resell, Interest-Bearing Due from and Deposits with Banks, Federal Reserve and Other Central Bank Deposits, Securities, Loans and Leases, and Other Interest-Earning Assets — are financed by a large base of interest-bearing funds that include client deposits, short-term borrowings, Senior Notes and Long-Term Debt. Short-term borrowings include Federal Funds Purchased, Securities Sold Under Agreements to Repurchase, and Other Borrowings. Earning assets also are funded by noninterest-related funds, which include demand deposits and Stockholders' Equity. Net Interest Income is subject to variations in the level and mix of earning assets and interest-bearing funds and their relative sensitivity to interest rates. In addition, the levels of nonaccruing assets and client compensating deposit balances used to pay for services impact Net Interest Income.

Net interest margin is the difference between what we earn on our assets and what we pay for deposits and other sources of funding. The direction and level of interest rates are important factors in our earnings. Net interest margin is calculated by dividing annualized Net Interest Income by average interest-earning assets.

Net Interest Income stated on an FTE basis is a non-GAAP financial measure that facilitates the analysis of asset yields. Management believes an FTE presentation provides a clearer indication of net interest margins for comparative purposes. When adjusted to an FTE basis, yields on taxable, nontaxable, and partially taxable assets are comparable; however, the adjustment to an FTE basis has no impact on Net Income. A reconciliation of Net Interest Income on a GAAP basis to Net Interest Income on an FTE basis is provided in "Supplemental Information—Reconciliation to Fully Taxable Equivalent" within this "Management's Discussion and Analysis of Financial Condition and Results of Operations" section.

The following tables present an analysis of average daily balances and interest rates affecting Net Interest Income and an analysis of Net Interest Income changes.

TABLE 21: AVERAGE CONSOLIDATED BALANCE SHEETS WITH ANALYSIS OF NET INTEREST INCOME (INTEREST AND RATE ON A FULLY TAXABLE EQUIVALENT BASIS)[1]

	2022			2021			2020		
($ In Millions)	INTEREST	AVERAGE BALANCE	AVERAGE RATE[7]	INTEREST	AVERAGE BALANCE	AVERAGE RATE[7]	INTEREST	AVERAGE BALANCE	AVERAGE RATE[7]
INTEREST-EARNING ASSETS									
Federal Reserve and Other Central Bank Deposits	$ 472.0	$ 36,248.8	1.30 %	$ 11.3	$ 39,028.2	0.03 %	$ 28.8	$ 27,904.2	0.10 %
Interest-Bearing Due from and Deposits with Banks[2]	46.6	4,192.5	1.11	9.1	5,779.7	0.16	22.4	5,400.8	0.41
Federal Funds Sold	0.1	5.5	3.22	—	0.1	0.41	—	2.3	1.37
Securities Purchased under Agreements to Resell[3]	103.7	1,071.2	9.68	3.5	1,067.4	0.33	3.9	1,253.1	0.31
Debt Securities									
Available For Sale	612.8	32,060.2	1.91	497.6	38,986.9	1.28	720.2	40,642.7	1.77
Held To Maturity	289.5	22,970.0	1.26	164.3	20,617.0	0.80	85.0	14,353.3	0.59
Trading Account	0.4	12.1	3.84	—	0.6	1.59	—	1.1	3.27
Total Debt Securities	902.7	55,042.3	1.64	661.9	59,604.5	1.11	805.2	54,997.1	1.46
Loans and Leases[4]	1,348.0	41,030.6	3.28	715.6	37,207.5	1.92	778.5	33,498.8	2.32
Other Interest-Earning Assets[5]	50.2	1,248.1	4.03	40.7	1,185.6	3.43	39.1	1,076.6	3.63
Total Interest-Earning Assets	2,923.3	138,839.0	2.11	1,442.1	143,873.0	1.00	1,677.9	124,132.9	1.35
Cash and Due from Banks and Other Central Bank Deposits[6]	—	2,069.5	—	—	2,285.9	—	—	2,603.0	—
Other Noninterest-Earning Assets	—	11,643.4	—	—	10,204.3	—	—	10,075.2	—
Total Assets	$ —	$152,551.9	— %	$ —	$156,363.2	— %	$ —	$136,811.1	— %
AVERAGE SOURCE OF FUNDS									
Deposits									
Savings, Money Market, and Other	$ 222.3	$ 30,205.0	0.74 %	$ 12.8	$ 28,339.0	0.05 %	$ 47.6	$ 23,396.4	0.20 %
Savings Certificates and Other Time	17.8	1,059.7	1.68	4.8	887.2	0.55	16.5	1,266.4	1.30
Non-U.S. Offices – Interest-Bearing	362.7	65,031.3	0.56	(78.9)	69,713.4	(0.11)	(15.7)	60,486.3	(0.03)
Total Interest-Bearing Deposits	602.8	96,296.0	0.63	(61.3)	98,939.6	(0.06)	48.4	85,149.1	0.06
Federal Funds Purchased	34.1	1,407.8	2.43	(0.4)	190.6	(0.19)	2.2	980.9	0.22
Securities Sold under Agreements to Repurchase[3]	90.7	433.6	20.94	0.2	232.0	0.07	1.0	218.3	0.47
Other Borrowings	126.2	5,463.5	2.31	14.2	5,049.8	0.28	45.3	6,401.1	0.71
Senior Notes	92.7	2,756.0	3.36	48.3	2,856.4	1.69	72.7	3,233.8	2.24
Long-Term Debt	44.0	1,258.9	3.49	21.1	1,166.1	1.81	26.5	1,189.2	2.24
Floating Rate Capital Debt	—	—	—	1.7	218.4	0.78	4.2	277.7	1.52
Total Interest-Related Funds	990.5	107,615.8	0.92	23.8	108,652.9	0.02	200.3	97,450.1	0.21
Interest Rate Spread	—	—	1.19	—	—	0.98	—	—	1.14
Demand and Other Noninterest-Bearing Deposits	—	29,296.4	—	—	31,143.5	—	—	23,362.0	—
Other Noninterest-Bearing Liabilities	—	4,558.3	—	—	4,869.8	—	—	4,806.4	—
Stockholders' Equity	—	11,081.4	—	—	11,697.0	—	—	11,192.6	—
Total Liabilities and Stockholders' Equity	$ —	$152,551.9	— %	$ —	$156,363.2	— %	$ —	$136,811.1	— %
Net Interest Income/Margin (FTE Adjusted)	$ 1,932.8	$ —	1.39 %	$ 1,418.3	$ —	0.99 %	$ 1,477.6	$ —	1.19 %
Net Interest Income/Margin (Unadjusted)	$ 1,887.2	$ —	1.36 %	$ 1,382.7	$ —	0.96 %	$ 1,443.2	$ —	1.16 %

(1) Northern Trust's non-U.S. activities are primarily related to its asset servicing, asset management, foreign exchange, cash management, and commercial banking businesses. The operations of Northern Trust are managed on a reporting segment basis and include components of both U.S and non-U.S. source income and assets. Non-U.S. source income and assets are not separately identified in Northern Trust's internal management reporting system. However, Northern Trust is required to disclose non-U.S. activities based on the domicile of the customer. Due to the complex and integrated nature of Northern Trust's activities, it is difficult to segregate with precision revenues, expenses and assets between U.S. and non-U.S.-domiciled customers. On the basis of averages, the percentage of total assets attributable to foreign activities was 18%, 19%, and 20% as of December 31, 2022, 2021 and 2020, respectively. On the basis of averages, the percentage of total liabilities attributable to foreign activities was 55%, 58%, and 56% as of December 31, 2022, 2021 and 2020, respectively. For additional information, refer to the Geographic Area Information section of Note 31, "Reporting Segments and Related Information," provided in Item 8, "Financial Statements and Supplementary Data."

(2) Interest-Bearing Due from and Deposits with Banks includes the interest-bearing component of Cash and Due from Banks and Interest-Bearing Deposits with Banks as presented on the consolidated balance sheets.

(3) Includes the impact of balance sheet netting under master netting arrangements of approximately $3.6 billion in 2022. Excluding the impact of netting, the average interest rate on Securities Purchased under Agreements to Resell would be approximately 2.23% in 2022. Excluding the impact of netting, the average interest rate on Securities Sold under Agreements to Repurchase would be approximately 2.27% in 2022. Beginning in the third quarter of 2021, Northern Trust became an approved Government Securities Division (GSD) netting and sponsoring member in the Fixed Income Clearing Corporation (FICC) sponsored member program, through which Northern Trust submits eligible repurchase and reverse repurchase transactions in U.S. Government securities between Northern Trust and its sponsored member clients for novation and clearing. Northern Trust nets securities sold under repurchase agreements against those purchased under resale agreements when FICC is the counterparty.

(4) Average balances include nonaccrual loans and leases.

(5) Other Interest-Earning Assets include certain community development investments, collateral deposits with certain securities depositories and clearing houses, and Federal Home Loan Bank and Federal Reserve stock, which are classified in Other Assets on the consolidated balance sheets.

(6) Cash and Due from Banks and Other Central Bank Deposits includes the noninterest-bearing component of Federal Reserve and Other Central Bank Deposits on the consolidated balance sheets.

(7) Rate calculations are based on actual balances rather than the rounded amounts presented in the Average Consolidated Balance Sheets with Analysis of Net Interest Income.

TABLE 22: ANALYSIS OF NET INTEREST INCOME CHANGES DUE TO VOLUME AND RATE

(INTEREST AND RATE ON A FULLY TAXABLE EQUIVALENT BASIS)	**2022/2021 CHANGE DUE TO**			2021/2020 CHANGE DUE TO		
(In Millions)	**AVERAGE BALANCE**	**AVERAGE RATE**	**NET (DECREASE) INCREASE**	AVERAGE BALANCE	AVERAGE RATE	NET (DECREASE) INCREASE
Increase (Decrease) in Net Interest Income (FTE)						
Federal Reserve and Other Central Bank Deposits	**$ (0.9)**	**$ 461.6**	**$ 460.7**	$ 7.8	$ (25.3)	$ (17.5)
Interest-Bearing Due from and Deposits with Banks	**(3.1)**	**40.6**	**37.5**	1.5	(14.8)	(13.3)
Federal Funds Sold	**0.1**	**—**	**0.1**	—	—	—
Securities Purchased under Agreements to Resell	**—**	**100.2**	**100.2**	(0.6)	0.2	(0.4)
Debt Securities						
Available For Sale	**(78.2)**	**193.4**	**115.2**	(6.4)	(216.2)	(222.6)
Held To Maturity	**20.6**	**104.6**	**125.2**	66.1	13.2	79.3
Trading Account	**0.4**	**—**	**0.4**	—	—	—
Total Debt Securities	**(57.2)**	**298.0**	**240.8**	59.7	(203.0)	(143.3)
Loans and Leases	**80.1**	**552.3**	**632.4**	164.0	(226.9)	(62.9)
Other Interest-Earning Assets	**$ 2.2**	**$ 7.3**	**$ 9.5**	$ 3.9	$ (2.3)	$ 1.6
Total Interest Income	**$ 21.2**	**$ 1,460.0**	**$ 1,481.2**	$ 236.3	$ (472.1)	$ (235.8)
Interest-Bearing Deposits						
Savings, Money Market and Other	**$ 1.0**	**$ 208.5**	**$ 209.5**	$ 7.8	$ (42.6)	$ (34.8)
Savings Certificates and Other Time	**1.1**	**11.9**	**13.0**	(4.0)	(7.7)	(11.7)
Non-U.S. Offices - Interest-Bearing	**(3.6)**	**445.2**	**441.6**	33.4	(96.6)	(63.2)
Total Interest-Bearing Deposits	**(1.5)**	**665.6**	**664.1**	37.2	(146.9)	(109.7)
Federal Funds Purchased	**7.7**	**26.8**	**34.5**	(0.8)	(1.8)	(2.6)
Securities Sold under Agreements to Repurchase	**0.2**	**90.3**	**90.5**	0.1	(0.9)	(0.8)
Other Borrowings	**1.3**	**110.7**	**112.0**	(8.1)	(23.0)	(31.1)
Senior Notes	**(1.8)**	**46.2**	**44.4**	(7.9)	(16.5)	(24.4)
Long-Term Debt	**1.8**	**21.1**	**22.9**	(0.5)	(4.9)	(5.4)
Floating Rate Capital Debt	**(1.7)**	**—**	**(1.7)**	(0.8)	(1.7)	(2.5)
Total Interest Expense	**$ 6.0**	**$ 960.7**	**$ 966.7**	$ 19.2	$ (195.7)	$ (176.5)
(Decrease) Increase in Net Interest Income (FTE)	**$ 15.2**	**$ 499.3**	**$ 514.5**	$ 217.1	$ (276.4)	$ (59.3)

[(1)] *Changes not due solely to average balance changes or rate changes are allocated proportionately to average balance and rate based on their relative absolute magnitudes.*

Notes: *Net Interest Income (FTE), a non-GAAP financial measure, includes adjustments to a fully taxable equivalent basis for loans, securities and other interest-earning assets. The adjustments are based on a federal income tax rate of 21.0%, where the rate is adjusted for applicable state income taxes, net of related federal tax benefit. Total taxable equivalent interest adjustments amounted to $45.6 million in 2022, $35.6 million in 2021 and $34.4 million in 2020. A reconciliation of Net Interest Income and net interest margin on a GAAP basis to Net Interest Income and net interest margin on an FTE basis (each of which is a non-GAAP financial measure) is provided in "Supplemental Information—Reconciliation to Fully Taxable Equivalent" within this "Management's Discussion and Analysis of Financial Condition and Results of Operations" section. Net interest margin is calculated by dividing annualized net interest income by average interest-earning assets.*

Interest revenue on cash collateral positions is reported above within Interest-Bearing Due from and Deposits with Banks and within Loans and Leases. Interest expense on cash collateral positions is reported above within Non-U.S. Offices Interest-Bearing Deposits. Related cash collateral received from and deposited with derivative counterparties is recorded net of the associated derivative contract in Other Assets and Other Liabilities, respectively.

Net Interest Income in 2022 increased from 2021. Net Interest Income, stated on an FTE basis, increased from 2021, due to a higher net interest margin, partially offset by lower levels of average earning assets. Average earning assets in 2022 decreased from 2021, primarily reflecting lower levels of Securities and short-term interest bearing deposits, partially offset by higher levels of Loans. Funding of the balance sheet reflected lower levels of client deposits, partially offset by higher short-term borrowing activity.

The net interest margin in 2022 increased from 2021. The net interest margin on an FTE basis in 2022 increased from 2021, primarily due to higher average interest rates and favorable balance sheet mix shift.

Federal Reserve and Other Central Bank Deposits averaged $36.2 billion in 2022, which decreased $2.8 billion, or 7%, from $39.0 billion in 2021, due to deposit outflows. Average Securities were $55.0 billion and decreased $4.6 billion, or 8%, from $59.6 billion in 2021. Average Other Interest-Earning Assets include certain community development investments, Federal Home Loan Bank stock, Federal Reserve stock, and collateral deposits with certain securities depositories and clearing houses, of $936.2 million, $149.3 million, $70.0 million, and $44.6 million respectively, which are recorded in Other Assets on the consolidated balance sheets. Average taxable Securities were $52.4 billion in 2022 and

$56.6 billion in 2021. Average nontaxable Securities, which represent securities that are primarily exempt from U.S. federal and state income taxes, were $2.6 billion in 2022 and $3.0 billion in 2021. Interest-Bearing Due From and Deposits with Banks averaged $4.2 billion in 2022 and $5.8 billion in 2021.

Loans and Leases averaged $41.0 billion, which increased $3.8 billion, or 10%, from $37.2 billion in 2021, primarily reflecting higher levels of commercial and institutional, non-U.S., commercial real estate, private client and residential real estate loans. Commercial and institutional loans averaged $12.3 billion and increased $1.9 billion, or 18%, from $10.4 billion for 2021. Non-U.S. loans averaged $3.5 billion and increased $946.8 million, or 37%, from $2.5 billion for 2021. Commercial real estate loans averaged $4.4 billion and increased $455.2 million, or 11%, from $4.0 billion for 2021. Private client loans averaged $13.9 billion and increased $191.3 million, or 1%, from $13.7 billion for 2021. Residential real estate loans averaged $6.4 billion and increased $161.9 million, or 3%, from $6.2 billion for 2021.

Northern Trust utilizes a diverse mix of funding sources. Average Interest-Bearing Deposits decreased $2.6 billion, or 3%, to $96.3 billion in 2022 from $98.9 billion in 2021. Average Interest-Related Funds decreased $1.1 billion, or 1%, to $107.6 billion in 2022 from $108.7 billion in 2021. The balances within short-term borrowing classifications vary based on funding requirements and strategies, interest rate levels, changes in the volume of lower-cost deposit sources, and the availability of collateral to secure these borrowings. Average net noninterest-related funds decreased $4.0 billion, or 11%, to $31.2 billion in 2022 from $35.2 billion in 2021, primarily resulting from lower levels of Demand and Other Noninterest-Bearing Deposits. Average Demand and Other Noninterest-Bearing Deposits decreased $1.9 billion , or 6%, to $29.3 billion in 2022 from $31.1 billion in 2021. The average rate on total source of funds was 0.70% in 2022 and 0.02% in 2021.

Interest expense for Interest-Bearing Deposits in the current year was driven by higher interest rates. Average Non-U.S. Offices Interest-Bearing Deposits comprised 68% and 70% of total average Interest-Bearing Deposits for the years ended December 31, 2022 and 2021, respectively.

Stockholders' Equity

Stockholders' Equity averaged $11.1 billion in 2022, compared with $11.7 billion in 2021. The decrease in average Stockholders' Equity of $615.6 million, or 5%, was primarily attributable to lower Accumulated Other Comprehensive Income relative to the prior year, partially offset by higher Retained Earnings. During the year ended December 31, 2022, the Corporation, through common stock dividends and repurchase of 311,536 shares of common stock, returned $648.4 million in capital to common stockholders. During the year ended December 31, 2021, the Corporation maintained its quarterly common stock dividend at $0.70 per share and repurchased 2,527,544 shares of common stock, returning $861.5 million in capital to common stockholders.

The Corporation's current stock repurchase authorization to repurchase up to 25.0 million shares was approved by the Board of Directors in October 2021. Shares are repurchased by the Corporation to, among other things, manage the Corporation's capital levels. Repurchased shares are used for general purposes, including the issuance of shares under stock option and other equity incentive plans. The repurchase authorization approved by the Board of Directors has no expiration date, thus the Corporation retains the ability to resume repurchases thereunder when circumstances warrant and applicable regulations permit. The 2021 purchases were predominantly made pursuant to the repurchase program authorized by the Board of Directors in July 2018. Please refer to Note 14, "Stockholders' Equity," provided in Item 8, "Financial Statements and Supplementary Data."

Provision for Credit Losses

There was a $12.0 million Provision for Credit Losses in 2022, as compared to a release of credit reserves of $81.5 million in 2021. The provision during 2022 was primarily due to an increase in the reserve evaluated on a collective basis, which relates to pooled financial assets sharing similar risk characteristics. The increase was driven by weaker macroeconomic conditions and portfolio growth, partially offset by improvements in credit quality. The increase in the collective basis reserve was primarily reflected in the commercial real estate and commercial and institutional portfolios. The prior-year release of credit reserves primarily reflected a decrease in the reserve evaluated on a collective basis, driven by improvements in projected economic conditions at the time and portfolio credit quality, partially offset by portfolio growth. The decrease in the collective basis reserve was primarily reflected in the commercial and institutional portfolio.

Net recoveries in 2022 totaled $4.2 million resulting from $6.0 million of charge-offs and $10.2 million of recoveries, compared to net recoveries of $6.3 million in 2021 resulting from $0.7 million of charge-offs and $7.0 million of recoveries.

For additional discussion of the Allowance for Credit Losses, refer to the "Asset Quality" section.

Noninterest Expense

Beginning in 2022, Other Operating Expense was impacted by the change in classification of certain amounts previously reported as a reduction of Other Operating Expense to Trust, Investment and Other Servicing Fees. The impact to Other Operating Expense in 2022 was $40.0 million relating to amounts now recorded in Trust, Investment and Other Servicing Fees rather than as a reduction of Other Operating Expense. Prior-year amounts have not been reclassified.

Noninterest Expense for 2022 increased from 2021, primarily reflecting increased Compensation, Equipment and Software, Other Operating Expense and Outside Services. Employee Benefits expense in 2022 included pension settlement charges of $44.1 million as compared to $27.9 million for the U.S. Qualified Plan.

The components of Noninterest Expense and a discussion of significant changes during 2022 and 2021 are provided below.

TABLE 23: NONINTEREST EXPENSE

	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
($ In Millions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
Compensation	**$ 2,248.0**	$ 2,011.0	$ 1,947.1	**12 %**	3 %
Employee Benefits	**437.4**	431.4	387.7	**1**	11
Outside Services	**880.3**	849.4	763.1	**4**	11
Equipment and Software	**838.8**	736.3	673.5	**14**	9
Occupancy	**219.1**	208.7	230.1	**5**	(9)
Other Operating Expense	**359.3**	299.1	346.7	**20**	(14)
Total Noninterest Expense	**$ 4,982.9**	$ 4,535.9	$ 4,348.2	**10 %**	4 %

Compensation

Compensation expense, the largest component of Noninterest Expense, increased in 2022 from 2021, primarily reflecting higher salary expense and equity incentives. The current year reflects $30.4 million of severance-related charges. Staff on a full-time equivalent basis totaled approximately 23,600 at December 31, 2022, up 12% from approximately 21,100 at December 31, 2021.

Employee Benefits

Employee Benefits expense in 2022 increased from 2021, primarily due to higher medical costs and pension settlement charge, partially offset by lower ongoing pension expense associated with a plan remeasurement. There were $44.1 million and $27.9 million of pension settlement charges in 2022 and 2021, respectively.

Outside Services

Outside Services expense in 2022 increased from 2021, primarily due to higher technical services costs and consulting services, partially offset by lower third-party advisory fees.

Equipment and Software

Equipment and Software expense in 2022 increased from 2021, primarily reflecting higher software costs driven by continued technology investments as well as amortization.

Occupancy

Occupancy expense in 2022 increased from 2021, primarily due to a $14.0 million charge related to early lease exits in 2022.

Other Operating Expense

Other Operating Expense in 2022 increased from 2021 primarily due to the accounting reclassification, higher staff-related expense and business promotion, partially offset by lower supplemental compensation plan expense. Please refer to Note 20, "Other Operating Expense" included under Item 8, "Financial Statements and Supplementary Data," for additional details related to other operating expenses.

Provision for Income Taxes

The 2022 Provision for Income Taxes was $430.3 million, representing an effective rate of 24.4%. This compares with a Provision for Income Taxes of $464.8 million and an effective rate of 23.1% in 2021. The increase in the effective tax rate was primarily driven by a higher net impact from international operations, including limitations on the U.S. foreign tax credit and reserves for uncertain tax positions, partially offset by increased tax benefits from tax-credit investments and tax-exempt income.

See Note 21, "Income Taxes," provided in Item 8, "Financial Statements and Supplementary Data," for more information on income taxes.

REPORTING SEGMENTS AND RELATED INFORMATION

The following information summarizes our consolidated results of operations by reporting segment for 2022 compared to 2021. For a discussion related to the consolidated results of operations by reporting segment for 2021 compared to 2020, refer to Part II, Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations in our 2021 Form 10-K, which was filed with the SEC on February 28, 2022.

Northern Trust is organized around its two client-focused reporting segments: Asset Servicing and Wealth Management. Asset management and related services are provided to Asset Servicing and Wealth Management clients primarily by the Asset Management business. The revenue and expenses of Asset Management and certain other support functions are allocated fully to Asset Servicing and Wealth Management.

Reporting segment financial information, presented on an internal management-reporting basis, is determined by accounting systems used to allocate revenue and expense to each segment, and incorporates processes for allocating assets, liabilities, equity and the applicable interest income and expense utilizing a funds transfer pricing (FTP) methodology. Under the methodology, assets and liabilities receive a funding charge or credit that considers interest rate risk, liquidity risk, and other product characteristics on an instrument level. Additionally, segment information is presented on an FTE basis as management believes an FTE presentation provides a clearer indication of net interest income. The adjustment to an FTE basis has no impact on Net Income.

Equity is allocated to the reporting segments based on a variety of factors including, but not limited to, risk, regulatory considerations, and internal metrics. Allocations of capital and certain corporate expense may not be representative of levels that would be required if the segments were independent entities. The accounting policies used for management reporting are consistent with those described in Note 1, "Summary of Significant Accounting Policies." Transfers of income and expense items are recorded at cost; there is no consolidated profit or loss on sales or transfers between reporting segments. Northern Trust's presentations are not necessarily consistent with similar information for other financial institutions.

Revenues, expenses and average assets are allocated to Asset Servicing and Wealth Management, with the exception of non-recurring activities such as certain costs associated with acquisitions, divestitures, litigation, restructuring, and tax adjustments not directly attributable to a specific reporting segment, which are reported within the Other segment.

Reporting segment results are subject to reclassification when organizational changes are made. The results are also subject to refinements in revenue and expense allocation methodologies, which are typically reflected on a prospective basis.

The following table presents the earnings and average assets for the Corporation.

TABLE 24: CONSOLIDATED FINANCIAL INFORMATION

	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
($ In Millions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
Noninterest Income					
Trust, Investment and Other Servicing Fees	**$ 4,432.6**	$ 4,361.1	$ 3,995.0	**2 %**	9 %
Foreign Exchange Trading Income	**288.6**	292.6	290.4	**(1)**	1
Other Noninterest Income	**152.8**	428.1	372.2	**(64)**	15
Total Noninterest Income	**4,874.0**	5,081.8	4,657.6	**(4)**	9
Net Interest Income	**1,887.2**	1,382.7	1,443.2	**36**	(4)
Revenue	**6,761.2**	6,464.5	6,100.8	**5**	6
Provision for Credit Losses	**12.0**	(81.5)	125.0	**N/M**	N/M
Noninterest Expense	**4,982.9**	4,535.9	4,348.2	**10**	4
Income before Income Taxes	**1,766.3**	2,010.1	1,627.6	**(12)**	24
Provision for Income Taxes	**430.3**	464.8	418.3	**(7)**	11
Net Income	**$ 1,336.0**	$ 1,545.3	$ 1,209.3	**(14)%**	28 %
Average Assets	**$ 152,551.9**	$ 156,363.2	$ 136,811.1	**(2)%**	14 %

Segment results are stated on an FTE basis which has no impact on Net Income. Net Interest Income on an FTE basis includes FTE adjustments of $45.6 million, $35.6 million, and $34.4 million for 2022, 2021, and 2020, respectively. A reconciliation of total consolidated revenue, Net Interest Income and net interest margin on a GAAP basis to revenue, Net Interest Income and net interest margin on an FTE basis, respectively, (each of which is a non-GAAP financial measure) is provided in "Supplemental Information—Reconciliation to Fully Taxable Equivalent" within this "Management's Discussion and Analysis of Financial Condition and Results of Operations" section.

Asset Servicing

Asset Servicing is a leading global provider of asset servicing and related services to corporate and public retirement funds, foundations, endowments, fund managers, insurance companies, sovereign wealth funds, and other institutional investors around the globe. Asset servicing and related services encompass a full range of capabilities including but not limited to: custody; fund administration; investment operations outsourcing; investment management; investment risk and analytical services; employee benefit services; securities lending; foreign exchange; treasury management; brokerage services; transition management services; banking; and cash management. Client relationships are managed through the Bank and the Bank's and the Corporation's other subsidiaries, including support from locations in North America, Europe, the Middle East, and the Asia-Pacific region. The following table summarizes the results of operations of Asset Servicing for the years ended December 31, 2022, 2021, and 2020 on a management-reporting basis.

TABLE 25: ASSET SERVICING RESULTS OF OPERATIONS

	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
($ In Millions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
Noninterest Income					
Trust, Investment and Other Servicing Fees	**$ 2,496.3**	$ 2,487.3	$ 2,321.6	**— %**	7 %
Foreign Exchange Trading Income	**281.0**	279.0	276.3	**1**	1
Other Noninterest Income	**250.7**	261.2	222.5	**(4)**	17
Total Noninterest Income	**3,028.0**	3,027.5	2,820.4	**—**	7
Net Interest Income[(1)]	**1,072.7**	637.2	665.5	**68**	(4)
Revenue[(1)]	**4,100.7**	3,664.7	3,485.9	**12**	5
Provision for Credit Losses	**2.4**	(33.8)	38.1	**N/M**	N/M
Noninterest Expense	**3,092.7**	2,863.0	2,752.7	**8**	4
Income before Income Taxes[(1)]	**1,005.6**	835.5	695.1	**20**	20
Provision for Income Taxes[(1)]	**243.2**	194.1	174.4	**25**	11
Net Income	**$ 762.4**	$ 641.4	$ 520.7	**19 %**	23 %
Percentage of Consolidated Net Income	**57 %**	41 %	43 %		
Average Assets	**$ 115,646.4**	$ 120,883.2	$ 104,790.6	**(4)%**	15 %

(1) *Non-GAAP financial measures stated on an FTE basis.*

Asset Servicing Net Income

Asset Servicing Net Income increased in 2022 compared to 2021, primarily reflecting higher Net Interest Income and Trust, Investment and Other Servicing Fees, partially offset by higher Noninterest Expense, Provision for Income Taxes, a provision for credit losses compared to a release in the prior year, and lower Other Noninterest Income.

Asset Servicing Trust, Investment and Other Servicing Fees

For an explanation of Asset Servicing Trust, Investment, and Other Servicing Fees, please see the "Trust, Investment, and Other Servicing Fees" section within the Consolidated Results of Operations section of the MD&A.

Asset Servicing Other Noninterest Income

Other Noninterest Income for 2022 decreased from 2021, primarily due to lower Other Operating Income and Treasury Management Fees, partially offset by higher Security Commissions and Trading Income.

Asset Servicing Net Interest Income

Net Interest Income on an FTE basis increased in 2022 from 2021, due to a higher net interest margin, partially offset by a decrease in average earning assets. Net interest margin on an FTE basis increased to 1.03% from 0.60%. Average earning assets of $104.8 billion, decreased $6.2 billion, or 6%, from $111.0 billion in the prior year. The earning assets in Asset Servicing consisted primarily of intercompany assets and loans. Funding sources were primarily comprised of non-U.S. custody-related interest-bearing deposits, which averaged $65.0 billion in 2022 as compared to $69.7 billion in 2021.

Asset Servicing Provision for Credit Losses

There was a Provision for Credit Losses of $2.4 million for 2022 compared to a release of credit reserves of $33.8 million for 2021. The 2022 Provision for Credit Losses was primarily due to weaker macroeconomic conditions. The release of credit reserves during 2021 reflected a decrease in the reserve evaluated on a collective basis driven by improvements in projected economic conditions at the time and portfolio credit quality.

Asset Servicing Noninterest Expense

Asset Servicing Noninterest Expense, which includes the direct expense of the reporting segment, indirect expense allocations for product and operating support, and indirect expense allocations for certain corporate support services, increased in 2022 from 2021. The increase primarily reflects higher expense allocations and Compensation expense.

Wealth Management

Wealth Management focuses on high-net-worth individuals and families, business owners, executives, professionals, retirees, and established privately-held businesses in its target markets. In supporting these targeted segments, Wealth Management provides trust, investment management, custody, and philanthropic services; financial consulting; guardianship and estate administration; family business consulting; family financial education; brokerage services; and private and business banking. Wealth Management also includes Global Family Office, which provides customized services, including but not limited to: investment consulting; global custody; fiduciary; and private banking; family office consulting, and technology solutions, to meet the complex financial and reporting needs of ultra-high-net-worth individuals and family offices across the globe. Wealth Management is one of the largest providers of advisory services in the United States with AUC/A, and assets under management of $898.5 billion, $892.3 billion, and $351.4 billion, respectively, at December 31, 2022. Wealth Management services are delivered by multidisciplinary teams through a network of offices in 19 U.S. states and Washington, D.C., as well as offices in London, Guernsey, and Abu Dhabi.

The following table summarizes the results of operations of Wealth Management for the years ended December 31, 2022, 2021, and 2020 on a management-reporting basis.

TABLE 26: WEALTH MANAGEMENT RESULTS OF OPERATIONS

	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
($ In Millions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
Noninterest Income					
Trust, Investment and Other Servicing Fees	**$ 1,936.3**	$ 1,873.8	$ 1,673.4	**3 %**	12 %
Foreign Exchange Trading Income	**7.6**	13.6	14.1	**(44)**	(4)
Other Noninterest Income	**137.7**	188.2	168.0	**(27)**	12
Total Noninterest Income	**2,081.6**	2,075.6	1,855.5	**—**	12
Net Interest Income[(1)]	**860.1**	781.1	812.1	**10**	(4)
Revenue[(1)]	**2,941.7**	2,856.7	2,667.6	**3**	7
Provision for Credit Losses	**9.6**	(47.7)	86.9	**N/M**	N/M
Noninterest Expense	**1,815.5**	1,651.1	1,559.7	**10**	6
Income before Income Taxes[(1)]	**1,116.6**	1,253.3	1,021.0	**(11)**	23
Provision for Income Taxes[(1)]	**310.0**	317.0	291.8	**(2)**	9
Net Income	**$ 806.6**	$ 936.3	$ 729.2	**(14)%**	28 %
Percentage of Consolidated Net Income	**60 %**	61 %	60 %		
Average Assets	**$ 36,905.5**	$ 35,480.0	$ 32,020.5	**4 %**	11 %

[(1)] *Non-GAAP financial measures stated on an FTE basis.*

Wealth Management Net Income

Wealth Management Net Income decreased in 2022, primarily reflecting higher Noninterest Expense, a provision for credit losses compared to a release of credit reserves in the prior year, and lower Other Noninterest Income, partially offset by higher Net Interest Income and Trust, Investment and Other Servicing Fees.

Wealth Management Trust, Investment and Other Servicing Fees

For an explanation of Wealth Management Trust, Investment, and Other Servicing Fees, please see the "Trust, Investment, and Other Servicing Fees" section within the Consolidated Results of Operations section of the MD&A.

Wealth Management Foreign Exchange Trading Income

Foreign Exchange Trading Income for 2022 decreased from 2021, primarily due to lower allocations.

Wealth Management Other Noninterest Income

Other Noninterest Income for 2022 decreased from 2021, primarily due to lower Other Operating Income due to prior-year gains on property sales and lower allocations.

Wealth Management Net Interest Income

Net Interest Income on an FTE basis for 2022 increased from 2021, primarily attributable to an increase in earning assets and net interest margin. Net interest margin on an FTE basis increased to 2.53% from 2.47%. Average earning assets of $34.0 billion in 2022, increased $1.2 billion, or 4%, from $32.8 billion in 2021. Earning assets and funding sources for the year ended December 31, 2022 were primarily comprised of loans and domestic interest-bearing deposits, respectively.

Wealth Management Provision for Credit Losses

There was a Provision for Credit Losses of $9.6 million for 2022 compared to a release of credit reserves of $47.7 million in 2021. The Provision for Credit Losses during 2022 was primarily due to an increase in the reserve evaluated on a collective basis, driven by weaker economic conditions and portfolio growth, partially offset by improvements in portfolio quality. The increase in the collective basis reserve was primarily reflected in the commercial and institutional and commercial real estate portfolios. The 2021 release of credit reserves reflected a decrease in the reserve evaluated on a collective basis driven by improvements in projected economic conditions at the time and portfolio credit quality, partially offset by portfolio growth.

Wealth Management Noninterest Expense

Wealth Management Noninterest Expense, which includes the direct expense of the reporting segment, indirect expense allocations for product and operating support, and indirect expense allocations for certain corporate support services, increased in 2022 from 2021. The increase primarily reflects higher expense allocations and Compensation expense.

Other

Income and expenses associated with non-recurring activities such as certain costs associated with acquisitions, divestitures, litigation, restructuring, and tax adjustments are included within Other. The following table summarizes the results of operations of the Other segment for the years ended December 31, 2022, 2021, and 2020 on a management-reporting basis.

TABLE 27: OTHER RESULTS OF OPERATIONS

	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
($ In Millions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
Noninterest Income	**$ (235.6)**	$ (21.3)	$ (18.3)	**N/M**	N/M
Net Interest Income[1]	**—**	—	—	**N/M**	N/M
Revenue[1]	**(235.6)**	(21.3)	(18.3)	**N/M**	N/M
Noninterest Expense	**74.7**	21.8	35.8	**N/M**	(39)
Income (Loss) before Income Taxes[1]	**(310.3)**	(43.1)	(54.1)	**N/M**	N/M
Provision (Benefit) for Income Taxes[1]	**(77.3)**	(10.7)	(13.5)	**N/M**	N/M
Net Income	**$ (233.0)**	$ (32.4)	$ (40.6)	**N/M**	N/M
Percentage of Consolidated Net Income	**(17)%**	(2)%	(3)%		
Average Assets	**$ —**	$ —	$ —	**N/M**	N/M

[1] *Non-GAAP financial measures stated on an FTE basis.*

Other—Noninterest Income

Noninterest Income in 2022 decreased from 2021 primarily due to a $213.0 million loss recognized in Investment Security Gains (Losses), net on the consolidated statements of income arising from an intent to sell available for sale debt securities, which were sold in January 2023.

Other—Noninterest Expense

Noninterest Expense in 2022 increased from 2021, primarily due to higher non-allocated occupancy expense due to early lease exits and higher pension settlement charges compared to the prior year.

Asset Management

Asset Management, through the Corporation's various subsidiaries, supports the Asset Servicing and Wealth Management reporting segments by providing a broad range of asset management and related services and other products to clients around the world. Investment solutions are delivered through separately managed accounts, bank common and collective funds, registered investment companies, exchange traded funds, non-U.S. collective investment funds, and unregistered private investment funds. Asset Management's capabilities include active and passive equity; active and passive fixed income; cash management; multi-asset and alternative asset classes (such as private equity and hedge funds of funds); and multi-manager advisory services and products. Asset Management's activities also include overlay services and other risk management services. Asset Management operates internationally through subsidiaries and distribution arrangements and its revenue and expense are allocated fully to Asset Servicing and Wealth Management.

At December 31, 2022, Northern Trust managed $1.25 trillion in assets for personal and institutional clients, including $898.1 billion for Asset Servicing clients and $351.4 billion for Wealth Management clients. The following table presents consolidated assets under management as of December 31, 2022, 2021 and 2020 by investment type.

TABLE 28: CONSOLIDATED ASSETS UNDER MANAGEMENT BY INVESTMENT TYPE

	DECEMBER 31,			CHANGE	
($ In Billions)	**2022**	2021	2020	**2022 / 2021**	2021 / 2020
Equities	**$ 671.3**	$ 856.5	$ 733.7	**(22)%**	17 %
Fixed Income Securities	**186.5**	216.1	204.8	**(14)**	6
Cash and Other Assets	**243.4**	338.9	279.9	**(28)**	21
Securities Lending Collateral	**148.3**	195.6	186.9	**(24)**	5
Total Assets Under Management	**$ 1,249.5**	$ 1,607.1	$ 1,405.3	**(22)%**	14 %

Assets under management decreased at year-end 2022 from year-end 2021. The decrease primarily reflected net outflows, unfavorable markets and unfavorable currency translation. The following table presents activity in consolidated assets under management by product during the years ended December 31, 2022, 2021 and 2020.

TABLE 29: ACTIVITY IN CONSOLIDATED ASSETS UNDER MANAGEMENT BY PRODUCT

($ In Billions)	**2022**	2021	2020
Balance as of January 1	**$ 1,607.1**	$ 1,405.3	$ 1,231.3
Inflows by Product			
Equities	**187.7**	292.9	193.0
Fixed Income	**48.7**	63.7	65.0
Cash and Other Assets	**643.2**	810.2	802.4
Securities Lending Collateral	**235.3**	270.6	268.8
Total Inflows	**1,114.9**	1,437.4	1,329.2
Outflows by Product			
Equities	**(231.9)**	(321.0)	(212.6)
Fixed Income	**(55.5)**	(56.2)	(68.5)
Cash and Other Assets	**(743.2)**	(745.4)	(746.5)
Securities Lending Collateral	**(282.6)**	(261.9)	(245.0)
Total Outflows	**(1,313.2)**	(1,384.5)	(1,272.6)
Net Inflows (Outflows)	**(198.3)**	52.9	56.6
Market Performance, Currency & Other			
Market Performance & Other	**(143.0)**	159.8	109.1
Currency	**(16.3)**	(10.9)	8.3
Total Market Performance, Currency & Other	**(159.3)**	148.9	117.4
Balance as of December 31	**$ 1,249.5**	$ 1,607.1	$ 1,405.3

CONSOLIDATED BALANCE SHEET REVIEW

The following tables summarize selected consolidated balance sheet information.

TABLE 30: SELECT CONSOLIDATED BALANCE SHEET INFORMATION

($ In Billions)	DECEMBER 31, 2022	DECEMBER 31, 2021	CHANGE	
Assets				
Federal Reserve and Other Central Bank Deposits	**$ 40.0**	$ 64.5	$ (24.5)	(38)%
Interest-Bearing Due from and Deposits with Banks[(1)]	**4.9**	3.9	1.0	28
Securities Purchased under Agreements to Resell	**1.1**	0.7	0.4	56
Total Securities	**51.8**	61.6	(9.8)	(16)
Loans and Leases	**42.9**	40.5	2.4	6
Other Interest-Earning Assets[(2)]	**1.8**	1.1	0.7	49
Total Earning Assets	**142.5**	172.3	(29.8)	(17)
Total Assets	**155.0**	183.9	(28.9)	(16)
Liabilities and Stockholders' Equity				
Total Interest-Bearing Deposits	**98.6**	111.6	(13.0)	(12)
Demand and Other Noninterest-Bearing Deposits	**25.3**	48.3	(23.0)	(48)
Federal Funds Purchased	**1.9**	—	1.9	N/M
Securities Sold under Agreements to Repurchase	**0.6**	0.5	0.1	7
Other Borrowings	**7.6**	3.6	4.0	112
Total Stockholders' Equity	**11.3**	12.0	(0.7)	(6)

(1) Interest-Bearing Due from and Deposits with Banks includes the interest-bearing component of Cash and Due from Banks and Interest-Bearing Deposits with Banks as presented on the consolidated balance sheets.

(2) Other Interest-Earning Assets includes certain community development investments, collateral deposits with certain securities depositories and clearing houses, and Federal Home Loan Bank and Federal Reserve stock, which are classified in Other Assets on the consolidated balance sheets.

TABLE 31: SELECT AVERAGE CONSOLIDATED BALANCE SHEET INFORMATION

	TWELVE MONTHS ENDED DECEMBER 31,			
($ In Billions)	2022	2021	CHANGE	
Assets				
Federal Reserve and Other Central Bank Deposits	**$ 36.2**	$ 39.0	$ (2.8)	(7)%
Interest-Bearing Due from and Deposits with Banks[(1)]	**4.2**	5.8	(1.6)	(27)
Securities Purchased under Agreements to Resell	**1.1**	1.1	—	—
Total Securities	**55.0**	59.6	(4.6)	(8)
Loans and Leases	**41.0**	37.2	3.8	10
Other Interest-Earning Assets[(2)]	**1.3**	1.2	0.1	5
Total Earning Assets	**138.8**	143.9	(5.1)	(3)
Total Assets	**152.6**	156.4	(3.8)	(2)
Liabilities and Stockholders' Equity				
Total Interest-Bearing Deposits	**96.3**	98.9	(2.6)	(3)
Demand and Other Noninterest-Bearing Deposits	**29.3**	31.1	(1.8)	(6)
Federal Funds Purchased	**1.4**	0.2	1.2	N/M
Securities Sold under Agreements to Repurchase	**0.4**	0.2	0.2	87
Other Borrowings	**5.5**	5.0	0.5	8
Total Stockholders' Equity	**11.1**	11.7	(0.6)	(5)

(1) Interest-Bearing Due from and Deposits with Banks includes the interest-bearing component of Cash and Due from Banks and Interest-Bearing Deposits with Banks as presented on the consolidated balance sheets.

(2) Other Interest-Earning Assets includes certain community development investments, collateral deposits with certain securities depositories and clearing houses, and Federal Home Loan Bank and Federal Reserve stock, which are classified in Other Assets on the consolidated balance sheets.

Average balances are considered to be a better measure of balance sheet trends, as period-end balances can be impacted by the timing of deposit and withdrawal activity involving large client balances.

Short-Term Borrowings. Short-term borrowings includes Federal Funds Purchased, Securities Sold under Agreements to Repurchase, and Other Borrowings. Securities Sold under Agreements to Repurchase are accounted for as collateralized financings and recorded at the amounts at which the securities were sold plus accrued interest. To minimize any potential credit risk associated with these transactions, the fair value of the securities sold is monitored, limits are set on exposure with counterparties, and the financial condition of counterparties is regularly assessed. Securities Sold under Agreements to Repurchase are held by the counterparty until the repurchase. See Note 5, “Securities Purchased Under Agreements to Resell and Securities Sold Under Agreements to Repurchase,” Note 25, “Commitments and Contingent Liabilities” and Note 27, “Offsetting of Assets and Liabilities” to the consolidated financial statements provided in Item 8, “Financial Statements and Supplementary Data” for additional information on Northern Trust’s repurchase and reverse repurchase agreements.

Stockholders’ Equity. The decrease in average Stockholders’ Equity was primarily attributable to lower Accumulated Other Comprehensive Income relative to the prior year, partially offset by higher Retained Earnings.

During the year ended December 31, 2022, the Corporation declared cash dividends totaling $613.0 million to common stockholders and repurchased 311,536 shares of common stock, all of which were shares withheld to satisfy tax withholding obligations related to share-based compensation, at a total cost of $35.4 million ($113.70 average price per share). During the year ended December 31, 2022, the Corporation declared cash dividends totaling $41.8 million to preferred stockholders.

During the year ended December 31, 2021, the Corporation declared cash dividends totaling $593.9 million to common stockholders and repurchased 2,527,544 shares of common stock, including 394,326 shares withheld to satisfy tax withholding obligations related to share-based compensation, at a total cost of $267.6 million ($105.90 average price per share). During the year ended December 31, 2021, the Corporation declared cash dividends totaling $41.8 million to preferred stockholders.

Asset Quality

Securities Portfolio

The following table presents the remaining maturity and average yield of Northern Trust's held to maturity (HTM) debt securities and available for sale (AFS) debt securities by security type as of December 31, 2022.

TABLE 32: REMAINING MATURITY AND AVERAGE YIELD OF HELD TO MATURITY AND AVAILABLE FOR SALE DEBT SECURITIES

	DECEMBER 31, 2022										
	TOTAL		ONE YEAR OR LESS		ONE TO FIVE YEARS		FIVE TO TEN YEARS		OVER TEN YEARS		
($ in Millions)	BOOK	YIELD	BOOK	YIELD	BOOK	YIELD	BOOK	YIELD	BOOK	YIELD	AVERAGE MATURITY
Held to Maturity Debt Securities											
U.S. Government	$ 50.0	3.32%	$ 50.0	3.32%	$ —	—%	$ —	— %	$ —	—%	2 mos.
Obligations of States and Political Subdivisions	2,565.3	2.76	36.4	3.28	753.0	3.42	1,325.5	3.32	450.4	3.92	81 mos.
Government Sponsored Agency	9,407.7	1.90	879.8	1.99	2,957.6	2.02	3,629.7	1.80	1,940.6	1.88	81 mos.
Non-U.S. Government	3,234.0	0.45	1,742.3	0.42	1,344.7	0.49	147.0	0.49	—	—	19 mos.
Corporate Debt	713.3	0.36	91.8	0.12	606.4	0.41	15.1	(0.20)	—	—	28 mos.
Covered Bonds	2,530.3	0.85	410.5	1.22	1,699.8	0.88	420.0	0.37	—	—	38 mos.
Certificates of Deposit	35.9	11.88	35.9	11.88	—	—	—	—	—	—	0 mos.
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	5,703.3	0.88	1,019.0	1.37	4,554.6	0.81	129.7	(0.23)	—	—	31 mos.
Other Asset-Backed	263.7	1.76	88.6	1.55	102.9	2.08	72.2	1.58	—	—	69 mos.
Other	532.6	1.17	46.5	1.51	301.2	1.22	34.5	2.55	150.4	0.66	104 mos.
Total Held to Maturity Debt Securities	$25,036.1	1.42%	$ 4,400.8	1.21%	$12,320.2	1.24%	$ 5,773.7	1.96 %	$2,541.4	1.47%	56 mos.
Available for Sale Debt Securities											
U.S. Government	$ 2,747.4	1.87%	$ 1,574.5	1.72%	$ 1,172.9	2.08%	$ —	— %	$ —	—%	20 mos.
Obligations of States and Political Subdivisions	787.6	2.15	—	—	105.5	2.43	646.5	2.10	35.6	2.29	77 mos.
Government Sponsored Agency	11,545.2	3.67	2,404.0	3.60	5,441.7	3.72	2,962.5	3.71	737.0	3.27	48 mos.
Non-U.S. Government	360.0	1.16	101.1	2.61	258.9	0.59	—	—	—	—	31 mos.
Corporate Debt	1,747.6	1.98	551.8	2.41	1,180.3	1.79	14.8	1.20	0.7	1.20	21 mos.
Covered Bonds	388.7	2.89	159.2	3.36	229.5	2.56	—	—	—	—	22 mos.
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	2,479.4	1.96	494.3	2.42	1,802.7	1.89	182.4	1.39	—	—	32 mos.
Other Asset-Backed	5,256.2	3.40	848.6	1.71	3,035.5	3.04	1,219.7	5.24	152.4	5.27	41 mos.
Commercial Mortgage-Backed	1,387.8	3.86	17.5	3.53	1,145.3	4.11	225.0	2.60	—	—	46 mos.
Total Available for Sale Debt Securities	$26,699.9	3.08%	$ 6,151.0	2.64%	$14,372.3	3.00%	$ 5,250.9	3.73 %	$ 925.7	3.56%	41 mos.

Note: Yield is calculated on amortized cost and presented on a taxable equivalent basis giving effect to the applicable federal and state tax rates.

Northern Trust maintains a high quality debt securities portfolio. Debt securities not explicitly rated were grouped where possible under the credit rating of the issuer of the security. The following tables provide the fair value of AFS debt securities and amortized cost of HTM debt securities by credit rating.

TABLE 33: FAIR VALUE OF AVAILABLE FOR SALE DEBT SECURITIES BY CREDIT RATING

	AS OF DECEMBER 31, 2022					
($ In Millions)	**AAA**	**AA**	**A**	**BBB**	**NOT RATED**	**TOTAL**
U.S. Government	**$ 2,747.4**	**$ —**	**$ —**	**$ —**	**$ —**	**$ 2,747.4**
Obligations of States and Political Subdivisions	**136.4**	**651.2**	**—**	**—**	**—**	**787.6**
Government Sponsored Agency	**11,545.2**	**—**	**—**	**—**	**—**	**11,545.2**
Non-U.S. Government	**360.0**	**—**	**—**	**—**	**—**	**360.0**
Corporate Debt	**302.5**	**462.6**	**938.7**	**19.6**	**24.2**	**1,747.6**
Covered Bonds	**367.0**	**—**	**21.7**	**—**	**—**	**388.7**
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	**1,816.3**	**451.5**	**211.6**	**—**	**—**	**2,479.4**
Other Asset-Backed	**5,256.2**	**—**	**—**	**—**	**—**	**5,256.2**
Commercial Mortgage-Backed	**1,387.8**	**—**	**—**	**—**	**—**	**1,387.8**
Total	**$ 23,918.8**	**$ 1,565.3**	**$ 1,172.0**	**$ 19.6**	**$ 24.2**	**$ 26,699.9**
Percent of Total	**90 %**	**6 %**	**4 %**	**— %**	**— %**	**100 %**

	AS OF DECEMBER 31, 2021					
($ In Millions)	AAA	AA	A	BBB	NOT RATED	TOTAL
U.S. Government	$ 2,426.1	$ —	$ —	$ —	$ —	$ 2,426.1
Obligations of States and Political Subdivisions	1,133.2	2,742.9	—	—	—	3,876.1
Government Sponsored Agency	18,075.6	—	—	—	—	18,075.6
Non-U.S. Government	374.0	—	—	—	—	374.0
Corporate Debt	442.0	466.2	1,206.6	29.4	197.5	2,341.7
Covered Bonds	364.1	—	23.5	—	118.0	505.6
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	2,030.9	783.7	230.5	—	—	3,045.1
Other Asset-Backed	5,941.6	—	—	—	—	5,941.6
Commercial Mortgage-Backed	1,424.7	—	—	—	—	1,424.7
Total	$ 32,212.2	$ 3,992.8	$ 1,460.6	$ 29.4	$ 315.5	$ 38,010.5
Percent of Total	84 %	11 %	4 %	— %	1 %	100 %

As of December 31, 2022, the less than 1% of AFS debt securities not rated by Moody's Investors Service, Inc. (Moody's), S&P Global Ratings (S&P Global) or Fitch Ratings, Inc. (Fitch Ratings) consisted of corporate debt securities.

As of December 31, 2021, the 1% of AFS debt securities not rated by Moody's, S&P Global or Fitch Ratings consisted of corporate debt securities and covered bonds.

TABLE 34: AMORTIZED COST OF HELD TO MATURITY DEBT SECURITIES BY CREDIT RATING

	AS OF DECEMBER 31, 2022					
($ In Millions)	**AAA**	**AA**	**A**	**BBB**	**NOT RATED**	**TOTAL**
U.S. Government	**$ 50.0**	**$ —**	**$ —**	**$ —**	**$ —**	**$ 50.0**
Obligations of States and Political Subdivisions	**926.8**	**1,638.5**	**—**	**—**	**—**	**2,565.3**
Government Sponsored Agency	**9,407.7**	**—**	**—**	**—**	**—**	**9,407.7**
Non-U.S. Government	**762.2**	**926.5**	**1,223.0**	**322.3**	**—**	**3,234.0**
Corporate Debt	**2.1**	**305.7**	**405.5**	**—**	**—**	**713.3**
Covered Bonds	**2,530.3**	**—**	**—**	**—**	**—**	**2,530.3**
Certificates of Deposit	**—**	**—**	**—**	**—**	**35.9**	**35.9**
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	**4,171.3**	**1,502.0**	**28.9**	**1.1**	**—**	**5,703.3**
Other Asset-Backed	**263.7**	**—**	**—**	**—**	**—**	**263.7**
Other	**65.8**	**—**	**—**	**—**	**466.8**	**532.6**
Total	**$ 18,179.9**	**$ 4,372.7**	**$ 1,657.4**	**$ 323.4**	**$ 502.7**	**$ 25,036.1**
Percent of Total	**73 %**	**17 %**	**7 %**	**1 %**	**2 %**	**100 %**

	AS OF DECEMBER 31, 2021					
(In Millions)	AAA	AA	A	BBB	NOT RATED	TOTAL
U.S. Government	$ 47.0	$ —	$ —	$ —	$ —	$ 47.0
Obligations of States and Political Subdivisions	—	0.8	—	—	—	0.8
Government Sponsored Agency	5,927.6	—	—	—	—	5,927.6
Non-U.S. Government	398.0	942.6	4,088.8	343.9	—	5,773.3
Corporate Debt	2.3	386.7	512.8	—	—	901.8
Covered Bonds	2,942.4	—	—	—	—	2,942.4
Certificates of Deposit	—	—	—	—	674.7	674.7
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	4,207.6	1,858.0	31.3	1.1	—	6,098.0
Other Asset-Backed	682.6	—	—	—	—	682.6
Other	—	—	—	—	516.3	516.3
Total	$ 14,207.5	$ 3,188.1	$ 4,632.9	$ 345.0	$ 1,191.0	$ 23,564.5
Percent of Total	60 %	14 %	20 %	1 %	5 %	100 %

As of December 31, 2022 and December 31, 2021, 2% and 5%, respectively, of HTM debt securities not rated by Moody's, S&P Global or Fitch Ratings consisted of certificates of deposit with a remaining life of less than six months, as well as investments purchased by Northern Trust to fulfill its obligations under the Community Reinvestment Act (CRA). Northern Trust fulfills its obligations under the CRA by making qualified investments for purposes of supporting institutions and programs that benefit low-to-moderate income communities within Northern Trust's market area.

Net unrealized losses within the investment securities portfolio totaled $3.2 billion at December 31, 2022, compared to net unrealized losses of $187.1 million as of December 31, 2021. Net unrealized losses as of December 31, 2022 were comprised of $9.1 million and $3.2 billion of gross unrealized gains and losses, respectively. Net unrealized losses as of December 31, 2021 were comprised of $345.1 million and $532.2 million of gross unrealized gains and losses, respectively.

As of December 31, 2022, the $26.7 billion AFS debt securities portfolio had unrealized losses of $351.6 million, $288.1 million, and $157.6 million related to government sponsored agency, other asset-backed, and sub-sovereign, supranational and non-U.S. agency bonds, respectively, which are primarily attributable to changes in market interest rates and credit spreads since their purchase. As of December 31, 2021, the $38.0 billion AFS debt securities portfolio had unrealized losses of $110.2 million related to government-sponsored agency, which are primarily attributable to changes in market interest rates and credit spreads since their purchase.

As of December 31, 2022, the $25.0 billion HTM debt securities portfolio had an unrealized loss of $1.1 billion and $436.1 million related to government sponsored agency and sub-sovereign, supranational and non-U.S. agency bonds, respectively, which are primarily attributable to changes in overall market interest rates and credit spreads since their purchase. As of December 31, 2021, the $23.6 billion HTM debt securities portfolio had an unrealized loss of $106.1 million and $80.0 million related to government-sponsored agency and sub-sovereign, supranational and non-U.S. agency bonds, respectively, which are primarily attributable to changes in overall market interest rates and credit spreads since their purchase.

HTM debt securities consist of securities that management intends to, and Northern Trust has the ability to, hold until maturity. During the year ended December 31, 2022, for capital management purposes, the Corporation transferred government sponsored agency and obligation of states and political subdivisions securities that had a fair value of $6.6 billion from the AFS to HTM classification, all of which were transferred in the third quarter of 2022. During the year ended December 31, 2021, the Corporation transferred government sponsored agency securities that had a fair value of $6.9 billion from AFS to HTM for capital management purposes, all of which were transferred in the second quarter of 2021. Upon transfer of a debt security from the AFS to HTM classification, the amortized cost is reset to fair value. Any net unrealized gain or loss at the date of transfer will remain in Accumulated Other Comprehensive Income (Loss) (AOCI) and be amortized into Net Interest Income over the remaining life of the securities using the effective interest method. The amortization of amounts retained in AOCI will offset the effect on interest income of the amortization of the premium or discount resulting from transferring the securities at fair value.

For additional information relating to the securities portfolio, refer to Note 4, "Securities," provided in Item 8, "Financial Statements and Supplementary Data."

Loans and Leases

For additional information relating to the loan and leases portfolio, refer to Note 6, "Loans and Leases," and Note 8, "Concentrations of Credit Risk" provided in Item 8, "Financial Statements and Supplementary Data."

The following table presents the remaining maturity of loans and leases by segment and class as of December 31, 2022.

TABLE 35: REMAINING MATURITY OF LOANS AND LEASES

	DECEMBER 31, 2022				
(In Millions)	TOTAL	ONE YEAR OR LESS	ONE TO FIVE YEARS	FIVE TO FIFTEEN YEARS	OVER FIFTEEN YEARS
U.S.:					
Commercial					
Commercial and Institutional	$ 12,415.0	$ 5,535.5	$ 6,598.2	$ 280.9	$ 0.4
Commercial Real Estate	4,773.0	1,410.9	2,711.1	651.0	—
Other	1,316.5	1,316.5	—	—	—
Personal					
Private Client	14,119.0	9,594.8	4,366.8	156.9	0.5
Residential Real Estate	6,413.5	299.6	1,009.8	1,971.3	3,132.8
Other	215.2	215.2	—	—	—
Total U.S.	$ 39,252.2	$ 18,372.5	$ 14,685.9	$ 3,060.1	$ 3,133.7
Non-U.S.:					
Non-U.S. - Commercial	$ 3,131.1	$ 2,833.9	$ 277.2	$ 20.0	$ —
Non-U.S. - Personal	510.0	316.8	137.0	30.2	26.0
Total Non-U.S.	$ 3,641.1	$ 3,150.7	$ 414.2	$ 50.2	$ 26.0
Total Loans and Leases	$ 42,893.3	$ 21,523.2	$ 15,100.1	$ 3,110.3	$ 3,159.7

Note: Non-U.S. loans primarily include short duration exposures related to custodied client investments.

TABLE 36: INTEREST RATE SENSITIVITY OF LOANS AND LEASES

	DECEMBER 31, 2022				
(In Millions)	TOTAL	ONE YEAR OR LESS	ONE TO FIVE YEARS	FIVE TO FIFTEEN YEARS	OVER FIFTEEN YEARS
Fixed Rate:					
Commercial					
Commercial and Institutional	$ 317.1	$ 129.3	$ 155.7	$ 31.9	$ 0.2
Commercial Real Estate	178.8	64.4	104.9	9.5	—
Non-U.S.	26.9	26.9		—	—
Total Commercial	$ 522.8	$ 220.6	$ 260.6	$ 41.4	$ 0.2
Personal					
Private Client	$ 395.0	$ 47.0	$ 342.5	$ 5.2	$ 0.3
Residential Real Estate	783.9	76.0	264.2	414.6	29.1
Non-U.S.	10.0	—	10.0	—	—
Total Personal	$ 1,188.9	$ 123.0	$ 616.7	$ 419.8	$ 29.4
Total Fixed Rate	$ 1,711.7	$ 343.6	$ 877.3	$ 461.2	$ 29.6
Variable Rate:					
Commercial					
Commercial and Institutional	$ 12,097.9	$ 5,406.3	$ 6,442.4	$ 249.0	$ 0.2
Commercial Real Estate	4,594.2	1,346.5	2,606.3	641.4	—
Non-U.S.	3,104.2	2,807.0	277.2	20.0	—
Other	1,316.5	1,316.5	—	—	—
Total Commercial	$ 21,112.8	$ 10,876.3	$ 9,325.9	$ 910.4	$ 0.2
Personal					
Private Client	$ 13,724.0	$ 9,547.7	$ 4,024.4	$ 151.7	$ 0.2
Residential Real Estate	5,629.6	223.8	745.3	1,556.8	3,103.7
Non-U.S.	500.0	316.6	127.2	30.2	26.0
Other	215.2	215.2	—	—	—
Total Personal	$ 20,068.8	$ 10,303.3	$ 4,896.9	$ 1,738.7	$ 3,129.9
Total Variable Rate	$ 41,181.6	$ 21,179.6	$ 14,222.8	$ 2,649.1	$ 3,130.1
Total Loans and Leases	$ 42,893.3	$ 21,523.2	$ 15,100.1	$ 3,110.3	$ 3,159.7

Nonaccrual Assets and 90 Days Past Due Loans

Nonaccrual assets consist of nonaccrual loans and other real estate owned (OREO). OREO is comprised of commercial and residential properties acquired in partial or total satisfaction of loans. Loans that are delinquent 90 days or more and still accruing interest can fluctuate widely at any reporting period based on the timing of cash collections, renegotiation and renewals. For additional information relating to nonaccrual loans, refer to Note 6, "Loans and Leases," provided in Item 8, "Financial Statements and Supplementary Data."

The following table presents nonaccrual assets and loans that were delinquent 90 days or more and still accruing interest at December 31, 2022 and 2021.

TABLE 37: NONACCRUAL ASSETS

($ In Millions)	**DECEMBER 31, 2022**	**% OF 2022 NONACCRUAL LOANS AND LEASES TO TOTAL NONACCRUAL LOANS AND LEASES**	DECEMBER 31, 2021	% OF 2021 NONACCRUAL LOANS AND LEASES TO TOTAL NONACCRUAL LOANS AND LEASES
Nonaccrual Loans and Leases				
Commercial				
Commercial and Institutional	**$ 17.4**	**38 %**	$ 19.5	16 %
Commercial Real Estate	**10.2**	**22 %**	66.6	54 %
Total Commercial	**$ 27.6**	**60 %**	$ 86.1	70 %
Personal				
Residential Real Estate	**$ 18.3**	**40 %**	$ 36.2	30 %
Private Client	**—**	**— %**	—	—
Total Personal	**$ 18.3**	**40 %**	$ 36.2	30 %
Total Nonaccrual Loans and Leases	**45.9**		122.3	
Other Real Estate Owned	**—**		3.0	
Total Nonaccrual Assets	**$ 45.9**		$ 125.3	
90 Day Past Due Loans Still Accruing	**$ 54.2**		$ 28.3	
Nonaccrual Loans and Leases to Total Loans and Leases	**0.11 %**		0.30 %	
Allowance for Credit Losses Assigned to Loans and Leases to Nonaccrual Loans and Leases	**3.1x**		1.1x	

Nonaccrual assets as of December 31, 2022 decreased from December 31, 2021, primarily in commercial real estate due to two upgrades to performing status and one payoff. In addition to the negative impact on Net Interest Income and the risk of credit losses, nonaccrual assets also increase operating costs due to the expense associated with collection efforts. Changes in the level of nonaccrual assets may be indicative of changes in the credit quality of one or more loan classes. Changes in credit quality impact the allowance for credit losses through the resultant adjustment of the allowance evaluated on an individual basis and the quantitative and qualitative factors used in the determination of the allowance evaluated on a collective basis within the allowance for credit losses.

Allowance for Credit Losses

The Allowance for Credit Losses—which represents management's best estimate of lifetime expected credit losses related to various portfolios subject to credit risk, off-balance sheet credit exposure, and specific borrower relationships—is determined by management through a disciplined credit review process. Northern Trust measures expected credit losses of financial assets with similar risk characteristics on a collective basis. A financial asset is measured individually if it does not share similar risk characteristics with other financial assets and the related allowance is determined through an individual evaluation.

Management's estimates utilized in establishing an appropriate level of allowance for credit losses are not dependent on any single assumption. In determining an appropriate allowance level, management evaluates numerous variables, many of which are interrelated or dependent on other assumptions and estimates, and takes into consideration past events, current conditions and reasonable and supportable forecasts.

The results of the credit reserve estimation methodology are reviewed quarterly by Northern Trust's Credit Loss Reserve Committee, which receives input from Credit Risk Management, Treasury, Corporate Finance, the Economic Research Department, and each of Northern Trust's reporting segments.

As of December 31, 2022, the Allowance for Credit Losses related to loans and leases, undrawn loan commitments and standby letters of credit, HTM debt securities, and other financial assets, was $144.3 million, $38.5 million, $16.0 million, and $0.8 million, respectively. As of December 31, 2021, the allowance for credit losses related to loans and leases, undrawn loan commitments and standby letters of credit, HTM debt securities, and other financial assets, was $138.4 million, $34.1 million, $11.2 million, and $1.0 million, respectively. For additional information relating to the Allowance for Credit Losses and the changes in the Allowance for Credit Losses during the years ended December 31, 2022 and 2021 due to charge-offs, recoveries and provisions for credit losses, refer to Note 7, "Allowance for Credit Losses," provided in Item 8, "Financial Statements and Supplementary Data."

The following table shows the net recoveries (charge-offs) to average loans and leases by segment and class at December 31, 2022, 2021, and 2020.

TABLE 38: NET RECOVERIES (CHARGE-OFFS) TO AVERAGE LOANS AND LEASES

($ in Millions)	**2022**	2021	2020
Net Recoveries (Charge-Offs) to Average Loans and Leases			
Commercial			
Commercial and Institutional	**— %**	0.01 %	0.02 %
Commercial Real Estate	**0.05**	(0.01)	(0.18)
Lease Financing, net[(1)]	**(61.3)**	—	—
Total Commercial	**(0.02)**	—	(0.03)
Personal			
Private Client	—	0.01	—
Residential Real Estate	**0.11**	0.07	0.02
Total Personal	**0.03**	0.03	—
Total Net Recoveries (Charge-Offs) to Select Average Loans and Leases	**0.01 %**	0.02 %	(0.01)%
Net Recoveries (Charge-Offs)			
Commercial			
Commercial and Institutional	**$ 0.1**	$ 0.9	$ 1.8
Commercial Real Estate	**2.2**	(0.3)	(5.7)
Lease Financing, net	**(4.9)**	—	—
Total Commercial	**(2.6)**	0.6	(3.9)
Personal			
Private Client	—	1.3	(0.5)
Residential Real Estate	**6.8**	4.4	1.2
Total Personal	**6.8**	5.7	0.7
Total Net Recoveries (Charge-Offs)	**$ 4.2**	$ 6.3	$ (3.2)
Average Loans and Leases			
Commercial			
Commercial and Institutional	**$ 12,258.9**	$ 10,428.6	$ 10,347.1
Commercial Real Estate	**4,432.2**	3,977.0	3,253.8
Lease Financing, net	**8.0**	11.2	48.9
Total Select Commercial	**16,699.1**	14,416.8	13,649.8
Personal			
Private Client	**13,877.9**	13,686.7	11,452.9
Residential Real Estate	**6,352.5**	6,190.6	6,116.4
Total Select Personal	**20,230.4**	19,877.3	17,569.3
Total Select Average Loans and Leases	**$ 36,929.5**	$ 34,294.1	$ 31,219.1

[(1)] *The ratio reflects a charge-off in the third quarter of 2022 in association with a sale of the last lease remaining in Northern Trust's lease portfolio. As of December 31, 2022, there were no leases outstanding.*

Net recoveries (charge-offs) for the following segments were zero and therefore excluded from the above table as the ratio of net recoveries (charge-offs) to average loans and leases is also zero: Other, and Non-U.S. The average loans and leases balances were also not provided in the table for Other and Non-U.S. Total average loans and leases for all loan portfolio categories were $41.0 billion, $37.2 billion, and $33.5 billion for the years ended December 31, 2022, 2021, and 2020, respectively. As of December 31, 2022, there were no leases outstanding.

The SEC requires the disclosure of the Allowance for Credit Losses that is applicable to international operations. The disclosure has been prepared in compliance with this disclosure requirement and is used in determining non-U.S. operating performance. The amounts disclosed should not be construed as being the only amounts that are available for non-U.S. loan charge-offs, since the entire Allowance for Credit Losses assigned to Loans and Leases is available to absorb losses on both U.S. and non-U.S. loans. In addition, these amounts are not intended to be indicative of future charge-off trends. Please refer to Table 39 below for the non-U.S. allowance balances.

The following table shows the allowance evaluated on an individual and collective basis for the loans and leases portfolio by segment and class at December 31, 2022 and 2021.

TABLE 39: ALLOCATION OF THE ALLOWANCE FOR CREDIT LOSSES

	DECEMBER 31,			
	2022		2021	
($ In Millions)	**ALLOWANCE AMOUNT**	**PERCENT OF LOANS TO TOTAL LOANS**	ALLOWANCE AMOUNT	PERCENT OF LOANS TO TOTAL LOANS
Evaluated on an Individual Basis	**$ 10.4**	**— %**	$ 10.1	— %
Evaluated on a Collective Basis				
Commercial				
Commercial and Institutional	**57.0**	**29**	50.6	27
Commercial Real Estate	**76.5**	**11**	68.2	11
Non-U.S.	**8.3**	**7**	7.7	5
Lease Financing, net	**—**	**—**	0.4	—
Other	**0.3**	**3**	—	2
Total Commercial	**142.1**	**50**	126.9	45
Personal				
Private Client	**11.2**	**33**	11.1	38
Residential Real Estate	**18.0**	**15**	23.3	16
Non-U.S.	**1.1**	**1**	1.1	1
Other	**—**	**1**	—	—
Total Personal	**30.3**	**50**	35.5	55
Total Allowance Evaluated on a Collective Basis	**$ 172.4**		$ 162.4	
Total Allowance for Credit Losses	**$ 182.8**		$ 172.5	
Allowance Assigned to:				
Loans and Leases	**$ 144.3**		$ 138.4	
Undrawn Commitments and Standby Letters of Credit	**38.5**		34.1	
Total Allowance for Credit Losses	**$ 182.8**		$ 172.5	
Allowance Assigned to Loans and Leases to Total Loans and Leases	**0.34 %**		0.34 %	

Allowance Related to Credit Exposure Evaluated on an Individual Basis: The allowance is determined through an individual evaluation of loans, leases, and lending-related commitments that have defaulted, generally those with Borrower Ratings of 8 and 9, that is based on expected future cash flows, the value of collateral, and other factors that may impact the borrower's ability to pay.

The allowance evaluated on an individual basis for Loans and Leases increased $0.3 million from $10.1 million at December 31, 2021 to $10.4 million at December 31, 2022, primarily attributable to an increase in outstanding loans in the commercial and institutional portfolio, partially offset by a decrease in outstanding loans in the commercial real estate portfolio.

Allowance Related to Credit Exposure Evaluated on a Collective Basis: Expected credit losses are measured on a collective basis as long as the financial assets included in the respective pool share similar risk characteristics. If financial assets are deemed to not share similar risk characteristics, an individual assessment is warranted.

The allowance evaluated on a collective basis for Loans and Leases increased $10.0 million to $172.4 million at December 31, 2022, compared with $162.4 million at December 31, 2021, primarily due to an increase in the reserve evaluated on a collective basis, which relates to pooled financial assets sharing similar risk characteristics. The increase was driven by weaker macroeconomic conditions and portfolio growth, partially offset by improvements in credit quality. The increase in the collective basis reserve was primarily reflected in the commercial real estate and commercial and institutional portfolios.

Overall Allowance: The evaluation of the reserve evaluated on an individual and collective basis resulted in a total Allowance for Credit Losses of $200.9 million at December 31, 2022, compared with $184.7 million at the end of 2021. The allowance of $144.3 million assigned to Loans and Leases, as a percentage of total Loans and Leases, was 0.34% at December 31, 2022, which increased from a $138.4 million allowance assigned to Loans and Leases, representing 0.34% of total Loans and Leases at December 31, 2021. Allowances assigned to undrawn loan commitments and standby letters of credit totaled $38.5 million and $34.1 million at December 31, 2022 and 2021, respectively, and are included in Other Liabilities on the consolidated balance sheets.

Capital Expenditures

Capital expenditures in 2022 included continued investments to enhance Northern Trust's software and hardware capabilities, as well as renovation and relocation projects to reduce our real estate footprint and modernize our existing offices for new ways of working. Capital expenditures for 2022 totaled $723.5 million, of which $594.9 million was for software, $84.0 million was for computer hardware, $35.5 million was for building and leasehold improvements, and $9.1 million was for furnishings. These capital expenditures principally support, enhance, and protect Northern Trust's investment management, asset servicing and wealth management systems and capabilities, with focus on delivering innovative solutions to better serve our clients. Additional capital expenditures committed for technology platforms will result in future expense for the depreciation of hardware and amortization of software. Software amortization and depreciation on computer hardware are charged to Equipment and Software expense. Depreciation on building and leasehold improvements and on furnishings is charged to Occupancy expense and equipment expense, respectively. Capital expenditures for 2021 totaled $515.1 million, of which $419.6 million was for software, $52.6 million was for computer hardware, $40.2 million was for building and leasehold improvements, and $2.7 million was for furnishings.

Deposits

The following table provides the scheduled maturity of total time deposits in denominations of $250,000 or greater at December 31, 2022. For additional information, refer to Note 12, "Deposits," provided in Item 8, "Financial Statements and Supplementary Data."

TABLE 40: REMAINING MATURITY OF TIME DEPOSITS $250,000 OR MORE

	DECEMBER 31, 2022		
	U.S. OFFICE	NON-U.S. OFFICES	
(In Millions)	CERTIFICATES OF DEPOSIT	OTHER TIME	TOTAL
3 Months or Less	$ **572.8**	$ **1,979.9**	$ **2,552.7**
Over 3 Months through 6 Months	**363.8**	**5.9**	**369.7**
Over 6 Months through 12 Months	**664.0**	**38.4**	**702.4**
Over 12 Months	**97.0**	**—**	**97.0**
Total	$ **1,697.6**	$ **2,024.2**	$ **3,721.8**

Deposits not insured by the FDIC as of December 31, 2022 and 2021 totaled $116.1 billion and $150.3 billion, respectively. These deposit amounts are derived by adding estimated domestic office uninsured deposits as allowed by Federal Financial Institutions Examination Council instructions to all foreign office deposits. Estimated uninsured domestic office deposits are determined by calculating and totaling the deposits in excess of the deposit insurance limit on an individual account basis.

Short-Term Borrowings

Securities purchased under agreements to resell and securities sold under agreements to repurchase are accounted for as collateralized financings and recorded at the amounts at which the securities were acquired or sold plus accrued interest. To minimize any potential credit risk associated with these transactions, the fair value of the securities purchased or sold is monitored, limits are set on exposure with counterparties, and the financial condition of counterparties is regularly assessed. It is Northern Trust's policy to take possession, either directly or via third-party custodians, of securities purchased under agreements to resell. Securities sold under agreements to repurchase are either directly held by, or pledged to the counterparty until the repurchase. Northern Trust nets securities sold under repurchase agreements against those purchased under resale agreements when the requirements to net are met. See Note 5, "Securities Purchased Under Agreements to Resell and Securities Sold Under Agreements to Repurchase," Note 25, "Commitments and Contingent Liabilities" and Note 27, "Offsetting of Assets and Liabilities" provided in Item 8, "Financial Statements and Supplementary Data" for additional information on our repurchase and reverse repurchase agreements.

Geographic Area Information

Northern Trust’s non-U.S. activities are primarily related to its asset servicing, asset management, foreign exchange, cash management, and commercial banking businesses. The operations of Northern Trust are managed on a reporting segment basis and include components of both U.S and non-U.S. source assets. Non-U.S. source assets are not separately identified in Northern Trust’s internal management reporting system. However, Northern Trust is required to disclose non-U.S. activities based on the domicile of the customer. Due to the complex and integrated nature of Northern Trust’s activities, it is difficult to segregate with precision assets between U.S. and non-U.S.-domiciled customers. Therefore, certain subjective estimates and assumptions have been made to allocate assets between U.S. and non-U.S. operations.

The following tables present selected average assets and liabilities attributable to non-U.S. operations (based on the obligor’s domicile) and the percent of those balances to total consolidated average assets. For additional information refer to Note 31, “Reporting Segments and Related Information,” provided in Item 8, “Financial Statements and Supplementary Data.”

TABLE 41: SELECTED AVERAGE ASSETS AND LIABILITIES ATTRIBUTABLE TO NON-U.S. OPERATIONS

($ In Millions)	**2022**	2021
Total Assets	**$ 26,904.3**	$ 29,902.8
Time Deposits with Banks	**2,082.2**	3,619.3
Loans	**2,562.7**	1,496.1
Non-U.S. Investments	**16,002.1**	18,252.5
Total Liabilities	**77,481.6**	84,230.9
Deposits	**75,808.6**	83,001.7

Non-U.S. Outstandings

As used in this discussion, non-U.S. outstandings are cross-border outstandings as defined by the SEC. They consist of loans, securities, interest-bearing deposits with financial institutions, accrued interest and other monetary assets. Not included are letters of credit, loan commitments, and non-U.S. office local currency claims on residents. Non-U.S. outstandings related to a country are net of guarantees given by third parties resident outside the country and the value of tangible, liquid collateral realizable outside the country. However, transactions with branches of non-U.S. banks are included in these outstandings and are classified according to the country location of the non-U.S. bank’s head office.

Short-term interbank time deposits with non-U.S. banks represent the largest category of non-U.S. outstandings. Northern Trust actively participates in the interbank market with U.S. and non-U.S. banks.

Northern Trust places deposits with non-U.S. counterparties that have strong internal (Northern Trust) risk ratings and external credit ratings. These non-U.S. banks are approved and monitored by Northern Trust’s Capital Markets Credit Committee, which has credit authority for exposure to all non-U.S. banks and approves credit limits. This process includes financial analysis of the non-U.S. banks, use of an internal risk rating system and consideration of external market indicators. Each counterparty is reviewed at least annually and potentially more frequently based on credit fundamentals or general market conditions. Separate from the entity-specific review process, the average life to maturity of deposits with non-U.S. banks is deliberately maintained on a short-term basis in order to respond quickly to changing credit conditions. Northern Trust also utilizes certain risk mitigation tools and agreements that may reduce exposures through use of collateral and/or balance sheet netting. Additionally, the Capital Markets Credit Committee oversees country-risk analyses and imposes limits on country exposure. For additional information refer to Note 31, “Reporting Segments and Related Information,” provided in Item 8, “Financial Statements and Supplementary Data.”

STATEMENTS OF CASH FLOWS

The following discusses the statement of cash flow activities for the years ended December 31, 2022, 2021, and 2020.

TABLE 42: CASH FLOW ACTIVITY SUMMARY

	FOR THE YEAR ENDED DECEMBER 31,		
(In Millions)	**2022**	2021	2020
Net cash provided by (used in):			
Operating activities	**$ 2,392.4**	$ 1,356.0	$ 1,896.8
Investing activities	**25,929.8**	(18,602.6)	(29,923.0)
Financing activities	**(26,437.4)**	16,073.5	27,871.9
Effect of Foreign Currency Exchange Rates on Cash	**(287.4)**	(159.6)	84.6
Change in Cash and Due from Banks	**$ 1,597.4**	$ (1,332.7)	$ (69.7)

Operating Activities

Net cash provided by operating activities of $2.4 billion for the year ended December 31, 2022 was primarily attributable to period earnings, lower net collateral deposited with derivative counterparties, and the impact of higher non-cash charges such as depreciation and amortization, partially offset by the impact of other operating activities, net.

For the year ended December 31, 2021, net cash provided by operating activities of $1.4 billion primarily reflected period earnings and the impact of higher non-cash charges such as depreciation and amortization, partially offset by higher net collateral deposited with derivative counterparties and in receivables.

Investing Activities

Net cash provided by investing activities of $25.9 billion for the year ended December 31, 2022 was primarily attributable to lower levels of deposits with the Federal Reserve and other central banks and net proceeds from held to maturity debt securities, partially offset by higher levels of loans.

For the year ended December 31, 2021, net cash used in investing activities of $18.6 billion primarily reflected higher levels of deposits with the Federal Reserve and other central banks, higher levels of loans and leases and net purchases of AFS debt securities, partially offset by lower levels of interest-bearing deposits with banks.

Financing Activities

Net cash used in financing activities of $26.4 billion for the year ended December 31, 2022 was primarily attributable to decreased levels of total deposits, partially offset by higher short-term other borrowings, proceeds from the issuance of 4.00% senior notes and 6.125% subordinated notes, and higher federal funds purchased. The decrease in total deposits was primarily attributable to lower levels of non-U.S. office noninterest-bearing deposits, non-U.S. office interest-bearing deposits, and demand and other noninterest-bearing deposits.

For the year ended December 31, 2021, net cash provided by financing activities of $16.1 billion primarily reflected higher levels of total deposits and securities sold under agreements to repurchase, partially offset by dividends paid on common stock, repayment of the 3.375% senior notes previously issued by the Corporation that matured in August 2021, lower short-term other borrowings, and the repayment of floating rate capital debt. The increase in total deposits was primarily attributable to higher levels of savings, money market and other interest-bearing deposits, non-U.S. interest-bearing deposits, and demand and other noninterest-bearing deposits.

CAPITAL MANAGEMENT

One of Northern Trust's primary objectives is to maintain a strong capital position to merit the confidence of clients, counterparties, creditors, regulators and stockholders. A strong capital position helps Northern Trust execute its strategies and withstand unforeseen adverse developments.

Senior management, with oversight from the Capital Governance Committee of the Board of Directors and the full Board of Directors, is responsible for capital management and planning. Northern Trust manages its capital on both a total Corporation basis and a legal entity basis. The Capital Committee is responsible for measuring and managing capital metrics against levels set forth within the Capital Policy approved by the Capital Governance Committee of the Board of Directors. In establishing the metrics related to capital, a variety of factors are taken into consideration, including the unique risk profiles of Northern Trust's businesses, regulatory requirements, capital levels relative to peers, economic and market forecasts, and the impact on credit ratings.

Capital levels declined in 2022 as average stockholders' equity decreased $615.6 million, or 5%, to $11.1 billion. Total stockholders' equity was $11.3 billion at December 31, 2022, as compared to $12.0 billion at December 31, 2021.

Preferred dividends totaling $41.8 million were declared in 2022. During 2022, the Corporation increased its quarterly common stock dividend to $0.75 per common share. Common dividends totaling $613.0 million were declared in 2022. During the year ended December 31, 2022, the Corporation repurchased 311,536 shares of common stock, all of which were shares withheld to satisfy tax withholding obligations related to share-based compensation, at an average price per share of $113.70.

In accordance with Basel III requirements, capital ratios are calculated using both the standardized and advanced approaches. As required by the Dodd-Frank Act, the lower of each capital ratio calculated under the standardized approach and the advanced approach serves as the effective ratio for purposes of determining capital adequacy. The following table provides a reconciliation of the Corporation's common stockholders' equity to total risk-based capital and its risk-based capital ratios, under the applicable U.S. regulatory rules as of December 31, 2022 and 2021.

TABLE 43: CAPITAL ADEQUACY

($ In Millions)	DECEMBER 31, 2022		DECEMBER 31, 2021	
	STANDARDIZED APPROACH	ADVANCED APPROACH	STANDARDIZED APPROACH	ADVANCED APPROACH
Common Equity Tier 1 Capital				
Common Stockholders' Equity	**$ 10,374.6**	**$ 10,374.6**	$ 11,131.9	$ 11,131.9
Goodwill and Other Intangible Assets, net of Deferred Tax Liability	**(719.7)**	**(719.7)**	(751.3)	(751.3)
Other	**(115.2)**	**(115.2)**	(103.5)	(103.5)
Total Common Equity Tier 1 Capital	**9,539.7**	**9,539.7**	10,277.1	10,277.1
Additional Tier 1 Capital				
Preferred Stock	**884.9**	**884.9**	884.9	884.9
Other	**(27.2)**	**(27.2)**	(19.8)	(19.8)
Total Additional Tier 1 Capital	**857.7**	**857.7**	865.1	865.1
Total Tier 1 Capital	**10,397.4**	**10,397.4**	11,142.2	11,142.2
Tier 2 Capital				
Qualifying Allowance for Credit Losses	**199.6**	**—**	184.8	—
Qualifying Subordinated Debt	**1,648.5**	**1,648.5**	799.8	799.8
Total Tier 2 Capital	**1,848.1**	**1,648.5**	984.6	799.8
Total Risk-Based Capital	**$ 12,245.5**	**$ 12,045.9**	$ 12,126.8	$ 11,942.0
Risk-Weighted Assets[(1)]	**$ 88,107.7**	**$ 83,181.2**	$ 86,292.6	$ 77,807.2
Total Assets – End of Period (EOP)	**155,036.7**	**155,036.7**	183,889.8	183,889.8
Adjusted Average Fourth Quarter Assets[(2)]	**146,883.8**	**146,883.8**	160,506.3	160,506.3
Total Loans and Leases – EOP	**42,893.3**	**42,893.3**	40,480.6	40,480.6
Common Stockholders' Equity to:				
Total Loans and Leases – EOP	**24.19 %**	**24.19 %**	27.50 %	27.50 %
Total Assets – EOP	**6.69**	**6.69**	6.05	6.05
Risk-Based Capital Ratios				
Common Equity Tier 1 Capital	**10.8 %**	**11.5 %**	11.9 %	13.2 %
Tier 1 Capital	**11.8**	**12.5**	12.9	14.3
Total Capital (Tier 1 and Tier 2)	**13.9**	**14.5**	14.1	15.3
Tier 1 Leverage	**7.1**	**7.1**	6.9	6.9
Supplementary Leverage	**N/A**	**7.9**	N/A	8.2

(1) Risk-weighted assets exclude, as applicable under each regulatory approach, amounts primarily related to goodwill, certain other intangible assets, and net unrealized gains or losses on securities and reflect adjustments for excess allowances for credit losses that have been excluded from Tier 1 and Tier 2 capital, if any.

(2) Adjusted average fourth quarter assets exclude amounts primarily related to goodwill, other intangible assets, and net unrealized gains or losses on securities.

As of December 31, 2022 and 2021, the Corporation's capital ratios exceeded the requirements for classification as "well-capitalized" under applicable U.S. regulatory requirements. The results of the 2022 Dodd-Frank Act Stress Test, published by the Federal Reserve Board on June 23, 2022, resulted in Northern Trust's stress capital buffer and effective Common Equity Tier 1 capital ratio minimum requirement remaining constant at 2.5% and 7.0%, respectively, for the 2022 Capital Plan cycle, which began on October 1, 2022.

Further information regarding the Corporation's and the Bank's capital ratios and the minimum requirements for classification as "well-capitalized" is provided in the "Supervision and Regulation—Capital Adequacy Requirements" section of Item 1, "Business," and Note 32, "Regulatory Capital Requirements," provided in Item 8, "Financial Statements and Supplementary Data."

CRITICAL ACCOUNTING ESTIMATES

Our significant accounting policies are described in Note 1, "Summary of Significant Accounting Policies," provided in Item 8, "Financial Statements and Supplementary Data." The use of estimates and assumptions is required in the preparation of financial statements in conformity with GAAP and actual results could differ from those estimates. The SEC has issued guidance relating to the disclosure of critical accounting estimates. Critical accounting estimates are those that require management to make subjective or complex judgments about the effect of matters that are inherently uncertain and may change in subsequent periods. Changes that may be required in the underlying assumptions or estimates in these areas could have a material impact on Northern Trust's future financial condition and results of operations.

For Northern Trust, accounting estimates that are viewed as critical are those relating to the allowance for credit losses and pension plan accounting. Management has discussed the development and selection of each critical accounting estimate with the Audit Committee of the Board of Directors (Audit Committee).

Allowance for Credit Losses

The Allowance for Credit Losses — which represents management's estimate of lifetime expected credit losses related to various portfolios subject to credit risk, off-balance sheet credit exposure, and specific borrower relationships — is determined by management through a disciplined credit review process. Northern Trust measures expected credit losses of financial assets with similar risk characteristics on a collective basis. A financial asset is measured individually if it does not share similar risk characteristics with other financial assets and the related allowance is determined through an individual evaluation.

Management's estimates utilized in establishing an appropriate level of Allowance for Credit Losses are not dependent on any single assumption. In determining an appropriate allowance level, management evaluates numerous variables, many of which are interrelated or dependent on other assumptions and estimates, and takes into consideration past events, current conditions and reasonable and supportable forecasts. Due to the inherent imprecision in accounting estimates, other estimates or assumptions could reasonably have been used in 2022 and changes in estimates are reasonably likely to occur from period to period.

The Allowance for Credit Losses consists of the following components:

Evaluated on a Collective Basis. Expected credit losses are measured on a collective basis as long as the financial assets included in the respective pool share similar risk characteristics. If financial assets are deemed to not share similar risk characteristics, an individual assessment is warranted.

The allowance estimation methodology for the collective assessment is based on data representative of the Corporation's financial asset portfolio from a historical observation period that includes both expansionary and recessionary periods. The estimation methodology and the related qualitative adjustment framework segregate the loan portfolio into segments based on loan and obligor-specific factors, including loan type, borrower type, collateral type, loan size, and borrower credit quality. For each segment, the probability of default and loss given default are derived for each quarter of the remaining life of each instrument. For the first two years (the reasonable and supportable period), these factors are derived by applying quarterly macroeconomic projections using models developed from historical data on macroeconomic factors and loans with similar factors. For periods beyond the reasonable and supportable period, Northern Trust reverts to its long-run historical loss experiences on a straight-line basis over four quarters. The projected exposure at default for every quarter is based on contractual balance projections as of each quarter-end, with adjustments made for potential draws on off-balance sheet commitments.

For each of the different parameters, specific credit models for the individual loan segments were developed. For each segment, the probability of default and the loss given default are applied to the exposure at default for each projected quarter to determine the quantitative component of the allowance. The quantitative allowance is then reviewed within the qualitative adjustment framework, through which management applies judgment by assessing internal risk factors, potential limitations in the quantitative methodology, and environmental factors that are not fully contemplated in the forecast to compute adjustments to the quantitative allowance that may impact individual or multiple segments of the loan portfolio.

ASC 326-20-30 requires the use of projected macroeconomic factors. The Corporation uses multiple forecasts approved by Northern Trust's Macroeconomic Scenario Development Committee (MSDC). The baseline forecast aligns with the Corporation's latest thinking on macroeconomic projections for the next eight quarters. An alternative scenario is also considered, which reflects a recession that incorporates the experiences of a wider set of historical economic cycles. The forecasts are weighted at each evaluation period and are management's best estimate of future economic projections at that time.

The allowance estimate is sensitive to changes in portfolio composition, portfolio quality, and macroeconomic forecasts. Increases in the amount of borrowing and material downgrades to the quality of the lending portfolio will increase the reserve, all else equal. Similarly, deteriorating projections for macroeconomic conditions will increase the reserve. Macroeconomic factors that are particularly correlated to Northern Trust's loan portfolio are equity market values, market volatility, corporate profits, residential and commercial real estate price indices, unemployment, and disposable income. To demonstrate the sensitivity to changes in macroeconomic conditions, Northern Trust applied a 100% probability weighting to downturn conditions, resulting in an increase to the collective component of the allowance for the loan portfolio of approximately $72.6 million. The investment security and other financial assets portfolios are less sensitive to macroeconomic factors in terms of overall reserve impact due to factors such as high credit quality, short duration, and low historical losses.

The commercial and institutional (C&I) portfolio utilizes Northern Trust's internal borrower rating assessments to determine initial credit quality. A sensitivity analysis was performed to determine the impact of upgrades or downgrades by shifting the rating up or down by one rating class, assuming no changes to other factors, such as macroeconomic projections or qualitative adjustments. The analysis excludes defaulted loans and does not assume a default event; hence, borrowers at the lowest non-default rating were not downgraded. Similarly, those at the highest rating could not be upgraded. Assuming the final forecast probability weighting, the collective component of the allowance assigned to the C&I portfolio would increase by approximately $93.0 million if all C&I borrowers were downgraded by one performing rating class. The C&I collective allowance would decrease by approximately $35.4 million if borrower ratings were upgraded by one rating class (if possible).

The results of the credit reserve estimation methodology are reviewed quarterly by Northern Trust's Credit Loss Reserve Committee, which receives input from Credit Risk Management, Treasury, Corporate Finance, the Economic Research group, and each of Northern Trust's business units. The Credit Loss Reserve Committee determines the probability weights applied to each forecast approved by MSDC, and also reviews and approves qualitative adjustments to the collective allowance in line with Northern Trust's qualitative adjustment framework.

Evaluated on an Individual Basis. The allowance is determined through an individual evaluation of financial assets that have defaulted that is based on expected future cash flows, the value of collateral, and other factors that may impact the borrower's ability to pay. For defaulted loans for which the amount of allowance, if any, is determined based on the value of the underlying real estate collateral, third-party appraisals are typically obtained and utilized by management. These appraisals are generally less than twelve months old and are subject to adjustments to reflect management's judgment as to the realizable value of the collateral.

Analysis and Controls. The quarterly analysis of the individual and collective allowance components and the control process maintained by Credit Risk Management and the lending staff are the principal methods relied upon by management for the timely identification and estimation of individual expected credit losses. In addition to Northern Trust's own experience, management also considers regulatory guidance. Control processes and analyses employed to determine an appropriate level of allowance for credit losses are reviewed at least annually and modified as considered appropriate.

Management believes that the Allowance for Credit Losses adequately considers these uncertainties and has been established at an appropriate level. Actual losses may vary from current estimates and the amount of the provision for credit losses may be greater or less than actual net charge-offs in any particular period.

Pension Plan Accounting

Northern Trust maintains a noncontributory defined benefit pension plan covering substantially all U.S. employees (U.S. Qualified Plan) and a U.S. noncontributory supplemental pension plan (U.S. Non-Qualified Plan). Certain European-based employees also retain benefits in local defined benefit pension plans, of which the majority are closed to new employees and to future benefit accruals. Measuring cost and reporting liabilities resulting from defined benefit pension plans requires the use of several assumptions regarding future interest rates, asset returns, compensation increases, mortality rates, and other actuarial-based projections relating to the plans. Due to the long-term nature of this obligation and the estimates that are required to be made, the assumptions used in determining the periodic pension expense and the projected benefit obligation are closely monitored and reviewed annually for adjustments that may be required. Pension accounting guidance requires that differences between estimates and actual experience be recognized as other comprehensive income in the period in which they occur. The differences are amortized into net periodic pension expense from accumulated other comprehensive income over the average remaining service period of eligible participants. As a result, differences between the estimates made in the calculation of periodic pension expense and the projected benefit obligation and actual experience affect stockholders' equity in the period in which they occur but continue to be recognized as expense systematically and gradually over subsequent periods.

Northern Trust recognizes the significant impact that these pension-related assumptions have on the determination of the pension obligations and related expense and has established procedures for monitoring and setting these assumptions each year. These procedures include an annual review of actual demographic and investment experience with the pension plans' actuaries. In addition to actual experience, adjustments to these assumptions consider observable yields on fixed income securities, known compensation trends and policies, as well as economic conditions and investment strategies that may impact the estimated long-term rate of return on plan assets.

In determining the pension expense for the U.S. Qualified Plan in 2022, Northern Trust utilized a discount rate of 3.03% as of December 31, 2021, 4.81% as of June 30, 2022, and 5.49% as of September 30, 2022. The application of settlement accounting in 2022 required interim re-measurements of the U.S. Qualified Plan throughout 2022. The discount rate utilized for the U.S. Non-Qualified Plan as of December 31, 2021 was 2.80%. For both plans, the rate of increase in the compensation level is based on a graded schedule from 9.00% to 2.50% that averaged 4.97%. The expected long-term rate of return on U.S. Qualified Plan assets was 5.25% as of December 31, 2021, 6.00% as of June 30, 2022, and 6.50% as of September 30, 2022.

In evaluating possible revisions to pension-related assumptions for the U.S. pension plans as of Northern Trust's December 31, 2022 measurement date, the following were considered:

- **Discount Rate:** Northern Trust estimates the discount rate for its U.S. pension plans by applying the plan specific projected cash flows for future benefit payments for each plan to the Aon AA Above Median yield curve as of the measurement date. This yield curve is composed of individual zero-coupon interest rates for 198 different time periods over a 99-year time horizon. Zero-coupon rates utilized by the yield curve are mathematically derived from observable market yields for AA-rated corporate bonds. This yield curve model referenced by Northern Trust in establishing the discount rate resulted in a rate of 5.22% and 5.15% at December 31, 2022 for the U.S. Qualified and U.S. Non-Qualified Plans, respectively.
- **Compensation Level:** Based on a review of actual and anticipated salary experience, the compensation scale assumption is based on a graded schedule from 9.00% to 2.50% that averages 5.56%.
- **Rate of Return on Plan Assets:** The expected return on plan assets is based on an estimate of the long-term (30 years) rate of return on plan assets, which is determined using a building block approach that considers the current asset mix and estimates of return by asset class based on historical experience, giving proper consideration to diversification and rebalancing. Current market factors such as inflation and interest rates are also evaluated before long-term capital market assumptions are determined. Peer data and historical returns are reviewed to check for reasonability and appropriateness. As a result of these analyses, Northern Trust's rate of return assumption for the U.S. Qualified Plan is 7.25% for 2023. The increase in the expected rate of return from 5.25% as of January 1, 2022, to 7.25% as of January 1, 2023, is primarily due to the increased interest rate environment and the associated impact on fixed income securities returns as well as to the change in the target asset allocation to allow for a greater component of return seeking investments as of the beginning of 2023.
- **Mortality Table:** Northern Trust had adopted the aggregate Pri-2012 mortality table with a 2012 base year, which was released by the Society of Actuaries in October 2019. Northern Trust's pension obligations reflect proposed future improvement under scale MP-2021, which was released by the Society of Actuaries in October 2021. No change to these assumptions was made in 2022 since the Society of Actuaries did not release any updates to its mortality tables and improvement scales in 2022. Mortality assumptions on lump sum payments remain static and continue to be in line with the IRS prescribed table for minimum lump sums in 2023.

Excluding any pension settlement charges, net pension expense in 2023 is expected to decrease by approximately $20.9 million, primarily driven by increased interest rates and expected rate of return on plan assets as well as lower loss amortization due to the 2021 and 2022 settlement recognition.

In order to illustrate the sensitivity of these assumptions on the expected U.S pension plans' periodic pension expense in 2023 and the projected benefit obligation as of December 31, 2022, the following table is presented to show the effect of increasing or decreasing each of these assumptions by 25 basis points.

TABLE 44: SENSITIVITY OF U.S. PENSION PLANS ASSUMPTIONS

($ In Millions)	25 BASIS POINT INCREASE	25 BASIS POINT DECREASE
Increase (Decrease) in 2023 Pension Expense		
Discount Rate Change	$ (1.3)	$ 2.8
Compensation Level Change	2.0	(2.0)
Rate of Return on Plan Assets Change	(3.5)	3.5
Increase (Decrease) in 2022 Projected Benefit Obligation		
Discount Rate Change	(30.4)	31.9
Compensation Level Change	7.7	(7.6)

Pension Contributions. The deduction limits specified by the Internal Revenue Code for contributions made by sponsors of defined benefit pension plans are based on a "Target Liability" under the provisions of the Pension Protection Act of

2006. There were no contributions to the U.S. Qualified Plan for the 2022 plan year. The minimum required contribution to the U.S. Qualified Plan is expected to be zero in 2023. The maximum deductible contribution is estimated at $561.0 million for 2023.

FAIR VALUE MEASUREMENTS

The preparation of financial statements in conformity with GAAP requires certain assets and liabilities to be reported at fair value. As of December 31, 2022, approximately 18% of Northern Trust's total assets and 1% of total liabilities were carried on the consolidated balance sheets at fair value. As of December 31, 2021, approximately 21% of Northern Trust's total assets and less than 1% of total liabilities were carried on the consolidated balance sheets at fair value. As discussed more fully in Note 3, "Fair Value Measurements," provided in Item 8, "Financial Statements and Supplementary Data," GAAP requires entities to categorize financial assets and liabilities carried at fair value according to a three-level valuation hierarchy. The hierarchy gives the highest priority to quoted, active market prices for identical assets and liabilities (Level 1) and the lowest priority to valuation techniques that require significant management judgment because one or more of the significant inputs are unobservable in the market place (Level 3). Approximately 10% and 6% of Northern Trust's assets carried at fair value are classified as Level 1 as of December 31, 2022 and 2021, respectively. Northern Trust typically does not hold equity securities or other instruments that are actively traded on an exchange.

As of December 31, 2022, approximately 90% of Northern Trust's assets and 100% of its liabilities carried at fair value are categorized as Level 2, as they are valued using models in which all significant inputs are observable in active markets. Investment debt securities classified as AFS make up 96% of Level 2 assets with the remaining 4% primarily consisting of derivative financial instruments. Level 2 liabilities are comprised solely of derivative financial instruments.

As of December 31, 2021, approximately 94% of Northern Trust's assets and 96% of its liabilities carried at fair value are categorized as Level 2, as they are valued using models in which all significant inputs are observable in active markets. Investment debt securities classified as AFS make up 98% of Level 2 assets with the remaining 2% primarily consisting of derivative financial instruments. Level 2 liabilities are comprised solely of derivative financial instruments.

Northern Trust's Level 2 assets include AFS and certain trading account debt securities, the fair values of which are determined predominantly by external pricing vendors. Northern Trust has a well-established process to validate prices received from pricing vendors as discussed more fully in Note 3, "Fair Value Measurements," provided in Item 8, "Financial Statements and Supplementary Data."

As of December 31, 2022 and 2021, all derivative assets and liabilities, excluding the swap related to the sale of certain Visa Class B common shares described below, were classified as Level 2 and approximately 97% and 96%, respectively, were measured on a notional value basis, related to client-related and trading activities, predominantly consisting of foreign exchange contracts. Derivative instruments are valued internally using widely accepted income-based models that incorporate inputs readily observable in actively quoted markets and reflect contractual terms of contracts. Northern Trust evaluated the impact of counterparty credit risk and its own credit risk on the valuation of derivative instruments. Factors considered included the likelihood of default by Northern Trust and its counterparties, the remaining maturities of the instruments, net exposures after giving effect to master netting agreements, available collateral, and other credit enhancements in determining the appropriate fair value of derivative instruments. The resulting valuation adjustments are not considered material.

As of December 31, 2022 and 2021, Northern Trust's Level 3 liabilities consisted of swaps that Northern Trust entered into with the purchaser of 1.1 million and 1.0 million shares of Visa Inc. Class B common stock (Visa Class B common shares) previously held by Northern Trust and sold in June 2016 and 2015, respectively. Pursuant to the swaps, Northern Trust retains the risks associated with the ultimate conversion of the Visa Class B common shares into shares of Visa Inc. Class A common stock (Visa Class A common shares), such that the counterparty will be compensated for any dilutive adjustments to the conversion ratio and Northern Trust will be compensated for any anti-dilutive adjustments to the ratio. The swaps also require periodic payments from Northern Trust to the counterparty calculated by reference to the market price of Visa Class A common shares and a fixed rate of interest. The fair value of the swaps are determined using a discounted cash flow methodology. The significant unobservable inputs used in the fair value measurement are Northern Trust's own assumptions about estimated changes in the conversion rate of the Visa Class B common shares into Visa Class A common shares, the date on which such conversion is expected to occur and the estimated growth rate of the Visa Class A common share price. See "Visa Class B Common Shares" under Note 25, "Commitments and Contingent Liabilities," provided in Item 8, "Financial Statements and Supplementary Data," for further information.

Northern Trust believes its valuation methods for its assets and liabilities carried at fair value are appropriate; however, the use of different methodologies or assumptions, particularly as applied to Level 3 assets, could have a material effect on the computation of their estimated fair values.

RECENT ACCOUNTING PRONOUNCEMENTS AND DEVELOPMENTS

In March 2022, the Financial Accounting Standards Board (FASB) issued ASU No. 2022-01, "Derivatives and Hedging (Topic 815): Fair Value Hedging—Portfolio Layer Method" (ASU 2022-01). The amendments in ASU 2022-01 expand the current last-of-layer hedging model from a single-layer method to allow multiple hedged layers of a single closed portfolio. To reflect that expansion, the last-of-layer method is renamed the portfolio layer method. In addition, ASU 2022-01 (1) expands the scope of the portfolio layer method to include non-prepayable assets, (2) specifies eligible hedging instruments in a single-layer hedge, (3) provides additional guidance on the accounting for and disclosure of hedge basis adjustments under the portfolio layer method and (4) specifies how hedge basis adjustments should be considered when determining credit losses for the assets included in the closed portfolio. ASU 2022-01 is effective for interim and annual periods beginning after December 15, 2022, although early adoption is permitted. Upon adoption, ASU 2022-01 is not expected to have a significant impact on Northern Trust's consolidated balance sheets or consolidated statements of income.

In March 2022, the FASB issued ASU No. 2022-02, "Financial Instruments—Credit Losses (Topic 326): Troubled Debt Restructurings and Vintage Disclosures" (ASU 2022-02). The amendments in ASU 2022-02 eliminate the accounting guidance for troubled debt restructurings (TDRs) for creditors that have adopted CECL while enhancing disclosure requirements for certain loan refinancings and restructurings made to borrowers experiencing financial difficulty. In addition, ASU 2022-02 requires that a public business entity disclose current-period gross write-offs by year of origination for financing receivables and net investment in leases. ASU 2022-02 is effective for interim and annual periods beginning after December 15, 2022, although early adoption is permitted. Upon adoption, ASU 2022-02 is not expected to have a significant impact on Northern Trust's consolidated balance sheets or consolidated statements of income.

In June 2022, the FASB issued ASU No. 2022-03, "Fair Value Measurement (Topic 820): Fair Value Measurement of Equity Securities Subject to Contractual Sale Restrictions" (ASU 2022-03). The amendments in ASU 2022-03 clarify that a contractual restriction on the sale of an equity security is not considered part of the unit of account of the equity security and, therefore, is not considered in measuring fair value. ASU 2022-03 also clarifies that an entity cannot, as a separate unit of account, recognize and measure a contractual sale restriction. In addition, ASU 2022-03 introduces new disclosure requirements to provide investors with information about contractual sale restrictions including the nature and remaining duration of these restrictions. ASU 2022-03 is effective for interim and annual periods beginning after December 15, 2023, although early adoption is permitted. Upon adoption, ASU 2022-03 is not expected to have a significant impact on Northern Trust's consolidated balance sheets or consolidated statements of income.

In September 2022, the FASB issued ASU No. 2022-04, "Liabilities—Supplier Finance Programs (Topic 405-50): Disclosure of Supplier Finance Program Obligations" (ASU 2022-04). The amendments in ASU 2022-04 enhance the transparency about the use of supplier finance programs for investors or other allocators of capital. Specifically, ASU 2022-04 requires that a buyer in a supplier finance program disclose sufficient qualitative and quantitative information about the program to allow a user of financial statements to understand the program's nature, activity during the period, changes from period to period, and potential magnitude. ASU 2022-04 is effective for interim and annual periods beginning after December 15, 2022, except for the amendment requiring disclosure of roll forward information, which is effective beginning after December 15, 2023. Early adoption is permitted. Upon adoption, ASU 2022-04 is not expected to have a significant impact on Northern Trust's consolidated balance sheets or consolidated statements of income.

RISK MANAGEMENT

Risk Management Overview

Northern Trust employs an integrated risk management framework to enable a risk informed profile and support its business decisions and the execution of its corporate strategies. The framework provides a methodology to identify, manage, report and govern both internal and external risks to Northern Trust, and promotes a culture of risk awareness and good conduct across the organization. Northern Trust's risk culture encompasses the general awareness, attitude and conduct of employees with respect to risk and the management of risk across all lines of defense within the organization. Northern Trust cultivates a culture of effective risk management by defining and embedding risk management accountabilities in all employee performance expectations and provides training, development and performance rewards to reinforce this culture.

Northern Trust's risk management framework contains three inter-related elements, designed to support consistent enterprise risk identification, management and reporting: a comprehensive risk inventory, a static taxonomy of risk categories and a dynamic taxonomy of risk themes. The risk inventory is a detailed register of the risks inherently faced by Northern Trust. The risk categories and risk themes are classification systems used for classifying and managing the risk inventory and enabling different risk profile views. All identified risks inherent in Northern Trust's business activities are cataloged into the following risk categories: credit, operational, fiduciary, compliance, liquidity, market, and strategic risk. All material risks are also dynamically cataloged into various risk themes which are defined groupings that share common characteristics, focus on business outcomes and span across risk categories.

Northern Trust implements its risk management framework through a "three lines of defense" operating model, embedding a robust risk management capability within its businesses. The model, used to communicate risk management expectations across the organization, contains three roles, each with a complementary level of risk management accountability. Within this operating model, Northern Trust's businesses are the first line of defense for protecting it against the risks inherent in its businesses and are supported by dedicated business risk management teams. The Risk Management function, the second line of defense, sets the direction for Northern Trust's risk management activities and provides aggregate risk oversight and reporting in support of risk governance. Audit Services, the third line of defense, provides independent assurance as to the effectiveness of the integrated risk framework.

Risk Governance and Oversight Overview

Risk governance is an integral aspect of corporate governance at Northern Trust, and includes clearly defined accountabilities, expectations, internal controls and processes for risk-based decision-making and escalation of issues. The following diagram provides a high-level overview of Northern Trust's risk governance structure, highlighting oversight by the Board of Directors and key risk-related committees.

TABLE 45: RISK GOVERNANCE STRUCTURE

Northern Trust Corporation Board of Directors			
Audit Committee	Business Risk Committee – Cybersecurity Risk Oversight Subcommittee	Capital Governance Committee	Human Capital and Compensation Committee

Global Enterprise Risk Committee (GERC)							
Credit Risk Committee	Market & Liquidity Risk Committee	Operational Risk Committee	Fiduciary Risk Committee	Compliance & Ethics Oversight Committee	Information Technology Risk Committee	Model Risk Oversight Committee	Workforce Risk Committee

The Board of Directors provides oversight of risk management directly and through certain of its committees: the Audit Committee, the Business Risk Committee, the Capital Governance Committee and the Human Capital and Compensation Committee. The Board of Directors annually approves Northern Trust's Risk Management Framework and Corporate Risk Appetite Statement.

The Audit Committee provides oversight with respect to financial reporting and legal risk.

The Business Risk Committee assumes primary responsibility and oversight with respect to the credit risk, operational risk, fiduciary risk, compliance risk, market risk, liquidity risk, strategic risk, and associated risk themes. The Cybersecurity Risk Oversight Subcommittee is a subcommittee of the Business Risk Committee and assists the Business Risk Committee in discharging its duties with respect to risks related to cybersecurity inherent in Northern Trust's businesses.

The Human Capital and Compensation Committee oversees the development and operation of Northern Trust's incentive compensation program. The Committee annually reviews management's assessment of the effectiveness of the design and performance of Northern Trust's incentive compensation arrangements and practices in providing incentives that are consistent with Northern Trust's safety, soundness, and culture. This assessment includes an evaluation of whether Northern Trust's incentive compensation arrangements and practices discourage inappropriate risk-taking behavior by participants.

The Capital Governance Committee assists the Board of Directors in discharging its oversight duties with respect to capital management and resolution planning activities. Among other responsibilities, the Capital Governance Committee oversees Northern Trust's capital management assessments, forecasting, and stress testing processes and activities, including the annual CCAR exercise, and challenges management, as appropriate, on various elements of such processes and activities. Accordingly, the Capital Governance Committee provides oversight with respect to Northern Trust's linkage of material risks to the capital adequacy assessment process.

The Chief Risk Officer (CRO) oversees Northern Trust's management of risk and compliance, promotes risk awareness and fosters a proactive risk management environment wherein risks inherent in the business strategy are identified, understood, appropriately monitored and mitigated. The CRO reports directly to the Business Risk Committee and the Corporation's Chief Executive Officer. The CRO regularly advises the Business Risk Committee and reports to the Committee at least quarterly on risk exposures, risk management deficiencies and emerging risks. In accordance with the risk management framework, the CRO, Chief Compliance and Ethics Officer, Head of Financial Risk & Chief Credit Officer, Head of Non-Financial Risk & Chief Operational Risk Officer, Chief Information Risk Officer, Chief Economist & Head of Strategic Risk and Risk Analytics, Chief Administrative Officer, Business Unit and Regional Chief Risk Officers, Chief Financial Officer, Head of Capital Resolution and Management Reporting Planning and Analysis, General Counsel, Chief Human Resources Officer and Head of Corporate Sustainability, Inclusion and Social Impact, meet as the Global Enterprise Risk Committee (GERC) to provide executive management oversight and guidance with respect to the management of the categories of risk and risk themes within Northern Trust. The Chief Audit Executive, or his or her designee, also attends GERC meetings as a non-voting member. Among other risk management responsibilities, GERC receives reports, escalations, or recommendations from senior risk committees that are responsible for the management of risk, and from time to time may delegate responsibility to such committees for risk issues. Senior risk committees include:

The Credit Risk Committee (CRC) establishes and monitors credit-related policies and practices throughout Northern Trust and promotes their uniform application.

The Market & Liquidity Risk Committee (MLRC) oversees activities relating to the management of market and liquidity risks by facilitating a focused review of market and liquidity risk exposures and providing rigorous challenge of related policies, key assumptions, and practices.

The Operational Risk Committee (ORC) provides independent oversight and is responsible for setting the operational risk-related policies and developing and implementing the operational risk management framework and programs that support coordination of operational risk activities.

The Fiduciary Risk Committee (FRC) is responsible for establishing and reviewing the fiduciary risk policies and establishing the fiduciary risk framework, governance and programs that support the coordination of fiduciary risk activities.

The Compliance & Ethics Oversight Committee (CEOC) provides oversight and direction with respect to compliance policies, implementation of the compliance and ethics program, and the coordination of regulatory compliance initiatives across the Corporation.

The Information Technology Risk Committee (ITRC) provides oversight and direction with respect to information security, technology and cyber risk. The committee is responsible for recommending the policies related to, and overseeing development and implementation of the risk management framework, standards and processes supporting coordination and governance of, information security, technology and cyber risk management activities.

The Model Risk Oversight Committee (MROC) is responsible for providing management attention, direction, and oversight of the model risk management framework and model risk within Northern Trust.

The Workforce Risk Committee (WRC) is responsible for assessing workforce risk and monitoring initiatives associated with workforce risk management.

In addition to the aforementioned committees, Northern Trust establishes business and regional risk committees that also report into GERC.

Risk Assessment, Appetite and Reporting Processes

As part of the integrated risk framework, Northern Trust has established key risk identification and risk management processes, embedded within its businesses to enable a risk-informed profile that supports its business decisions and the execution of its corporate strategies. Northern Trust's risk assessment process consists of a series of programs across the first and second lines of defense that identify, measure, manage and report risks in line with risk appetite and guidelines.

Northern Trust defines its risk appetite as the aggregate level and types of risk the Board of Directors and senior management are willing to assume to achieve the Corporation's strategic objectives and business plan, consistent with prudent management of risk and applicable capital, liquidity, and other regulatory requirements. It includes consideration of the likelihood and impact of risks, using both monetary loss and non-financial measures across risk themes to monitor against tolerance thresholds and guideline levels that trigger escalation to risk committees, senior management, and the Board of Directors or committees thereof, as appropriate.

Risk Control
Risk Control is an internal, independent review function within the Risk Management function. Risk Control is managed by the Head of Risk Control and is comprised of Model Risk Management, Credit Review, and Global Compliance Testing groups, each with its own risk focus and oversight. Model Risk Management is responsible for the implementation and management of the enterprise-wide model risk framework and independently validating new models and reviewing and re-validating existing models. Credit Review provides an independent, ongoing assessment of credit exposure and related credit risk management processes across Northern Trust. Lastly, Global Compliance Testing evaluates the effectiveness of procedures and controls designed to comply with relevant laws and regulations, as well as corresponding Northern Trust policies governing regulatory compliance activities. The Business Risk Committee has oversight responsibility with respect to Risk Control generally as well as each of these groups.

Audit Services
Audit Services is an independent control function that assesses and validates controls within Northern Trust's risk management framework. Audit Services is managed by the Chief Audit Executive with oversight from the Audit Committee. Audit Services tests the overall adequacy and effectiveness of the system of internal controls associated with the framework on an ongoing basis and reports the results of these audits directly to the Audit Committee. Audit Services includes professionals with a broad range of audit and industry experience, including risk management expertise. The Chief Audit Executive reports directly to the Audit Committee and administratively reports to the Corporation's Chief Executive Officer and is a non-voting member of GERC.

Credit Risk
Credit risk is the risk to interest income or principal from the failure of a borrower, issuer, or counterparty to perform on an obligation.

Credit Risk Overview
Credit risk is inherent in many of Northern Trust's activities. A significant component of credit risk relates to loans, leases, securities, and wholesale counterparty-related exposures, such as over-the-counter (OTC) derivatives and repo-style transactions. Northern Trust's loan portfolio differs significantly from those of other large U.S. financial institutions in that Northern Trust is generally:

- not an originator of loan products intended to be sold into a secondary market or to be bundled into asset securitizations;
- not an agent bank or syndicator of loans, where risk management is achieved post-close through the sale of participations; and
- not a participant in leveraged financial transactions, such as project finance, private-equity-originated acquisition financing, hedge fund leveraging, or prime brokerage finance activities.

Credit Risk Framework and Governance
The CRC is the most senior credit committee at Northern Trust, with responsibility for establishing, approving, and monitoring credit-related policies and programs throughout the Bank. The Chief Credit Officer reports directly to the CRO, chairs the CRC, and heads the Credit Risk Management function at Northern Trust.

The Credit Risk Management function is the focal point of the credit risk framework and, while independent of the business units that manage client relationships, it works closely with them to achieve the goal of assuring proactive management of credit risk. To monitor and control credit risk, the Credit Risk Management function maintains a framework that consists of policies, standards, and programs designed to promote a prudent credit culture and monitors adherence to those internal policies, standards, and programs, as well as external regulations. Independent oversight and review of the credit risk framework also is provided by Risk Control.

The credit risk framework stipulates authority levels for approval of the extension of credit. Individual credit authority for commercial and personal loans is limited to specified amounts and maturities. Credit requests exceeding policies or standards because of amount, maturity, rating, or other conditions, are referred to the relevant Group Credit Approval Committee. Credit decisions involving requests in excess of Group Credit Approval Committee limits require the approval of the Senior Credit Committee. The Capital Markets Credit Committee has sole authority for the approval, modification, or renewal of credit exposure limits to all wholesale market counterparties. The Senior Credit Committee and Capital Markets Credit Committee are both direct sub-committees of the CRC. The Treasury Credit Committee provides similar approval for investments in assets subject to credit risk, such as bonds and equities.

Credit Risk Measurement

The credit risk framework covers a number of different measurements of credit risk at Northern Trust, including risk-weighted assets (RWA), the allowance for credit losses, and stress tests using various macroeconomic scenarios, such as the internal capital adequacy approval program and CCAR.

An integral component of credit risk measurement is Northern Trust's internal risk rating system. Northern Trust's internal risk rating system enables identification, measurement, approval and monitoring of the Corporation's credit risk. Calculations include entity-specific information about the obligor's or counterparty's probability of default (PD) and exposure-specific information about loss given default (LGD), exposure at default (EAD), and maturity. Northern Trust's internal risk rating system is intended to rank its credit risk without any direct linkage to external credit ratings.

Obligors are assigned PDs after consideration of both quantitative and qualitative factors. Although the criteria vary, the objective is for assigned PDs to be consistent in the measurement and ranking of risk. LGD and EAD are assigned based on obligor, product, collateral and instrument characteristics.

Risk ratings are assigned at the time a counterparty or an obligation is approved, renewed, or amended. Risk ratings are reviewed annually or when new information relevant to the rating is received. Risk ratings are utilized for credit underwriting, management reporting, and the calculation of regulatory capital.

The Credit Risk Management function is responsible for the ongoing oversight of each model that supports the internal risk-rating system. Independent model governance and oversight is further supported by the activities of Risk Control.

Loans and Other Extensions of Credit

A significant component of credit risk relates to the loan portfolio, including contractual obligations such as legally binding commitments to extend credit, commercial letters of credit, and standby letters of credit. These contractual obligations and arrangements are discussed in Note 25, "Commitments and Contingent Liabilities," provided in Item 8, "Financial Statements and Supplementary Data."

Undrawn commitments to extend credit generally have fixed expiration dates or other termination clauses. Since a significant portion of the commitments are expected to expire without being drawn upon, the total commitment amount does not necessarily represent future loans or liquidity requirements. The following table provides information about the industry sector and expiration dates of undrawn commitments to extend credit as of December 31, 2022 and 2021.

TABLE 46: UNDRAWN COMMITMENTS TO EXTEND CREDIT BY INDUSTRY SECTOR

	DECEMBER 31, 2022				DECEMBER 31, 2021			
	COMMITMENTS				COMMITMENTS			
($ In Millions)	**TOTAL**	**ONE YEAR AND LESS**	**OVER ONE YEAR**	**OUTSTANDING LOANS**	TOTAL	ONE YEAR AND LESS	OVER ONE YEAR	OUTSTANDING LOANS
Commercial								
Commercial and Institutional								
Finance and Insurance	**$ 6,694.8**	**$ 3,981.3**	**$ 2,713.5**	**$ 5,044.9**	$ 4,778.8	$ 2,769.7	$ 2,009.1	$ 4,950.5
Holding Companies	**—**	**—**	**—**	**45.0**	—	—	—	34.6
Manufacturing	**6,063.3**	**764.2**	**5,299.1**	**1,855.0**	6,721.6	786.2	5,935.4	1,602.2
Mining	**499.0**	**36.8**	**462.2**	**60.7**	758.0	236.0	522.0	94.1
Public Administration	**50.0**	**50.0**	**—**	**13.3**	100.0	50.0	50.0	14.6
Retail Trade	**1,158.2**	**369.0**	**789.2**	**203.7**	812.7	207.3	605.4	235.5
Services	**5,860.6**	**2,357.7**	**3,502.9**	**4,099.0**	5,742.0	2,126.0	3,616.0	3,532.6
Transportation and Warehousing	**243.9**	**—**	**243.9**	**251.8**	279.6	1.5	278.1	262.8
Utilities	**1,220.7**	**67.7**	**1,153.0**	**8.6**	1,208.0	25.4	1,182.6	21.5
Wholesale Trade	**741.4**	**118.8**	**622.6**	**484.7**	797.7	171.5	626.2	396.4
Other Commercial	**147.5**	**89.4**	**58.1**	**348.3**	230.4	197.9	32.5	344.4
Commercial and Institutional[(1)]	**22,679.4**	**7,834.9**	**14,844.5**	**12,415.0**	21,428.8	6,571.5	14,857.3	11,489.2
Commercial Real Estate	**449.3**	**124.4**	**324.9**	**4,773.0**	357.9	61.8	296.1	4,326.3
Non-U.S.	**2,137.6**	**1,572.5**	**565.1**	**3,131.1**	1,514.4	1,096.1	418.3	1,990.2
Lease Financing, net	**—**	**—**	**—**	**—**	—	—	—	11.0
Other	**91.4**	**91.4**	**—**	**1,316.5**	97.2	97.2	—	670.7
Total Commercial	**25,357.7**	**9,623.2**	**15,734.5**	**21,635.6**	23,398.3	7,826.6	15,571.7	18,487.4
Personal								
Private Client	**3,970.0**	**3,090.4**	**879.6**	**14,119.0**	2,499.5	766.4	1,733.1	15,256.3
Residential Real Estate	**783.4**	**125.6**	**657.8**	**6,413.5**	665.9	118.4	547.5	6,319.9
Non-U.S.	**849.5**	**800.0**	**49.5**	**510.0**	858.5	855.6	2.9	381.8
Other	**—**	**—**	**—**	**215.2**	—	—	—	35.2
Total Personal	**5,602.9**	**4,016.0**	**1,586.9**	**21,257.7**	4,023.9	1,740.4	2,283.5	21,993.2
Total	**$ 30,960.6**	**$ 13,639.2**	**$ 17,321.4**	**$ 42,893.3**	$27,422.2	$ 9,567.0	$ 17,855.2	$ 40,480.6

[(1)] *The commercial and institutional industry sector information is presented on the basis of the North American Industry Classification System (NAICS).*

As part of Northern Trust's credit processes, the Credit Risk Management function oversees a range of portfolio reviews that focus on significant and/or weaker-rated credits. This approach allows management to take remedial action in an effort to deal with potential problems. An integral part of the Credit Risk Management function is a formal review of past due and potential problem loans to determine which credits, if any, need to be placed on nonaccrual status or charged off. Northern Trust maintains a loan portfolio "watch list" for adversely classified credit exposures that includes all nonaccrual credits as well as other loans with elevated risk of default. Independent from the Credit Risk Management function, Credit Review undertakes both on-site and off-site file reviews that evaluate the effectiveness of management's implementation of Credit Risk Management's requirements.

Counterparty Credit Risk

Counterparty credit risk for Northern Trust primarily arises from a variety of funding, treasury, trading and custody-related activities, including trading OTC foreign exchange and interest rate derivatives, indemnified securities lending transactions, and sponsored repurchase and reverse repurchase transactions. Credit exposure to counterparties is managed by use of a framework for setting limits by product type and exposure tenor.

To calculate exposure, Northern Trust treats repurchase agreements, reverse repurchase agreements, indemnified securities lending, and sponsored repurchase and reverse repurchase transactions as repo-style transactions. Foreign exchange exposures and interest rate derivatives are treated as OTC derivatives. The exposure at default measurement methodology for each eligible type of counterparty credit exposure, including the use of netting and collateral as risk mitigants, is determined based on regulatory requirements.

Credit Risk Mitigation

Northern Trust considers cash flow to be the primary source of repayment for client-related credit exposures. However, Northern Trust employs several different types of credit risk mitigants to manage its overall credit risk in the event cash flow is not sufficient to repay a credit exposure. Northern Trust broadly groups its risk mitigation techniques into the following three primary categories.

Physical and Financial Collateral: One of Northern Trust's primary credit risk mitigation approaches is the requirement of collateral. Residential and commercial real estate exposures are typically secured by properly margined mortgages on the property. Various other types of physical and financial collateral are also accepted for certain commercial and personal loans, in line with Northern Trust's lending standards. In cases where loans to clients are secured by marketable securities, the daily values of the securities are monitored closely to ensure adherence to collateral coverage policies.

Netting: On-balance sheet netting is employed where applicable for counterparties with master netting agreements. Netting is primarily related to foreign exchange transactions with major banks and institutional clients subject to eligible master netting agreements.

Guarantees: Personal and corporate guarantees are accepted, as warranted, to reduce risk of default, facilitate potential collection efforts, and protect Northern Trust's claims relative to other creditors.

Another important risk management practice is the avoidance of undue concentrations of exposure, such as in any single (or small number of related) obligor/counterparty, loan type, industry, geography, country or risk mitigant. Processes are in place to establish limits on certain concentrations and the monitoring of adherence to the limits.

Operational Risk

Operational risk is the risk of loss from inadequate or failed internal processes, human factors and systems, or from external events.

Operational Risk Overview

Operational risk is inherent in each of Northern Trust's businesses and corporate functions and reflects the potential for inadequate information systems, operating problems, challenges related to reliance on third parties, product design and delivery difficulties, potential legal actions or catastrophes to result in losses. This includes the potential that continuity of service and resilience may be impacted.

Operational risk includes information technology and cybersecurity, compliance, fiduciary and legal risks, which under the Corporation's risk structure are governed and managed explicitly.

Operational Risk Framework and Governance

To monitor and control operational risk, Northern Trust maintains a framework consisting of risk management policies, programs and practices designed to promote a sound operational environment and maintain the Corporation's operational risk profile and losses within approved risk appetites and guidelines. The framework implements a structured approach to establishing and communicating operational risk management practices and responsibilities. This structured approach to measuring and managing operational risk addresses operational resilience which requires that Northern Trust minimize service disruptions and limit systemic impacts from adverse events as well as risk quantification. The framework is deployed consistently and globally across all businesses and its objective is to identify and measure the factors that influence risk and drive action to maintain operational resilience and reduce future loss events. The Operational Risk Management function is responsible for defining the operational risk management framework and providing independent oversight of the framework implementation and application across Northern Trust. It is the responsibility of each business to implement the enterprise-wide operational risk framework and business-specific risk management programs to identify, monitor, measure, manage and report on operational risk and mitigate Northern Trust's exposure to service disruptions and loss. Several key programs support the operational risk framework, including:

- ***Loss Event Data Program*** - a program that collects internal and external loss data for use in monitoring operational risk exposure, various business analyses and a Basel Advanced Measurement Approach (AMA) capital quantification.
- ***Risk and Control Self-Assessment*** - a comprehensive, structured risk management process used by Northern Trust's businesses to identify, measure, monitor and mitigate operational risk exposures throughout the enterprise.
- ***Operational Risk Scenario Analysis*** - a systematic process of obtaining expert opinions from business managers and risk management experts to derive reasoned assessments of the likelihood of occurrence and the potential loss impact of plausible operational losses.

- ***Product and Process Risk Management Program*** - a program used for evaluating and managing risks associated with the introduction of new and modified noncredit products and services, significant changes to operating processes, and related significant loss events.
- ***Operational Resilience*** - a program that outlines the business service lifecycle assessment, designed to identify Northern Trust's most important business services, ensure the continuity business service delivery and promote the ability to prevent, respond to, recover and learn from disruptions.
- ***Third-Party Risk Management Program*** - a program that provides processes for evaluating, quantifying and qualifying appropriate risk assessment, measurement, monitoring and management of third and fourth parties (inclusive of external and internal, e.g., Northern Trust legal entity to legal entity relationships).
- ***Global Fraud Risk*** - a program designed to prevent, detect and respond to attempted or actual fraud impacting the bank and its clients globally.
- ***Data Management*** - a program that embeds data management and data governance related activities into Northern Trust processes in order to manage data risk.
- ***Data Privacy Program*** - a program that sets forth a consistent, global approach to compliance with all applicable laws, rules, and regulations relating to privacy and establishes overarching principles for the responsible use and protection of confidential information. The Program is designed to guide Northern Trust to more effectively identify, assess, manage and mitigate privacy risks and privacy incidents.
- ***Information Security, Technology, and Cyber Risk Management*** - a program that sets forth a consistent, global approach to communicate risk management processes and controls addressing information security, including cyber threats, technology, and related compliance risks to the organization.
- ***Operational Resiliency and Recovery Management Program*** - a program designed to protect life safety, minimize and manage the business impact and support the recovery of critical functions for clients following an incident.
- ***Physical Security*** - a program that provides for the life safety of Northern Trust partners, clients, and visitors worldwide.
- ***Insurance Management Program*** - a program designed to reduce the monetary impact of certain operational loss events through the securing of appropriate insurance policy protection.

As discussed in "Risk Control" above, Model Risk Management also is part of the operational risk framework.

The ORC is responsible for overseeing the activities of Northern Trust related to the management of operational risk including establishing and maintaining the Corporate Operational Risk Policy and approving the operational risk framework and programs. This committee has the expanded role of coordinating operational risk issues related to information technology, cybersecurity, compliance and fiduciary risks. The purpose of this committee is to provide executive management's insight and guidance to the management of existing and emerging operational risks. This includes identification and assessment of evolving risk trends across the operational risk framework and how these can be best managed.

Operational Risk Measurement

Northern Trust utilizes the AMA capital quantification process to estimate required capital for the Corporation and applicable U.S. banking subsidiaries. Northern Trust's AMA capital quantification process incorporates outputs from the Loss Event Data, Risk and Control Self-Assessment and Operational Risk Scenario Analysis programs to derive required capital. Business environment factor information is used to estimate loss frequency. The AMA capital quantification process uses a Loss Distribution Approach methodology to combine frequency and severity distributions to arrive at an estimate of the potential aggregate loss at the 99.9^{th} percentile of the aggregate loss distribution over a one-year time horizon.

Information Security, Technology, and Cyber Risk Management

Effective management of risks related to the confidentiality, integrity and availability of information is crucial in an environment of increasing cyber threats and requires a structured approach to establish and communicate expectations and required practices. Northern Trust's information security, technology, and cyber risk management program provides the overall structure for managing the respective risks in a sustainable manner. The program is supported by the Information Security, Technology, and Cyber Risk Management Policy, which is the highest-level governing document and is approved by the Business Risk Committee. In addition, the program is supported by an organizational structure that reflects support from executive management and includes risk committees comprised of members from across the business, including the Information Technology Risk Committee (ITRC). The ITRC is chaired by the Chief Information Risk Officer, who regularly reports to the Board of Directors and its subcommittees, as appropriate, on the status of the information security, technology, and cyber risk profile.

The governance process, internal controls and risk management practices are designed to keep risk at levels appropriate to Northern Trust’s overall risk appetite and the inherent risk in the markets in which Northern Trust operates. Northern Trust employees are responsible for promoting information security as well as adhering to applicable policies and standards to safeguard electronic information and business systems within their care. In cases where Northern Trust relies on vendors to perform services, controls are routinely reviewed for alignment with industry standards and their ability to protect information. Any findings identified are remediated following a risk-based approach.

In addition to the information security controls managed and monitored within the organization, Northern Trust uses external third-party security teams on a regular basis to assess effectiveness. These teams perform program maturity assessments, penetration tests, security assessments and reviews of Northern Trust’s vulnerability to cyber-attacks. Northern Trust also operates a global security operations center for threat identification and response. This center aggregates security threat information from systems and platforms across the business and alerts the organization in accordance with its documented Cybersecurity Incident Response Plan.

The Cybersecurity Incident Response Plan is used to respond to cybersecurity incidents. A cybersecurity incident is defined as any event that has a negative effect on the confidentiality, integrity, or availability of Northern Trust’s or its clients’ assets resulting from malicious or intentional actions. These can include, but are not limited to, disruptions of service, denials of service, compromises of information systems, data exfiltration or data corruption. The plan provides a streamlined approach that can be invoked rapidly to address matters that raise enterprise concern and to communicate impact, actions, and status to senior management, including the Chief Information Security Officer, Chief Information Risk Officer, and appropriate stakeholders. The plan is designed to work with enterprise-level response plans, and is reviewed, tested, and updated regularly.

Northern Trust’s disclosure procedures and controls also address cybersecurity incidents and include elements to ensure an analysis of potential disclosure obligations arising from any such incidents. Northern Trust maintains compliance programs to address the applicability of restrictions on securities trading while in possession of material, nonpublic information, including instances in which such information may relate to cybersecurity incidents.

Northern Trust also maintains a comprehensive Information and Cyber Security Training and Awareness practice providing baseline and targeted education and awareness for employees and contractors. This program includes at least one required annual online training class for all employees and contractors, supplemental refresher training throughout the year, targeted training based on roles and risk levels, multiple simulated phishing and vishing attacks with associated training, the distribution of regular information security awareness materials, and the designation of individuals as Information Security and Privacy champions within the businesses.

Operational Resilience and Recovery Management

Northern Trust’s operational resilience approach encompasses operational resilience and recovery processes enterprise-wide (including staff, technology and facilities) to anticipate and limit disruptions and to ensure that following a disaster or business interruption Northern Trust is able to resume critical business functions and fulfills all regulatory and legal requirements.

Northern Trust’s operational resilience mitigation and preventative measures include sophisticated physical security, resilient designs and peer capacity for its corporate data centers, a highly redundant global network, robust network security, resilience centers that offer alternative workstations and transfer of work and work-from-home programs that provide further capability.

All of Northern Trust’s businesses are required to risk-assess all their functions regularly and develop business continuity plans covering resource requirements (people, systems, vendor relationships and other assets), arrangements for obtaining these resources and prioritizing the resumption of each function in compliance with corporate standards. The business continuity programs of all critical third-party vendors to Northern Trust are reviewed on a regular basis. All of Northern Trust’s businesses test their plans at least annually. The ORC annually reviews and presents the corporate business continuity plan to the Business Risk Committee.

Fiduciary Risk

Fiduciary risks are risks arising from the failure in administering or managing financial and other assets in clients’ fiduciary accounts: i) to adhere to a fiduciary standard of care if required under the terms of governing documents or applicable laws; or ii) to properly discharge fiduciary duties. Fiduciary status may hinge on the nature of a particular function being performed and fiduciary standards may vary by jurisdiction, type of relationship and governing document.

Fiduciary Risk Overview

The fiduciary risk management framework identifies, assesses, measures, monitors and reports on fiduciary risk matters deemed significant. Fiduciary risk is mitigated through internal controls and risk management practices that are designed to identify, understand and keep such risk at levels consistent with the organization's overall risk appetite while also managing the inherent risk in each relationship for which Northern Trust serves in a fiduciary capacity. Each business is responsible for complying with all corporate policies and external regulations and for establishing specific procedures, standards and guidelines to manage fiduciary risk within the desired risk appetite.

Fiduciary Risk Framework and Governance

The FRC is responsible for overseeing activities related to the exercise of fiduciary powers throughout the organization in clients' fiduciary accounts, and for establishing and reviewing the fiduciary risk policies and the fiduciary risk framework that supports the coordination of activities to identify, monitor, manage and report on fiduciary risk. In addition, the FRC serves as an escalation point for significant issues raised by its subcommittees or elsewhere in the organization.

Compliance Risk

Compliance risk is the risk of legal or regulatory sanctions, financial loss, or damage to reputation resulting from failure to comply with laws, regulations, rules, other regulatory requirements, or codes of conduct and other standards of self-regulatory organizations applicable to Northern Trust. Compliance risk includes the following two subcategories:

- Regulatory Risk - risk arising from failure to comply with prudential and conduct of business or other regulatory requirements.
- Financial Crime Risk - risk arising from financial crime (e.g., money laundering, sanctions violations, fraud, insider dealing, theft, etc.) in relation to the products, services, or accounts of the institution, its clients, or others associated with the same.

Compliance Risk Framework and Governance

The compliance risk management framework identifies, assesses, controls, measures, monitors and reports on compliance risk. The framework is designed to minimize compliance risk and maintain an environment in which criminal or regulatory violations do not occur. The framework includes a comprehensive governance structure and a Compliance and Ethics Program approved by the Business Risk Committee.

Each business is responsible for the implementation and effectiveness of the Compliance and Ethics Program and specific compliance policies within their respective businesses. Each business is responsible for its respective employees' compliance with corporate policies and external regulations and for establishing specific procedures, standards and guidelines to manage compliance risk in accordance with Northern Trust's Compliance and Ethics Program.

The CEOC establishes and monitors adherence to Northern Trust's Compliance and Ethics Program. The Chief Compliance and Ethics Officer reports to the Business Risk Committee, as appropriate, and chairs the CEOC.

Liquidity Risk Management

Liquidity Risk Overview

Liquidity risk is the risk of not being able to raise sufficient funds or maintain collateral to meet balance sheet and contingent liability cash flow obligations when due, because of firm-specific or market-wide stress events.

Northern Trust maintains a strong liquidity position and liquidity risk profile. Northern Trust's balance sheet is primarily liability-driven. That is, the main driver of balance sheet changes comes from changing levels of client deposits, which are generally related to the level of custody assets serviced and commercial and personal deposits and can also be influenced by market conditions. This liability-driven business model differs from a typical asset-driven business model, where increased levels of deposits and wholesale borrowings are required to support, for example, increased levels of lending. Northern Trust's balance sheet is generally comprised of high-quality assets that are managed to meet anticipated obligations under stress, resulting in low liquidity risk.

Liquidity Risk Framework and Governance

Northern Trust maintains a liquidity risk framework consisting of risk management policies and practices to keep its risk profile within the Board-approved Corporate Risk Appetite Statement. All liquidity risk activities are overseen by the Risk Management function, which is independent of the businesses undertaking the activities.

The Liquidity Management Policy and exposure limits for liquidity risk are set by the Board of Directors, and committee structures have been established to implement and monitor adherence to corporate policies, external regulations and established procedures. Limits are monitored based on measures such as the liquidity coverage ratio (LCR), the NSFR, and the liquidity stress-testing buffer across a range of time horizons. Treasury, in the first line of defense, proposes liquidity risk management strategies and is responsible for performing liquidity management activities. The Asset and

Liability Management Committee (ALCO) provides first-line management oversight and is responsible for approving strategies and activities within the risk appetite, monitoring risk metrics, overseeing balance sheet resources, and reviewing reporting such as cash flows, LCR, NSFR, and stress test results.

Market and Liquidity Risk Management, in the second line of defense, provides challenge to the first-line activities, evaluates compliance with regulatory requirements and process effectiveness, and escalates material items for corrective action. The Market and Liquidity Risk Committee (MLRC) provides second-line oversight and is responsible for reviewing market and liquidity risk exposures, approving and monitoring risk metrics, and approving key methodologies and assumptions that drive liquidity risk measurement.

Liquidity Risk Analysis, Monitoring, and Reporting

Liquidity risk is analyzed and monitored in order to ensure compliance with the approved risk appetite. Various liquidity analysis and monitoring activities are employed by Northern Trust to understand better the nature and sources of its liquidity risks, including: liquidity stress testing, liquidity metric monitoring, collateral management, intraday management, cash flow projections, operational deposit modeling, liquid asset buffer measurement, funds transfer pricing, and contingency funding planning.

The liquidity risk management process is supported through management and regulatory reporting. Both Northern Trust's Treasury and Market and Liquidity Risk Management functions produce management reports that enable oversight bodies to make informed decisions and support management of liquidity risk within the approved risk appetite. Holistic liquidity metrics such as LCR, NSFR and internal liquidity stress testing are actively monitored, along with a suite of other metrics that provide early warning indicators of changes in the risk profile.

Regulatory Environment

Northern Trust actively follows regulatory developments and regularly evaluates its liquidity risk management framework against proposed rule-making and industry best practices in order to comply with applicable regulations and further enhance its liquidity policies. Please refer to "Supervision and Regulation—Liquidity Standards" in Item 1, "Business," for a discussion of applicable liquidity standards.

Liquidity Coverage Ratio (LCR)

The LCR Final Rule requires covered banking organizations, which include the Corporation, to maintain an amount of high-quality liquid assets (HQLAs) equal to or greater than 100% of the banking organization's total net cash outflows over a 30 calendar-day standardized supervisory liquid stress scenario. The requirements of the LCR Final Rule are intended to promote the short-term resilience of the liquidity risk profile of covered banking organizations, improve the banking industry's ability to absorb shocks arising from financial and economic stress, and improve the measurement and management of liquidity risk. The Corporation and the Bank each satisfied the U.S. liquidity coverage ratio requirements during 2022.

U.S. Net Stable Funding Ratio (NSFR)

The NSFR Final Rule requires covered banking organizations, which include the Corporation, to maintain an amount of available stable funding (ASF) equal to or greater than the banking organization's projected minimum funding needs, or required stable funding (RSF), over a one-year time horizon. The NSFR is designed to reduce the likelihood that disruptions to a banking organization's regular sources of funding will compromise its liquidity position, promote effective liquidity risk management, and support the ability of banking organizations to provide financial intermediation to businesses and households across a range of market conditions. The NSFR supports financial stability by requiring banking organizations to fund their activities with stable sources of funding on an ongoing basis, reducing the possibility that funding shocks would substantially increase distress at individual banking organizations. The Corporation and the Bank each satisfied the NSFR requirements during 2022.

Funding

Northern Trust maintains a very liquid balance sheet, with cash and due from banks, deposits with the Federal Reserve and other central banks, short-term money market assets and investment securities in aggregate representing 63% and 71% of total assets as of December 31, 2022 and 2021, respectively. The market value of unencumbered securities at the Bank, which include those placed at the Federal Reserve discount window, totaled $46.2 billion and $59.0 billion at December 31, 2022 and 2021, respectively.

As the Corporation's principal subsidiary encompassing all of Northern Trust's banking activities, the Bank centrally manages liquidity for all U.S. and international banking operations. Liquidity is provided by a variety of sources, including client deposits (institutional and personal) from the Asset Servicing and Wealth Management businesses, wholesale funding from the capital markets, maturities of short-term investments, interest earned on investment securities and money market assets, Federal Home Loan Bank advances, and unencumbered liquid assets that can be sold or pledged to secure additional funds. While management does not view central bank discount windows as primary sources of liquidity, at December 31, 2022 and 2021, the Bank had over $39.0 billion and $55.0 billion, respectively of securities and loans readily available as collateral to support discount window borrowings. The Bank also is active in the U.S. interbank funding market, providing an important source of additional liquidity and low-cost funds.

The liquidity of the Corporation is managed separately from that of the Bank. The primary sources of cash for the Corporation are issuances of debt or equity and dividend payments from the Bank. For further information on issuances or redemptions of debt or equity, please refer to Note 13, "Senior Notes and Long-Term Debt" provided in Item 8, "Financial Statements and Supplementary Data." The Corporation received no dividends and $751.1 million of dividends from the Bank in 2022 and 2021, respectively. Dividends from the Bank are subject to certain restrictions, as discussed in further detail in Note 30, "Restrictions on Subsidiary Dividends and Loans or Advances," provided in Item 8, "Financial Statements and Supplementary Data."

The Corporation's liquidity, defined as the amount of cash and highly marketable assets, was $601.4 million and $1.7 billion at December 31, 2022 and 2021, respectively. During, and at year-end, 2022 and 2021, these assets were comprised almost entirely of cash in a demand deposit account at the Bank or overnight money market placements, both of which were fully available to the Corporation to support its own cash flow requirements or those of its subsidiaries, as needed. Average liquidity during 2022 and 2021 was $1.2 billion and $1.8 billion, respectively. The cash flows of the Corporation are shown in Note 33, "Northern Trust Corporation (Corporation only)," provided in Item 8, "Financial Statements and Supplementary Data."

Uses of Liquidity

Liquidity supports a variety of activities, including client withdrawals, purchases of securities, net loan growth, and draws on commitments to extend credit.

The Corporation's uses of cash consist mainly of dividend payments to the Corporation's stockholders; the payment of principal and interest to note holders; repurchases of its common stock; and investments in, or loans to, its subsidiaries. The most significant uses of cash by the Corporation during 2022 were $750.2 million of common stock dividends and $35.4 million of common stock repurchases. The most significant uses of cash by the Corporation during 2021 were $583.3 million of common stock dividends, repayments of senior notes and floating rate capital debt of $500.0 million and $278.8 million, respectively, and $267.6 million of common stock repurchases.

Credit Ratings

A significant source of liquidity for both the Corporation and the Bank is the ability to draw funding from capital markets globally. The credit ratings of the Corporation and the Bank as of December 31, 2022, provided in the following table, allow Northern Trust to access capital markets on favorable terms.

TABLE 47: NORTHERN TRUST CREDIT RATINGS AS OF DECEMBER 31, 2022

	CREDIT RATING		
	STANDARD & POOR'S	MOODY'S	FITCH RATINGS
Northern Trust Corporation:			
Senior Debt	A+	A2	A+
Subordinated Debt	A	A2	A+
Preferred Stock	BBB+	Baa1	BBB
Outlook	Stable	Stable	Stable
The Northern Trust Company:			
Short-Term Deposit	A-1+	P-1	F1+
Long-Term Deposit/Debt	AA-	Aa2	AA
Subordinated Debt	A+	A2	A+
Outlook	Stable	Stable	Stable

A significant downgrade in one or more of these ratings could limit Northern Trust's access to capital markets and/or increase the rates paid for short-term borrowings, including deposits, and future long-term debt issuances. The size of these rate increases would depend on multiple factors, including the extent of the downgrade, Northern Trust's relative debt rating compared to other financial institutions, current market conditions, and other factors. In addition, as discussed in Note 27, "Offsetting of Assets and Liabilities," provided in Item 8, "Financial Statements and Supplementary Data," Northern Trust enters into certain master netting arrangements with derivative counterparties that contain credit-risk-related contingent features in which the counterparty has the option to declare Northern Trust in default and accelerate cash settlement of net derivative liabilities with the counterparty in the event Northern Trust's credit rating falls below specified levels. At December 31, 2022, the net maximum amount of these termination payments that Northern Trust could have been required to pay was $135.8 million. Other than these credit-risk-related contingent derivative counterparty payments, Northern Trust had no long-term debt covenants or other credit-risk-related payments at December 31, 2022, that would be triggered by a significant downgrade in its debt ratings.

Off-Balance Sheet Arrangements

Please refer to Note 25, "Commitments and Contingent Liabilities," provided in Item 8, "Financial Statements and Supplementary Data" for information on off-balance sheet arrangements and the Credit Risk discussion in the "Risk Management" section for further detail on undrawn commitments.

Market Risk Management

There are two types of market risk, interest rate risk associated with the banking book and trading risk. Interest rate risk associated with the banking book is the potential for movements in interest rates to cause changes in Net Interest Income and the market value of equity, including Accumulated Other Comprehensive Income (Loss) from the available for sale debt securities portfolio. Trading risk is the potential for movements in market variables such as foreign exchange and interest rates to cause changes in the value of trading positions.

Market Risk Framework and Governance

Northern Trust maintains a market risk framework consisting of risk management policies and practices to keep its risk profile within the Board-approved Corporate Risk Appetite Statement. All market risk activities are overseen by the Risk Management function, which is independent of the businesses undertaking the activities.

The Asset and Liability Management Policy, Policy on Dealer Trading Activities, and exposure limits for market risk are set by Board-level committees, and committee structures have been established to implement and monitor adherence to corporate policies, external regulations and established procedures. Limits are monitored based on measures such as sensitivity of Net Interest Income (NII), sensitivity of market value of equity (MVE), and value-at-risk (VaR) across a range of time horizons.

Treasury, in the first line of defense, proposes market risk management strategies and is responsible for performing market risk management activities. The ALCO provides first-line management oversight and is responsible for approving strategies and activities within the risk appetite, monitoring risk metrics, overseeing balance sheet resources, overseeing the execution of strategies, and reviewing reporting such as stress test results.

Market and Liquidity Risk Management, in the second line of defense, provides challenge to the first-line activities, evaluates compliance with regulatory requirements and process effectiveness, and escalates material items for corrective action. The MLRC provides second-line oversight and is responsible for reviewing market risk exposures, establishing and monitoring risk metrics, and approving key methodologies and assumptions that drive market risk measurement.

Interest Rate Risk Overview

Interest rate risk in the banking book is the potential for deterioration in Northern Trust's financial position (e.g. interest income, market value of equity, or capital) due to changes in interest rates. NII and MVE sensitivity are the primary metrics used for measurement and management of interest rate risk. Changes in interest rates can have a positive or negative impact on NII depending on the positioning of assets, liabilities and off-balance sheet instruments. Changes in interest rates also can impact the values of assets, liabilities and off-balance sheet positions, which directly impact the MVE. Higher interest rates may impact the fair value of available for sale debt securities which in turn affects Accumulated Other Comprehensive Income (Loss) that can impact regulatory capital ratios. To mitigate interest rate risk, the balance sheet is managed so that movements of interest rates on assets and liabilities (adjusted for hedges) are sufficiently correlated, which allows Northern Trust to manage its interest rate risk within its risk appetite.

There are four commonly recognized types of structural interest rate risk in the banking book:

- repricing risk, which arises from differences in the maturity and repricing terms of assets and liabilities;
- yield curve risk, which arises from changes in the shape of the yield curve;
- basis risk, which arises from imperfect correlation in the adjustment of the rates earned and paid on different financial instruments with otherwise similar repricing characteristics; and
- embedded optionality risk, which arises from client or counterparty behavior in response to interest rate changes.

Interest Rate Risk Analysis, Monitoring, and Reporting

Northern Trust uses two primary measurement techniques to manage interest rate risk: NII and MVE sensitivity. NII sensitivity provides management with a short-term view of the impact of interest rate changes on NII. MVE sensitivity provides management with a long-term view of interest rate changes on MVE based on the period-end balance sheet.

Northern Trust limits aggregate interest rate risk (as measured by the NII sensitivity and MVE sensitivity simulation techniques) to an acceptable level within the context of risk appetite. A variety of actions may be used to implement risk management strategies to modify interest rate risk including:

- purchase of investment securities;
- sale of investment securities that are classified as available for sale;
- issuance of senior notes and subordinated notes;
- collateralized borrowings from the Federal Home Loan Bank; and
- hedging with various types of derivative financial instruments.

NII Sensitivity

The modeling of NII sensitivity incorporates on-balance sheet positions, as well as derivative financial instruments (principally interest rate swaps) that are used to manage interest rate risk. Northern Trust uses market implied forward interest rates as the base case and measures the sensitivity (i.e., change) of a static balance sheet to changes in interest rates. Stress testing of interest rates is performed to include such scenarios as immediate parallel shocks to rates, nonparallel (i.e., twist) changes to yield curves that result in their becoming steeper or flatter, and changes to the relationship among the yield curves (i.e., basis risk).

The NII sensitivity analysis incorporates certain critical assumptions such as interest rates and client behaviors under changing rate environments. These assumptions are based on a combination of historical analysis and future expected pricing behavior. The simulation cannot precisely estimate NII sensitivity given uncertainty in the assumptions. The following key assumptions are incorporated into the NII simulation:

- the balance sheet size and mix remains constant over the simulation horizon with maturing assets and liabilities replaced with instruments with similar terms as those that are maturing, with the exception of certain nonmaturity deposits that are considered short-term in nature and therefore receive a more conservative interest-bearing treatment;
- prepayments on mortgage loans and securities collateralized by mortgages are projected under each rate scenario using a third-party mortgage analytics system that incorporates market prepayment assumptions;
- cash flows for structured securities are estimated using a third-party vendor in conjunction with the prepayments provided by the third-party mortgage analytics vendor;
- nonmaturity deposit pricing is projected based on Northern Trust's actual historical patterns and management judgment, depending upon the availability of historical data and current pricing strategies/or judgment; and
- new business rates are based on current spreads to market indices.

The following table shows the estimated NII impact over the next twelve months of 100 and 200 basis point ramps upward and 100 basis point ramp downward movements in interest rates relative to forward rates as of December 31, 2022 and 2021. A 200 basis point ramp downward movement in interest rate relative to forward rate is provided as of December 31, 2022. Each rate movement is assumed to occur gradually over a one-year period. Given the low level of interest rates at the time and assumed interest rate floors as rates approach zero, the 200 basis point ramp downward movement in interest rate relative to forward rate as of December 31, 2021 would not provide meaningful results and is therefore not provided.

TABLE 48: NET INTEREST INCOME SENSITIVITY

INCREASE/(DECREASE) ESTIMATED IMPACT ON NEXT TWELVE MONTHS OF NET INTEREST INCOME

($ In Millions)	DECEMBER 31, 2022	DECEMBER 31, 2021
INCREASE IN INTEREST RATES ABOVE MARKET IMPLIED FORWARD RATES		
100 Basis Points	**$ 41**	$ 302
200 Basis Points	**80**	514
DECREASE IN INTEREST RATES BELOW MARKET IMPLIED FORWARD RATES		
100 Basis Points	**$ (31)**	$ (229)
200 Basis Points	**(64)**	N/M

The NII sensitivity analysis does not incorporate certain management actions that may be used to mitigate adverse effects of actual interest rate movement. For that reason and others, the estimated impacts do not reflect the likely actual results but serve as estimates of interest rate risk. NII sensitivity is not comparable to actual results disclosed elsewhere or directly predictive of future values of other measures provided.

MVE Sensitivity

MVE is defined as the present value of assets minus the present value of liabilities, net of the value of financial derivatives that are used to manage the interest rate risk of balance sheet items. The MVE looks at the whole balance sheet, which includes available for sale debt securities, held to maturity debt securities, money market accounts, deposits, loans and wholesale borrowings. The potential effect of interest rate changes on MVE is derived from the impact of such changes on projected future cash flows and the present value of these cash flows and is then compared to the established limit. Northern Trust uses current market rates (and the future rates implied by these market rates) as the base case and measures MVE sensitivity under various rate scenarios. Stress testing of interest rates is performed to include such scenarios as immediate parallel shocks to rates, nonparallel (i.e., twist) changes to yield curves that result in their becoming steeper or flatter, and changes to the relationship among the yield curves (i.e., basis risk).

The MVE sensitivity analysis incorporates certain critical assumptions such as interest rates and client behaviors under changing rate environments. These assumptions are based on a combination of historical analysis and future expected pricing behavior. The simulation cannot precisely estimate MVE sensitivity given uncertainty in the assumptions. Many of the assumptions that apply to NII sensitivity also apply to MVE sensitivity simulations, with the following separate key assumptions incorporated into the MVE simulation:

- the present value of nonmaturity deposits are estimated using dynamic decay methodologies or estimated remaining lives, which are based on a combination of Northern Trust's actual historical runoff patterns and management judgment—some balances are assumed to be core and have longer lives while other balances are assumed to be temporary and have comparatively shorter lives;
- the present values of most noninterest-related balances (such as receivables, equipment, and payables) are the same as their book values; and
- Monte Carlo simulation is used to generate forward interest rate paths.

The following table shows the estimated impact on MVE of 100 and 200 basis point shocks up and 100 basis point shock down from current market implied forward rates at December 31, 2022 and 2021. A 200 basis point shock down from current market implied forward rate is provided at December 31, 2022. Each rate movement is assumed to occur gradually over a one-year period. The 200 basis point shock down from current market implied forward rate at December 31, 2021 would not provide meaningful results and is therefore not provided.

TABLE 49: MARKET VALUE OF EQUITY SENSITIVITY

INCREASE/(DECREASE) ESTIMATED IMPACT ON MARKET VALUE OF EQUITY ($ In Millions)	DECEMBER 31, 2022	DECEMBER 31, 2021
INCREASE IN INTEREST RATES ABOVE MARKET IMPLIED FORWARD RATES		
100 Basis Points	**$ (472)**	$ 241
200 Basis Points	**(965)**	(60)
DECREASE IN INTEREST RATES BELOW MARKET IMPLIED FORWARD RATES		
100 Basis Points	**$ 596**	$ (384)
200 Basis Points	**842**	N/M

The MVE simulations do not incorporate certain management actions that may be used to mitigate adverse effects of actual interest rate movements. For that reason and others, the estimated impacts do not reflect the likely actual results but serve as estimates of interest rate risk. MVE sensitivity is not comparable to actual results disclosed elsewhere or directly predictive of future values of other measures provided.

Foreign Currency Risk Overview

Northern Trust's balance sheet is exposed to nontrading foreign currency risk as a result of its holdings of non-U.S. dollar denominated assets and liabilities, investment in non-U.S. subsidiaries, and future non-U.S. dollar denominated revenue and expense. To manage currency exposures on the balance sheet, Northern Trust attempts to match its assets and liabilities by currency. If those currency offsets do not exist on the balance sheet, Northern Trust will use foreign exchange derivative contracts to mitigate its currency exposure. Foreign exchange contracts are also used to reduce Northern Trust's currency exposure to future non-U.S. dollar denominated revenue and expense.

In addition, Northern Trust provides global foreign exchange (GFX) services to clients. Most of these services are provided in connection with Northern Trust's global custody business. In the normal course of business, Northern Trust also engages in trading of non-U.S. currencies for its own account. Both activities are considered trading activities.

Foreign currency trading positions exist when aggregate obligations to purchase and sell a currency other than the U.S. dollar do not offset each other in amount, or offset each other over different time periods. The GFX trading portfolio at Northern Trust is composed of spot, forward, and non-deliverable foreign currency transactions. For GFX, spot risk is driven primarily by foreign exchange rate (FX) risk, and forward risk is driven primarily by interest rate (IR) risk.

Foreign Currency Risk Measurement

Northern Trust measures daily the risk of loss associated with all non-U.S. currency positions using a VaR model and applying the historical simulation methodology. This statistical model provides estimates, based on high confidence levels, of the potential loss in value that might be incurred if an adverse shift in non-U.S. currency exchange rates and interest rates were to occur over a small number of days. The model incorporates foreign currency and interest rate volatilities and correlations in price movements among the currencies. VaR is computed for each trading desk and for the global portfolio.

VaR measures are computed in a vendor software application which reads foreign exchange positions from Northern Trust’s trading systems each day. Data vendors provide foreign exchange rates and interest rates for all currencies. The Risk Management function monitors on a daily basis VaR model inputs and outputs for reasonableness.

Foreign Currency Risk Monitoring, Reporting and Analysis

Northern Trust monitors several variations of the GFX VaR measures to meet specific regulatory and internal management needs. Variations include different methodologies (historical simulation, Monte Carlo simulation and Taylor approximation), horizons of one day and ten days, confidence levels of 95% and 99%, subcomponent VaRs using only FX drivers and only IR drivers, and look-back periods of one year, two years, and four years. Those alternative measures provide management an array of corroborating metrics and alternative perspectives on Northern Trust’s market risks.

Automated daily reports are produced and distributed to business managers and risk managers. The Risk Management function also reviews and reports several variations of the VaR measures in historical time series format to provide management with a historical perspective on risk.

The following table presents the levels of total regulatory VaR and its subcomponents for GFX in the years indicated below, based on the historical simulation methodology, a 99% confidence level, a one-day horizon and equally-weighted volatility. The total VaR for GFX is typically less than the sum of its two subcomponents due to diversification benefits derived from the two subcomponents.

TABLE 50: GLOBAL FOREIGN CURRENCY VALUE-AT-RISK

($ In Millions)	TOTAL VaR (FX AND IR DRIVERS)		FX VaR (FX DRIVERS ONLY)		IR VaR (IR DRIVERS ONLY)	
FOR THE YEAR ENDED DECEMBER 31,	**2022**	2021	**2022**	2021	**2022**	2021
High	**$ 0.2**	$ 0.9	**$ 0.2**	$ 0.4	**$ 0.3**	$ 0.7
Low	**0.1**	—	**—**	—	**—**	—
Average	**0.1**	0.2	**0.1**	0.1	**0.1**	0.2
As of December 31,	**0.1**	0.1	**0.1**	0.1	**0.1**	0.1

During 2022 and 2021, Northern Trust did not incur an actual GFX trading loss in excess of the daily GFX VaR estimate.

Other Nonmaterial Trading Activities

Market risk associated with other trading activities is immaterial. Northern Trust’s broker-dealer subsidiary, Northern Trust Securities, Inc., maintains a portfolio of trading securities held for customer accommodation purposes and, beginning in 2022, invests excess cash balances in short-term investment vehicles. These activities averaged $12.1 million and $0.6 million for the year ended December 31, 2022 and 2021, respectively.

Northern Trust is also party to interest rate derivative contracts consisting mostly of interest rate swaps and swaptions entered into to meet clients’ interest rate risk management needs, but also including a small number of caps and floors. All interest rate derivative transactions are executed by Northern Trust's Treasury department. When Northern Trust enters into client transactions, its practice is to mitigate the resulting market risk with offsetting interbank derivative transactions with matching terms and maturities.

Strategic Risk

Strategic risk is the vulnerability of the organization to internal or external developments that render corporate strategy ineffective or unachievable. The consequences of strategic risk can be diminished long-term earnings and capital, as well as reputational damage to the firm. Strategic risk encompasses two main areas:

- Macroeconomic and geopolitical risk centers on external events or developments that would have a detrimental impact on financial markets and/or financial services firms.
- Business risk arises from internal, secular, competitive, or regulatory trends that impact Northern Trust’s stated strategy or its achievability.

Strategic Risk Framework and Governance

The Corporate Strategic Risk Framework has been developed in conjunction with the Corporation's risk appetite and risk management policies, and defines the mission and expectations of the Strategic Risk Management function to identify and analyze the sources and consequences of strategic risk.

This is achieved through participation in the establishment and review of business line strategy, coordination of risk input to the evaluation of key strategic opportunities, and developing and maintaining a risk inventory and set of metrics which attempt to gauge the level of strategic risk within the organization.

In addition, the Strategic Risk Management function maintains the Global Event Response Program, which aims to anticipate and prepare for stress scenarios, and provide an outline for responding to them when they occur.

Both GERC and the Business Risk Committee are responsible for reviewing the general methods, guidelines and frameworks by which Northern Trust monitors and evaluates strategic risk.

Climate Risk

Climate risk continues to be a growing strategic risk for the Corporation. Climate risk refers to the risk of loss arising from climate change and is comprised of both physical risk and transition risk. Physical risk refers to the risks related to the physical impacts of climate change, driven by extreme weather events, such as hurricanes and floods, as well as chronic longer-term shifts, such as rising average global temperatures and sea-level rise. Transition risk refers to the transition to a low-carbon economy, which may entail extensive policy, regulatory, legal, technology and market changes. These risks can impact both financial and nonfinancial risk types and can have broad impacts on operations, supply chains, distribution networks, customers and markets.

Effective management of climate risk requires coordinated governance, clearly defined roles and responsibilities and well-developed processes to identify, measure, monitor and control risks. We continue to build out and enhance our climate risk management capabilities. Our climate risk management efforts are overseen by the Director of Climate Risk who reports indirectly to the CRO. The Risk Management function has created a dedicated climate and sustainability risk unit to monitor, oversee and take account of the increasing impact that climate change has, or may in the future have, on operations, credit conditions, and regulatory compliance across the globe. The climate and sustainability risk unit will also work to continually evolve the risk management framework to ensure the Corporation meets the expectations of all stakeholders as well as all climate-related commitments made by the Corporation to external agencies.

The Board of Directors, and in particular its Corporate Governance Committee, engages in active oversight of ESG matters of significance to the Corporation and its subsidiaries, including climate-related risk. In addition, the Business Risk Committee provides oversight of certain financial and operational risks associated with climate change and other environmental factors through its oversight of the Corporation's global risk management framework and risk management policies. The Business Risk Committee also engages in periodic discussions with management and members of the Risk Management function regarding strategic risks, including climate-related risk.

The Corporation expects that climate change will increasingly impact the risk types it manages, and the Corporation will continue to integrate climate considerations into its risk management framework as its understanding of climate change and risks driven by it evolve. Various regulatory agencies, investors, and other stakeholders have increased expectations and scrutiny in this area. The Corporation is committed to helping mitigate the impacts of climate change related to its activities and to partner with key stakeholders to do the same.

FORWARD-LOOKING STATEMENTS

This report may include statements which constitute "forward-looking statements" within the meaning of the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. Forward-looking statements are identified typically by words or phrases such as "believe," "expect," "anticipate," "intend," "estimate," "project," "likely," "plan," "goal," "target," "strategy," and similar expressions or future or conditional verbs such as "may," "will," "should," "would," and "could." Forward-looking statements include statements, other than those related to historical facts, that relate to Northern Trust's financial results and outlook; capital adequacy; dividend policy and share repurchase program; accounting estimates and assumptions; credit quality including allowance levels; future pension plan contributions; effective tax rate; anticipated expense levels; contingent liabilities; acquisitions; strategies; market and industry trends; and expectations regarding the impact of accounting pronouncements and legislation. These statements are based on Northern Trust's current beliefs and expectations of future events or future results, and involve risks and uncertainties that are difficult to predict and subject to change. These statements are also based on assumptions about many important factors, including:

- financial market disruptions or economic recession in the United States or other countries across the globe resulting from any of a number of factors;
- volatility or changes in financial markets, including debt and equity markets, that impact the value, liquidity, or credit ratings of financial assets in general, or financial assets held in particular investment funds or client portfolios, including those funds, portfolios, and other financial assets with respect to which Northern Trust has taken, or may in the future take, actions to provide asset value stability or additional liquidity;
- the impact of equity markets on fee revenue;
- changes in interest rates or in the monetary or other policies of various regulatory authorities or central banks;
- Northern Trust's success in controlling the costs and expenses of its business operations and the impacts of any broader inflationary environment thereon;
- a decline in the value of securities held in Northern Trust's investment portfolio, the liquidity and pricing of which may be negatively impacted by periods of economic turmoil and financial market disruptions;
- Northern Trust's ability to address operating risks, including those related to cybersecurity, data security, human errors or omissions, pricing or valuation of securities, fraud, operational resilience (including systems performance), failure to maintain sustainable business practices, and breakdowns in processes or internal controls;
- Northern Trust's success in responding to and investing in changes and advancements in technology;
- geopolitical risks, risks related to global climate change and the risks of extraordinary events such as pandemics, natural disasters, terrorist events and war (including the continuing military conflict involving Ukraine and the Russian Federation), and the responses of the United States and other countries to those events;
- the effectiveness of Northern Trust's management of its human capital, including its success in recruiting and retaining necessary and diverse personnel to support business growth and expansion and maintain sufficient expertise to support increasingly complex products and services;
- the downgrade of U.S. government-issued and other securities;
- changes in foreign exchange trading client volumes and volatility in foreign currency exchange rates, changes in the valuation of the U.S. dollar relative to other currencies in which Northern Trust records revenue or accrues expenses, and Northern Trust's success in assessing and mitigating the risks arising from all such changes and volatility;
- a significant downgrade of any of Northern Trust's debt ratings;
- the health and soundness of the financial institutions and other counterparties with which Northern Trust conducts business;
- uncertainties inherent in the complex and subjective judgments required to assess credit risk and establish appropriate allowances therefor;
- the transition away from LIBOR or changes in the calculation of alternative interest rate benchmarks;
- the pace and extent of continued globalization of investment activity and growth in worldwide financial assets;
- changes in the legal, regulatory and enforcement framework and oversight applicable to financial institutions, including Northern Trust;
- increased costs of compliance and other risks associated with changes in regulation, the current regulatory environment, and areas of increased regulatory emphasis and oversight in the United States and other countries, such as anti-money laundering, anti-bribery, and data privacy;
- failure to satisfy regulatory standards or to obtain regulatory approvals when required, including for the use and distribution of capital;
- changes in tax laws, accounting requirements or interpretations and other legislation in the United States or other countries that could affect Northern Trust or its clients;
- changes in the nature and activities of Northern Trust's competition;

- Northern Trust's success in maintaining existing business and continuing to generate new business in existing and targeted markets and its ability to deploy deposits in a profitable manner consistent with its liquidity requirements;
- Northern Trust's ability to address the complex needs of a global client base and manage compliance with legal, tax, regulatory and other requirements;
- Northern Trust's ability to maintain a product mix that achieves acceptable margins;
- Northern Trust's ability to continue to generate investment results that satisfy clients and to develop an array of investment products;
- uncertainties inherent in Northern Trust's assumptions concerning its pension plan, including discount rates and expected contributions, returns and payouts;
- Northern Trust's success in continuing to enhance its risk management practices and controls and managing risks inherent in its businesses, including credit risk, operational risk, market and liquidity risk, fiduciary risk, compliance risk and strategic risk;
- risks and uncertainties inherent in the litigation and regulatory process, including the possibility that losses may be in excess of Northern Trust's recorded liability and estimated range of possible loss for litigation exposures;
- risks associated with being a holding company, including Northern Trust's dependence on dividends from its principal subsidiary;
- the risk of damage to Northern Trust's reputation which may undermine the confidence of clients, counterparties, rating agencies, and stockholders; and
- other factors identified elsewhere in this Annual Report on Form 10-K, including those factors described in Item 1A, "Risk Factors," and other filings with the SEC, all of which are available on Northern Trust's website.

Actual results may differ materially from those expressed or implied by forward-looking statements. The information contained herein is current only as of the date of that information. All forward-looking statements included in this document are based upon information presently available, and Northern Trust assumes no obligation to update its forward-looking statements.

SUPPLEMENTAL INFORMATION

Reconciliation to Fully Taxable Equivalent

The following table presents a reconciliation of Interest Income, Net Interest Income, net interest margin, and total revenue prepared in accordance with GAAP to such measures on an FTE basis, which are non-GAAP financial measures. Net interest margin is calculated by dividing annualized Net Interest Income by average interest-earning assets. Management believes this presentation provides a clearer indication of these financial measures for comparative purposes. When adjusted to an FTE basis, yields on taxable, nontaxable and partially taxable assets are comparable; however, the adjustment to an FTE basis has no impact on Net Income.

TABLE 51: RECONCILIATION TO FULLY TAXABLE EQUIVALENT

	FOR THE YEAR ENDED DECEMBER 31,		
($ In Millions)	**2022**	2021	2020
Net Interest Income			
Interest Income - GAAP	**$ 2,877.7**	$ 1,406.5	$ 1,643.5
Add: FTE Adjustment	**45.6**	35.6	34.4
Interest Income (FTE) - Non-GAAP	**$ 2,923.3**	$ 1,442.1	$ 1,677.9
Net Interest Income - GAAP	**$ 1,887.2**	$ 1,382.7	$ 1,443.2
Add: FTE Adjustment	**45.6**	35.6	34.4
Net Interest Income (FTE) - Non-GAAP	**$ 1,932.8**	$ 1,418.3	$ 1,477.6
Net Interest Margin - GAAP	**1.36 %**	0.96 %	1.16 %
Net Interest Margin (FTE) - Non-GAAP	**1.39 %**	0.99 %	1.19 %
Total Revenue			
Total Revenue - GAAP	**$ 6,761.2**	$ 6,464.5	$ 6,100.8
Add: FTE Adjustment	**45.6**	35.6	34.4
Total Revenue (FTE) - Non-GAAP	**$ 6,806.8**	$ 6,500.1	$ 6,135.2

ITEM 7A – QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

The information called for by this item is incorporated herein by reference to the “Risk Management” section of Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in this Annual Report on Form 10-K.

ITEM 8 – FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Northern Trust Corporation:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Northern Trust Corporation and subsidiaries (the Corporation) as of December 31, 2022 and 2021, the related consolidated statements of income, comprehensive income, changes in stockholders’ equity, and cash flows for each of the years in the three-year period ended December 31, 2022, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Corporation as of December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2022, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Corporation’s internal control over financial reporting as of December 31, 2022, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated February 28, 2023 expressed an unqualified opinion on the effectiveness of the Corporation’s internal control over financial reporting.

Basis for Opinion

These consolidated financial statements are the responsibility of the Corporation’s management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Corporation in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of a critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Assessment of the allowance for credit losses for commercial loans and leases evaluated on a collective basis

As discussed in Notes 1 and 7 to the consolidated financial statements, the Corporation's allowance for credit losses for commercial loans and leases evaluated on a collective basis (the collective ACL) was $105.8 million of a total allowance for credit losses assigned to loans and leases of $144.3 million as of December 31, 2022. Expected credit losses are measured on a collective basis as long as the financial assets included in the respective pool share similar risk characteristics. The allowance estimation methodology for the collective assessment is based on data representative of the Corporation's financial asset portfolio from a historical observation period that includes both expansionary and recessionary periods. The estimation methodology and the related qualitative adjustment framework segregate the loan and lease portfolio into segments based on loan and obligor specific factors, including loan type, borrower type, collateral type, loan size, and borrower credit quality. The estimation methodology applies probability of default and loss given default assumptions to the projected exposure at default on a pool basis. For each segment, the probability of default (PD) and loss given default (LGD) are derived for each quarter of the remaining life of each instrument. For the first two years (the reasonable and supportable period), these factors are derived by applying quarterly macroeconomic projections using models developed from historical data on macroeconomic factors and loans with similar factors, including the borrower rating assigned to individual obligors, as applicable. For periods beyond the reasonable and supportable period, the Corporation reverts to its own long-run historical loss experience on a straight-line basis over four quarters. The projected exposure at default for every quarter is based on contractual balance projections as of each quarter-end. Estimating expected lifetime credit losses requires the consideration of the effect of future economic conditions. The Corporation employs multiple scenarios over a reasonable and supportable period to project future conditions. The Corporation determines the probability weights assigned to each scenario at each quarter-end. The quantitative allowance is then reviewed within the qualitative adjustment framework, through which the Corporation applies judgment by assessing internal risk factors, potential limitations in the quantitative methodology, and environmental factors that are not fully contemplated in the forecast to compute adjustments to the quantitative allowance that may impact individual or multiple segments of the loan portfolio.

We identified the assessment of the quantitative component of the collective ACL as a critical audit matter. A high degree of audit effort, including specialized skills and knowledge, and subjective and complex auditor judgment was involved in the assessment of the quantitative component of the collective ACL due to significant measurement uncertainty. Specifically, the assessment encompassed the evaluation of the quantitative component of the collective ACL methodology, including the methods and models used to estimate the PD and LGD and their significant assumptions, the multiple economic forecast scenarios and macroeconomic factors and their respective weightings, and borrower ratings for certain commercial loans and leases. In addition, auditor judgment was required to evaluate the sufficiency of audit evidence obtained.

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and operating effectiveness of certain internal controls related to the critical audit matter. This included controls related to the Corporation's measurement of the quantitative component of the collective ACL estimate, including controls over:

- development of the quantitative component of the collective ACL methodology
- development, calibration and/or performance monitoring of certain PD and LGD models
- development and approval of the multiple economic forecast scenarios, macroeconomic factors and their respective weightings
- identification and determination of the significant assumptions used in certain PD and LGD models
- analysis of the allowance for credit losses for loans and leases results.

We evaluated the Corporation's process to develop the quantitative component of the collective ACL estimate by testing certain sources of data, factors, and assumptions that the Corporation used, and considered the relevance and reliability of such data, factors and assumptions. In addition, we involved credit risk professionals with specialized skills and knowledge, who assisted in:

- evaluating the quantitative component of the Corporation's collective ACL methodology for compliance with U.S. generally accepted accounting principles
- evaluating judgments made by the Corporation relative to the development, calibration and/or performance monitoring of certain PD and LGD models
- assessing the conceptual soundness and performance testing of certain PD and LGD models by inspecting model documentation to determine whether the models were suitable for their intended use

- assessing the economic forecast scenarios, the economic input variables and their respective weightings through comparison to publicly available forecasts and the Corporation's business environment
- testing individual borrower ratings for a selection of commercial loan and lease relationships by evaluating the financial performance of the borrower, sources of repayment, and any relevant guarantees or underlying collateral.

We also assessed the sufficiency of the audit evidence obtained related to the quantitative component of the collective ACL by evaluating the:

- cumulative results of the procedures
- qualitative aspects of the Corporation's accounting practices
- potential bias in the accounting estimate

/s/ KPMG LLP

We have served as the Corporation's auditor since 2002.

Chicago, Illinois
February 28, 2023

CONSOLIDATED BALANCE SHEETS

	DECEMBER 31,	
(In Millions Except Share Information)	**2022**	2021
ASSETS		
Cash and Due from Banks	**$ 4,654.2**	$ 3,056.8
Federal Reserve and Other Central Bank Deposits	**40,030.4**	64,582.2
Interest-Bearing Deposits with Banks	**1,941.1**	1,949.4
Federal Funds Sold	**32.0**	—
Securities Purchased under Agreements to Resell	**1,070.3**	686.4
Debt Securities		
Available for Sale (Amortized cost of $27,760.0 and $37,948.5)	**26,699.9**	38,010.5
Held to Maturity (Fair value of $22,879.3 and $23,315.4)	**25,036.1**	23,564.5
Trading Account	**95.2**	0.3
Total Debt Securities	**51,831.2**	61,575.3
Loans and Leases		
Commercial	**21,635.6**	18,487.4
Personal	**21,257.7**	21,993.2
Total Loans and Leases (Net of unearned income of $9.0 and $10.4)	**42,893.3**	40,480.6
Allowance for Credit Losses	**(161.1)**	(150.6)
Buildings and Equipment	**500.5**	488.7
Client Security Settlement Receivables	**1,698.3**	1,941.2
Goodwill	**691.3**	706.2
Other Assets	**9,855.2**	8,573.6
Total Assets	**$ 155,036.7**	$ 183,889.8
LIABILITIES		
Deposits		
Demand and Other Noninterest-Bearing	**$ 16,582.7**	$ 22,028.2
Savings, Money Market and Other Interest-Bearing	**31,128.6**	35,003.1
Savings Certificates and Other Time	**1,981.3**	842.7
Non U.S. Offices — Noninterest-Bearing	**8,757.6**	26,287.3
— Interest-Bearing	**65,481.9**	75,767.1
Total Deposits	**123,932.1**	159,928.4
Federal Funds Purchased	**1,896.9**	0.2
Securities Sold Under Agreements to Repurchase	**567.2**	531.9
Other Borrowings	**7,592.3**	3,583.8
Senior Notes	**2,724.2**	2,505.5
Long-Term Debt	**2,066.2**	1,145.7
Other Liabilities	**4,998.3**	4,177.5
Total Liabilities	**143,777.2**	171,873.0
STOCKHOLDERS' EQUITY		
Preferred Stock, No Par Value; Authorized 10,000,000 shares:		
Series D, outstanding shares of 5,000	**493.5**	493.5
Series E, outstanding shares of 16,000	**391.4**	391.4
Common Stock, $1.66 2/3 Par Value; Authorized 560,000,000 shares; Outstanding shares of 208,428,309 and 207,761,875	**408.6**	408.6
Additional Paid-In Capital	**983.5**	939.3
Retained Earnings	**13,798.5**	13,117.3
Accumulated Other Comprehensive Loss	**(1,569.2)**	(35.6)
Treasury Stock (36,743,215 and 37,409,649 shares, at cost)	**(3,246.8)**	(3,297.7)
Total Stockholders' Equity	**11,259.5**	12,016.8
Total Liabilities and Stockholders' Equity	**$ 155,036.7**	$ 183,889.8

See accompanying notes to consolidated financial statements on pages 99-167.

CONSOLIDATED STATEMENTS OF INCOME

(In Millions Except Share Information)	FOR THE YEAR ENDED DECEMBER 31, 2022	2021	2020
Noninterest Income			
Trust, Investment and Other Servicing Fees	**$ 4,432.6**	$ 4,361.1	$ 3,995.0
Foreign Exchange Trading Income	**288.6**	292.6	290.4
Treasury Management Fees	**39.3**	44.3	45.4
Security Commissions and Trading Income	**136.2**	140.2	133.2
Other Operating Income	**191.3**	243.9	194.0
Investment Security Gains (Losses), net	**(214.0)**	(0.3)	(0.4)
Total Noninterest Income	**4,874.0**	5,081.8	4,657.6
Net Interest Income			
Interest Income	**2,877.7**	1,406.5	1,643.5
Interest Expense	**990.5**	23.8	200.3
Net Interest Income	**1,887.2**	1,382.7	1,443.2
Provision for Credit Losses	**12.0**	(81.5)	125.0
Net Interest Income after Provision for Credit Losses	**1,875.2**	1,464.2	1,318.2
Noninterest Expense			
Compensation	**2,248.0**	2,011.0	1,947.1
Employee Benefits	**437.4**	431.4	387.7
Outside Services	**880.3**	849.4	763.1
Equipment and Software	**838.8**	736.3	673.5
Occupancy	**219.1**	208.7	230.1
Other Operating Expense	**359.3**	299.1	346.7
Total Noninterest Expense	**4,982.9**	4,535.9	4,348.2
Income before Income Taxes	**1,766.3**	2,010.1	1,627.6
Provision for Income Taxes	**430.3**	464.8	418.3
NET INCOME	**$ 1,336.0**	$ 1,545.3	$ 1,209.3
Preferred Stock Dividends	**41.8**	41.8	56.2
Net Income Applicable to Common Stock	**$ 1,294.2**	$ 1,503.5	$ 1,153.1
PER COMMON SHARE			
Net Income – Basic	**$ 6.16**	$ 7.16	$ 5.48
– Diluted	**6.14**	7.14	5.46
Average Number of Common Shares Outstanding – Basic	**208,309,331**	208,075,522	208,319,412
– Diluted	**208,867,264**	208,899,230	209,007,986

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

(In Millions)	FOR THE YEAR ENDED DECEMBER 31, 2022	2021	2020
Net Income	**$ 1,336.0**	$ 1,545.3	$ 1,209.3
Other Comprehensive Income (Loss) (Net of Tax and Reclassifications)			
Net Unrealized Gains (Losses) on Available for Sale Debt Securities	**(1,474.7)**	(534.7)	527.8
Net Unrealized Gains (Losses) on Cash Flow Hedges	**3.6**	0.8	0.5
Net Foreign Currency Adjustments	**9.4**	10.5	26.9
Net Pension and Other Postretirement Benefit Adjustments	**(71.9)**	59.8	67.5
Other Comprehensive Income (Loss)	**(1,533.6)**	(463.6)	622.7
Comprehensive Income (Loss)	**$ (197.6)**	$ 1,081.7	$ 1,832.0

See accompanying notes to consolidated financial statements on pages 99-167.

CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY

(In Millions Except Per Share Information)	PREFERRED STOCK	COMMON STOCK	ADDITIONAL PAID-IN CAPITAL	RETAINED EARNINGS	ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)	TREASURY STOCK	TOTAL
Balance at January 1, 2020	$ 1,273.4	$ 408.6	$ 1,013.1	$ 11,646.6	$ (194.7)	$ (3,066.1)	$ 11,080.9
Net Income	—	—	—	1,209.3	—	—	1,209.3
Other Comprehensive Income (Loss) (Net of Tax and Reclassifications)	—	—	—	—	622.7	—	622.7
Dividends Declared:							
Common Stock, $2.80 per share	—	—	—	(592.0)	—	—	(592.0)
Preferred Stock	—	—	—	(44.7)	—	—	(44.7)
Redemption of Preferred Stock, Series C	(388.5)	—	—	(11.5)	—	—	(400.0)
Stock Awards and Options Exercised	—	—	(49.5)	—	—	161.4	111.9
Stock Purchased	—	—	—	—	—	(299.8)	(299.8)
Balance at December 31, 2020	$ 884.9	$ 408.6	$ 963.6	$ 12,207.7	$ 428.0	$ (3,204.5)	$ 11,688.3
Net Income	—	—	—	1,545.3	—	—	1,545.3
Other Comprehensive Income (Loss) (Net of Tax and Reclassifications)	—	—	—	—	(463.6)	—	(463.6)
Dividends Declared:							
Common Stock, $2.80 per share	—	—	—	(593.9)	—	—	(593.9)
Preferred Stock	—	—	—	(41.8)	—	—	(41.8)
Stock Awards and Options Exercised	—	—	(24.3)	—	—	174.4	150.1
Stock Purchased	—	—	—	—	—	(267.6)	(267.6)
Balance at December 31, 2021	$ 884.9	$ 408.6	$ 939.3	$ 13,117.3	$ (35.6)	$ (3,297.7)	$ 12,016.8
Net Income	—	—	—	1,336.0	—	—	1,336.0
Other Comprehensive Income (Loss) (Net of Tax and Reclassifications)	—	—	—	—	(1,533.6)	—	(1,533.6)
Dividends Declared:							
Common Stock, $2.90 per share	—	—	—	(613.0)	—	—	(613.0)
Preferred Stock	—	—	—	(41.8)	—	—	(41.8)
Stock Awards and Options Exercised	—	—	44.2	—	—	86.3	130.5
Stock Purchased	—	—	—	—	—	(35.4)	(35.4)
Balance at December 31, 2022	**$ 884.9**	**$ 408.6**	**$ 983.5**	**$ 13,798.5**	**$ (1,569.2)**	**$ (3,246.8)**	**$ 11,259.5**

See accompanying notes to consolidated financial statements on pages 99-167.

CONSOLIDATED STATEMENTS OF CASH FLOWS

(In Millions)	FOR THE YEAR ENDED DECEMBER 31, 2022	2021	2020
CASH FLOWS FROM OPERATING ACTIVITIES			
Net Income	**$ 1,336.0**	$ 1,545.3	$ 1,209.3
Adjustments to Reconcile Net Income to Net Cash Provided by Operating Activities			
Investment Security Gains (Losses), net	**1.1**	0.3	0.4
Amortization and Accretion of Securities and Unearned Income, net	**59.2**	99.7	88.9
Provision for Credit Losses	**12.0**	(81.5)	125.0
Depreciation and Amortization	**553.6**	515.6	500.3
Change in Accrued Income Taxes	**61.3**	37.2	25.4
Pension Plan Contributions	**(24.3)**	(11.2)	(15.6)
Deferred Income Tax Provision	**(142.7)**	2.0	16.4
Change in Receivables	**57.9**	(460.9)	4.5
Change in Interest Payable	**172.6**	(7.8)	(23.6)
Change in Collateral With Derivative Counterparties, net	**639.4**	(466.5)	(17.8)
Other Operating Activities, net	**(333.7)**	183.8	(16.4)
Net Cash Provided by Operating Activities	**2,392.4**	1,356.0	1,896.8
CASH FLOWS FROM INVESTING ACTIVITIES			
Change in Federal Funds Sold	**(32.0)**	—	5.0
Change in Securities Purchased under Agreements to Resell	**(419.0)**	897.7	(700.9)
Change in Interest-Bearing Deposits with Banks	**(158.9)**	2,344.5	712.6
Net Change in Federal Reserve and Other Central Bank Deposits	**23,483.8**	(9,970.4)	(19,845.2)
Purchases of Held to Maturity Debt Securities	**(32,830.8)**	(54,734.9)	(40,187.9)
Proceeds from Maturity and Redemption of Held to Maturity Debt Securities	**37,667.8**	54,902.6	35,658.6
Purchases of Available for Sale Debt Securities	**(4,567.7)**	(13,896.2)	(10,886.8)
Proceeds from Maturity and Redemption of Available for Sale Debt Securities	**6,513.0**	10,079.0	8,748.2
Change in Loans and Leases	**(2,441.6)**	(6,744.7)	(2,316.7)
Purchases of Buildings and Equipment	**(128.6)**	(95.5)	(135.8)
Purchases and Development of Computer Software	**(594.9)**	(419.6)	(424.6)
Change in Client Security Settlement Receivables	**258.0**	(801.4)	(226.8)
Bank-Owned Life Insurance Policy Premiums	**(500.0)**	—	—
Other Investing Activities, net	**(319.3)**	(163.7)	(322.7)
Net Cash Provided by (Used in) Investing Activities	**25,929.8**	(18,602.6)	(29,923.0)
CASH FLOWS FROM FINANCING ACTIVITIES			
Change in Deposits	**(32,996.9)**	17,885.5	32,137.9
Change in Federal Funds Purchased	**1,896.7**	(260.0)	(292.7)
Change in Securities Sold under Agreements to Repurchase	**35.3**	492.1	(450.0)
Change in Short-Term Other Borrowings	**3,966.9**	(426.5)	(2,698.3)
Redemption of Preferred Stock - Series C	**—**	—	(400.0)
Proceeds from Senior Notes and Long-Term Debt	**1,988.8**	—	993.2
Repayments of Senior Notes	**(500.0)**	(500.0)	(508.6)
Repayment of Floating Rate Capital Debt	**—**	(278.8)	—
Treasury Stock Purchased	**(35.4)**	(267.6)	(299.8)
Net Proceeds from Stock Options	**3.9**	53.8	19.5
Cash Dividends Paid on Common Stock	**(750.2)**	(583.3)	(584.6)
Cash Dividends Paid on Preferred Stock	**(46.5)**	(41.8)	(45.9)
Other Financing Activities, net	**—**	0.1	1.2
Net Cash (Used in) Provided by Financing Activities	**(26,437.4)**	16,073.5	27,871.9
Effect of Foreign Currency Exchange Rates on Cash	**(287.4)**	(159.6)	84.6
Change in Cash and Due from Banks	**1,597.4**	(1,332.7)	(69.7)
Cash and Due from Banks at Beginning of Period	**3,056.8**	4,389.5	4,459.2
Cash and Due from Banks at End of Period	**$ 4,654.2**	$ 3,056.8	$ 4,389.5
SUPPLEMENTAL DISCLOSURES OF CASH FLOW INFORMATION			
Interest Paid	**$ 822.4**	$ 30.8	$ 226.8
Income Taxes Paid	**459.9**	371.0	327.7
Transfers from Loans to OREO	**—**	12.9	0.2
Transfers from Available for Sale Debt Securities to Held to Maturity Debt Securities	**6,623.3**	6,864.1	301.5

See accompanying notes to consolidated financial statements on pages 99-167.

Note 1 – Summary of Significant Accounting Policies

The consolidated financial statements have been prepared in conformity with U.S. generally accepted accounting principles (GAAP) and reporting practices prescribed for the banking industry. A description of the more significant accounting policies follows.

A. Basis of Presentation. The consolidated financial statements include the accounts of Northern Trust Corporation (Corporation) and its wholly-owned subsidiary, The Northern Trust Company (Bank), and various other wholly-owned subsidiaries of the Corporation and Bank. Throughout the notes to the consolidated financial statements, the term "Northern Trust" refers to the Corporation and its subsidiaries. Intercompany balances and transactions have been eliminated in consolidation. The consolidated statements of income include results of acquired subsidiaries from the dates of acquisition. Certain prior-year balances have been reclassified consistent with the current year's presentation. During 2022, the Corporation changed the name of the Corporate & Institutional Services segment to "Asset Servicing." Accordingly, the disclosures herein refer to this segment as Asset Servicing.

B. Nature of Operations. The Corporation is a bank holding company that has elected to be a financial holding company under the Bank Holding Company Act of 1956, as amended. The Bank is an Illinois banking corporation headquartered in Chicago and the Corporation's principal subsidiary. The Corporation conducts business in the United States (U.S.) and internationally through various U.S. and non-U.S. subsidiaries, including the Bank.

Northern Trust generates the majority of its revenue from its two client-focused reporting segments: Asset Servicing and Wealth Management. Asset management and related services are provided to Asset Servicing and Wealth Management clients primarily by the Asset Management business.

Asset Servicing is a leading global provider of asset servicing and related services to corporate and public retirement funds, foundations, endowments, fund managers, insurance companies, sovereign wealth funds, and other institutional investors around the globe. Asset servicing and related services encompass a full range of capabilities including but not limited to: custody; fund administration; investment operations outsourcing; investment management; investment risk and analytical services; employee benefit services; securities lending; foreign exchange; treasury management; brokerage services; transition management services; banking; and cash management. Client relationships are managed through the Bank and the Bank's and the Corporation's other subsidiaries, including support from locations in North America, Europe, the Middle East, and the Asia-Pacific region.

Wealth Management focuses on high-net-worth individuals and families, business owners, executives, professionals, retirees, and established privately-held businesses in its target markets. In supporting these targeted segments, Wealth Management provides trust, investment management, custody, and philanthropic services; financial consulting; guardianship and estate administration; family business consulting; family financial education; brokerage services; and private and business banking. Wealth Management also includes Global Family Office, which provides customized services, including but not limited to: investment consulting; global custody; fiduciary; and private banking; family office consulting, and technology solutions, to meet the complex financial and reporting needs of ultra-high-net-worth individuals and family offices across the globe. Wealth Management services are delivered by multidisciplinary teams through a network of offices in 19 U.S. states and Washington, D.C., as well as offices in London, Guernsey, and Abu Dhabi.

C. Use of Estimates in the Preparation of Financial Statements. The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions in the application of certain of our significant accounting policies that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenue and expense during the reporting period. Actual results could differ from those estimates.

D. Foreign Currency Remeasurement and Translation. Asset and liability accounts denominated in nonfunctional currencies are remeasured into functional currencies at period-end rates of exchange, except for certain balance sheet items including but not limited to buildings and equipment, goodwill and other intangible assets, which are remeasured at historical exchange rates. Results from remeasurement of asset and liability accounts are reported in Other Operating Income on the consolidated statements of income. Income and expense accounts are remeasured at period-average rates of exchange.

Asset and liability accounts of entities with functional currencies that are not the U.S. dollar are translated at period-end rates of exchange. Income and expense accounts are translated at period-average rates of exchange. Translation adjustments, net of applicable taxes, are reported directly to accumulated other comprehensive income (AOCI), a component of stockholders' equity.

E. Securities. ***Available for Sale (AFS) Securities*** are reported at fair value, with unrealized gains and losses credited or charged, net of the tax effect, to AOCI. Realized gains and losses on AFS securities are determined on a specific identification basis and are reported within Investment Security Gains (Losses), net, on the consolidated statements of income. Interest income is recorded on the accrual basis, adjusted for the amortization of premium and accretion of discount.

Held to Maturity (HTM) Securities consist of debt securities that management intends to, and Northern Trust has the ability to, hold until maturity. Such securities are reported at cost, adjusted for amortization of premium and accretion of discount. Interest income is recorded on the accrual basis adjusted for the amortization of premium and accretion of discount.

Held for Trading Securities are reported at fair value. Realized and unrealized gains and losses on securities held for trading are reported within Security Commissions and Trading Income on the consolidated statements of income.

Nonmarketable Securities primarily consist of Federal Reserve Bank of Chicago and Federal Home Loan Bank stock and community development investments, each of which are recorded in Other Assets on the consolidated balance sheets. Federal Reserve Bank of Chicago and Federal Home Loan Bank stock are reported at cost, which represents redemption value. Community development investments are typically reported at amortized cost. Those community development investments that are designed to generate a return primarily through realization of tax credits and other tax benefits, which are discussed in further detail in Note 28, "Variable Interest Entities," are amortized over the lives of the related tax credits and other tax benefits.

F. Securities Purchased Under Agreements to Resell and Securities Sold Under Agreements to Repurchase. Securities purchased under agreements to resell and securities sold under agreements to repurchase are accounted for as collateralized financings and recorded at the amounts at which the securities were acquired or sold plus accrued interest. To minimize any potential credit risk associated with these transactions, the fair value of the securities purchased or sold is monitored, limits are set on exposure with counterparties, and the financial condition of counterparties is regularly assessed. It is Northern Trust's policy to take possession, either directly or via third-party custodians, of securities purchased under agreements to resell. Securities sold under agreements to repurchase are either directly held by, or pledged to the counterparty until the repurchase. Northern Trust nets securities sold under repurchase agreements against those purchased under resale agreements when the requirements to net are met.

G. Derivative Financial Instruments. Northern Trust is a party to various derivative financial instruments that are used in the normal course of business to meet the needs of its clients, as part of its trading activity for its own account, and as part of its risk management activities. These instruments generally include foreign exchange contracts, interest rate contracts, total return swap contracts and credit default swap contracts. All derivative financial instruments, whether designated as hedges or not, are recorded at fair value within Other Assets and Other Liabilities on the consolidated balance sheets. Derivative asset and liability positions with the same counterparty are reflected on a net basis on the consolidated balance sheets in cases where legally enforceable master netting arrangements or similar agreements exist. These derivative assets and liabilities are further reduced by cash collateral received from, and deposited with, derivative counterparties. The accounting for changes in the fair value of a derivative on the consolidated statements of income depends on whether or not the contract has been designated as a hedge and qualifies for hedge accounting under GAAP. Derivative financial instruments are recorded within the line item, Other Operating Activities, net, on the consolidated statement of cash flows, except for net investment hedges which are recorded within Other Investing Activities, net.

Changes in the fair value of client-related and trading derivative instruments, which are not designated hedges under GAAP, are recognized currently in either Foreign Exchange Trading Income or Security Commissions and Trading Income on the consolidated statements of income. Changes in the fair value of derivative instruments entered into for risk management purposes but not designated as hedges are recognized currently in Other Operating Income on the consolidated statements of income. Certain derivative instruments used by Northern Trust to manage risk are formally designated and qualify for hedge accounting as fair value, cash flow, or net investment hedges.

Derivatives designated as fair value hedges are used to limit Northern Trust's exposure to changes in the fair value of assets and liabilities due to movements in interest rates. Changes in the fair value of the derivative instrument and changes in the fair value of the hedged asset or liability attributable to the hedged risk are recognized currently in Interest Income or Interest Expense on the consolidated statements of income. For substantially all fair value hedges, Northern Trust applies the "shortcut" method of accounting, available under GAAP. As a result, changes recorded in the fair value of the hedged item are assumed to equal the offsetting gain or loss on the derivative. For fair value hedges that do not qualify for the "shortcut" method of accounting, Northern Trust utilizes regression analysis in assessing whether these hedging relationships are highly effective at inception and quarterly thereafter.

Derivatives designated as cash flow hedges are used to minimize the variability in cash flows of earning assets or forecasted transactions caused by movements in interest or foreign exchange rates. Changes in the fair value of such derivatives are recognized in AOCI, a component of stockholders' equity, and there is no change to the accounting for the hedged item. Balances in AOCI are reclassified to earnings when the hedged forecasted transaction impacts earnings, and are reflected in the same income statement line item. Northern Trust applies the "shortcut" method of accounting for cash flow hedges of certain available for sale investment securities. For cash flow hedges of certain other available for sale investment securities, foreign currency denominated investment securities, and forecasted foreign currency denominated revenue and expenditure transactions, Northern Trust closely matches all terms of the hedged item and hedging derivative at inception and on an ongoing basis. For cash flow hedges of available for sale investment securities, to the extent all terms are not perfectly matched, effectiveness is assessed using regression analysis. For cash flow hedges of forecasted foreign currency denominated revenue and expenditure transactions and investment securities, to the extent all terms are not perfectly matched, effectiveness is assessed using the dollar-offset method.

Foreign exchange contracts and qualifying non-derivative instruments designated as net investment hedges are used to minimize Northern Trust's exposure to variability in the foreign currency translation of net investments in non-U.S. branches and subsidiaries. Changes in the fair value of the hedging instrument are recognized in AOCI consistent with the related translation gains and losses of the hedged net investment. For net investment hedges, all critical terms of the hedged item and the hedging instrument are matched at inception and on an ongoing basis. Amounts recorded in AOCI are reclassified to earnings only upon the sale or liquidation of an investment in a non-U.S. branch or subsidiary.

Fair value, cash flow, and net investment hedges are designated and formally documented as such contemporaneous with the transaction. The formal documentation describes the hedge relationship and identifies the hedging instruments and hedged items. Included in the documentation is a discussion of the risk management objectives and strategies for undertaking such hedges, the nature of the risk being hedged, and a description of the method for assessing hedge effectiveness at inception and on an ongoing basis. For hedges that do not qualify for the "shortcut" or the critical terms match methods of accounting, a formal assessment is performed on a calendar quarter basis to verify that derivatives used in hedging transactions continue to be highly effective in offsetting the changes in fair value or cash flows of the hedged item. Hedge accounting is discontinued if a derivative ceases to be highly effective, matures, is terminated or sold, if a hedged forecasted transaction is no longer expected to occur, or if Northern Trust removes the derivative's hedge designation. Subsequent gains and losses on these derivatives are included in Foreign Exchange Trading Income or Security Commissions and Trading Income on the consolidated statements of income. For discontinued cash flow hedges, the accumulated gain or loss on the derivative remains in AOCI and is reclassified to earnings in the period in which the previously hedged forecasted transaction impacts earnings or is no longer probable of occurring. For discontinued fair value hedges, the previously hedged asset or liability ceases to be adjusted for changes in its fair value. Previous adjustments to the hedged item are amortized over the remaining life of the hedged item.

H. Loans and Leases. Loans and leases are recognized assets that represent a contractual right to receive money either on demand or on fixed or determinable dates. Loans and leases are disaggregated for disclosure purposes by portfolio segment (segment) and by class. Northern Trust has defined its segments as commercial and personal. A class of loans and leases is a subset of a segment, the components of which have similar risk characteristics, measurement attributes, or risk monitoring methods. The classes within the commercial segment have been defined as commercial and institutional, commercial real estate, lease financing, net, non-U.S. and other. The classes within the personal segment have been defined as residential real estate, private client and other.

Loan Classification. Loans that are held for investment are reported at the principal amount outstanding, net of unearned income. Loans classified as held for sale are reported at the lower of cost or fair value. Undrawn commitments relating to loans that are not held for sale are recorded in Other Liabilities and are carried at the amount of unamortized fees with an allowance for credit loss liability recognized for any estimated expected losses.

Nonaccrual Loans and Recognition of Income. Interest income on loans and leases is recorded on an accrual basis unless, in the opinion of management, there is a question as to the ability of the debtor to meet the terms of the loan agreement, or interest or principal is more than 90 days contractually past due and the loan is not well-secured and in the process of collection. Loans meeting such criteria are classified as nonaccrual and interest income is recorded on a cash basis. Northern Trust's accounting policies for material nonaccrual loans is consistent across all classes of loans and leases. Past due status is based on how long since the contractual due date a principal or interest payment has been past due. For disclosure purposes, loans that are 29 days past due or less are reported as current. At the time a loan is determined to be nonaccrual, interest accrued but not collected is reversed against interest income in the current period. Interest collected on nonaccrual loans is applied to principal unless, in the opinion of management, collectability of principal is not in doubt. Management's assessment of indicators of loan and lease collectability, and its policies relative to the recognition of interest income, including the suspension and subsequent resumption of income recognition, do not meaningfully vary between loan and lease classes. Nonaccrual loans are returned to performing status when factors indicating doubtful collectability no longer exist. Factors considered in returning a loan to performing status are consistent across all classes of loans and leases and, in accordance with regulatory guidance, relate primarily to expected payment performance. A loan is eligible to be returned to performing status when: (i) no principal or interest that is due is unpaid and repayment of the remaining contractual principal and interest is expected or (ii) the loan has otherwise become well-secured (possessing realizable value sufficient to discharge the debt, including accrued interest, in full) and is in the process of collection (through action reasonably expected to result in debt repayment or restoration to a current status in the near future). A loan that has not been brought fully current may be restored to performing status provided there has been a sustained period of repayment performance (generally a minimum of six payment periods) by the borrower in accordance with the contractual terms, and Northern Trust is reasonably assured of repayment within a reasonable period of time. Additionally, a loan that has been formally restructured so as to be reasonably assured of repayment and performance according to its modified terms may be returned to accrual status, provided there was a well-documented credit evaluation of the borrower's financial condition and prospects of repayment under the revised terms, and there has been a sustained period of repayment performance (generally a minimum of six payment periods) under the revised terms.

Troubled Debt Restructurings (TDRs). A loan that has been modified as a concession by Northern Trust or a bankruptcy court resulting from the debtor's financial difficulties is referred to as a troubled debt restructuring (TDR). All TDRs are reported starting in the calendar year of their restructuring. In subsequent years, a TDR may cease being reported if the loan was modified at a market rate and has performed according to the modified terms for at least six payment periods. A loan that has been modified at a below market rate will return to accrual status if it satisfies the six-payment-period performance requirement.

The expected credit loss is measured based upon the present value of expected future cash flows, discounted at the effective interest rate based on the original contractual rate. If a loan's contractual interest rate varies based on subsequent changes in an independent factor, such as an index or rate, the loan's effective interest rate is calculated based on the factor as it changes over the life of the loan. Northern Trust elected not to project changes in the factor for purposes of estimating expected future cash flows. Further, Northern Trust elected not to adjust the effective interest rate for prepayments. If the loan is collateral dependent, the expected loss is measured based on the fair value of the collateral at the reporting date.

If the loan valuation is less than the recorded value of the loan, either an allowance is established, or a charge-off is recorded, for the difference. Smaller balance (individually less than $1 million) homogeneous loans are collectively evaluated.

All loans and leases with TDR modifications are evaluated for additional expected credit losses. The nature and extent of further deterioration in credit quality, including a subsequent default, is considered in the determination of an appropriate level of allowance for credit losses.

Collateral Dependent Financial Assets. A financial asset is collateral-dependent when the borrower is experiencing financial difficulty and repayment is expected to be provided substantially through the sale or operation of the collateral. Most of Northern Trust's collateral dependent credit exposure relates to its residential real estate portfolio for which the collateral is usually the underlying real estate property. For collateral dependent financial assets, it is Northern Trust's policy to reserve or charge-off the difference between the amortized cost basis of the loan and the value of the collateral.

Premium, Discounts, Origination Costs and Fees. Premiums and discounts on loans are recognized as an adjustment of yield using the interest method based on the contractual terms of the loan. Certain direct origination costs and fees are netted, deferred and amortized over the life of the related loan as an adjustment to the loan's yield.

I. Allowance for Credit Losses.

The allowance for credit losses represents management's best estimate of lifetime expected credit losses related to various portfolios subject to credit risk, off-balance sheet credit exposure, and specific borrower relationships.

Northern Trust measures expected credit losses of financial assets with similar risk characteristics on a collective basis. A financial asset is measured individually if it does not share similar risk characteristics with other financial assets and the related allowance is determined through an individual evaluation.

Management's estimates utilized in establishing an appropriate level of allowance for credit losses are not dependent on any single assumption. In determining an appropriate allowance level, management evaluates numerous variables, many of which are interrelated or dependent on other assumptions and estimates, and takes into consideration past events, current conditions and reasonable and supportable forecasts.

Forecasting and Reversion. Estimating expected lifetime credit losses requires the consideration of the effect of future economic conditions. Northern Trust employs multiple scenarios over a reasonable and supportable period (currently two years) to project future conditions. Key variables determined to be relevant for projecting credit losses on the portfolios in scope include macroeconomic factors, such as corporate profits, unemployment, and real estate price indices, as well as financial market factors such as equity prices, volatility, and credit spreads. For periods beyond the reasonable and supportable period, Northern Trust reverts to its own historical loss experiences on a straight-line basis over four quarters.

Allowance for Loans and Leases. The allowance estimation methodology for the collective assessment is primarily based on internally developed loss data specific to the Northern Trust financial asset portfolio from a historical observation period that includes both expansionary and recessionary periods. The estimation methodology and the related qualitative adjustment framework segregate the loan and lease portfolio into homogeneous segments based on similar risk characteristics or risk monitoring methods.

Northern Trust utilizes a quantitative probability of default/loss given default approach for the calculation of its credit allowance on a collective basis. For each of the different parameters, specific credit models or qualitative estimation methodologies for the individual loan segments were developed. For each segment, the probability of default and the loss given default are applied to the exposure at default for each projected quarter to determine the quantitative component of the allowance. The quantitative allowance is then reviewed within a qualitative adjustment framework, through which management applies judgment by assessing internal risk factors, potential limitations in the quantitative methodology, and environmental factors that are not fully contemplated in the forecast to compute an adjustment to the quantitative allowance for each segment of the loan portfolio.

The allowance related to credit exposure evaluated on an individual basis is determined through an individual evaluation of loans, leases, and lending-related commitments that have defaulted, generally those with Borrower Ratings of 8 and 9, that is based on expected future cash flows, the value of collateral, and other factors that may impact the borrower's ability to pay. For defaulted loans for which the amount of allowance, if any, is determined based on the value of the underlying real estate collateral, third-party appraisals are typically obtained and utilized by management. These appraisals are generally less than twelve months old and are subject to adjustments to reflect management's judgment as to the realizable value of the collateral.

Northern Trust analyzes its exposure to credit losses from both on-balance sheet and off-balance sheet activity using a consistent methodology for the quantitative framework as well as the qualitative framework. For purposes of estimating the allowance for credit losses for undrawn loan commitments and standby letters of credit, the exposure at default includes an estimated drawdown of unused credit based on credit utilization factors, resulting in a proportionate amount of expected credit losses.

Allowance for HTM Securities. HTM debt securities classified as U.S. government, government sponsored agency, and certain securities classified as obligations of states and political subdivisions are considered to be guarantees of the U.S. government or an agency of the U.S. government and therefore an allowance for credit losses is not estimated for such investments as the expected probability of non-payment of the amortized cost basis is zero.

HTM debt securities classified as "other asset-backed securities" represent pools of underlying receivables from which the cash flows are used to pay the bonds that vary in seniority. Utilizing a qualitative estimation approach, the allowance for other asset-backed securities is assessed by evaluating underlying pool performance based on delinquency rates and available credit support.

HTM debt securities classified as "other" relate to investments purchased by Northern Trust to fulfill its obligations under the Community Reinvestment Act (CRA). Northern Trust fulfills its obligations under the CRA by making qualified investments for purposes of supporting institutions and programs that benefit low-to-moderate income communities within Northern Trust's market area. The allowance for CRA investments is assessed using a qualitative estimation approach primarily based on internal historical performance experience and default history of the underlying CRA portfolios to determine a quantitative component of the allowance.

The allowance estimation methodology for all other HTM debt securities is developed using a combination of external and internal data. The estimation methodology groups securities with shared characteristics for which the probability of default and the loss given default are applied to the total exposure at default to determine a quantitative component of the allowance.

Allowance for AFS Securities. AFS securities impairment reviews are conducted quarterly to identify and evaluate securities that have indications of possible credit losses. A determination as to whether a security's decline in market value is related to credit impairment takes into consideration numerous factors and the relative significance of any single factor can vary by security. Factors Northern Trust considers in determining whether impairment is credit related include, but are not limited to, the severity of the impairment; the cause of the impairment and the financial condition and near-term prospects of the issuer; activity in the market of the issuer, which may indicate adverse credit conditions; Northern Trust's intent regarding the sale of the security as of the balance sheet date; and the likelihood that Northern Trust will not be required to sell the security for a period of time sufficient to allow for the recovery of the security's amortized cost basis. For each security meeting the requirements of Northern Trust's internal screening process, an extensive review is conducted to determine if a credit loss has occurred that is then based on the best estimate of cash flows to be collected from the security, discounted using the security's effective interest rate. If the present value of the expected cash flows is found to be less than the current amortized cost of the security, an allowance for credit losses is generally recorded equal to the difference between the two amounts, limited to the amount the amortized cost basis exceeds the fair value of the security.

If management intends to sell, or will more likely than not be required to sell, an AFS security prior to recovery of its amortized cost basis, the security is written down to fair value with unrealized losses recognized in Investment Security Gains (Losses), net on the consolidated statements of income.

Allowance for Other Financial Assets. The allowance for other financial assets consists of the allowance for those other financial assets presented in Due from Banks, Other Central Bank Deposits, Interest-Bearing Deposits with Banks, Federal Funds Sold, and Other Assets. The Other Assets category includes other miscellaneous credit exposures reported in Other Assets on the consolidated balance sheets. The allowance estimation methodology for other financial assets primarily utilizes a similar approach as the one used for the HTM debt securities portfolio. It consists of a combination of externally and internally developed loss data, adjusted for the appropriate contractual term. Northern Trust's portfolio is composed mostly of institutions within the "1 to 3" internal borrower rating category and is expected to exhibit minimal to modest likelihood of loss.

The portion of the allowance assigned to loans and leases, HTM debt securities, and other financial assets is presented as a contra asset in Allowance for Credit Losses on the consolidated balance sheets. The portion of the allowance assigned to undrawn loan commitments and standby letters of credit is reported in Other Liabilities on the consolidated balance sheets. The allowance for AFS securities is presented parenthetically with the amortized cost basis of AFS securities on the consolidated balance sheets.

Provision for Credit Losses. Provision for Credit Losses on the consolidated statements of income represents the change in the Allowance for Credit Losses on the consolidated balance sheets and is the charge to current period earnings. It represents the amount needed to maintain the Allowance for Credit Losses on the consolidated balance sheets at an appropriate level to absorb lifetime expected credit losses related to financial assets in scope. Actual losses may vary from current estimates and the amount of the Provision for Credit Losses may be either greater than or less than actual net charge-offs.

Contractual Term. Northern Trust estimates expected credit losses over the contractual term of the financial assets adjusted for prepayments, unless prepayments are not relevant to specific portfolios or sub-portfolios. Extension and renewal options are typically not considered since it is not Northern Trust's practice to enter into arrangements where the borrower has the unconditional option to renew, or a conditional extension option whereby the conditions are beyond Northern Trust's control.

Accrued Interest. Northern Trust elected not to measure an allowance for credit losses for accrued interest receivables related to its loan and securities portfolios as its policy is to write-off uncollectible accrued interest receivable balances in a timely manner. Accrued interest is written off by reversing interest income during the quarter the financial asset is moved from an accrual to a nonaccrual status.

J. Standby Letters of Credit. Fees on standby letters of credit are recognized in Other Operating Income on the consolidated statements of income using the straight-line method over the lives of the underlying agreements. Northern Trust's recorded other liability for standby letters of credit, reflecting the obligation it has undertaken, is measured as the amount of unamortized fees on these instruments.

K. Buildings and Equipment. Buildings and equipment owned are carried at original cost less accumulated depreciation. The charge for depreciation is computed using the straight-line method based on the following range of lives: buildings – up to 30 years; equipment – 3 to 10 years; and leasehold improvements – the shorter of the lease term or 15 years.

L. Other Real Estate Owned (OREO). OREO is comprised of commercial and residential real estate properties acquired in partial or total satisfaction of loans. OREO assets are carried at the lower of cost or fair value less estimated costs to sell and are recorded in Other Assets on the consolidated balance sheets. Fair value is typically based on third-party appraisals. Appraisals of OREO properties are updated on an annual basis and are subject to adjustments to reflect management's judgment as to the realizable value of the properties. Losses identified during the 90-day period after the acquisition of such properties are charged against the Allowance for Credit Losses assigned to Loans and Leases. Subsequent write-downs to the carrying value of these assets that may be required and gains or losses realized from asset sales are recorded within Other Operating Expense on the consolidated statements of income.

M. Goodwill and Other Intangible Assets. Goodwill is not subject to amortization. Separately identifiable acquired intangible assets with finite lives are amortized over their estimated useful lives, primarily on a straight-line basis. Purchased software, software licenses, and allowable internal costs, including compensation relating to software developed for internal use, are capitalized. Software is amortized using the straight-line method over the estimated useful lives of the assets, generally ranging from 3 to 10 years. Fees paid for the use of software services that do not convey a software license are expensed as incurred.

Goodwill and other intangible assets are reviewed for impairment on an annual basis or more frequently if events or changes in circumstances indicate the carrying amounts may not be recoverable.

N. Trust, Investment and Other Servicing Fees. Trust, Investment and Other Servicing Fees are recorded on an accrual basis, over the period in which the service is provided. Fees are primarily a function of the market value of assets custodied, managed and serviced, transaction volumes, and securities lending volume and spreads, as set forth in the underlying client agreement. This revenue recognition involves the use of estimates and assumptions, including components that are calculated based on estimated asset valuations and transaction volumes.

O. Client Security Settlement Receivables. These receivables result from custody client withdrawals from short-term investment funds that settle on the following business day as well as custody client security sales executed under contractual settlement date accounting that have not yet settled. Northern Trust advances cash to the client on the date of either client withdrawal or trade execution and awaits collection from either the short-term investment funds or via the settled trade.

P. Income Taxes. Northern Trust follows an asset and liability approach to account for income taxes. The objective is to recognize the amount of taxes payable or refundable for the current year, and to recognize deferred tax assets and liabilities resulting from temporary differences between the amounts reported in the financial statements and the tax bases of assets and liabilities. The measurement of tax assets and liabilities is based on enacted tax laws and applicable tax rates.

Tax positions taken or expected to be taken on a tax return are evaluated based on their likelihood of being sustained upon examination by tax authorities. Only tax positions that are considered more-likely-than-not to be sustained are recorded on the consolidated financial statements. A valuation allowance is established for deferred tax assets if it is more-likely-than-not that all or a portion will not be realized. Northern Trust recognizes any interest and penalties related to unrecognized tax benefits in the Provision for Income Taxes on the consolidated statements of income.

Q. Cash Flow Statements. Cash and cash equivalents in the cash flow statements have been defined as “Cash and Due from Banks” on the consolidated balance sheets.

R. Pension and Other Postretirement Benefits. Northern Trust records the funded status of its defined benefit pension and other postretirement plans on the consolidated balance sheets. Overfunded pension and postretirement benefits are reported in Other Assets and underfunded pension and postretirement benefits are reported in Other Liabilities on the consolidated balance sheets. Plan assets and benefit obligations are measured annually at December 31, unless specific circumstances require an interim remeasurement. Plan assets are determined based on fair value generally representing observable market prices. The projected benefit obligations are determined based on the present value of projected benefit distributions at an assumed discount rate. Actuarial gains and losses accumulated in AOCI are amortized as a component of net periodic pension cost if they exceed 10% of the greater of the projected benefit obligation or the market-related value of plan assets as of the beginning of the year. Amortization is recognized on a straight-line basis over the expected average remaining service period of the active employees or over the expected remaining lifetime of plan participants for plans that have been previously frozen.

S. Share-Based Compensation Plans. Northern Trust recognizes as expense the grant-date fair value of stock and stock unit awards and other share-based compensation granted to employees as Compensation on the consolidated statements of income. The fair values of stock and stock unit awards, including performance stock unit awards and director awards, are based on the closing price of the Corporation’s stock on the date of grant adjusted for certain awards that do not accrue dividends while vesting.

Compensation expense for share-based award grants with terms that provide for a graded vesting schedule, whereby portions of the award vest in increments over the requisite service period, are recognized on a straight-line basis over the requisite service period for the entire award. Compensation expense for performance stock unit awards are recognized on a straight-line basis over the requisite service period of the award based on expected achievement of the performance condition. Adjustments are made for employees that meet certain eligibility criteria at the grant date or during the requisite service period.

Northern Trust does not include an estimate of future forfeitures in its recognition of share-based compensation expense. Share-based compensation expense is adjusted based on forfeitures as they occur. Dividend equivalents are accrued for performance stock unit awards, most restricted stock unit awards, and director awards not yet vested, and are paid upon vesting. Certain restricted stock units are not entitled to dividend equivalents during the vesting period. Cash flows resulting from the realization of excess tax benefits are classified as operating cash flows on the consolidated statements of cash flows.

T. Net Income Per Common Share. Basic net income per common share is computed by dividing net income/loss applicable to common stock by the weighted average number of common shares outstanding during each period. Diluted net income per common share is computed by dividing net income applicable to common stock and potential common shares by the aggregate of the weighted average number of common shares outstanding during the period and common share equivalents calculated for stock options outstanding using the treasury stock method. In a period of a net loss, diluted net income per common share is calculated in the same manner as basic net income per common share.

Northern Trust calculates net income applicable to common stock using the two-class method, whereby net income is allocated between common stock and participating securities.

Note 2 – Recent Accounting Pronouncements

On January 1, 2022, Northern Trust adopted Accounting Standards Update (ASU) No. 2020-06, “Debt—Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging—Contract in Entity's Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity’s Own Equity” (ASU 2020-06).

ASU 2020-06 simplifies the convertible instrument accounting framework through the elimination of the beneficial conversion and cash conversion accounting models used to account for convertible debt and convertible preferred stock. ASU 2020-06 also amends the accounting for certain contracts in an entity's own equity that are currently accounted for as derivatives because of specific settlement provisions in Accounting Standards Codification 815—Derivatives and Hedging. In addition, ASU 2020-06 modifies how particular convertible instruments and certain contracts that may be settled in cash or shares impact the diluted earnings per share computation. Upon adoption of ASU 2020-06, there was no significant impact to Northern Trust's consolidated balance sheets or consolidated statements of income.

On January 1, 2022, Northern Trust adopted ASU No. 2021-10, "Government Assistance (Topic 832): Disclosures by Business Entities about Government Assistance" (ASU 2021-10). ASU 2021-10 requires annual disclosures about transactions with a government that are accounted for by applying a grant or contribution accounting model by analogy to other accounting guidance within Topic 958, Not-for-Profit Entities, or International Accounting Standards 20, Accounting for Government Grants and Disclosure of Government Assistance. Upon adoption of ASU 2021-10, there was no significant impact to Northern Trust's consolidated balance sheets or consolidated statements of income.

On March 31, 2022, the Securities and Exchange Commission (SEC) released Staff Accounting Bulletin No. 121 (SAB 121) which expresses the SEC staff's view regarding the accounting for entities that have obligations to safeguard "crypto-assets" held for their platform users. SAB 121 requires that entities that perform custodial activities for crypto-assets, whether directly or through an agent acting on its behalf, should recognize a liability and a corresponding asset in respect of the crypto-assets safeguarded for their platform users, with the liability and asset measured at the fair value of the crypto-assets. SAB 121 further requires an entity to provide certain disclosures related to safeguarding obligations for crypto-assets. The guidance is effective for interim and annual periods ending after June 15, 2022, with retrospective application as of the beginning of the fiscal year to which the interim or annual period relates. The release of SAB 121 did not have an impact to Northern Trust's consolidated balance sheets or consolidated statements of income.

On December 21, 2022, Northern Trust adopted ASU No. 2022-06, "Reference Rate Reform (Topic 848) and Derivatives and Hedging (Topic 815): Deferral of the Sunset Date of Topic 848" (ASU 2022-06). In March 2020, the FASB issued ASU No. 2020-04, "Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting" (ASU 2020-04) to provide optional guidance to ease the potential burden in accounting for (or recognizing the effects of) reference rate reform on financial reporting. ASU 2020-04 established Topic 848 to provide relief during the temporary transition period and includes a sunset provision based on expectations of when the London Interbank Offered Rate (LIBOR) would cease being published. ASU 2022-06 further defers the sunset provision date of Topic 848 from December 31, 2022, to December 31, 2024, after which entities will no longer be permitted to apply the relief in Topic 848. Upon adoption of ASU 2022-06, there was no significant impact to Northern Trust's consolidated balance sheets or consolidated statements of income.

Note 3 – Fair Value Measurements

Fair value under GAAP is defined as the price that would be received to sell an asset or paid to transfer a liability (an exit price) in an orderly transaction between market participants on the measurement date.

Fair Value Hierarchy. The following describes the hierarchy of valuation inputs (Levels 1, 2, and 3) used to measure fair value and the primary valuation methodologies used by Northern Trust for financial instruments measured at fair value on a recurring basis. Observable inputs reflect market data obtained from sources independent of the reporting entity; unobservable inputs reflect the entity's own assumptions about how market participants would value an asset or liability based on the best information available. GAAP requires an entity measuring fair value to maximize the use of observable inputs and minimize the use of unobservable inputs and establishes a fair value hierarchy of inputs. Financial instruments are categorized within the hierarchy based on the lowest level input that is significant to their valuation. Northern Trust's policy is to recognize transfers into and transfers out of fair value levels as of the end of the reporting period in which the transfer occurred. No transfers into or out of Level 3 occurred during the years ended December 31, 2022, or 2021.

Level 1 – Quoted, active market prices for identical assets or liabilities. Northern Trust's Level 1 assets are comprised primarily of AFS investments in U.S. Treasury securities.

Level 2 – Observable inputs other than Level 1 prices, such as quoted active market prices for similar assets or liabilities, quoted prices for identical or similar assets in inactive markets, and model-derived valuations in which all significant inputs are observable in active markets. Northern Trust's Level 2 assets include AFS and certain trading account debt securities, the fair values of which are determined predominantly by external pricing vendors. Prices received from vendors are compared to other vendor and third-party prices. If a security price obtained from a pricing vendor is determined to exceed pre-determined tolerance levels that are assigned based on an asset type's characteristics, the exception is researched and, if the price is not able to be validated, an alternate pricing vendor is utilized, consistent with

Northern Trust's pricing source hierarchy. As of December 31, 2022, Northern Trust's AFS debt securities portfolio included 1,163 Level 2 securities with an aggregate market value of $24.0 billion. All 1,163 debt securities were valued by external pricing vendors. As of December 31, 2021, Northern Trust's AFS debt securities portfolio included 2,547 Level 2 debt securities with an aggregate market value of $35.6 billion. All 2,547 debt securities were valued by external pricing vendors.

Northern Trust has established processes and procedures to assess the suitability of valuation methodologies used by external pricing vendors, including reviews of valuation techniques and assumptions used for selected securities. On a daily basis, periodic quality control reviews of prices received from vendors are conducted which include comparisons to prices on similar security types received from multiple pricing vendors and to the previous day's reported prices for each security. Predetermined tolerance level exceptions are researched and may result in additional validation through available market information or the use of an alternate pricing vendor. Quarterly, Northern Trust reviews documentation from third-party pricing vendors regarding the valuation processes and assumptions used in their valuations and assesses whether the fair value levels assigned by Northern Trust to each security classification are appropriate. Annually, valuation inputs used within third-party pricing vendor valuations are reviewed for propriety on a sample basis through a comparison of inputs used to comparable market data, including security classifications that are less actively traded and security classifications comprising significant portions of the portfolio.

Level 2 assets and liabilities also include derivative contracts which are valued internally using widely accepted income-based models that incorporate inputs readily observable in actively quoted markets and reflect the contractual terms of the contracts. Observable inputs include foreign exchange rates and interest rates for foreign exchange contracts; credit spreads, default probabilities, and recovery rates for credit default swap contracts; interest rates for interest rate swap contracts and forward contracts; and interest rates and volatility inputs for interest rate option contracts. Northern Trust evaluates the impact of counterparty credit risk and its own credit risk on the valuation of its derivative instruments. Factors considered include the likelihood of default by Northern Trust and its counterparties, the remaining maturities of the instruments, net exposures after giving effect to master netting arrangements or similar agreements, available collateral, and other credit enhancements in determining the appropriate fair value of derivative instruments. The resulting valuation adjustments have not been considered material.

Level 3 – Valuation techniques in which one or more significant inputs are unobservable in the marketplace.

Northern Trust's Level 3 liabilities consist of swaps that Northern Trust entered into with the purchaser of 1.1 million and 1.0 million shares of Visa Inc. Class B common stock (Visa Class B common shares) previously held by Northern Trust and sold in June 2016 and 2015, respectively. Pursuant to the swaps, Northern Trust retains the risks associated with the ultimate conversion of the Visa Class B common shares into shares of Visa Inc. Class A common stock (Visa Class A common shares), such that the counterparty will be compensated for any dilutive adjustments to the conversion ratio and Northern Trust will be compensated for any anti-dilutive adjustments to the ratio. The swaps also require periodic payments from Northern Trust to the counterparty calculated by reference to the market price of Visa Class A common shares and a fixed rate of interest. The fair value of the swaps is determined using a discounted cash flow methodology. The significant unobservable inputs used in the fair value measurement are Northern Trust's own assumptions about estimated changes in the conversion rate of the Visa Class B common shares into Visa Class A common shares, the date on which such conversion is expected to occur and the estimated growth rate of the Visa Class A common share price. See "Visa Class B Common Shares" under Note 25, "Commitments and Contingent Liabilities," for further information.

Northern Trust believes its valuation methods for its assets and liabilities carried at fair value are appropriate; however, the use of different methodologies or assumptions, particularly as applied to Level 3 assets and liabilities, could have a material effect on the computation of their estimated fair values.

Management of various businesses and departments of Northern Trust (including Corporate Market Risk, Credit Risk Management, Corporate Finance, Asset Servicing and Wealth Management) reviews valuation methods and models for Level 3 assets and liabilities. Fair value measurements are performed upon acquisitions of an asset or liability. Management of the appropriate business or department reviews assumed inputs, especially when unobservable in the marketplace, in order to substantiate their use in each fair value measurement. When appropriate, management reviews forecasts used in the valuation process in light of other relevant financial projections to understand any variances between current and previous fair value measurements. In certain circumstances, third party information is used to support the fair value measurements. If certain third party information seems inconsistent with consensus views, a review of the information is performed by management of the respective business or department to determine the appropriate fair value of the asset or liability.

The following table presents the fair values of Northern Trust's Level 3 liabilities as of December 31, 2022 and 2021, as well as the valuation techniques, significant unobservable inputs, and quantitative information used to develop significant unobservable inputs for such liabilities as of such dates.

TABLE 52: LEVEL 3 SIGNIFICANT UNOBSERVABLE INPUTS

			DECEMBER 31, 2022		
FINANCIAL INSTRUMENT	FAIR VALUE	VALUATION TECHNIQUE	UNOBSERVABLE INPUTS	INPUT VALUES	WEIGHTED-AVERAGE INPUT VALUES[1]
Swaps Related to Sale of Certain Visa Class B Common Shares	**$34.8 million**	**Discounted Cash Flow**	**Conversion Rate**	**1.60x**	**1.60x**
			Visa Class A Appreciation	**8.53%**	**8.53%**
			Expected Duration	**12 - 33 months**	**20 months**

[1] *Weighted average of expected duration based on scenario probability.*

			DECEMBER 31, 2021		
FINANCIAL INSTRUMENT	FAIR VALUE	VALUATION TECHNIQUE	UNOBSERVABLE INPUTS	INPUT VALUES	WEIGHTED-AVERAGE INPUT VALUES[1]
Swaps Related to Sale of Certain Visa Class B Common Shares	$37.5 million	Discounted Cash Flow	Conversion Rate	1.62x	1.62x
			Visa Class A Appreciation	10.10%	10.10%
			Expected Duration	12 - 33 months	20 months

[1] *Weighted average of expected duration based on scenario probability.*

The following presents assets and liabilities measured at fair value on a recurring basis as of December 31, 2022 and 2021, segregated by fair value hierarchy level.

TABLE 53: RECURRING BASIS HIERARCHY LEVELING

	DECEMBER 31, 2022				
(In Millions)	LEVEL 1	LEVEL 2	LEVEL 3	NETTING	ASSETS/ LIABILITIES AT FAIR VALUE
Debt Securities					
Available for Sale					
U.S. Government	$ 2,747.4	$ —	$ —	$ —	$ 2,747.4
Obligations of States and Political Subdivisions	—	787.6	—	—	787.6
Government Sponsored Agency	—	11,545.2	—	—	11,545.2
Non-U.S. Government	—	360.0	—	—	360.0
Corporate Debt	—	1,747.6	—	—	1,747.6
Covered Bonds	—	388.7	—	—	388.7
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	—	2,479.4	—	—	2,479.4
Other Asset-Backed	—	5,256.2	—	—	5,256.2
Commercial Mortgage-Backed	—	1,387.8	—	—	1,387.8
Total Available for Sale	2,747.4	23,952.5	—	—	26,699.9
Trading Account	95.0	0.2	—	—	95.2
Total Available for Sale and Trading Debt Securities	2,842.4	23,952.7	—	—	26,795.1
Other Assets					
Derivative Assets					
Foreign Exchange Contracts	—	3,510.1	—	(2,666.4)	843.7
Interest Rate Contracts	—	222.0	—	(144.3)	77.7
Other Financial Derivatives[1]	—	0.3	—	—	0.3
Total Derivative Assets	—	3,732.4	—	(2,810.7)	921.7
Other Liabilities					
Derivative Liabilities					
Foreign Exchange Contracts	—	3,187.5	—	(1,826.7)	1,360.8
Interest Rate Contracts	—	431.8	—	(5.9)	425.9
Other Financial Derivatives[2]	—	—	34.8	(33.3)	1.5
Total Derivative Liabilities	$ —	$ 3,619.3	$ 34.8	$ (1,865.9)	$ 1,788.2

Note: Northern Trust has elected to net derivative assets and liabilities when legally enforceable master netting arrangements or similar agreements exist between Northern Trust and the counterparty. As of December 31, 2022, derivative assets and liabilities shown above also include reductions of $1,140.2 million and $195.3 million, respectively, as a result of cash collateral received from and deposited with derivative counterparties.
[1] *This line consists of total return swap contracts.*
[2] *This line consists of swaps related to the sale of certain Visa Class B common shares.*

(In Millions)	DECEMBER 31, 2021 LEVEL 1	LEVEL 2	LEVEL 3	NETTING	ASSETS/ LIABILITIES AT FAIR VALUE
Debt Securities					
Available for Sale					
U.S. Government	$ 2,426.1	$ —	$ —	$ —	$ 2,426.1
Obligations of States and Political Subdivisions	—	3,876.1	—	—	3,876.1
Government Sponsored Agency	—	18,075.6	—	—	18,075.6
Non-U.S. Government	—	374.0	—	—	374.0
Corporate Debt	—	2,341.7	—	—	2,341.7
Covered Bonds	—	505.6	—	—	505.6
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	—	3,045.1	—	—	3,045.1
Other Asset-Backed	—	5,941.6	—	—	5,941.6
Commercial Mortgage Backed	—	1,424.7	—	—	1,424.7
Total Available for Sale	2,426.1	35,584.4	—	—	38,010.5
Trading Account	—	0.3	—	—	0.3
Total Available for Sale and Trading Debt Securities	2,426.1	35,584.7	—	—	38,010.8
Other Assets					
Derivative Assets					
Foreign Exchange Contracts	—	2,207.4	—	(1,530.7)	676.7
Interest Rate Contracts	—	140.0	—	(3.1)	136.9
Total Derivatives Assets	—	2,347.4	—	(1,533.8)	813.6
Other Liabilities					
Derivative Liabilities					
Foreign Exchange Contracts	—	1,998.8	—	(1,234.5)	764.3
Interest Rate Contracts	—	98.9	—	(48.1)	50.8
Other Financial Derivative[1]	—	—	37.5	(0.9)	36.6
Total Derivative Liabilities	$ —	$ 2,097.7	$ 37.5	$ (1,283.5)	$ 851.7

Note: Northern Trust has elected to net derivative assets and liabilities when legally enforceable master netting arrangements or similar agreements exist between Northern Trust and the counterparty. As of December 31, 2021, derivative assets and liabilities shown above also include reductions of $389.4 million and $139.0 million, respectively, as a result of cash collateral received from and deposited with derivative counterparties.

[1] *This line consists of swaps related to the sale of certain Visa Class B common shares.*

The following table presents the changes in Level 3 liabilities for the years ended December 31, 2022 and 2021.

TABLE 54: CHANGES IN LEVEL 3 LIABILITIES

LEVEL 3 LIABILITIES (In Millions)	SWAPS RELATED TO SALE OF CERTAIN VISA CLASS B COMMON SHARES **2022**	2021
Fair Value at January 1	**$ 37.5**	$ 35.3
Total (Gains) Losses:		
Included in Earnings[1]	**22.6**	21.3
Purchases, Issues, Sales, and Settlements		
Settlements	**(25.3)**	(19.1)
Fair Value at December 31	**$ 34.8**	$ 37.5
Unrealized Losses (Gains) Included in Earnings Related to Financial Instruments Held at December 31[1]	**$ 16.6**	$ 22.0

[1] *Gains (losses) are recorded in Other Operating Income on the consolidated statements of income.*

Carrying values of assets and liabilities that are not measured at fair value on a recurring basis may be adjusted to fair value in periods subsequent to their initial recognition, for example, to record an impairment of an asset. GAAP requires entities to separately disclose these subsequent fair value measurements and to classify them under the fair value hierarchy.

Assets measured at fair value on a nonrecurring basis at December 31, 2022 and 2021, all of which were categorized as Level 3 under the fair value hierarchy, were comprised of nonaccrual loans whose values were based on real estate and other available collateral, and of OREO properties.

Fair values of real estate loan collateral were estimated using a market approach typically supported by third-party valuations and property-specific fees and taxes. The fair values of real estate loan collateral were subject to adjustments to reflect management's judgment as to realizable value and consisted of discount factors ranging from 15.0% to 20.0% with a weighted average based on fair values of 17.2% and 15.4% as of December 31, 2022 and 2021, respectively. Other loan collateral, which typically consists of accounts receivable, inventory and equipment, is valued using a market approach adjusted for asset-specific characteristics and in limited instances third-party valuations are used. OREO assets are carried at the lower of cost or fair value less estimated costs to sell, with fair value typically based on third-party appraisals.

Collateral-dependent nonaccrual loans that have been adjusted to fair value totaled $6.6 million and $15.0 million at December 31, 2022 and 2021, respectively.

The following table presents the fair values of Northern Trust's Level 3 assets that were measured at fair value on a nonrecurring basis as of December 31, 2022 and 2021, as well as the valuation technique, significant unobservable inputs, and quantitative information used to develop the significant unobservable inputs for such assets as of such dates.

TABLE 55: LEVEL 3 NONRECURRING BASIS SIGNIFICANT UNOBSERVABLE INPUTS

DECEMBER 31, 2022

FINANCIAL INSTRUMENT	FAIR VALUE[1]	VALUATION TECHNIQUE	UNOBSERVABLE INPUTS	INPUT VALUES	WEIGHTED-AVERAGE INPUT VALUES
Loans	**$6.6 million**	**Market Approach**	**Discount factor applied to real estate collateral-dependent loans to reflect realizable value**	**15.0% – 20.0%**	**17.2%**

[1] *Includes real estate collateral-dependent loans and other collateral-dependent loans.*

DECEMBER 31, 2021

FINANCIAL INSTRUMENT	FAIR VALUE[1]	VALUATION TECHNIQUE	UNOBSERVABLE INPUTS	INPUT VALUES	WEIGHTED-AVERAGE INPUT VALUES
Loans	$15.0 million	Market Approach	Discount factor applied to real estate collateral-dependent loans to reflect realizable value	15.0% – 20.0%	15.4%

[1] *Includes real estate collateral-dependent loans and other collateral-dependent loans.*

The following tables presents the book value and estimated fair value, including the fair value hierarchy level, of Northern Trust's financial instruments that are not measured at fair value on the consolidated balance sheets as of December 31, 2022 and 2021. The following tables exclude those items measured at fair value on a recurring basis.

TABLE 56: FAIR VALUE OF FINANCIAL INSTRUMENTS

	DECEMBER 31, 2022				
			ESTIMATED FAIR VALUE		
(In Millions)	BOOK VALUE	TOTAL ESTIMATED FAIR VALUE	LEVEL 1	LEVEL 2	LEVEL 3
FINANCIAL ASSETS					
Cash and Due from Banks	$ 4,654.2	$ 4,654.2	$ 4,654.2	$ —	$ —
Federal Reserve and Other Central Bank Deposits	40,030.4	40,030.4	—	40,030.4	—
Interest-Bearing Deposits with Banks	1,941.1	1,941.1	—	1,941.1	—
Federal Funds Sold	32.0	32.0	—	32.0	—
Securities Purchased under Agreements to Resell	1,070.3	1,070.3	—	1,070.3	—
Debt Securities - Held to Maturity	25,036.1	22,879.3	50.0	22,829.3	—
Loans (excluding Leases)					
Held for Investment	42,749.0	42,636.5	—	—	42,636.5
Other Assets	1,476.9	1,460.4	94.7	1,365.7	—
FINANCIAL LIABILITIES					
Deposits					
Demand, Noninterest-Bearing, Savings, Money Market and Other Interest-Bearing	$ 56,468.9	$ 56,468.9	$ 56,468.9	$ —	$ —
Savings Certificates and Other Time	1,981.3	1,976.1	—	1,976.1	—
Non U.S. Offices Interest-Bearing	65,481.9	65,481.9	—	65,481.9	—
Federal Funds Purchased	1,896.9	1,896.9	—	1,896.9	—
Securities Sold Under Agreements to Repurchase	567.2	567.2	—	567.2	—
Other Borrowings	7,592.3	7,592.8	—	7,592.8	—
Senior Notes	2,724.2	2,729.8	—	2,729.8	—
Long-Term Debt	2,066.2	2,110.7	—	2,110.7	—
Unfunded Commitments	218.9	218.9	—	218.9	—
Other Liabilities	73.2	73.2	—	—	73.2

	DECEMBER 31, 2021				
			ESTIMATED FAIR VALUE		
(In Millions)	BOOK VALUE	TOTAL ESTIMATED FAIR VALUE	LEVEL 1	LEVEL 2	LEVEL 3
FINANCIAL ASSETS					
Cash and Due from Banks	$ 3,056.8	$ 3,056.8	$ 3,056.8	$ —	$ —
Federal Reserve and Other Central Bank Deposits	64,582.2	64,582.2	—	64,582.2	—
Interest-Bearing Deposits with Banks	1,949.4	1,949.4	—	1,949.4	—
Securities Purchased under Agreements to Resell	686.4	686.4	—	686.4	—
Debt Securities - Held to Maturity	23,564.5	23,315.4	47.0	23,268.4	—
Loans (excluding Leases)					
Held for Investment	40,319.3	40,208.2	—	—	40,208.2
Held for Sale	12.3	24.5	—	24.5	—
Other Assets	1,275.3	1,279.8	119.1	1,160.7	—
FINANCIAL LIABILITIES					
Deposits					
Demand, Noninterest-Bearing, Savings, Money Market and Other Interest-Bearing	$ 83,318.6	$ 83,318.6	$ 83,318.6	$ —	$ —
Savings Certificates and Other Time	842.7	843.8	—	843.8	—
Non U.S. Offices Interest-Bearing	75,767.1	75,767.1	—	75,767.1	—
Federal Funds Purchased	0.2	0.2	—	0.2	—
Securities Sold Under Agreements to Repurchase	531.9	531.9	—	531.9	—
Other Borrowings	3,583.8	3,583.9	—	3,583.9	—
Senior Notes	2,505.5	2,591.4	—	2,591.4	—
Long-Term Debt	1,145.7	1,189.4	—	1,189.4	—
Unfunded Commitments	289.3	289.3	—	289.3	—
Other Liabilities	75.5	75.5	—	—	75.5

Note 4 – Securities

Available for Sale Debt Securities. The following tables provide the amortized cost, fair values, and remaining maturities of AFS debt securities.

TABLE 57: RECONCILIATION OF AMORTIZED COST TO FAIR VALUE OF AVAILABLE FOR SALE DEBT SECURITIES

	DECEMBER 31, 2022			
(In Millions)	AMORTIZED COST	GROSS UNREALIZED GAINS	GROSS UNREALIZED LOSSES	FAIR VALUE
U.S. Government	**$ 2,837.7**	**$ 2.5**	**$ 92.8**	**$ 2,747.4**
Obligations of States and Political Subdivisions	**817.8**	**—**	**30.2**	**787.6**
Government Sponsored Agency	**11,892.5**	**4.3**	**351.6**	**11,545.2**
Non-U.S. Government	**387.6**	**—**	**27.6**	**360.0**
Corporate Debt	**1,774.3**	**0.2**	**26.9**	**1,747.6**
Covered Bonds	**403.1**	**0.3**	**14.7**	**388.7**
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	**2,645.8**	**0.3**	**166.7**	**2,479.4**
Other Asset-Backed	**5,544.3**	**—**	**288.1**	**5,256.2**
Commercial Mortgage-Backed	**1,456.9**	**0.1**	**69.2**	**1,387.8**
Total	**$ 27,760.0**	**$ 7.7**	**$ 1,067.8**	**$ 26,699.9**

	DECEMBER 31, 2021			
(In Millions)	AMORTIZED COST	GROSS UNREALIZED GAINS	GROSS UNREALIZED LOSSES	FAIR VALUE
U.S. Government	$ 2,406.2	$ 29.3	$ 9.4	$ 2,426.1
Obligations of States and Political Subdivisions	3,841.0	73.7	38.6	3,876.1
Government Sponsored Agency	18,092.1	93.7	110.2	18,075.6
Non-U.S. Government	383.4	0.1	9.5	374.0
Corporate Debt	2,319.8	31.6	9.7	2,341.7
Covered Bonds	502.6	3.9	0.9	505.6
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	3,052.4	28.1	35.4	3,045.1
Other Asset-Backed	5,962.0	11.3	31.7	5,941.6
Commercial Mortgage-Backed	1,389.0	38.9	3.2	1,424.7
Total	$ 37,948.5	$ 310.6	$ 248.6	$ 38,010.5

TABLE 58: REMAINING MATURITY OF AVAILABLE FOR SALE DEBT SECURITIES

DECEMBER 31, 2022	ONE YEAR OR LESS		ONE TO FIVE YEARS		FIVE TO TEN YEARS		OVER TEN YEARS		TOTAL	
(In Millions)	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value
U.S. Government	**$ 1,576.6**	**$ 1,574.5**	**$ 1,261.1**	**$ 1,172.9**	**$ —**	**$ —**	**$ —**	**$ —**	**$ 2,837.7**	**$ 2,747.4**
Obligations of States and Political Subdivisions	**—**	**—**	**105.5**	**105.5**	**675.4**	**646.5**	**36.9**	**35.6**	**817.8**	**787.6**
Government Sponsored Agency	**2,452.0**	**2,404.0**	**5,602.6**	**5,441.7**	**3,060.2**	**2,962.5**	**777.7**	**737.0**	**11,892.5**	**11,545.2**
Non-U.S. Government	**101.3**	**101.1**	**286.3**	**258.9**	**—**	**—**	**—**	**—**	**387.6**	**360.0**
Corporate Debt	**555.8**	**551.8**	**1,199.3**	**1,180.3**	**18.3**	**14.8**	**0.9**	**0.7**	**1,774.3**	**1,747.6**
Covered Bonds	**159.5**	**159.2**	**243.6**	**229.5**	**—**	**—**	**—**	**—**	**403.1**	**388.7**
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	**498.9**	**494.3**	**1,923.7**	**1,802.7**	**223.2**	**182.4**	**—**	**—**	**2,645.8**	**2,479.4**
Other Asset-Backed	**893.7**	**848.6**	**3,244.1**	**3,035.5**	**1,250.2**	**1,219.7**	**156.3**	**152.4**	**5,544.3**	**5,256.2**
Commercial Mortgage-Backed	**17.3**	**17.5**	**1,188.1**	**1,145.3**	**251.5**	**225.0**	**—**	**—**	**1,456.9**	**1,387.8**
Total	**$ 6,255.1**	**$ 6,151.0**	**$ 15,054.3**	**$ 14,372.3**	**$ 5,478.8**	**$ 5,250.9**	**$ 971.8**	**$ 925.7**	**$ 27,760.0**	**$ 26,699.9**

Note: Mortgage-backed and asset-backed securities are included in the above table taking into account anticipated future prepayments.

Available for Sale Debt Securities with Unrealized Losses. The following table provides information regarding AFS debt securities with no credit losses reported that had been in a continuous unrealized loss position for less than twelve months and for twelve months or longer as of December 31, 2022 and 2021.

TABLE 59: AVAILABLE FOR SALE DEBT SECURITIES IN UNREALIZED LOSS POSITION WITH NO CREDIT LOSSES REPORTED

AS OF DECEMBER 31, 2022	LESS THAN 12 MONTHS		12 MONTHS OR LONGER		TOTAL	
(In Millions)	FAIR VALUE	UNREALIZED LOSSES	FAIR VALUE	UNREALIZED LOSSES	FAIR VALUE	UNREALIZED LOSSES
U.S. Government	**$ 1,123.6**	**$ 64.1**	**$ 343.1**	**$ 28.7**	**$ 1,466.7**	**$ 92.8**
Obligations of States and Political Subdivisions	**160.0**	**16.8**	**120.6**	**13.4**	**280.6**	**30.2**
Government Sponsored Agency	**7,631.4**	**262.1**	**2,737.7**	**89.5**	**10,369.1**	**351.6**
Non-U.S. Government	**235.4**	**17.3**	**124.6**	**10.3**	**360.0**	**27.6**
Corporate Debt	**427.3**	**14.6**	**130.3**	**2.8**	**557.6**	**17.4**
Covered Bonds	**238.0**	**13.5**	**42.8**	**1.2**	**280.8**	**14.7**
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	**1,305.4**	**74.4**	**807.1**	**83.2**	**2,112.5**	**157.6**
Other Asset-Backed	**3,873.4**	**217.5**	**1,247.6**	**70.6**	**5,121.0**	**288.1**
Commercial Mortgage-Backed	**670.9**	**47.4**	**215.6**	**21.8**	**886.5**	**69.2**
Total	**$ 15,665.4**	**$ 727.7**	**$ 5,769.4**	**$ 321.5**	**$ 21,434.8**	**$ 1,049.2**

Note: Three corporate debt AFS securities with a fair value of $93.8 million and unrealized losses of $9.5 million and one sub-sovereign, supranational and non-U.S. agency bonds AFS security with a fair value of $68.3 million and unrealized loss of $9.1 million have been excluded from the table above as these AFS securities have a $1.3 million allowance for credit losses reported as of December 31, 2022. Refer to the discussion further below and Note 7, "Allowance for Credit Losses" for further information.

AS OF DECEMBER 31, 2021	LESS THAN 12 MONTHS		12 MONTHS OR LONGER		TOTAL	
(In Millions)	FAIR VALUE	UNREALIZED LOSSES	FAIR VALUE	UNREALIZED LOSSES	FAIR VALUE	UNREALIZED LOSSES
U.S. Government	$ 239.0	$ 9.4	$ —	$ —	$ 239.0	$ 9.4
Obligations of States and Political Subdivisions	1,699.5	37.4	31.6	1.2	1,731.1	38.6
Government Sponsored Agency	8,207.3	90.2	1,821.4	20.0	10,028.7	110.2
Non-U.S. Government	230.0	9.5	—	—	230.0	9.5
Corporate Debt	693.7	9.7	—	—	693.7	9.7
Covered Bonds	92.1	0.9	—	—	92.1	0.9
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	1,116.8	31.9	172.3	3.5	1,289.1	35.4
Other Asset-Backed	3,815.5	31.4	11.7	0.3	3,827.2	31.7
Commercial Mortgage-Backed	566.8	3.2	—	—	566.8	3.2
Total	$ 16,660.7	$ 223.6	$ 2,037.0	$ 25.0	$ 18,697.7	$ 248.6

As of December 31, 2022, 1,030 AFS debt securities with a combined fair value of $21.4 billion were in an unrealized loss position without an allowance for credit losses, with their unrealized losses totaling $1.0 billion. As of December 31, 2022, unrealized losses in AFS debt securities of $351.6 million, $288.1 million, and $157.6 million related to government sponsored agency, other asset-backed, and sub-sovereign, supranational and non-U.S. agency bonds, respectively, which are primarily attributable to changes in market interest rates and credit spreads since their purchase.

As of December 31, 2021, 1,233 AFS debt securities with a combined fair value of $18.7 billion were in an unrealized loss position without an allowance for credit losses, with their unrealized losses totaling $248.6 million. As of December 31, 2021, unrealized losses in AFS debt securities of $110.2 million related to government-sponsored agency, which are primarily attributable to changes in market interest rates and credit spreads since their purchase.

As of December 31, 2022, Northern Trust had the intent to sell a portfolio of AFS debt securities with an amortized cost of $2.3 billion and a fair value of $2.1 billion. The amortized cost basis of the securities were written down to their fair value and a loss of $213.0 million was recognized in Investment Security Gains (Losses), net on the consolidated statements of income in 2022. Please see Note 34, "Subsequent Event" for discussion on the January 2023 sale of these securities.

AFS debt securities impairment reviews are conducted quarterly to identify and evaluate securities that have indications of possible credit losses. A determination as to whether a security's decline in market value is related to credit impairment takes into consideration numerous factors and the relative significance of any single factor can vary by security. Factors Northern Trust considers in determining whether impairment is credit-related include, but are not limited to, the severity of the impairment; the cause of the impairment and the financial condition and near-term prospects of the issuer; activity in the market of the issuer, which may indicate adverse credit conditions; Northern Trust's intent regarding the sale of the security as of the balance sheet date; and the likelihood that Northern Trust will not be required to sell the security for a period of time sufficient to allow for the recovery of the security's amortized cost basis. For each security meeting the requirements of Northern Trust's internal screening process, an extensive review is conducted to determine if a credit loss has occurred.

There was a $1.3 million provision for credit losses and allowance for credit losses for AFS securities for the year ended December 31, 2022, primarily for corporate debt securities. There was no provision for credit losses or allowance for credit losses for AFS securities for the year ended December 31, 2021. The process for identifying credit losses for AFS securities is based on the best estimate of cash flows to be collected from the security, discounted using the security's effective interest rate. If the present value of the expected cash flows is found to be less than the current amortized cost of the security, an allowance for credit losses is generally recorded equal to the difference between the two amounts, limited to the amount the amortized cost basis exceeds the fair value of the security. For additional information, please refer to Note 7, "Allowance for Credit Losses."

Held to Maturity Debt Securities. The following tables provide the amortized cost, fair values and remaining maturities of held to maturity (HTM) debt securities.

TABLE 60: RECONCILIATION OF AMORTIZED COST TO FAIR VALUES OF HELD TO MATURITY DEBT SECURITIES

	DECEMBER 31, 2022			
(In Millions)	AMORTIZED COST	GROSS UNREALIZED GAINS	GROSS UNREALIZED LOSSES	FAIR VALUE
U.S. Government	**$ 50.0**	**$ —**	**$ —**	**$ 50.0**
Obligations of States and Political Subdivisions	**2,565.3**	**—**	**149.8**	**2,415.5**
Government Sponsored Agency	**9,407.7**	**—**	**1,076.0**	**8,331.7**
Non-U.S. Government	**3,234.0**	**0.1**	**133.8**	**3,100.3**
Corporate Debt	**713.3**	**—**	**45.4**	**667.9**
Covered Bonds	**2,530.3**	**0.3**	**158.7**	**2,371.9**
Certificates of Deposit	**35.9**	**—**	**—**	**35.9**
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	**5,703.3**	**1.0**	**436.1**	**5,268.2**
Other Asset-Backed	**263.7**	**—**	**1.0**	**262.7**
Other	**532.6**	**—**	**157.4**	**375.2**
Total	**$ 25,036.1**	**$ 1.4**	**$ 2,158.2**	**$ 22,879.3**

	DECEMBER 31, 2021			
(In Millions)	AMORTIZED COST	GROSS UNREALIZED GAINS	GROSS UNREALIZED LOSSES	FAIR VALUE
U.S. Government	$ 47.0	$ —	$ —	$ 47.0
Obligations of States and Political Subdivisions	0.8	—	—	0.8
Government Sponsored Agency	5,927.6	1.1	106.1	5,822.6
Non-U.S. Government	5,773.3	3.9	9.8	5,767.4
Corporate Debt	901.8	2.5	6.5	897.8
Covered Bonds	2,942.4	8.3	9.6	2,941.1
Certificates of Deposit	674.7	—	—	674.7
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	6,098.0	14.3	80.0	6,032.3
Other Asset-Backed	682.6	1.0	—	683.6
Other	516.3	3.4	71.6	448.1
Total	$ 23,564.5	$ 34.5	$ 283.6	$ 23,315.4

As of December 31, 2022, the $25.0 billion HTM debt securities portfolio had unrealized losses of $1.1 billion and $436.1 million related to government sponsored agency and sub-sovereign, supranational and non-U.S. agency bonds, respectively, which are primarily attributable to changes in overall market interest rates and credit spreads since their purchase. As of December 31, 2021, the $23.6 billion HTM debt securities portfolio had an unrealized loss of $106.1 million and $80.0 million related to government-sponsored agency and sub-sovereign, supranational and non-U.S. agency bonds, respectively, which are primarily attributable to changes in overall market interest rates and credit spreads since their purchase.

TABLE 61: REMAINING MATURITY OF HELD TO MATURITY DEBT SECURITIES

DECEMBER 31, 2022	ONE YEAR OR LESS		ONE TO FIVE YEARS		FIVE TO TEN YEARS		OVER TEN YEARS		TOTAL	
(In Millions)	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value
U.S. Government	$ 50.0	$ 50.0	$ —	$ —	$ —	$ —	$ —	$ —	$ 50.0	$ 50.0
Obligations of States and Political Subdivisions	36.4	36.0	753.0	725.8	1,325.5	1,242.3	450.4	411.4	2,565.3	2,415.5
Government Sponsored Agency	879.8	775.0	2,957.6	2,624.9	3,629.7	3,232.7	1,940.6	1,699.1	9,407.7	8,331.7
Non-U.S. Government	1,742.3	1,741.8	1,344.7	1,233.0	147.0	125.5	—	—	3,234.0	3,100.3
Corporate Debt	91.8	90.9	606.4	565.0	15.1	12.0	—	—	713.3	667.9
Covered Bonds	410.5	408.6	1,699.8	1,607.6	420.0	355.7	—	—	2,530.3	2,371.9
Certificates of Deposit	35.9	35.9	—	—	—	—	—	—	35.9	35.9
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	1,019.0	1,006.8	4,554.6	4,154.1	129.7	107.3	—	—	5,703.3	5,268.2
Other Asset-Backed	88.6	88.4	102.9	102.4	72.2	71.9	—	—	263.7	262.7
Other	46.5	44.6	301.2	261.7	34.5	24.8	150.4	44.1	532.6	375.2
Total	$ 4,400.8	$ 4,278.0	$ 12,320.2	$ 11,274.5	$ 5,773.7	$ 5,172.2	$ 2,541.4	$ 2,154.6	$25,036.1	$22,879.3

Note: Mortgage-backed and asset-backed securities are included in the above table taking into account anticipated future prepayments.

HTM debt securities consist of securities that management intends to, and Northern Trust has the ability to, hold until maturity. During the year ended December 31, 2022, for capital management purposes, the Corporation transferred government sponsored agency and obligations of states and political subdivisions securities that had a fair value of $6.6 billion from the AFS to HTM classification, all of which were transferred in the third quarter of 2022. During the year ended December 31, 2021, the Corporation transferred government sponsored agency securities that had a fair value of $6.9 billion from AFS to HTM for capital management purposes, all of which were transferred in the second quarter of 2021. Upon transfer of a debt security from the AFS to HTM classification, the amortized cost is reset to fair value. Any net unrealized gain or loss at the date of transfer will remain in AOCI and be amortized into Net Interest Income over the remaining life of the securities using the effective interest method. The amortization of amounts retained in AOCI will offset the effect on interest income of the amortization of the premium or discount resulting from transferring the securities at fair value.

Credit Quality Indicators. The following table provides the amortized cost of HTM debt securities by credit rating.

TABLE 62: AMORTIZED COST OF HELD TO MATURITY DEBT SECURITIES BY CREDIT RATING

	AS OF DECEMBER 31, 2022					
(In Millions)	AAA	AA	A	BBB	NOT RATED	TOTAL
U.S. Government	$ 50.0	$ —	$ —	$ —	$ —	$ 50.0
Obligations of States and Political Subdivisions	926.8	1,638.5	—	—	—	2,565.3
Government Sponsored Agency	9,407.7	—	—	—	—	9,407.7
Non-U.S. Government	762.2	926.5	1,223.0	322.3	—	3,234.0
Corporate Debt	2.1	305.7	405.5	—	—	713.3
Covered Bonds	2,530.3	—	—	—	—	2,530.3
Certificates of Deposit	—	—	—	—	35.9	35.9
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	4,171.3	1,502.0	28.9	1.1	—	5,703.3
Other Asset-Backed	263.7	—	—	—	—	263.7
Other	65.8	—	—	—	466.8	532.6
Total	$ 18,179.9	$ 4,372.7	$ 1,657.4	$ 323.4	$ 502.7	$ 25,036.1
Percent of Total	73 %	17 %	7 %	1 %	2 %	100 %

	AS OF DECEMBER 31, 2021					
(In Millions)	AAA	AA	A	BBB	NOT RATED	TOTAL
U.S. Government	$ 47.0	$ —	$ —	$ —	$ —	$ 47.0
Obligations of States and Political Subdivisions	—	0.8	—	—	—	0.8
Government Sponsored Agency	5,927.6	—	—	—	—	5,927.6
Non-U.S. Government	398.0	942.6	4,088.8	343.9	—	5,773.3
Corporate Debt	2.3	386.7	512.8	—	—	901.8
Covered Bonds	2,942.4	—	—	—	—	2,942.4
Certificates of Deposit	—	—	—	—	674.7	674.7
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	4,207.6	1,858.0	31.3	1.1	—	6,098.0
Other Asset-Backed	682.6	—	—	—	—	682.6
Other	—	—	—	—	516.3	516.3
Total	$ 14,207.5	$ 3,188.1	$ 4,632.9	$ 345.0	$ 1,191.0	$ 23,564.5
Percent of Total	60 %	14 %	20 %	1 %	5 %	100 %

Credit quality indicators are metrics that provide information regarding the relative credit risk of debt securities. Northern Trust maintains a high quality debt securities portfolio, with 97% and 94% of the HTM portfolio comprised of securities rated A or higher as of December 31, 2022 and 2021, respectively. The remaining HTM debt securities portfolio was comprised of 1% rated BBB at both December 31, 2022 and 2021, and 2% and 5% not rated by Moody's, S&P Global, or Fitch Ratings at December 31, 2022 and 2021, respectively. Securities not explicitly rated were grouped where possible under the credit rating of the issuer of the security.

Investment Security Gains and Losses. During the fourth quarter of 2022, losses of $213.0 million were recognized in conjunction with the intent to sell certain AFS debt securities which is included in the tables below. Refer to Note 34, "Subsequent Event" for the January 2023 sale of such securities. Proceeds of $138.7 million, $116.7 million and $879.9 million in 2022, 2021 and 2020, respectively, from the sale of debt securities resulted in the following pre-tax Investment Security Gains (Losses), net shown in the following tables.

TABLE 63: INVESTMENT SECURITY GAINS AND LOSSES

	DECEMBER 31,		
(In Millions)	**2022**	2021	2020
Gross Realized Debt Securities Gains	**$ —**	$ 1.4	$ 3.4
Gross Realized Debt Securities Losses	**(214.0)**	(1.7)	(3.8)
Investment Security Gains (Losses), net[1]	**$ (214.0)**	$ (0.3)	$ (0.4)

[1] $214.0 million of Investment Security Gains (Losses), net includes a $213.0 million loss recognized in 2022 in conjunction with the intent to sell certain AFS debt securities.

TABLE 64: INVESTMENT SECURITY GAINS AND LOSSES BY SECURITY TYPE

	DECEMBER 31,		
(In Millions)	**2022**	2021	2020
Obligations of States and Political Subdivisions	**$ (95.8)**	$ —	$ —
Government Sponsored Agency	**—**	—	(1.8)
Corporate Debt[1]	**(67.3)**	(0.3)	(0.4)
Other Asset-Backed	**(17.1)**	—	(0.7)
Commercial Mortgage-Backed	**(33.8)**	—	2.5
Investment Security Gains (Losses), net[2]	**$ (214.0)**	$ (0.3)	$ (0.4)

[1] Proceeds of $138.7 million from the sale of corporate debt securities in 2022 resulted in a $1.0 million loss in pre-tax Investment Security Gains (Losses), net.

[2] $214.0 million of Investment Security Gains (Losses), net includes a $213.0 million loss recognized in 2022 in conjunction with the intent to sell certain AFS debt securities.

Note 5 – Securities Purchased Under Agreements to Resell and Securities Sold Under Agreements to Repurchase

Securities purchased under agreements to resell and securities sold under agreements to repurchase are accounted for as collateralized financings and recorded at the amounts at which the securities were acquired or sold plus accrued interest. To minimize any potential credit risk associated with these transactions, the fair value of the securities purchased or sold is monitored, limits are set on exposure with counterparties, and the financial condition of counterparties is regularly assessed. It is Northern Trust's policy to take possession, either directly or via third-party custodians, of securities purchased under agreements to resell. Securities sold under agreements to repurchase are either directly held by, or pledged to the counterparty until the repurchase.

During the third quarter of 2021, Northern Trust became a Government Securities Division (GSD) netting and sponsoring member in the Fixed Income Clearing Corporation (FICC) sponsored member program. FICC, a wholly-owned subsidiary of The Depository Trust & Clearing Corporation, is a central counterparty and provides netting and settlement for the U.S. Government securities marketplace. Northern Trust nets securities sold under repurchase agreements against those purchased under resale agreements when the Fixed Income Clearing Corporation (FICC) is the counterparty. Refer to Note 25, "Commitments and Contingent Liabilities."

The following tables summarize information related to Securities Purchased under Agreements to Resell and Securities Sold under Agreements to Repurchase.

TABLE 65: SECURITIES PURCHASED UNDER AGREEMENTS TO RESELL

($ In Millions)	2022	2021
Balance at December 31	$ 1,070.3	$ 686.4
Average Balance During the Year	1,071.2	1,067.4
Average Interest Rate Earned During the Year	9.68 %	0.33 %
Maximum Month-End Balance During the Year	$ 1,320.8	$ 1,819.1

Note: Northern Trust nets securities sold under repurchase agreements against those purchased under resale agreements when FICC is the counterparty. The table above includes the impact of balance sheet netting under master netting arrangements. Refer to Note 27, "Offsetting of Assets and Liabilities."

TABLE 66: SECURITIES SOLD UNDER AGREEMENTS TO REPURCHASE

($ In Millions)	2022	2021
Balance at December 31	$ 567.2	$ 531.9
Average Balance During the Year	433.6	232.0
Average Interest Rate Paid During the Year	20.94 %	0.07 %
Maximum Month-End Balance During the Year	$ 869.0	$ 892.6

Note: Northern Trust nets securities sold under repurchase agreements against those purchased under resale agreements when FICC is the counterparty. The table above includes the impact of balance sheet netting under master netting arrangements. Refer to Note 27, "Offsetting of Assets and Liabilities."

TABLE 67: REPURCHASE AGREEMENTS ACCOUNTED FOR AS SECURED BORROWINGS

	REMAINING CONTRACTUAL MATURITY OF THE AGREEMENTS					
	December 31, 2022			December 31, 2021		
($ In Millions)	OVERNIGHT AND CONTINUOUS	UP TO 30 DAYS	TOTAL	OVERNIGHT AND CONTINUOUS	UP TO 30 DAYS	TOTAL
U.S. Treasury and Agency Securities	$ 567.2	$ —	$ 567.2	$ 32.4	$ 499.5	$ 531.9
Total Borrowings	567.2	—	567.2	32.4	499.5	531.9
Net Amount of Recognized Liabilities for Repurchase Agreements in Note 27	567.2	—	567.2	32.4	499.5	531.9

Note 6 – Loans and Leases

Amounts outstanding for Loans and Leases, by segment and class, are shown in the following table.

TABLE 68: LOANS AND LEASES

	DECEMBER 31,	
(In Millions)	**2022**	2021
Commercial		
Commercial and Institutional[(1)]	**$ 12,415.0**	$ 11,489.2
Commercial Real Estate	**4,773.0**	4,326.3
Non-U.S.[(1)]	**3,131.1**	1,990.2
Lease Financing, net	**—**	11.0
Other	**1,316.5**	670.7
Total Commercial	**21,635.6**	18,487.4
Personal		
Private Client	**14,119.0**	15,256.3
Residential Real Estate	**6,413.5**	6,319.9
Non-U.S.	**510.0**	381.8
Other	**215.2**	35.2
Total Personal	**21,257.7**	21,993.2
Total Loans and Leases	**$ 42,893.3**	$ 40,480.6

(1) Commercial and institutional and commercial-non-U.S. combined include $5.6 billion and $4.9 billion of private equity capital call finance loans at December 31, 2022 and 2021, respectively.

Residential real estate loans consist of traditional first lien mortgages and equity credit lines that generally require a loan-to-collateral value ratio of no more than 65% to 80% at inception. Northern Trust's equity credit line products generally have draw periods of up to 10 years and a balloon payment of any outstanding balance is due at maturity. Payments are interest-only with variable interest rates. Northern Trust does not offer equity credit lines that include an option to convert the outstanding balance to an amortizing payment loan. As of December 31, 2022 and 2021, equity credit lines totaled $248.6 million and $258.2 million, respectively. Equity credit lines for which first liens were held by Northern Trust represented 98% and 97% of the total equity credit lines as of December 31, 2022 and 2021, respectively.

Included within the commercial-non-U.S., commercial-other, and personal-other classes are short duration advances, primarily related to the processing of custodied client investments, totaling $2.9 billion and $1.6 billion at December 31, 2022 and 2021, respectively. Demand deposit overdrafts reclassified as loan balances, primarily in personal-other, totaled $24.4 million and $8.0 million at December 31, 2022 and 2021, respectively. There were no loans classified as held for sale at December 31, 2022. There were $12.3 million loans classified as held for sale at December 31, 2021 related to the decision to exit a non-strategic loan portfolio primarily within residential real estate. Loans classified as held for sale are recorded at the lower of cost or fair value. There was $11.2 million and $118.8 million loans sold during the year ended December 31, 2022 and 2021, respectively, which were primarily residential real estate loans.

As of December 31, 2022 and 2021, there were no leases classified as held for sale. As of December 31, 2022, there were no leases outstanding.

Credit Quality Indicators. Credit quality indicators are statistics, measurements or other metrics that provide information regarding the relative credit risk of loans and leases. Northern Trust utilizes a variety of credit quality indicators to assess the credit risk of loans and leases at the segment, class, and individual credit exposure levels.

As part of its credit process, Northern Trust utilizes an internal borrower risk rating system to support identification, approval, and monitoring of credit risk. Borrower risk ratings are used in credit underwriting and management reporting. Risk ratings are used for ranking the credit risk of borrowers and the probability of their default. Each borrower is rated using one of a number of ratings models, which consider both quantitative and qualitative factors. The ratings models vary among classes of loans and leases in order to capture the unique risk characteristics inherent within each particular type of credit exposure. Provided below are the more significant performance indicator attributes considered within Northern Trust's borrower rating models, by loan and lease class.

- Commercial and Institutional: leverage, profit margin, liquidity, asset size and capital levels;
- Commercial Real Estate: debt service coverage, loan-to-value ratio, leasing status and guarantor support;
- Lease Financing and Commercial-Other: leverage, profit margin, liquidity, asset size and capital levels;
- Non-U.S.: leverage, profit margin, liquidity, return on assets and capital levels;
- Residential Real Estate: payment history, credit bureau scores and loan-to-value ratio;
- Private Client: cash-flow-to-debt and net worth ratios, leverage and liquidity; and
- Personal-Other: cash-flow-to-debt and net worth ratios.

While the criteria vary by model, the objective is for the borrower ratings to be consistent in both the measurement and ranking of risk. Each model is calibrated to a master rating scale to support this consistency. Ratings for borrowers not in default range from "1" for the strongest credits to "7" for the weakest non-defaulted credits. Ratings of "8" or "9" are used for defaulted borrowers. Borrower risk ratings are monitored and are revised when events or circumstances indicate a change is required. Risk ratings are generally validated at least annually.

Loan and lease segment and class balances as of December 31, 2022 are provided in the following table, segregated by borrower ratings into "1 to 3," "4 to 5" and "6 to 9" (watch list and nonaccrual status) categories by year of origination at amortized cost basis. Loans that are held for investment are reported at the principal amount outstanding, net of unearned income.

TABLE 69: CREDIT QUALITY INDICATOR AT AMORTIZED COST BASIS BY ORIGINATION YEAR

DECEMBER 31, 2022	TERM LOANS AND LEASES						REVOLVING LOANS	REVOLVING LOANS CONVERTED TO TERM LOANS	
(In Millions)	**2022**	2021	2020	2019	2018	PRIOR			**TOTAL**
Commercial									
Commercial and Institutional									
Risk Rating:									
1 to 3 Category	**$ 753.3**	**$ 1,087.5**	**$ 209.8**	**$ 159.3**	**$ 45.9**	**$ 511.3**	**$ 6,032.8**	**$ 17.7**	**$ 8,817.6**
4 to 5 Category	**744.1**	**740.6**	**300.8**	**191.1**	**151.4**	**174.7**	**1,102.3**	**32.9**	**3,437.9**
6 to 9 Category	**50.8**	**30.5**	**—**	**13.7**	**—**	**—**	**64.5**	**—**	**159.5**
Total Commercial and Institutional	**1,548.2**	**1,858.6**	**510.6**	**364.1**	**197.3**	**686.0**	**7,199.6**	**50.6**	**12,415.0**
Commercial Real Estate									
Risk Rating:									
1 to 3 Category	**318.7**	**227.4**	**123.6**	**123.5**	**39.8**	**39.1**	**113.4**	**3.0**	**988.5**
4 to 5 Category	**968.5**	**1,040.0**	**637.8**	**447.3**	**153.0**	**256.9**	**181.5**	**17.5**	**3,702.5**
6 to 9 Category	**7.7**	**22.7**	**—**	**49.1**	**—**	**—**	**2.5**	**—**	**82.0**
Total Commercial Real Estate	**1,294.9**	**1,290.1**	**761.4**	**619.9**	**192.8**	**296.0**	**297.4**	**20.5**	**4,773.0**
Non-U.S.									
Risk Rating:									
1 to 3 Category	**991.9**	**46.2**	**109.6**	**14.8**	**—**	**6.5**	**1,158.3**	**—**	**2,327.3**
4 to 5 Category	**459.0**	**—**	**—**	**—**	**—**	**214.9**	**89.5**	**1.8**	**765.2**
6 to 9 Category	**0.1**	**—**	**—**	**23.1**	**—**	**—**	**15.4**	**—**	**38.6**
Total Non-U.S.	**1,451.0**	**46.2**	**109.6**	**37.9**	**—**	**221.4**	**1,263.2**	**1.8**	**3,131.1**
Other									
Risk Rating:									
1 to 3 Category	**993.9**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**993.9**
4 to 5 Category	**322.6**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**322.6**
Total Other	**1,316.5**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**1,316.5**
Total Commercial	**5,610.6**	**3,194.9**	**1,381.6**	**1,021.9**	**390.1**	**1,203.4**	**8,760.2**	**72.9**	**21,635.6**
Personal									
Private Client									
Risk Rating:									
1 to 3 Category	**395.5**	**159.9**	**50.5**	**313.6**	**13.4**	**18.5**	**5,352.5**	**28.2**	**6,332.1**
4 to 5 Category	**430.3**	**755.1**	**192.4**	**191.3**	**38.7**	**160.0**	**5,728.6**	**267.2**	**7,763.6**
6 to 9 Category	**0.9**	**—**	**0.1**	**—**	**18.6**	**—**	**3.7**	**—**	**23.3**
Total Private Client	**826.7**	**915.0**	**243.0**	**504.9**	**70.7**	**178.5**	**11,084.8**	**295.4**	**14,119.0**
Residential Real Estate									
Risk Rating:									
1 to 3 Category	**871.6**	**666.7**	**567.7**	**168.1**	**102.9**	**750.8**	**128.4**	**7.9**	**3,264.1**
4 to 5 Category	**354.3**	**656.7**	**597.6**	**290.0**	**170.9**	**838.2**	**180.4**	**1.0**	**3,089.1**
6 to 9 Category	**—**	**6.8**	**1.5**	**1.1**	**3.7**	**35.9**	**11.3**	**—**	**60.3**
Total Residential Real Estate	**1,225.9**	**1,330.2**	**1,166.8**	**459.2**	**277.5**	**1,624.9**	**320.1**	**8.9**	**6,413.5**
Non-U.S.									
Risk Rating:									
1 to 3 Category	**3.0**	**3.7**	**—**	**—**	**4.6**	**2.3**	**124.6**	**—**	**138.2**
4 to 5 Category	**24.2**	**40.3**	**—**	**21.3**	**3.2**	**2.9**	**272.0**	**7.8**	**371.7**
6 to 9 Category	**—**	**—**	**—**	**—**	**—**	**0.1**	**—**	**—**	**0.1**
Total Non-U.S.	**27.2**	**44.0**	**—**	**21.3**	**7.8**	**5.3**	**396.6**	**7.8**	**510.0**
Other									
Risk Rating:									
1 to 3 Category	**190.8**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**190.8**
4 to 5 Category	**24.4**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**24.4**
Total Other	**215.2**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**215.2**
Total Personal	**2,295.0**	**2,289.2**	**1,409.8**	**985.4**	**356.0**	**1,808.7**	**11,801.5**	**312.1**	**21,257.7**
Total Loans and Leases	**$ 7,905.6**	**$ 5,484.1**	**$ 2,791.4**	**$ 2,007.3**	**$ 746.1**	**$ 3,012.1**	**$ 20,561.7**	**$ 385.0**	**$42,893.3**

December 31, 2021 (In Millions)	TERM LOANS AND LEASES 2021	2020	2019	2018	2017	PRIOR	REVOLVING LOANS	REVOLVING LOANS CONVERTED TO TERM LOANS	TOTAL
Commercial									
Commercial and Institutional									
Risk Rating:									
1 to 3 Category	$ 1,042.0	$ 310.2	$ 468.9	$ 163.9	$ 55.4	$ 541.6	$ 4,946.0	$ 0.1	$ 7,528.1
4 to 5 Category	993.4	441.7	406.7	193.6	243.3	230.2	1,217.8	33.1	3,759.8
6 to 9 Category	44.0	6.0	47.1	30.2	9.9	1.9	62.2	—	201.3
Total Commercial and Institutional	2,079.4	757.9	922.7	387.7	308.6	773.7	6,226.0	33.2	11,489.2
Commercial Real Estate									
Risk Rating:									
1 to 3 Category	472.0	298.7	279.8	65.8	16.6	79.5	67.5	2.9	1,282.8
4 to 5 Category	912.7	644.8	491.5	205.4	89.6	390.6	182.3	20.5	2,937.4
6 to 9 Category	50.1	—	50.6	—	—	2.9	2.5	—	106.1
Total Commercial Real Estate	1,434.8	943.5	821.9	271.2	106.2	473.0	252.3	23.4	4,326.3
Non-U.S.									
Risk Rating:									
1 to 3 Category	816.5	68.9	38.4	—	9.1	—	582.0	—	1,514.9
4 to 5 Category	167.0	—	—	1.9	—	191.9	73.3	1.8	435.9
6 to 9 Category	2.9	—	23.1	—	—	—	13.4	—	39.4
Total Non-U.S.	986.4	68.9	61.5	1.9	9.1	191.9	668.7	1.8	1,990.2
Lease Financing, net									
Risk Rating:									
6 to 9 Category	—	—	—	—	—	11.0	—	—	11.0
Total Lease Financing, net	—	—	—	—	—	11.0	—	—	11.0
Other									
Risk Rating:									
1 to 3 Category	551.5	—	—	—	—	—	—	—	551.5
4 to 5 Category	119.2	—	—	—	—	—	—	—	119.2
Total Other	670.7	—	—	—	—	—	—	—	670.7
Total Commercial	5,171.3	1,770.3	1,806.1	660.8	423.9	1,449.6	7,147.0	58.4	18,487.4
Personal									
Private Client									
Risk Rating:									
1 to 3 Category	432.5	116.6	90.3	14.9	39.3	129.8	7,592.8	44.7	8,460.9
4 to 5 Category	567.8	335.2	396.9	213.3	55.0	39.9	4,979.8	178.3	6,766.2
6 to 9 Category	1.9	2.4	3.0	20.4	—	—	1.5	—	29.2
Total Private Client	1,002.2	454.2	490.2	248.6	94.3	169.7	12,574.1	223.0	15,256.3
Residential Real Estate									
Risk Rating:									
1 to 3 Category	1,018.1	660.3	213.0	110.4	139.8	763.1	161.5	—	3,066.2
4 to 5 Category	434.0	676.6	325.5	190.9	172.1	1,145.9	218.1	2.2	3,165.3
6 to 9 Category	0.3	9.9	6.5	5.3	6.3	55.1	5.0	—	88.4
Total Residential Real Estate	1,452.4	1,346.8	545.0	306.6	318.2	1,964.1	384.6	2.2	6,319.9
Non-U.S.									
Risk Rating:									
1 to 3 Category	27.5	—	1.2	—	—	1.0	44.1	—	73.8
4 to 5 Category	36.1	—	20.6	10.4	—	3.8	229.1	7.8	307.8
6 to 9 Category	—	—	—	—	—	0.2	—	—	0.2
Total Non-U.S.	63.6	—	21.8	10.4	—	5.0	273.2	7.8	381.8
Other									
Risk Rating:									
1 to 3 Category	13.4	—	—	—	—	—	—	—	13.4
4 to 5 Category	21.8	—	—	—	—	—	—	—	21.8
Total Other	35.2	—	—	—	—	—	—	—	35.2
Total Personal	2,553.4	1,801.0	1,057.0	565.6	412.5	2,138.8	13,231.9	233.0	21,993.2
Total Loans and Leases	$ 7,724.7	$ 3,571.3	$ 2,863.1	$ 1,226.4	$ 836.4	$ 3,588.4	$ 20,378.9	$ 291.4	$40,480.6

Loans and leases in the “1 to 3” category are expected to exhibit minimal to modest probabilities of default and are characterized by borrowers having the strongest financial qualities, including above average financial flexibility, cash flows and capital levels. Borrowers assigned these ratings are anticipated to experience very little to moderate financial pressure in adverse down-cycle scenarios. As a result of these characteristics, borrowers within this category exhibit a minimal to modest likelihood of loss.

Loans and leases in the “4 to 5” category are expected to exhibit moderate to acceptable probabilities of default and are characterized by borrowers with less financial flexibility than those in the “1 to 3” category. Cash flows and capital levels are generally sufficient to allow for borrowers to meet current requirements, but have fewer financial resources to manage through economic downturns. As a result of these characteristics, borrowers within this category exhibit a moderate likelihood of loss.

Loans and leases in the watch list category have elevated credit risk profiles that are monitored through internal watch lists, and consist of credits with borrower ratings of “6 to 9.” These credits, which include all nonaccrual credits, are expected to exhibit probabilities of default, elevated risk of default, or are currently in default. Borrowers associated with these risk profiles that are not currently in default have limited financial flexibility. Cash flows and capital levels range from acceptable to potentially insufficient to meet current requirements, particularly in adverse down cycle scenarios. As a result of these characteristics, borrowers in this category exhibit an elevated to probable likelihood of loss.

Past Due Status. Past due status is based on the length of time from the contractual due date a principal or interest payment has been past due. For disclosure purposes, loans and leases that are 29 days past due or less are reported as current.

The following table provides balances and delinquency status of accrual and nonaccrual loans and leases by segment and class, as well as the other real estate owned and nonaccrual asset balances, as of December 31, 2022 and 2021.

TABLE 70: DELINQUENCY STATUS

	ACCRUAL							
(In Millions)	CURRENT	30 – 59 DAYS PAST DUE	60 – 89 DAYS PAST DUE	90 DAYS OR MORE PAST DUE	TOTAL ACCRUAL	NONACCRUAL	TOTAL LOANS AND LEASES	NONACCRUAL WITH NO ALLOWANCE
December 31, 2022								
Commercial								
Commercial and Institutional	$ 12,353.7	$ 40.2	$ 3.0	$ 0.7	$ 12,397.6	$ 17.4	$ 12,415.0	$ 4.4
Commercial Real Estate	4,761.5	1.3	—	—	4,762.8	10.2	4,773.0	6.2
Non-U.S.	3,131.1	—	—	—	3,131.1	—	3,131.1	—
Other	1,316.5	—	—	—	1,316.5	—	1,316.5	—
Total Commercial	21,562.8	41.5	3.0	0.7	21,608.0	27.6	21,635.6	10.6
Personal								
Private Client	13,843.5	192.3	29.9	53.3	14,119.0	—	14,119.0	—
Residential Real Estate	6,373.2	9.6	12.3	0.1	6,395.2	18.3	6,413.5	18.3
Non-U.S.	509.9	—	—	0.1	510.0	—	510.0	—
Other	215.2	—	—	—	215.2	—	215.2	—
Total Personal	20,941.8	201.9	42.2	53.5	21,239.4	18.3	21,257.7	18.3
Total Loans and Leases	$ 42,504.6	$ 243.4	$ 45.2	$ 54.2	$ 42,847.4	$ 45.9	$ 42,893.3	$ 28.9
					Other Real Estate Owned	$ —		
					Total Nonaccrual Assets	$ 45.9		

	ACCRUAL							
(In Millions)	CURRENT	30 – 59 DAYS PAST DUE	60 – 89 DAYS PAST DUE	90 DAYS OR MORE PAST DUE	TOTAL ACCRUAL	NONACCRUAL	TOTAL LOANS AND LEASES	NONACCRUAL WITH NO ALLOWANCE
December 31, 2021								
Commercial								
Commercial and Institutional	$ 11,434.7	$ 32.5	$ 2.1	$ 0.4	$ 11,469.7	$ 19.5	$ 11,489.2	$ 8.8
Commercial Real Estate	4,256.6	3.1	—	—	4,259.7	66.6	4,326.3	52.3
Non-U.S.	1,990.2	—	—	—	1,990.2	—	1,990.2	—
Lease Financing, net	11.0	—	—	—	11.0	—	11.0	—
Other	670.7	—	—	—	670.7	—	670.7	—
Total Commercial	18,363.2	35.6	2.1	0.4	18,401.3	86.1	18,487.4	61.1
Personal								
Private Client	14,927.3	229.5	71.8	27.7	15,256.3	—	15,256.3	—
Residential Real Estate	6,273.2	7.0	3.3	0.2	6,283.7	36.2	6,319.9	36.2
Non-U.S	381.6	0.2	—	—	381.8	—	381.8	—
Other	35.2	—	—	—	35.2	—	35.2	—
Total Personal	21,617.3	236.7	75.1	27.9	21,957.0	36.2	21,993.2	36.2
Total Loans and Leases	$ 39,980.5	$ 272.3	$ 77.2	$ 28.3	$ 40,358.3	$ 122.3	$ 40,480.6	$ 97.3
					Other Real Estate Owned	$ 3.0		
					Total Nonaccrual Assets	$ 125.3		

Interest income that would have been recorded for nonaccrual loans and leases in accordance with their original terms was $4.1 million in 2022, $4.6 million in 2021, and $4.6 million in 2020.

Collateral Dependent Financial Assets. A financial asset is collateral-dependent when the borrower is experiencing financial difficulty and repayment is expected to be provided substantially through the sale or operation of the collateral. Most of Northern Trust’s collateral dependent credit exposure relates to its residential real estate portfolio for which the collateral is usually the underlying real estate property. For collateral-dependent financial assets, it is Northern Trust’s policy to reserve or charge-off the difference between the amortized cost basis of the loan and the value of the collateral. The collateral-dependent financial asset balance as of December 31, 2022 was immaterial to Northern Trust’s financial statements.

Nonaccrual Loans and Troubled Debt Restructurings (TDRs). A loan that has been modified as a concession by Northern Trust or a bankruptcy court resulting from the debtor’s financial difficulties is referred to as a troubled debt restructuring. There were $35.3 million and $76.7 million of nonaccrual TDRs included within nonaccrual loans as of December 31, 2022 and 2021, respectively. There were $39.7 million and $16.5 million of accrual TDRs included within nonaccrual loans as of December 31, 2022 and 2021, respectively. There were $0.2 million of aggregate undrawn loan commitments and standby letters of credit at both December 31, 2022 and 2021, issued to borrowers with TDR modifications of loans.

The following table provides, by segment and class, the number of TDR modifications of loans and leases during the years ended December 31, 2022, and 2021, and the recorded investments and unpaid principal balances as of December 31, 2022 and 2021.

TABLE 71: TROUBLED DEBT RESTRUCTURINGS

($ In Millions)	LOAN MODIFICATION DETAIL	NUMBER OF LOANS AND LEASES	RECORDED INVESTMENT	UNPAID PRINCIPAL BALANCE
December 31, 2022				
Commercial				
Commercial and Institutional	Interest rate concession, extension of term, and other modification	**2**	**$ 0.6**	**$ 0.6**
Commercial Real Estate	Interest rate concession and other modification	**1**	**31.6**	**32.5**
Total Commercial		**3**	**32.2**	**33.1**
Personal				
Residential Real Estate	Interest rate concession, deferrals of principal, extension of term, and other modification	**3**	**0.2**	**0.2**
Private Client	Interest rate concession and extension of term	**1**	**0.4**	**0.4**
Total Personal		**4**	**0.6**	**0.6**
Total Loans and Leases		**7**	**$ 32.8**	**$ 33.7**

Note: Period-end balances reflect all paydowns and charge-offs during the year.

($ In Millions)	LOAN MODIFICATION DETAIL	NUMBER OF LOANS AND LEASES	RECORDED INVESTMENT	UNPAID PRINCIPAL BALANCE
December 31, 2021				
Commercial				
Commercial and Institutional	Deferrals of principal	6	$ 19.6	$ 19.6
Commercial Real Estate	Deferrals of principal, interest rate concessions, other modifications, and extension of term	3	36.0	42.4
Total Commercial		9	55.6	62.0
Personal				
Residential Real Estate	Deferrals of principal, extension of term, and other modifications	10	1.3	1.5
Total Personal		10	1.3	1.5
Total Loans and Leases		19	$ 56.9	$ 63.5

Note: Period-end balances reflect all paydowns and charge-offs during the year.

TDR modifications involve extensions of term, deferrals of principal, interest rate concessions, and other modifications. Other modifications typically reflect other nonstandard terms which Northern Trust would not offer in non-troubled situations.

There were no loan or lease TDR modifications during the previous twelve-month period which subsequently had a payment default during the year ended December 31, 2022.

There were two loan or lease TDR modifications during the previous twelve-month period which subsequently had a payment default during the year ended December 31, 2021. The total recorded investment for these loans was approximately $5.6 million and the unpaid principal balance for these loans was approximately $5.6 million.

Northern Trust may obtain physical possession of real estate via foreclosure on an in-substance repossession. As of December 31, 2022 and 2021, Northern Trust held foreclosed real estate properties with an immaterial carrying value for both years as a result of obtaining physical possession. In addition, as of December 31, 2022 and 2021, Northern Trust had loans with a carrying value of $1.1 million and $2.6 million, respectively, for which formal foreclosure proceedings were in process.

Note 7 – Allowance for Credit Losses

Allowance and Provision for Credit Losses. The allowance for credit losses—which represents management's best estimate of lifetime expected credit losses related to various portfolios subject to credit risk, off-balance sheet credit exposures, and specific borrower relationships—is determined by management through a disciplined credit review process. Northern Trust measures expected credit losses of financial assets with similar risk characteristics on a collective basis. A financial asset is measured individually if it does not share similar risk characteristics with other financial assets and the related allowance is determined through an individual evaluation.

Management's estimates utilized in establishing an appropriate level of allowance for credit losses are not dependent on any single assumption. In determining an appropriate allowance level, management evaluates numerous variables, many of which are interrelated or dependent on other assumptions and estimates, and takes into consideration past events, current conditions and reasonable and supportable forecasts. Northern Trust employs multiple scenarios over a reasonable and supportable period (currently two years) to project future conditions. For periods beyond the reasonable and supportable period, Northern Trust reverts to its own historical loss experiences on a straight-line basis over four quarters. While uncertainty and volatility have increased recently due to geopolitical events and higher levels of inflation and interest rates, the primary forecast provides for continued economic growth, recognizing the current strength of the labor market, consumer spending, and business investment. An alternative scenario is also considered, which reflects a recession that incorporates the experiences of a wider set of historical economic cycles.

The results of the credit reserve estimation methodology are reviewed quarterly by Northern Trust's Credit Loss Reserve Committee, which receives input from Credit Risk Management, Treasury, Corporate Finance, the Economic Research Department, and each of Northern Trust's reporting segments. The Credit Loss Reserve Committee determines the probability weights applied to each forecast approved by Northern Trust's Macroeconomic Scenario Development Committee, and also reviews and approves qualitative adjustments to the collective allowance in line with Northern Trust's qualitative adjustment framework.

The following table provides information regarding changes in the total allowance for credit losses.

TABLE 72: CHANGES IN THE ALLOWANCE FOR CREDIT LOSSES

	2022				
(In Millions)	**LOANS AND LEASES**	**UNDRAWN LOAN COMMITMENTS AND STANDBY LETTERS OF CREDIT**	**HELD TO MATURITY DEBT SECURITIES**	**OTHER FINANCIAL ASSETS**	**TOTAL**
Balance at Beginning of Period	**$ 138.4**	**$ 34.1**	**$ 11.2**	**$ 1.0**	**$ 184.7**
Charge-Offs	**(6.0)**	**—**	**—**	**—**	**(6.0)**
Recoveries	**10.2**	**—**	**—**	**—**	**10.2**
Net Recoveries (Charge-Offs)	**4.2**	**—**	**—**	**—**	**4.2**
Provision for Credit Losses[1]	**1.7**	**4.4**	**4.8**	**(0.2)**	**10.7**
Balance at End of Period	**$ 144.3**	**$ 38.5**	**$ 16.0**	**$ 0.8**	**$ 199.6**

[1] *The table excludes a provision for credit losses of $1.3 million for the year ended December 31, 2022 for AFS debt securities. See further detail in Note 4, "Securities."*

	2021				
(In Millions)	LOANS AND LEASES	UNDRAWN LOAN COMMITMENTS AND STANDBY LETTERS OF CREDIT	HELD TO MATURITY DEBT SECURITIES	OTHER FINANCIAL ASSETS	TOTAL
Balance at Beginning of Period	$ 190.7	$ 61.1	$ 7.3	$ 0.8	$ 259.9
Charge-Offs	(0.7)	—	—	—	(0.7)
Recoveries	7.0	—	—	—	7.0
Net Recoveries (Charge-Offs)	6.3	—	—	—	6.3
Provision for Credit Losses	(58.6)	(27.0)	3.9	0.2	(81.5)
Balance at End of Period	$ 138.4	$ 34.1	$ 11.2	$ 1.0	$ 184.7

	2020				
(In Millions)	LOANS AND LEASES	UNDRAWN LOAN COMMITMENTS AND STANDBY LETTERS OF CREDIT	HELD TO MATURITY DEBT SECURITIES	OTHER FINANCIAL ASSETS	TOTAL
Balance at End of Prior Period	$ 104.5	$ 19.9	$ —	$ —	$ 124.4
Cumulative Effect Adjustment	(2.2)	8.9	6.6	0.4	13.7
Balance at Beginning of Period	102.3	28.8	6.6	0.4	138.1
Charge-Offs	(9.7)	—	—	—	(9.7)
Recoveries	6.5	—	—	—	6.5
Net Recoveries (Charge-Offs)	(3.2)	—	—	—	(3.2)
Provision for Credit Losses	91.6	32.3	0.7	0.4	125.0
Balance at End of Period	$ 190.7	$ 61.1	$ 7.3	$ 0.8	$ 259.9

The Provision for Credit Losses, excluding the provision for available for sale debt securities of $1.3 million, was a provision of $10.7 million for the year ended December 31, 2022, as compared to a $81.5 million release of credit reserves in the year ended December 31, 2021. The provision for loans and undrawn commitments and standby letters of credit was primarily due to an increase in the reserve evaluated on a collective basis, driven by a weaker macroeconomic outlook and growth in the commercial and institutional and commercial real estate portfolios, partially offset by improvements in credit quality, mainly within the commercial and institutional portfolio during the year ended December 31, 2022. There were net recoveries of $4.2 million during the year ended December 31, 2022, as compared to net recoveries of $6.3 million for the year ended December 31, 2021. For further detail, please see the Allowance for the Loan and Lease Portfolio and the Allowance for Held to Maturity Debt Securities Portfolio sections below.

For credit exposure and the associated allowance related to fee receivables, please refer to Note 17, “Revenue from Contracts with Clients.” For information related to the allowance for AFS debt securities, please refer to Note 4, “Securities.” For the allowance pertaining to all other financial assets recognized at amortized cost, which include Due from Banks, Other Central Bank Deposits, Interest Bearing Deposits with Banks, and Other Assets, please refer to the Allowance for Other Financial Assets section within this footnote.

Allowance for the Loan and Lease Portfolio. The following table provides information regarding changes in the total allowance for credit losses related to loans and leases, including undrawn loan commitments and standby letters of credit, by segment.

TABLE 73: CHANGES IN THE ALLOWANCE FOR CREDIT LOSSES RELATED TO LOANS AND LEASES

	2022					
	LOANS AND LEASES			UNDRAWN LOAN COMMITMENTS AND STANDBY LETTERS OF CREDIT		
(In Millions)	COMMERCIAL	PERSONAL	TOTAL	COMMERCIAL	PERSONAL	TOTAL
Balance at Beginning of Period	**$ 105.6**	**$ 32.8**	**$ 138.4**	**$ 31.4**	**$ 2.7**	**$ 34.1**
Charge-Offs	**(5.3)**	**(0.7)**	**(6.0)**	**—**	**—**	**—**
Recoveries	**2.7**	**7.5**	**10.2**	**—**	**—**	**—**
Net Recoveries (Charge-Offs)	**(2.6)**	**6.8**	**4.2**	**—**	**—**	**—**
Provision for Credit Losses	**13.2**	**(11.5)**	**1.7**	**4.9**	**(0.5)**	**4.4**
Balance at End of Period	**$ 116.2**	**$ 28.1**	**$ 144.3**	**$ 36.3**	**$ 2.2**	**$ 38.5**

	2021					
	LOANS AND LEASES			UNDRAWN LOAN COMMITMENTS AND STANDBY LETTERS OF CREDIT		
(In Millions)	COMMERCIAL	PERSONAL	TOTAL	COMMERCIAL	PERSONAL	TOTAL
Balance at Beginning of Period	$ 142.2	$ 48.5	$ 190.7	$ 57.6	$ 3.5	$ 61.1
Charge-Offs	(0.3)	(0.4)	(0.7)	—	—	—
Recoveries	0.9	6.1	7.0	—	—	—
Net Recoveries (Charge-Offs)	0.6	5.7	6.3	—	—	—
Provision for Credit Losses	(37.2)	(21.4)	(58.6)	(26.2)	(0.8)	(27.0)
Balance at End of Period	$ 105.6	$ 32.8	$ 138.4	$ 31.4	$ 2.7	$ 34.1

	2020					
	LOANS AND LEASES			UNDRAWN LOAN COMMITMENTS AND STANDBY LETTERS OF CREDIT		
(In Millions)	COMMERCIAL	PERSONAL	TOTAL	COMMERCIAL	PERSONAL	TOTAL
Balance at End of Prior Period	$ 58.1	$ 46.4	$ 104.5	$ 15.8	$ 4.1	$ 19.9
Cumulative Effect Adjustment	(5.9)	3.7	(2.2)	11.9	(3.0)	8.9
Balance at Beginning of Period	$ 52.2	$ 50.1	$ 102.3	$ 27.7	$ 1.1	$ 28.8
Charge-Offs	(6.3)	(3.4)	(9.7)	—	—	—
Recoveries	2.4	4.1	6.5	—	—	—
Net Recoveries (Charge-Offs)	(3.9)	0.7	(3.2)	—	—	—
Provision for Credit Losses	93.9	(2.3)	91.6	29.9	2.4	32.3
Balance at End of Period	$ 142.2	$ 48.5	$ 190.7	$ 57.6	$ 3.5	$ 61.1

The following table provides information regarding the recorded investments in loans and leases and the allowance for credit losses for loans and leases and undrawn loan commitments and standby letters of credit by segment as of December 31, 2022 and 2021.

TABLE 74: RECORDED INVESTMENTS IN LOANS AND LEASES

	DECEMBER 31, 2022			DECEMBER 31, 2021		
(In Millions)	COMMERCIAL	PERSONAL	TOTAL	COMMERCIAL	PERSONAL	TOTAL
Loans and Leases						
Evaluated on an Individual Basis	**$ 63.0**	**$ 46.1**	**$ 109.1**	$ 92.1	$ 74.5	$ 166.6
Evaluated on a Collective Basis	**21,572.6**	**21,211.6**	**42,784.2**	18,395.3	21,918.7	40,314.0
Total Loans and Leases	**21,635.6**	**21,257.7**	**42,893.3**	18,487.4	21,993.2	40,480.6
Allowance for Credit Losses on Loans and Leases						
Evaluated on an Individual Basis	**10.4**	**—**	**10.4**	10.1	—	10.1
Evaluated on a Collective Basis	**105.8**	**28.1**	**133.9**	95.5	32.8	128.3
Allowance Assigned to Loans and Leases	**116.2**	**28.1**	**144.3**	105.6	32.8	138.4
Allowance for Undrawn Loan Commitments and Standby Letters of Credit						
Evaluated on an Individual Basis	**—**	**—**	**—**	—	—	—
Evaluated on a Collective Basis	**36.3**	**2.2**	**38.5**	31.4	2.7	34.1
Allowance Assigned to Undrawn Loan Commitments and Standby Letters of Credit	**36.3**	**2.2**	**38.5**	31.4	2.7	34.1
Total Allowance Assigned to Loans and Leases and Undrawn Loan Commitments and Standby Letters of Credit	**$ 152.5**	**$ 30.3**	**$ 182.8**	$ 137.0	$ 35.5	$ 172.5

Allowance for Held to Maturity Debt Securities Portfolio. The following table provides information regarding changes in the total allowance for credit losses for HTM debt securities during 2022 and 2021.

TABLE 75: CHANGES IN THE ALLOWANCE FOR CREDIT LOSSES RELATED TO HELD TO MATURITY DEBT SECURITIES

	2022						
(In Millions)	CORPORATE DEBT	NON-U.S. GOVERNMENT	SUB-SOVEREIGN, SUPRANATIONAL, AND NON-U.S. AGENCY BONDS	OBLIGATIONS OF STATES AND POLITICAL SUBDIVISIONS [(1)]	COVERED BONDS	OTHER	TOTAL
Balance at Beginning of Period	**$ 1.4**	**$ 1.9**	**$ 3.0**	**$ —**	**$ 0.1**	**$ 4.8**	**$ 11.2**
Provision for Credit Losses	**0.5**	**1.7**	**1.0**	**1.5**	**—**	**0.1**	**4.8**
Balance at End of Period	**$ 1.9**	**$ 3.6**	**$ 4.0**	**$ 1.5**	**$ 0.1**	**$ 4.9**	**$ 16.0**

[(1)] The allowance for Obligations of States and Political Subdivisions is related to (non pre-refunded) municipal securities that do not fall under Northern Trust's zero-loss assumption.

	2021						
(In Millions)	CORPORATE DEBT	NON-U.S. GOVERNMENT	SUB-SOVEREIGN, SUPRANATIONA L, AND NON-U.S. AGENCY BONDS	OBLIGATIONS OF STATES AND POLITICAL SUBDIVISIONS	COVERED BONDS	OTHER	TOTAL
Balance at Beginning of Period	$ 0.8	$ 0.2	$ 1.2	$ —	$ 0.1	$ 5.0	$ 7.3
Provision for Credit Losses	0.6	1.7	1.8	—	—	(0.2)	3.9
Balance at End of Period	$ 1.4	$ 1.9	$ 3.0	$ —	$ 0.1	$ 4.8	$ 11.2

Allowance for Other Financial Assets. The allowance for Other Financial Assets consists of the allowance for Due from Banks, Other Central Bank Deposits, Interest Bearing Deposits with Banks, and Other Assets. Northern Trust's portfolio is composed mostly of institutions within the "1 to 3" internal borrower rating category and is expected to exhibit minimal to modest likelihood of loss. The Allowance for Credit Losses related to Other Financial Assets was $0.8 million and $1.0 million as of December 31, 2022 and 2021, respectively.

Accrued Interest. Accrued interest balances are reported within Other Assets on the consolidated balance sheets. Northern Trust elected not to measure an allowance for credit losses for accrued interest receivables related to its loan and securities portfolios as its policy is to write-off uncollectible accrued interest receivable balances in a timely manner. Accrued interest is written off by reversing interest income during the period the financial asset is moved from an accrual to a nonaccrual status.

The following table provides the amount of accrued interest excluded from the amortized cost basis of the following portfolios.

TABLE 76: ACCRUED INTEREST

(In Millions)	**DECEMBER 31, 2022**	DECEMBER 31, 2021
Loans and Leases	**$ 203.1**	$ 62.6
Debt Securities		
Held to Maturity	**63.2**	30.4
Available for Sale	**147.1**	129.7
Other Financial Assets	**43.8**	2.3
Total	**$ 457.2**	$ 225.0

Accrued interest in 2022 increased compared to 2021, primarily due to higher interest rates. The amount of accrued interest reversed through interest income for loans and leases was immaterial and there was no accrued interest reversed through interest income related to any other financial assets during the years ended 2022 and 2021.

Note 8 – Concentrations of Credit Risk

Concentrations of credit risk exist if a number of borrowers or other counterparties are engaged in similar activities and have similar economic characteristics that would cause their ability to meet contractual obligations to be similarly affected by changes in economic or other conditions. The fact that a credit exposure falls into one of these groups does not necessarily indicate that the credit has a higher than normal degree of credit risk. These groups are: banks and bank holding companies, residential real estate, and commercial real estate.

Banks and Bank Holding Companies. At December 31, 2022, on-balance sheet credit risk to banks and bank holding companies, both U.S. and non-U.S., consisted primarily of Interest-Bearing Deposits with Banks of $1.9 billion, demand balances maintained at correspondent banks of $4.6 billion, and Securities Purchased under Agreements to Resell of $1.1 billion. At December 31, 2021, on-balance sheet credit risk to banks and bank holding companies, both U.S. and non-U.S., consisted primarily of Interest-Bearing Deposits with Banks of $1.9 billion, demand balances maintained at correspondent banks of $3.0 billion, and Securities Purchased under Agreements to Resell of $686.4 million. Credit risk associated with U.S. and non-U.S. banks and bank holding companies deemed to be counterparties by Credit Risk Management is managed by the Capital Markets Credit Committee. Credit limits are established through a review process that includes an internally-prepared financial analysis, use of an internal risk rating system and consideration of external ratings from rating agencies. Northern Trust places deposits with banks that have strong internal and external credit ratings and the average life to maturity of deposits with banks is maintained on a short-term basis in order to respond quickly to changing credit conditions.

Residential Real Estate. Residential real estate loans totaled $6.4 billion at December 31, 2022 and $6.3 billion at December 31, 2021, representing 16% and 17%, respectively, of total U.S. loans and leases. Residential real estate loans consist of traditional first lien mortgages and equity credit lines, which generally require a loan-to-collateral value ratio of no more than 65% to 80% at inception. Revaluations of supporting collateral are obtained upon refinancing or default or when otherwise considered warranted. Collateral revaluations for mortgages are performed by independent third parties. Legally binding undrawn commitments to extend residential real estate credit, which are primarily equity credit lines, totaled $783.4 million and $665.9 million at December 31, 2022 and 2021, respectively. The table below provides additional detail regarding residential real estate loans by geographic region.

TABLE 77: RESIDENTIAL REAL ESTATE LOANS BY GEOGRAPHIC REGION

	DECEMBER 31,	
(In Millions)	**2022**	2021
Residential Real Estate by geographic region:		
Florida	**$ 1,603.2**	$ 1,554.8
California	**1,508.1**	1,449.0
Illinois	**686.9**	738.8
New York	**498.7**	449.4
Colorado	**364.2**	309.0
Texas	**312.4**	320.3
All other[1]	**1,440.0**	1,498.6
Total Residential Real Estate	**$ 6,413.5**	$ 6,319.9

[1] *The remainder is distributed throughout the other geographic regions within the U.S. served by Northern Trust.*

Commercial Real Estate. In managing its credit exposure, management has defined a commercial real estate loan as one where: (1) the borrower's principal business activity is the acquisition or the development of real estate for commercial purposes; (2) the principal collateral is real estate held for commercial purposes, and loan repayment is expected to flow from the operation of the property; or (3) the loan repayment is expected to flow from the sale or refinance of real estate as a normal and ongoing part of the business. Unsecured lines of credit to firms or individuals engaged in commercial real estate endeavors are included without regard to the use of loan proceeds. The commercial real estate portfolio consists of commercial mortgages and construction, acquisition and development loans extended primarily to experienced investors well known to Northern Trust. Underwriting standards generally reflect conservative loan-to-value ratios and debt service coverage requirements. Recourse to borrowers through guarantees is also commonly required. Commercial mortgage financing is provided for the acquisition or refinancing of income-producing properties. Cash flows from the properties generally are sufficient to amortize the loan. These loans are primarily located in the California, Illinois, Florida, Texas, and New York markets. Construction, acquisition and development loans provide financing for commercial real estate prior to rental income stabilization. The intent is generally that the borrower will sell the project or refinance the loan through a commercial mortgage with Northern Trust or another financial institution upon completion. At December 31, 2022, legally binding commitments to extend credit and standby letters of credit to commercial real estate borrowers totaled $449.3 million and $69.7 million, respectively. At December 31, 2021, legally binding commitments to extend credit and standby letters of credit to commercial real estate borrowers totaled $357.9 million and $30.0 million, respectively.

The table below provides additional detail regarding commercial real estate loan types.

TABLE 78: COMMERCIAL REAL ESTATE LOANS

(In Millions)	DECEMBER 31, 2022	2021
Commercial Mortgages		
Office	**$ 1,054.0**	$ 1,011.4
Apartment/ Multi-family	**1,392.7**	1,288.8
Retail	**572.2**	601.8
Industrial/ Warehouse	**596.2**	442.9
Other	**548.0**	516.8
Total Commercial Mortgages	**4,163.1**	3,861.7
Construction, Acquisition and Development Loans	**609.9**	464.6
Total Commercial Real Estate Loans	**$ 4,773.0**	$ 4,326.3

Note 9 – Buildings and Equipment

A summary of Buildings and Equipment is presented in the following table.

TABLE 79: BUILDINGS AND EQUIPMENT

	DECEMBER 31, 2022		
(In Millions)	**ORIGINAL COST**	**ACCUMULATED DEPRECIATION**	**NET BOOK VALUE**
Land and Improvements	**$ 11.5**	**$ 0.3**	**$ 11.2**
Buildings	**224.7**	**137.7**	**87.0**
Equipment	**499.7**	**281.9**	**217.8**
Leasehold Improvements	**514.1**	**329.6**	**184.5**
Total Buildings and Equipment	**$ 1,250.0**	**$ 749.5**	**$ 500.5**

	DECEMBER 31, 2021		
(In Millions)	ORIGINAL COST	ACCUMULATED DEPRECIATION	NET BOOK VALUE
Land and Improvements	$ 11.5	$ 0.3	$ 11.2
Buildings	217.6	136.5	81.1
Equipment	478.4	275.4	203.0
Leasehold Improvements	513.6	320.2	193.4
Total Buildings and Equipment	$ 1,221.1	$ 732.4	$ 488.7

The charge for depreciation amounted to $110.1 million in 2022, $110.8 million in 2021, and $116.5 million in 2020 on the consolidated statements of income.

Note 10 – Lease Commitments

At December 31, 2022, Northern Trust was obligated under a number of non-cancelable operating leases, primarily for real estate. Certain leases contain rent escalation clauses based on market indices, renewal option clauses calling for increased rentals, and rental payments based on usage. There are no restrictions imposed by any lease agreement regarding the payment of dividends, debt financing or Northern Trust entering into further lease agreements.

The components of lease costs for the years ended December 31, 2022 and 2021 were as follows.

TABLE 80: LEASE COST COMPONENTS

	FOR THE YEAR ENDED DECEMBER 31,	
(In Millions)	**2022**	2021
Operating Lease Cost	**$ 104.5**	$ 96.2
Variable Lease Cost [1]	**82.2**	76.9
Sublease Income	**(2.9)**	(4.5)
Total Lease Cost	**$ 183.8**	$ 168.6

[1] *Variable Lease Cost includes rental payments based on usage, common-area maintenance costs and property taxes.*

The following table presents a maturity analysis of lease liabilities as of December 31, 2022.

TABLE 81: MATURITY OF LEASE LIABILITIES

(In Millions)	MATURITY OF LEASE LIABILITIES
2023	**$ 88.3**
2024	**86.3**
2025	**88.5**
2026	**71.9**
2027	**71.4**
Later Years	**319.2**
Total Lease Payments	**725.6**
Less: Imputed Interest	**(99.4)**
Present Value of Lease Liabilities	**$ 626.2**

As of December 31, 2022, Northern Trust had commitments for operating leases in addition to the above that have not yet commenced for approximately $122.7 million. These operating leases are for the use of office space with lease terms of between 7 and 20 years and are expected to commence in the first and third quarter of 2023.

Northern Trust uses its incremental borrowing rate to determine the present value of lease payments for operating leases. Operating lease right-of-use (ROU) assets and lease liabilities may include options to extend or terminate the lease only when it is reasonably certain that Northern Trust will exercise that option. Northern Trust elects not to separate lease and non-lease components of a contract for its real estate leases. The location and amount of ROU assets and lease liabilities recorded on the consolidated balance sheets as of December 31, 2022 and 2021 are presented in the following table.

TABLE 82: LOCATION AND AMOUNT OF LEASE ASSETS AND LIABILITIES

(In Millions)	LOCATION OF LEASE ASSETS AND LEASE LIABILITIES ON THE BALANCE SHEET	DECEMBER 31, 2022	DECEMBER 31, 2021
Assets			
Operating Lease Right-of-Use Asset	Other Assets	**$ 484.8**	$ 531.2
Liabilities			
Operating Lease Liability	Other Liabilities	**$ 626.2**	$ 663.1

The weighted-average remaining lease term and weighted-average discount rate applied to leases as of December 31, 2022 and 2021 were as follows:

TABLE 83: WEIGHTED-AVERAGE REMAINING LEASE TERM AND DISCOUNT RATE

	DECEMBER 31, 2022	DECEMBER 31, 2021
Operating Leases		
Weighted-Average Remaining Lease Term	**9.3 years**	**9.6 years**
Weighted-Average Discount Rate	**3.0 %**	**2.4 %**

The following table provides supplemental cash flow information related to leases for the years ended December 31, 2022 and 2021.

TABLE 84: SUPPLEMENTAL CASH FLOW INFORMATION

(In Millions)	FOR THE YEAR ENDED DECEMBER 31, 2022	2021
Supplemental cash flow information		
Cash paid for amounts included in the measurement of lease liabilities - operating cash flows	**$ 70.3**	**$ 69.5**
Supplemental non-cash information		
Right-of-use assets obtained in exchange for new operating lease liabilities	**$ 61.0**	**$ 58.5**

Note 11 – Goodwill and Other Intangibles

Goodwill. Changes by reporting segment in the carrying amount of Goodwill for the years ended December 31, 2022 and 2021, including the effect of foreign exchange rates on non-U.S.-dollar denominated balances, were as follows.

TABLE 85: GOODWILL

(In Millions)	ASSET SERVICING	WEALTH MANAGEMENT	TOTAL
Balance at December 31, 2020	$ 626.7	$ 80.5	$ 707.2
Goodwill Acquired	4.2	—	4.2
Foreign Exchange Rates	(5.2)	—	(5.2)
Balance at December 31, 2021	$ 625.7	$ 80.5	$ 706.2
Foreign Exchange Rates	**(14.7)**	**(0.2)**	**(14.9)**
Balance at December 31, 2022	**$ 611.0**	**$ 80.3**	**$ 691.3**

The goodwill impairment test is performed at least annually at the reporting-unit level. The Corporation has determined its reporting units for this purpose to be Asset Servicing and Wealth Management. Goodwill was tested for impairment during the fourth quarter of 2022 using a quantitative assessment in which the estimated fair values of the reporting units are compared to their carrying values. Impairment is deemed to exist if the carrying value of a reporting unit exceeds its estimated fair value. Based upon the quantitative assessments, there were no impairments to goodwill in 2022.

Other Intangible Assets Subject to Amortization. The gross carrying amount and accumulated amortization of other intangible assets subject to amortization as of December 31, 2022 and 2021 were as follows.

TABLE 86: OTHER INTANGIBLE ASSETS

(In Millions)	DECEMBER 31, 2022	2021
Gross Carrying Amount	**$ 197.9**	$ 206.4
Less: Accumulated Amortization	**120.3**	114.8
Net Book Value	**$ 77.6**	$ 91.6

Other intangible assets consist primarily of the value of acquired client relationships and are included in Other Assets on the consolidated balance sheets. Amortization expense related to other intangible assets was $9.3 million, $14.8 million, and $16.9 million for the years ended December 31, 2022, 2021, and 2020, respectively. Amortization for the years 2023, 2024, 2025, 2026, and 2027 is estimated to be $9.2 million, $9.1 million, $8.5 million, $8.1 million, and $7.9 million respectively.

Capitalized Software. The gross carrying amount and accumulated amortization of capitalized software as of December 31, 2022 and 2021 were as follows.

TABLE 87: CAPITALIZED SOFTWARE

(In Millions)	DECEMBER 31, 2022	2021
Gross Carrying Amount	**$ 3,479.3**	$ 2,982.1
Less: Accumulated Amortization	**1,517.4**	1,299.5
Net Book Value	**$ 1,961.9**	$ 1,682.6

Capitalized software, which is included in Other Assets on the consolidated balance sheets, consists primarily of purchased software, software licenses, and allowable internal costs, including compensation relating to software developed for internal use. Fees paid for the use of software licenses that are not hosted by Northern Trust are expensed as incurred. Amortization expense, which is included in Equipment and Software on the consolidated statements of income, totaled $434.2 million in 2022, $390.1 million in 2021, and $366.9 million in 2020.

Note 12 – Deposits

The following table provides the scheduled maturity of total time deposits in denominations of $250,000 or greater at December 31, 2022.

TABLE 88: REMAINING MATURITY OF TIME DEPOSITS $250,000 OR MORE

(In Millions)	DECEMBER 31, 2022 U.S. OFFICE CERTIFICATES OF DEPOSIT	NON-U.S. OFFICES OTHER TIME	TOTAL
1 Year or Less	**$ 1,600.6**	**$ 2,024.2**	**$ 3,624.8**
Over 1 Year to 2 Years	**91.4**	**—**	**91.4**
Over 2 Years to 3 Years	**2.3**	**—**	**2.3**
Over 3 Years to 4 Years	**1.3**	**—**	**1.3**
Over 4 Years to 5 Years	**2.0**	**—**	**2.0**
Over 5 Years	**—**	**—**	**—**
Total	**$ 1,697.6**	**$ 2,024.2**	**$ 3,721.8**

As of December 31, 2021, there were $1,025.2 million of time deposits in denominations of $250,000 or greater, of which $641.7 million were Certificates of Deposit and $383.5 million were non-U.S.

Note 13 – Senior Notes and Long-Term Debt

Senior Notes. On May 10, 2022, the Corporation issued $1.0 billion of 4.00% senior notes, due May 10, 2027. The senior notes bear interest at an annual rate of 4.00%, payable semi-annually in arrears. The senior notes are unsecured and rank equally with all of the Corporation's existing and future senior debt. On or after April 10, 2027, the senior notes may be redeemed, in whole or in part, at a redemption price equal to 100% of the principal amount of the senior notes to be redeemed plus accrued and unpaid interest to, but excluding, the redemption date.

A summary of Senior Notes outstanding at December 31, 2022 and 2021 is presented in the following table.

TABLE 89: SENIOR NOTES

($ In Millions)	RATE	DECEMBER 31, 2022	2021
Corporation-Senior Notes			
Fixed Rate Due Aug. 2022[(1)]	2.375 %	$ —	$ 499.8
Fixed Rate Due May 2027[(2)]	4.00	**995.0**	—
Fixed Rate Due Aug. 2028[(3)(4)]	3.65	**476.6**	548.5
Fixed Rate Due May 2029[(3)(4)]	3.15	**460.3**	533.9
Fixed Rate Due May 2030[(3)(4)]	1.95	**792.3**	923.3
Total Senior Notes		**$ 2,724.2**	$ 2,505.5

(1) Not redeemable prior to maturity.
(2) Redeemable within one month of maturity.
(3) Redeemable within three months of maturity.
(4) Interest rate swap contracts were entered into to modify the interest expense from fixed rates to floating rates. The swaps are recorded as fair value hedges and (decreases) increases in the carrying values of senior notes outstanding of $(264.7) million and $12.5 million were recorded as of December 31, 2022 and 2021, respectively. See further detail in Note 26, "Derivative Financial Instruments."

Long-Term Debt. On November 2, 2022, the Corporation issued $1.0 billion of 6.125% subordinated notes, due November 2, 2032. The subordinated notes bear interest at an annual rate of 6.125%, payable semi-annually in arrears. The subordinated notes are unsecured and rank junior to all of the Corporation's existing and future senior debt. On or after August 2, 2032, the subordinated notes may be redeemed, in whole or in part, at a redemption price equal to 100% of the principal amount of the subordinated notes to be redeemed plus accrued and unpaid interest to, but excluding, the redemption date.

A summary of Long-Term Debt outstanding at December 31, 2022 and 2021 is presented in the following table.

TABLE 90: LONG-TERM DEBT

($ In Millions)	RATE	DECEMBER 31, 2022	2021
Corporation-Subordinated Debt			
Fixed Rate Notes due October 2025[(1)(2)]	3.95 %	$ **720.1**	$ 796.2
Fixed-to-Floating Rate Notes due May 2032[(3)]	3.375	**349.7**	349.5
Fixed Rate Notes due November 2032[(4)]	6.125	**996.4**	—
Total Long-Term Debt		**$ 2,066.2**	$ 1,145.7
Long-Term Debt Qualifying as Risk-Based Capital		**$ 1,648.5**	$ 799.8

(1) Not redeemable prior to maturity.
(2) Interest rate swap contracts were entered into to modify the interest expense from fixed rates to floating rates. The swaps are recorded as fair value hedges and (decreases) increases in the carrying values of the subordinated notes outstanding of $(29.3) million and $46.9 million were recorded as of December 31, 2022 and 2021, respectively. See further detail in Note 26, "Derivative Financial Instruments."
(3) The subordinated notes will bear interest from the date they were issued to, but excluding, May 8, 2027, at an annual rate of 3.375%, payable semi-annually in arrears. Effective February 27, 2023, the Board of Governors of the Federal Reserve adopted a final rule to implement the Adjustable Interest Rate (LIBOR) Act (the "LIBOR Act"). The final rule establishes benchmark replacements for contracts governed by U.S. law that reference certain tenors of U.S. dollar LIBOR after June 30, 2023. Pursuant to the final rule, three-month LIBOR will be replaced by the three-month CME Term SOFR Reference Rate, as administered by CME Group Benchmark Administration, Ltd. ("three-month CME Term SOFR") plus the statutory spread adjustment of 0.26161% as set forth in the final rule. As a result, from, and including, May 8, 2027, the subordinated notes will bear interest at an annual rate equal to three-month CME Term SOFR plus 0.26161% plus 1.131%, payable quarterly in arrears. The subordinated notes are unsecured and may be redeemed, in whole but not in part, on, and only on, May 8, 2027, at a redemption price equal to 100% of the principal amount of the subordinated notes to be redeemed, plus accrued and unpaid interest, if any, up to but excluding the redemption date.
(4) Redeemable within three months of maturity.

Note 14 – Stockholders' Equity

Preferred Stock. The Corporation is authorized to issue 10 million shares of preferred stock without par value. The Board of Directors is authorized to fix the particular designations, preferences and relative, participating, optional and other special rights and qualifications, limitations or restrictions for each series of preferred stock issued.

As of December 31, 2022, 5,000 shares of Series D Non-Cumulative Perpetual Preferred Stock ("Series D Preferred Stock") and 16,000 shares of Series E Non-Cumulative Perpetual Preferred Stock ("Series E Preferred Stock") were outstanding.

Series D Preferred Stock. As of December 31, 2022, the Corporation had issued and outstanding 500,000 depositary shares, each representing a 1/100th ownership interest in a share of Series D Preferred Stock, issued in August 2016. Equity related to Series D Preferred Stock as of December 31, 2022 and 2021 was $493.5 million. Shares of the Series D Preferred Stock have no par value and a liquidation preference of $100,000 per share (equivalent to $1,000 per depositary share).

Dividends on the Series D Preferred Stock, which are not mandatory, accrue and are payable on the liquidation preference amount, on a non-cumulative basis, at a rate per annum equal to (i) 4.60% from the original issue date of the Series D Preferred Stock to but excluding October 1, 2026; and (ii) a floating rate equal to three-month CME Term SOFR plus a statutory spread adjustment of 0.26161% (as set forth in the final rule to implement the LIBOR Act) plus 3.202% from and including October 1, 2026. Fixed rate dividends are payable in arrears on the first day of April and October of each year, through and including October 1, 2026, and floating rate dividends will be payable in arrears on the first day of January, April, July and October of each year, commencing on January 1, 2027.

The Series D Preferred Stock has no maturity date and is redeemable at the Corporation's option in whole, or in part, on any dividend payment date on or after October 1, 2026. The Series D Preferred Stock is redeemable at the Corporation's option in whole, but not in part, including prior to October 1, 2026, within 90 days of a regulatory capital treatment event, as described in the Series D Preferred Stock Certificate of Designation.

Shares of the Series D Preferred Stock rank senior to the Corporation's common stock, and will rank at least equally with any other series of preferred stock it may issue (except for any senior series that may be issued with the requisite consent of the holders of the Series D Preferred Stock) and all other parity stock, with respect to the payment of dividends and distributions upon liquidation, dissolution or winding up.

Series E Preferred Stock. As of December 31, 2022, the Corporation had issued and outstanding 16 million depositary shares, each representing 1/1,000th ownership interest in a share of Series E Preferred Stock, issued in November 2019. Equity related to Series E Preferred Stock as of December 31, 2022 and 2021 was $391.4 million. Shares of the Series E Preferred Stock have no par value and a liquidation preference of $25,000 per share (equivalent to $25 per depositary share).

Dividends on the Series E Preferred Stock, which are not mandatory, accrue and are payable on the liquidation preference amount, on a non-cumulative basis, quarterly in arrears on the first day of January, April, July and October of each year, at a rate per annum equal to 4.70%. On October 18, 2022, the Corporation declared a cash dividend of $293.75 per share of Series E Preferred Stock payable on January 1, 2023, to stockholders of record as of December 15, 2022.

The Series E Preferred Stock has no maturity date and is redeemable at the Corporation's option in whole, or in part, on any dividend payment date on or after January 1, 2025. The Series E Preferred Stock is redeemable at the Corporation's option in whole, but not in part, including prior to January 1, 2025, within 90 days of a regulatory capital treatment event, as described in the Series E Preferred Stock Certificate of Designation.

Shares of the Series E Preferred Stock rank senior to the Corporation's common stock, and will rank at least equally with any other series of preferred stock it may issue (except for any senior series that may be issued with the requisite consent of the holders of the Series E Preferred Stock) and all other parity stock, with respect to the payment of dividends and distributions upon liquidation, dissolution or winding up.

Common Stock. The Corporation's current stock repurchase authorization to repurchase up to 25.0 million shares was approved by the Board of Directors in October 2021. Shares are repurchased by the Corporation to, among other things, manage the Corporation's capital levels. Repurchased shares are used for general purposes, including the issuance of shares under stock option and other incentive plans. The repurchase authorization approved by the Board of Directors has no expiration date. During the year ended December 31, 2022, the Corporation repurchased 311,536 shares of common stock, all of which were shares withheld to satisfy tax withholding obligations related to share-based compensation, at a total cost of $35.4 million. During the year ended December 31, 2021, the Corporation repurchased 2,527,544 shares of common stock, including 394,326 shares withheld related to share-based compensation, at a total cost of $267.6 million. During the year ended December 31, 2020, the Corporation repurchased 3,276,589 shares of common stock, including 532,713 shares withheld related to share-based compensation, at a total cost of $299.8 million. The 2021 and 2020 purchases were made pursuant to the repurchase program authorized by the Board of Directors in July 2018.

The average price paid per share for common stock repurchased in 2022, 2021, and 2020 was $113.70, $105.90, and $91.49, respectively.

An analysis of changes in the number of shares of common stock outstanding follows:

TABLE 91: SHARES OF COMMON STOCK

	2022	2021	2020
Balance at January 1	**207,761,875**	208,289,178	209,709,046
Incentive Plan and Awards	**914,404**	1,162,484	1,512,035
Stock Options Exercised	**63,566**	837,757	344,686
Treasury Stock Purchased	**(311,536)**	(2,527,544)	(3,276,589)
Balance at December 31	**208,428,309**	207,761,875	208,289,178

Note 15 – Accumulated Other Comprehensive Income (Loss)

The following tables summarize the components of Accumulated Other Comprehensive Income (Loss) (AOCI) at December 31, 2022, 2021, and 2020, and changes during the years then ended.

TABLE 92: SUMMARY OF CHANGES IN ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)

(In Millions)	NET UNREALIZED GAINS (LOSSES) ON AVAILABLE FOR SALE DEBT SECURITIES[1]	NET UNREALIZED (LOSSES) GAINS ON CASH FLOW HEDGES	NET FOREIGN CURRENCY ADJUSTMENT	NET PENSION AND OTHER POSTRETIREMENT BENEFIT ADJUSTMENTS	TOTAL
Balance at December 31, 2019	$ 114.0	$ (3.7)	$ 117.8	$ (422.8)	$ (194.7)
Net Change	527.8	0.5	26.9	67.5	622.7
Balance at December 31, 2020	$ 641.8	$ (3.2)	$ 144.7	$ (355.3)	$ 428.0
Net Change	(534.7)	0.8	10.5	59.8	(463.6)
Balance at December 31, 2021	$ 107.1	$ (2.4)	$ 155.2	$ (295.5)	$ (35.6)
Net Change	**(1,474.7)**	**3.6**	**9.4**	**(71.9)**	**(1,533.6)**
Balance at December 31, 2022	**$ (1,367.6)**	**$ 1.2**	**$ 164.6**	**$ (367.4)**	**$ (1,569.2)**

[1] Includes net unrealized gains (losses) on debt securities transferred from AFS to HTM. Refer to Note 4, "Securities" for further information.

TABLE 93: DETAILS OF CHANGES IN ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)

FOR THE YEAR ENDED DECEMBER 31,	**2022**			2021			2020		
(In Millions)	**PRE-TAX**	**TAX**	**AFTER TAX**	PRE-TAX	TAX	AFTER TAX	PRE-TAX	TAX	AFTER TAX
Unrealized Gains (Losses) on Available for Sale Debt Securities									
Unrealized Gains (Losses) on Available for Sale Debt Securities	**$(2,263.8)**	**$ 580.2**	**$ (1,683.6)**	$ (685.0)	$ 177.5	$ (507.5)	$ 706.8	$(179.3)	$ 527.5
Reclassification Adjustments for Losses (Gains) Included in Net Income:									
Interest Income on Debt Securities[1]	**65.1**	**(16.4)**	**48.7**	(36.6)	9.2	(27.4)	—	—	—
Net Losses on Debt Securities[2]	**214.0**	**(53.8)**	**160.2**	0.3	(0.1)	0.2	0.4	(0.1)	0.3
Net Change	**$(1,984.7)**	**$ 510.0**	**$ (1,474.7)**	$ (721.3)	$ 186.6	$ (534.7)	$ 707.2	$(179.4)	$ 527.8
Unrealized (Losses) Gains on Cash Flow Hedges									
Foreign Exchange Contracts	**$ 1.0**	**$ (0.3)**	**$ 0.7**	$ 5.6	$ (1.4)	$ 4.2	$ 28.9	$ (7.3)	$ 21.6
Reclassification Adjustment for (Gains) Losses Included in Net Income[3]	**3.7**	**(0.8)**	**2.9**	(4.5)	1.1	(3.4)	(28.1)	7.0	(21.1)
Net Change	**$ 4.7**	**$ (1.1)**	**$ 3.6**	$ 1.1	$ (0.3)	$ 0.8	$ 0.8	$ (0.3)	$ 0.5
Foreign Currency Adjustments									
Foreign Currency Translation Adjustments	**$ (200.1)**	**$ 3.0**	**$ (197.1)**	$ (133.8)	$ 4.1	$ (129.7)	$ 169.1	$ (8.3)	$ 160.8
Long-Term Intra-Entity Foreign Currency Transaction (Losses) Gains	**(2.6)**	**0.7**	**(1.9)**	0.6	(0.1)	0.5	2.1	(0.5)	1.6
Net Investment Hedge Gains (Losses)	**278.7**	**(70.3)**	**208.4**	186.6	(46.9)	139.7	(178.7)	43.2	(135.5)
Net Change	**$ 76.0**	**$ (66.6)**	**$ 9.4**	$ 53.4	$ (42.9)	$ 10.5	$ (7.5)	$ 34.4	$ 26.9
Pension and Other Postretirement Benefit Adjustments									
Net Actuarial (Losses) Gains	**$ (163.9)**	**$ 44.7**	**$ (119.2)**	$ 7.9	$ 0.2	$ 8.1	$ 47.4	$ (12.3)	$ 35.1
Reclassification Adjustment for Losses (Gains) Included in Net Income[4]									
Amortization of Net Actuarial Loss	**19.1**	**(4.7)**	**14.4**	41.4	(10.3)	31.1	42.2	(10.4)	31.8
Amortization of Prior Service Cost (Credit)	**(1.0)**	**0.3**	**(0.7)**	(1.0)	0.3	(0.7)	(0.1)	—	(0.1)
Settlement Loss	**44.9**	**(11.3)**	**33.6**	28.3	(7.0)	21.3	0.8	(0.1)	0.7
Net Change	**$ (100.9)**	**$ 29.0**	**$ (71.9)**	$ 76.6	$ (16.8)	$ 59.8	$ 90.3	$ (22.8)	$ 67.5
Total Net Change	**$(2,004.9)**	**$ 471.3**	**$ (1,533.6)**	$ (590.2)	$ 126.6	$ (463.6)	$ 790.8	$(168.1)	$ 622.7

[1] The before-tax reclassification adjustment is related to the unrealized gains (losses) amortization on AFS debt securities that were transferred to HTM debt securities during the second quarter of 2021 and third quarter of 2022. Refer to Note 4, "Securities" for further information.
[2] The net losses on AFS debt securities before-tax reclassification adjustment is recorded in Investment Security Gains (Losses), net on the consolidated statements of income. Refer to Note 4, "Securities" for further information.
[3] See Note 26, "Derivative Financial Instruments" for the location of the reclassification adjustment related to cash flow hedges.
[4] The pension and other postretirement benefit before-tax reclassification adjustment is recorded in Employee Benefits expense on the consolidated statements of income.

Note 16 – Net Income per Common Share

The computations of net income per common share are presented in the following table.

TABLE 94: NET INCOME PER COMMON SHARE

	FOR THE YEAR ENDED DECEMBER 31,		
($ In Millions Except Per Common Share Information)	**2022**	2021	2020
BASIC NET INCOME PER COMMON SHARE			
Average Number of Common Shares Outstanding	**208,309,331**	208,075,522	208,319,412
Net Income	**$ 1,336.0**	$ 1,545.3	$ 1,209.3
Less: Dividends on Preferred Stock	**41.8**	41.8	56.2
Net Income Applicable to Common Stock	**1,294.2**	1,503.5	1,153.1
Less: Earnings Allocated to Participating Securities	**11.8**	12.9	12.1
Earnings Allocated to Common Shares Outstanding	**$ 1,282.4**	$ 1,490.6	$ 1,141.0
Basic Net Income Per Common Share	**6.16**	7.16	5.48
DILUTED NET INCOME PER COMMON SHARE			
Average Number of Common Shares Outstanding	**208,309,331**	208,075,522	208,319,412
Plus Dilutive Effect of Share-based Compensation	**557,933**	823,708	688,574
Average Common and Potential Common Shares	**208,867,264**	208,899,230	209,007,986
Earnings Allocated to Common and Potential Common Shares	**$ 1,282.4**	$ 1,490.6	$ 1,141.1
Diluted Net Income Per Common Share	**6.14**	7.14	5.46

Note: For the years ended December 31, 2022, 2021, and 2020, there were no common stock equivalents excluded in the computation of diluted net income per share.

Note 17 – Revenue from Contracts with Clients

Trust, Investment, and Other Servicing Fees. Custody and Fund Administration income is comprised of revenues received from our core asset servicing business for providing custody, fund administration, and middle-office-related services, primarily to Asset Servicing clients. Investment Management and Advisory income contains revenue received from providing asset management and related services to Wealth Management and Asset Servicing clients and to Northern Trust sponsored funds. Securities Lending income represents revenues generated from securities lending arrangements that Northern Trust enters into as agent, mainly with Asset Servicing clients. Other income largely consists of revenues received from providing employee benefit, investment risk and analytic and other services to Asset Servicing and Wealth Management clients.

Other Noninterest Income. Treasury management income represents revenues received from providing cash and liquidity management services to Asset Servicing and Wealth Management clients. The portion of Security Commissions and Trading Income that relates to revenue from contracts with clients is primarily comprised of commissions earned from providing securities brokerage services to Wealth Management and Asset Servicing clients. The portion of Other Operating Income that relates to revenue from contracts with clients is mainly comprised of service fees for banking-related services provided to Wealth Management and Asset Servicing clients.

Performance Obligations. Clients are typically charged monthly or quarterly in arrears based on the fee arrangement agreed to with each client; payment terms will vary depending on the client and services offered.

Substantially all revenues generated from contracts with clients for asset servicing, asset management, securities lending, treasury management and banking-related services are recognized on an accrual basis, over the period in which services are provided. The nature of Northern Trust's performance obligations is to provide a series of distinct services in which the customer simultaneously receives and consumes the benefits of the promised services as they are performed. Fee arrangements are mainly comprised of variable amounts based on market value of client assets managed and serviced, transaction volumes, number of accounts, and securities lending volume and spreads. Revenue is recognized using the output method in an amount that reflects the consideration to which Northern Trust expects to be entitled in exchange for providing each month or quarter of service. For contracts with multiple performance obligations, revenue is allocated to each performance obligation based on the price agreed to with the client, representing its relative standalone selling price.

Security brokerage revenue is primarily represented by securities commissions received in exchange for providing trade execution related services. Control is transferred at a point in time, on the trade date of the transaction, and fees are typically variable based on transaction volumes and security types.

Northern Trust's contracts with its clients are typically open-ended arrangements and are therefore considered to have an original duration of less than one year. Northern Trust has elected the practical expedient to not disclose the value of remaining performance obligations for contracts with an original expected duration of one year or less.

The following table presents revenues disaggregated by major revenue source.

TABLE 95: REVENUE DISAGGREGATION

	FOR THE YEAR ENDED DECEMBER 31,		
(In Millions)	**2022**	2021	2020
Noninterest Income			
Trust, Investment and Other Servicing Fees			
Custody and Fund Administration	**$ 1,816.0**	$ 1,917.5	$ 1,674.3
Investment Management and Advisory	**2,299.1**	2,140	2,029.3
Securities Lending	**81.6**	76.9	88.3
Other	**235.9**	226.7	203.1
Total Trust, Investment and Other Servicing Fees	**$ 4,432.6**	$ 4,361.1	$ 3,995.0
Other Noninterest Income			
Foreign Exchange Trading Income	**$ 288.6**	$ 292.6	$ 290.4
Treasury Management Fees	**39.3**	44.3	45.4
Security Commissions and Trading Income	**136.2**	140.2	133.2
Other Operating Income	**191.3**	243.9	194.0
Investment Security Gains (Losses), net	**(214.0)**	(0.3)	(0.4)
Total Other Noninterest Income	**$ 441.4**	$ 720.7	$ 662.6
Total Noninterest Income	**$ 4,874.0**	$ 5,081.8	$ 4,657.6

On the consolidated statements of income, Trust, Investment and Other Servicing Fees and Treasury Management Fees represent revenue from contracts with clients. For the year ended December 31, 2022, revenue from contracts with clients also includes $116.8 million of the $136.2 million total Security Commissions and Trading Income and $37.2 million of the $191.3 million total Other Operating Income. For the year ended December 31, 2021, revenue from contracts with clients also includes $112.1 million of the $140.2 million total Security Commissions and Trading Income and $53.9 million of the $243.9 million total Other Operating Income. For the year ended December 31, 2020, revenue from contracts with clients also includes $102.4 million of the $133.2 million total Security Commissions and Trading Income and $42.8 million of the $194.0 million total Other Operating Income.

Receivables Balances. The following table represents receivables balances from contracts with clients, which are included in Other Assets on the consolidated balance sheets, at December 31, 2022 and 2021.

TABLE 96: CLIENT RECEIVABLES

	DECEMBER 31,	
(In Millions)	**2022**	2021
Trust Fees Receivable, net[(1)]	**$ 882.5**	$ 925.2
Other	**55.4**	126.9
Total Client Receivables	**$ 937.9**	$ 1,052.1

[(1)]Trust Fees Receivable is net of a $13.5 million and $10.9 million fee receivable allowance as of December 31, 2022 and 2021, respectively.

Note 18 – Net Interest Income

The components of Net Interest Income were as follows:

TABLE 97: NET INTEREST INCOME

	FOR THE YEAR ENDED DECEMBER 31,		
(In Millions)	**2022**	2021	2020
Interest Income			
Federal Reserve and Other Central Bank Deposits	**$ 472.1**	$ 11.3	$ 28.8
Interest-Bearing Due from and Deposits with Banks[(1)]	**46.6**	9.1	22.4
Securities Purchased under Agreements to Resell	**103.7**	3.5	3.9
Securities – Taxable	**899.9**	658.8	801.2
– Non-Taxable[(2)]	**1.3**	1.5	1.4
Loans and Leases	**1,344.3**	713.5	774.6
Other Interest-Earning Assets[(3)]	**9.8**	8.8	11.2
Total Interest Income	**$ 2,877.7**	$ 1,406.5	$ 1,643.5
Interest Expense			
Deposits	**$ 602.8**	$ (61.3)	$ 48.4
Federal Funds Purchased	**34.1**	(0.4)	2.2
Securities Sold under Agreements to Repurchase	**90.7**	0.2	1.0
Other Borrowings	**126.2**	14.2	45.3
Senior Notes	**92.7**	48.3	72.7
Long-Term Debt	**44.0**	21.1	26.5
Floating Rate Capital Debt	**—**	1.7	4.2
Total Interest Expense	**$ 990.5**	$ 23.8	$ 200.3
Net Interest Income	**$ 1,887.2**	$ 1,382.7	$ 1,443.2

(1) Interest-Bearing Due from and Deposits with Banks includes the interest-bearing component of Cash and Due from Banks and Interest-Bearing Deposits with Banks as presented on the consolidated balance sheets.
(2) Non-taxable Securities represent securities that are exempt from U.S. federal income taxes.
(3) Other Interest-Earning Assets include certain community development investments, collateral deposits with certain securities depositories and clearing houses, and Federal Home Loan Bank and Federal Reserve stock, which are classified in Other Assets on the consolidated balance sheets.

Note 19 – Other Operating Income

The components of Other Operating Income were as follows:

TABLE 98: OTHER OPERATING INCOME

	FOR THE YEAR ENDED DECEMBER 31,		
(In Millions)	**2022**	2021	2020
Loan Service Fees	**$ 71.5**	$ 66.6	$ 52.5
Banking Service Fees	**49.8**	50.9	46.1
Other Income	**70.0**	126.4	95.4
Total Other Operating Income	**$ 191.3**	$ 243.9	$ 194.0

Note 20 – Other Operating Expense

The components of Other Operating Expense were as follows:

TABLE 99: OTHER OPERATING EXPENSE

	FOR THE YEAR ENDED DECEMBER 31,		
(In Millions)	**2022**	2021	2020
Business Promotion	**$ 76.7**	$ 65.5	$ 59.2
Staff Related	**34.6**	33.9	29.4
FDIC Insurance Premiums	**17.8**	14.6	11.8
Other Intangibles Amortization	**9.3**	14.8	16.9
Other Expenses	**220.9**	170.3	229.4
Total Other Operating Expense	**$ 359.3**	$ 299.1	$ 346.7

Note 21 – Income Taxes

The following table reconciles the statutory federal tax rate with the effective tax rate for the periods presented below.

TABLE 100: INCOME TAXES

	FOR THE YEAR ENDED DECEMBER 31,		
	2022	2021	2020
Statutory Federal Tax Rate	**21.0 %**	21.0 %	21.0 %
Tax Exempt Income	**(0.9)**	(0.6)	(0.9)
Foreign Tax Rate Differential	**0.1**	0.1	0.7
Excess Tax Benefit Related to Share-Based Compensation	**(0.2)**	(0.4)	(0.6)
Tax Credits	**(2.0)**	(1.6)	(1.7)
Reversal of Tax Benefits Previously Recognized through Earnings	**—**	—	1.6
State Taxes, net	**3.3**	3.4	3.2
Valuation Allowance	**1.5**	0.6	1.6
Other	**1.6**	0.6	0.8
Effective Tax Rate	**24.4 %**	23.1 %	25.7 %

Income tax expense for the year ended December 31, 2022 and 2021 was $430.3 million and $464.8 million, representing an effective tax rate of 24.4% and 23.1%, respectively. For the year ended December 31, 2022, the increase in the effective tax rate was primarily driven by a higher net impact from international operations, including limitations on the U.S. foreign tax credit and reserves for uncertain tax positions, partially offset by increased tax benefits from tax-credit investments and tax-exempt income.

For the year ended December 31, 2021, the decrease in the effective tax rate was primarily driven by the lower net tax impact from international operations and $26.8 million of prior-year tax expense related to the reversal of tax benefits previously recognized through earnings.

For the year ended December 31, 2020, the increase in the effective tax rate was primarily driven by $26.8 million of tax expense related to the reversal of tax benefits previously recognized through earnings and higher taxes payable on the income of the Corporation's non-U.S. branches.

The Corporation files income tax returns in the U.S. federal, various state, and foreign jurisdictions. The Corporation is no longer subject to income tax examinations by U.S. federal authorities before 2013, U.S. state or local tax authorities for years before 2011, or non-U.S. tax authorities for years before 2013.

Included in Other Liabilities on the consolidated balance sheets at December 31, 2022 and 2021 were $40.7 million and $25.3 million of unrecognized tax benefits, respectively. If recognized, the amounts would reduce 2022 and 2021 income tax expense by $37.4 million and $23.9 million, respectively. A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows.

TABLE 101: UNRECOGNIZED TAX BENEFITS

(In Millions)	**2022**	2021	2020
Balance at January 1	**$ 25.3**	$ 22.4	$ 25.3
Additions for Tax Positions Taken in the Current Year	**1.7**	1.2	0.9
Additions for Tax Positions Taken in Prior Years	**13.7**	4.2	0.4
Reductions for Tax Positions Taken in Prior Years	**—**	(2.5)	(4.2)
Reductions Resulting from Expiration of Statutes	**—**	—	—
Balance at December 31	**$ 40.7**	$ 25.3	$ 22.4

It is possible that changes in the amount of unrecognized tax benefits could occur in the next 12 months due to changes in judgment related to recognition or measurement, settlements with taxing authorities, or expiration of statute of limitations. Management does not believe that future changes, if any, would have a material effect on the consolidated financial position or liquidity of Northern Trust, although they could have a material effect on operating results for a particular period.

A provision for interest and penalties of $11.1 million, net of tax, was included in the Provision for Income Taxes for the year ended December 31, 2022. This compares to a benefit for interest and penalties of $0.4 million, net of tax, and a provision of $1.2 million, net of tax, for the year ended December 31, 2021 and 2020, respectively. As of December 31, 2022 and 2021, the liability for the potential payment of interest and penalties totaled $22.2 million and $9.2 million, net of tax, respectively.

The components of the consolidated Provision for Income Taxes for each of the three years ended December 31 are as follows.

TABLE 102: PROVISION FOR INCOME TAXES

	FOR THE YEAR ENDED DECEMBER 31,		
(In Millions)	**2022**	2021	2020
Current Tax Provision:			
Federal	**$ 357.7**	$ 241.5	$ 203.0
State	**84.7**	74.0	57.2
Non-U.S.	**130.6**	147.3	141.7
Total	**$ 573.0**	$ 462.8	$ 401.9
Deferred Tax Provision:			
Federal	**$ (126.0)**	$ (11.7)	$ 8.8
State	**(10.7)**	12.0	5.4
Non-U.S.	**(6.0)**	1.7	2.2
Total	**$ (142.7)**	$ 2.0	$ 16.4
Provision for Income Taxes	**$ 430.3**	$ 464.8	$ 418.3

In addition to the amounts shown above, tax charges (benefits) have been recorded directly to Stockholders' Equity for the following. For further detail, refer to Note 15, "Accumulated Other Comprehensive Income (Loss)."

TABLE 103: TAX CHARGES (BENEFITS) RECORDED DIRECTLY TO STOCKHOLDERS' EQUITY

	FOR THE YEAR ENDED DECEMBER 31,		
(In Millions)	**2022**	2021	2020
Tax Effect of Other Comprehensive Income	**$ (471.3)**	$ (126.6)	$ 168.1

Deferred taxes result from temporary differences between the amounts reported on the consolidated financial statements and the tax bases of assets and liabilities. Deferred tax assets and liabilities have been computed as follows.

TABLE 104: DEFERRED TAX ASSETS AND LIABILITIES

	DECEMBER 31,	
(In Millions)	**2022**	2021
Deferred Tax Liabilities:		
Lease Financing	**$ —**	$ 7.0
Software Development	**354.7**	271.8
Depreciation and Amortization	**122.6**	181.3
Unrealized Gains on Securities, net	**—**	82.8
Compensation and Benefits	**5.2**	65.6
State Taxes, net	**58.3**	76.3
Other Liabilities	**42.1**	23.3
Gross Deferred Tax Liabilities	**582.9**	708.1
Deferred Tax Assets:		
Allowance for Credit Losses	**41.8**	38.6
Unrealized Losses on Securities, net	**427.3**	—
Tax Credit and Loss Carryforwards	**95.3**	68.2
Other Assets	**143.7**	85.4
Gross Deferred Tax Assets	**708.1**	192.2
Valuation Reserve	**(95.3)**	(68.2)
Deferred Tax Assets, net of Valuation Reserve	**612.8**	124.0
Net Deferred Tax Assets (Liabilities)	**$ 29.9**	$ (584.1)

The Corporation generated a foreign tax credit carryforward during the years ended December 31, 2022 and 2021, expiring in 2032 and 2031, respectively. A cumulative valuation allowance related to the credit carryforward of $94.9

million and $67.8 million was recorded at December 31, 2022 and 2021, respectively, as management believes the foreign tax credit carryforwards will not be fully realized.

Northern Trust had various state net operating loss carryforwards as of December 31, 2022 and 2021. The income tax benefits associated with these loss carryforwards were approximately $0.4 million as of both December 31, 2022 and 2021. A valuation allowance related to the loss carryforwards of $0.4 million was recorded at both December 31, 2022 and 2021, as management believes the net operating losses will not be fully realized.

Note 22 – Employee Benefits

The Corporation and certain of its subsidiaries provide various benefit programs, including defined benefit pension, postretirement health care, and defined contribution plans. A description of each major plan and related disclosures are provided below.

Pension. A noncontributory qualified defined benefit pension plan covers substantially all U.S. employees of Northern Trust. Employees of certain European subsidiaries retain benefits in local defined benefit plans, although those plans are closed to new participants and to future benefit accruals. Employees continue to accrue benefits under the Swiss pension plan, which is accounted for as a defined benefit plan under U.S. GAAP.

Northern Trust also maintains a noncontributory supplemental pension plan for participants whose retirement benefits under the U.S. Qualified Plan are expected to exceed the limits imposed by federal tax law. Northern Trust has a nonqualified trust, referred to as a "Rabbi" Trust, used to hold assets designated for the funding of benefits in excess of those permitted in certain of its qualified retirement plans. This arrangement offers participants a degree of assurance for payment of benefits in excess of those permitted in the related qualified plans. As the "Rabbi" Trust assets remain subject to the claims of creditors and are not the property of the employees, they are accounted for as corporate assets and are included in Other Assets on the consolidated balance sheets. Total assets in the "Rabbi" Trust related to the nonqualified pension plan at December 31, 2022 and 2021 amounted to $92.3 million and $117.8 million, respectively. Contributions of $20.7 million and $6.7 million were made to the "Rabbi" Trust in 2022 and 2021, respectively.

The following tables set forth the status, amounts included in AOCI, and net periodic pension expense of the U.S. Qualified Plan, Non-U.S. Pension Plans, and U.S. Non-Qualified Plan for 2022, 2021, and 2020. Prior service credits for the U.S. Qualified Plan were amortized on a straight-line basis over 11 years and were amortized in full as of December 31, 2022. Prior service costs for the U.S. Non-Qualified Plan were amortized on a straight-line basis over 10 years and were amortized in full as of December 31, 2021.

TABLE 105: EMPLOYEE BENEFIT PLAN STATUS

	U.S. QUALIFIED PLAN		NON-U.S. PENSION PLANS		U.S. NON-QUALIFIED PLAN	
($ In Millions)	**2022**	2021	**2022**	2021	**2022**	2021
Accumulated Benefit Obligation	**$ 963.3**	$ 1,246.6	**$ 126.2**	$ 204.5	**$ 97.4**	$ 125.5
Projected Benefit Obligation	**$ 1,077.7**	$ 1,401.3	**$ 129.0**	$ 210.1	**$ 113.6**	$ 147.7
Plan Assets at Fair Value	**1,176.8**	1,708.9	**134.5**	198.7	**—**	—
Funded Status at December 31	**$ 99.1**	$ 307.6	**$ 5.5**	$ (11.4)	**$ (113.6)**	$ (147.7)
Weighted-Average Assumptions:						
Discount Rates	**5.22 %**	3.03 %	**3.76 %**	1.34 %	**5.15 %**	2.80 %
Rate of Increase in Compensation Level	**5.56**	4.97	**1.75**	1.50	**5.56**	4.97
Expected Long-Term Rate of Return on Assets	**7.25**	5.25	**3.99**	1.79	**N/A**	N/A

TABLE 106: AMOUNTS INCLUDED IN ACCUMULATED OTHER COMPREHENSIVE INCOME

	U.S. QUALIFIED PLAN		NON-U.S. PENSION PLANS		U.S. NON-QUALIFIED PLAN	
(In Millions)	**2022**	2021	**2022**	2021	**2022**	2021
Net Actuarial Loss	**$ 418.3**	$ 273.8	**$ 24.3**	$ 40.4	**$ 59.2**	$ 86.6
Prior Service (Credit) Cost	**—**	(0.1)	**0.2**	0.6	**—**	—
Gross Amount in Accumulated Other Comprehensive Income	**418.3**	273.7	**24.5**	41.0	**59.2**	86.6
Income Tax Effect	**105.1**	68.7	**4.9**	5.2	**14.8**	21.7
Net Amount in Accumulated Other Comprehensive Income	**$ 313.2**	$ 205.0	**$ 19.6**	$ 35.8	**$ 44.4**	$ 64.9

TABLE 107: NET PERIODIC PENSION EXPENSE

	U.S. QUALIFIED PLAN[(1)]			NON-U.S. PENSION PLANS			U.S. NON-QUALIFIED PLAN		
($ In Millions)	**2022**	2021	2020	**2022**	2021	2020	**2022**	2021	2020
Service Cost	**$ 48.0**	$ 52.3	$ 47.4	**$ 1.7**	$ 2.2	$ 1.9	**$ 5.6**	$ 5.3	$ 4.6
Interest Cost	**46.3**	40.4	43.3	**2.5**	2.2	2.9	**3.9**	3.7	4.8
Expected Return on Plan Assets	**(85.7)**	(79.0)	(76.8)	**(3.2)**	(3.2)	(3.1)	**—**	—	—
Amortization:									
Net Actuarial Loss	**11.4**	32.4	35.0	**0.6**	1.0	0.8	**7.4**	8.2	7.0
Prior Service (Credit) Cost	**(0.1)**	(0.4)	(0.4)	**—**	0.2	0.4	**—**	0.1	0.2
Net Periodic Pension Expense	**$ 19.9**	$ 45.7	$ 48.5	**$ 1.6**	$ 2.4	$ 2.9	**$ 16.9**	$ 17.3	$ 16.6
Settlement Expense	**44.1**	27.9	—	**0.8**	0.4	0.8	**—**	—	—
Total Pension Expense	**$ 64.0**	$ 73.6	$ 48.5	**$ 2.4**	$ 2.8	$ 3.7	**$ 16.9**	$ 17.3	$ 16.6
Weighted-Average Assumptions:									
Discount Rates	**3.03% 4.81%**	2.75% 3.05%	3.37 %	**1.34 %**	0.93 %	1.40 %	**2.80 %**	2.45 %	3.37 %
	5.49% 5.22%	3.06% 3.03%							
Rate of Increase in Compensation Level	**4.97**	4.97	4.97	**1.50**	1.50	1.50	**4.97**	4.97	4.97
Expected Long-Term Rate of Return on Assets	**5.25 6.00**	5.25 5.00	5.25	**1.79**	1.28	1.72	**N/A**	N/A	N/A
	6.50								

(1) In determining the pension expense for the U.S. Qualified Plan for 2022, Northern Trust utilized a discount rate of 3.03% as of December 31, 2021, 4.81% as of June 30, 2022, 5.49% as of September 30, 2022, and 5.22% as of December 31, 2022 and the expected long-term rate of return was 5.25% as of December 31, 2021, 6.00% as of June 30, 2022, and 6.50% as of September 30, 2022.

In determining the pension expense for the U.S. Qualified Plan for 2021, Northern Trust utilized a discount rate of 2.75% as of December 31, 2020, 3.05% as of June 30, 2021, 3.06% as of September 30, 2021, and 3.03% as of December 31, 2021 and an expected long-term rate of return of 5.25% as of both December 31, 2020 and June 30, 2021, and 5.00% as of September 30, 2021.

Northern Trust's U.S. Qualified Plan provides participants the option to select lump-sum benefit payments upon retirement and termination of service. In the second quarter of both 2022 and 2021, it became probable that total lump-sum payments during each year would exceed the settlement threshold of the sum of annual service and interest cost. Therefore, Northern Trust recognized settlement charges related to its U.S. Qualified Plan in the second, third, and fourth quarter of both 2022 and 2021, which required interim remeasurements of the U.S. Qualified Plan as of each respective quarter-end. The settlement charge represents the pro rata amount of the net loss in AOCI that is charged to income based on the proportion of the Projected Benefit Obligation settled to the total Projected Benefit Obligation and amounted to a total of $44.1 million and $27.9 million in 2022 and 2021, respectively.

The components of net periodic pension expense are included in Employee Benefits expense on the consolidated statements of income.

TABLE 108: CHANGE IN PROJECTED BENEFIT OBLIGATION

	U.S. QUALIFIED PLAN		NON-U.S. PENSION PLANS		U.S. NON-QUALIFIED PLAN	
(In Millions)	**2022**	2021	**2022**	2021	**2022**	2021
Beginning Balance	**$ 1,401.3**	$ 1,470.6	**$ 210.1**	$ 236.1	**$ 147.7**	$ 162.3
Service Cost	**48.0**	52.3	**1.7**	2.2	**5.6**	5.3
Interest Cost	**46.3**	40.4	**2.5**	2.2	**3.9**	3.7
Employee Contributions	**—**	—	**0.7**	0.6	**—**	—
Plan Amendment	**—**	—	**(0.3)**	(1.4)	**—**	—
Actuarial Loss (Gain)	**(281.2)**	(19.1)	**(64.3)**	(10.4)	**(20.0)**	(2.0)
Settlements	**(125.0)**	(132.1)	**(0.9)**	(9.4)	**—**	—
Benefits Paid	**(11.7)**	(10.8)	**(4.6)**	(5.5)	**(23.6)**	(21.6)
Foreign Exchange Rate Changes	**—**	—	**(15.9)**	(4.3)	**—**	—
Ending Balance	**$ 1,077.7**	$ 1,401.3	**$ 129.0**	$ 210.1	**$ 113.6**	$ 147.7

Actuarial gains of $365.5 million in 2022 were primarily caused by substantial increases in discount rates, while actuarial gains of $31.5 million in 2021 were primarily also caused by increases in discount rates, but to a lesser extent.

TABLE 109: ESTIMATED FUTURE BENEFIT PAYMENTS

(In Millions)	U.S. QUALIFIED PLAN	NON-U.S.PENSION PLANS	U.S. NON-QUALIFIED PLAN
2023	**$ 90.7**	**$ 4.2**	**$ 20.2**
2024	**90.7**	**4.4**	**13.6**
2025	**93.9**	**4.3**	**14.1**
2026	**93.5**	**5.2**	**11.6**
2027	**95.3**	**6.4**	**12.2**
2028-2032	**464.7**	**33.6**	**54.4**

TABLE 110: CHANGE IN PLAN ASSETS

	U.S. QUALIFIED PLAN		NON-U.S PENSION PLANS	
(In Millions)	**2022**	2021	**2022**	2021
Fair Value of Assets at Beginning of Period	**$ 1,708.9**	$ 1,793.7	**$ 198.7**	$ 211.5
Actual Return on Assets[(1)]	**(395.4)**	58.1	**(46.9)**	(0.8)
Employer Contributions	**—**	—	**3.6**	4.5
Employee Contributions	**—**	—	**0.7**	0.6
Settlements	**(125.0)**	(132.1)	**(0.9)**	(9.4)
Benefits Paid	**(11.7)**	(10.8)	**(4.6)**	(5.5)
Foreign Exchange Rate Changes	**—**	—	**(16.1)**	(2.2)
Fair Value of Assets at End of Period	**$ 1,176.8**	$ 1,708.9	**$ 134.5**	$ 198.7

[(1)] The 2021 actual return on assets for the U.S. Qualified Plan includes a reimbursement of $0.1 million of historical investment expenses paid from the pension trust.

The decrease in plan assets of $532.1 million from the prior year was driven by unfavorable market conditions in 2022.

The minimum required and maximum remaining deductible contributions for the U.S. Qualified Plan in 2023 are estimated to be zero and $561.0 million, respectively.

The investment strategy employed for Northern Trust's U.S. Qualified Plan utilizes a dynamic glide path based on a set of pre-approved asset allocations to return-seeking and liability-hedging assets that vary in accordance with the U.S. Qualified Plan's projected benefit obligation funded ratio. In general, as the U.S. Qualified Plan's projected benefit obligation funded ratio increases beyond an established threshold, the U.S. Qualified Plan's allocation to liability-hedging assets will increase while the allocation to return-seeking assets will decrease. Conversely, a decrease in the U.S. Qualified Plan's projected benefit obligation funded ratio beyond an established threshold will generally result in a decrease in the U.S. Qualified Plan's allocation to liability-hedging assets and increase in the allocation to return-seeking assets. Liability-hedging assets include U.S. long credit bonds, U.S. long government bonds, and a custom completion strategy used to hedge more closely the liability duration of projected plan benefits with bond duration across all durations. Return-seeking assets include: U.S. equity, international developed equity, emerging markets equity, real estate, high yield bonds, global listed infrastructure, emerging market debt, private equity and hedge funds. During 2022, the funded ratio fell below the threshold and in early 2023 the asset allocation of the U.S. Qualified Plan was adjusted to a stage of the glide path which allows for a greater component of return-seeking assets.

Northern Trust utilizes an asset/liability methodology to determine the investment policies that will best meet its short and long-term objectives. The process is performed by modeling current and alternative strategies for asset allocation, funding policy and actuarial methods and assumptions. The financial modeling uses projections of expected capital market returns and expected volatility of those returns to determine alternative asset mixes having the greatest probability of meeting the U.S. Qualified Plan's investment objectives. Risk tolerance is established through careful consideration of the U.S. Qualified Plan liabilities, funded status, and corporate financial condition. The intent of this strategy is to protect the U.S. Qualified Plan's healthy funded status and generate returns, which in combination with minimal voluntary contributions are expected to outpace the U.S. Qualified Plan's liability growth over the long run.

As of December 31, 2022, the target allocation of the U.S. Qualified Plan assets consisted of 55% U.S. long credit bonds, 15% global equities (developed and emerging markets), 10% custom completion, 5% private equity, 4% high yield bonds, 3% emerging market debt, 3% global listed infrastructure, 3% private real estate, and 2% hedge funds.

Global equity investments include common stocks that are listed on an exchange and investments in commingled funds that invest primarily in publicly traded equities. Equity investments are diversified across country, region, investment style and market capitalization. Fixed income securities held include U.S. treasury securities, corporate bonds, and investments in commingled funds that invest in a diversified blend of longer duration fixed income securities; the custom completion strategy uses U.S. treasury securities and interest rate futures (or similar instruments) to align more closely with the target hedge ratio across maturities. Diversifying investments, including private equity, hedge funds, private real estate, emerging market debt, high yield bonds, and global listed infrastructure, are used judiciously to enhance long-term returns while improving portfolio diversification. Private equity assets consist primarily of investments in limited partnerships that invest in individual companies in the form of non-public equity or non-public debt positions. Direct or co-investment in non-public stock by the U.S. Qualified Plan is prohibited. The U.S. Qualified Plan's private equity investments are limited to 20% of each of the total limited partnership or fund of funds and the maximum allowable loss cannot exceed the commitment amount. The U.S. Qualified Plan invests in one hedge fund of funds, which invests, either directly or indirectly, in diversified portfolios of funds or other pooled investment vehicles.

Investments in private real estate, high yield bonds, emerging market debt, and global listed infrastructure are designed to provide income and added diversification.

Derivatives may be used, depending on the nature of the asset class to which they relate, to gain market exposure in an efficient and timely manner, to hedge foreign currency exposure or interest rate risk, or to alter the duration of a portfolio. There were four and three derivatives held by the U.S. Qualified Plan at December 31, 2022 and 2021, respectively.

Investment risk is measured and monitored on an ongoing basis through monthly liability measurements, periodic asset/liability studies, and quarterly investment portfolio reviews. Standards used to evaluate the U.S. Qualified Plan's investment manager performance include, but are not limited to, the achievement of objectives, operation within guidelines and policy, and comparison against a benchmark. In addition, each manager of the investment funds held by the U.S. Qualified Plan is ranked against a universe of peers and compared to a benchmark. Total U.S. Qualified Plan performance analysis includes an analysis of the market environment, asset allocation impact on performance, risk and return relative to other ERISA plans, and manager impacts upon U.S. Qualified Plan performance.

The following describes the hierarchy of inputs used to measure fair value and the primary valuation methodologies used by Northern Trust for the U.S. Qualified Plan assets measured at fair value.

Level 1 – Quoted, active market prices for identical assets or liabilities. The U.S. Qualified Plan's Level 1 assets are comprised primarily of mutual funds and domestic common stocks. The U.S. Qualified Plan's Level 1 investments that are exchange traded are valued at the closing price reported by the respective exchanges on the day of valuation.

Level 2 – Observable inputs other than Level 1 prices, such as quoted active market prices for similar assets or liabilities, quoted prices for identical or similar assets in inactive markets, and model-derived valuations in which all significant inputs are observable in active markets. The U.S. Qualified Plan's Level 2 assets are comprised of collective trust funds, corporate bonds, government obligations, and municipal and provincial bonds. The investments in collective trust funds fair values are calculated on a scheduled basis using the closing market prices and accruals of securities in the funds (total value of the funds) divided by the number of fund shares currently issued and outstanding. Redemptions of the collective trust funds occur by contract at the respective fund's redemption date net asset value (NAV).

Level 3 – Valuation techniques in which one or more significant inputs are unobservable in the marketplace. The U.S. Qualified Plan did not hold Level 3 assets as of December 31, 2022 and 2021.

Assets valued at fair value using NAV per share - The U.S. Qualified Plan's assets valued at fair value using NAV per share include investments in private equity funds and a hedge fund, which invest in underlying groups of investment funds or other pooled investment vehicles that are selected by the respective funds' investment managers. The investment funds and the underlying investments held by these investment funds are valued at fair value. In determining the fair value of the underlying investments of each fund, the fund's investment manager or general partner takes into account the estimated value reported by the underlying funds as well as any other considerations that may, in their judgment, increase or decrease such estimated value. The investments in the private equity funds and a hedge fund are considered to be long-term investments. There are no capital withdrawal options related to the investments in the private equity funds. However, capital is periodically distributed as underlying investments are sold. It is estimated that the current private equity investments would be liquidated over 1 to 15 years, depending on the vintage year of a particular fund. With sixty days advance notice, the Plan's investment in the hedge fund can be withdrawn at the next calendar quarter end.

The U.S. Qualified Plan's assets valued at fair value using NAV per share also include investments in real estate funds, which invest in real estate assets. The investment in properties by the real estate funds are carried at fair value, which is estimated based on the price that would be received to sell an asset in an orderly transaction between marketplace participants at the measurement date. The valuation plan for each real estate investment is subject to review on an annual basis which is based on either an external appraisal from appraisal firms or internal valuations prepared by the real estate fund's investment advisor. The Plan's investment in real estate funds are considered to be long-term investments and, with forty-five days advance notice, can be withdrawn at the next calendar quarter end to the extent the real estate funds have liquid assets.

As investments in the private equity funds, hedge fund, and real estate fund are valued at fair value using NAV per share, they are not required to be categorized within the fair value hierarchy.

While Northern Trust believes its valuation methods for U.S. Qualified Plan assets are appropriate and consistent with other market participants, the use of different methodologies or assumptions could have a material effect on the computation of the estimated fair values.

The following table presents the fair values of Northern Trust's U.S. Qualified Plan assets, by major asset category, and their level within the fair value hierarchy defined by GAAP as of December 31, 2022 and 2021.

TABLE 111: FAIR VALUE OF U.S. QUALIFIED PLAN ASSETS

	DECEMBER 31, 2022			
(In Millions)	LEVEL 1	LEVEL 2	LEVEL 3	TOTAL
Domestic Common Stock	$ **14.7**	$ **—**	$ **—**	$ **14.7**
Foreign Common Stock	**0.5**	**—**	**—**	**0.5**
Domestic Corporate Bonds	**—**	**263.6**	**—**	**263.6**
Foreign Corporate Bonds	**—**	**39.6**	**—**	**39.6**
U.S. Government Obligations	**—**	**77.5**	**—**	**77.5**
Non-U.S. Government Obligations	**—**	**13.8**	**—**	**13.8**
Domestic Municipal and Provincial Bonds	**—**	**16.8**	**—**	**16.8**
Foreign Municipal and Provincial Bonds	**—**	**0.2**	**—**	**0.2**
Collective Trust Funds	**—**	**522.3**	**—**	**522.3**
Mutual Funds	**61.4**	**—**	**—**	**61.4**
Cash and Other[1]	**(1.1)**	**—**	**—**	**(1.1)**
Total Assets at Fair Value in the Fair Value Hierarchy	$ **75.5**	$ **933.8**	$ **—**	$ **1,009.3**
Assets Valued at NAV per share				
Northern Trust Private Equity Funds				**33.2**
Northern Trust Hedge Fund				**35.2**
Real Estate Funds				**99.1**
Total Assets at Fair Value				$ **1,176.8**

[1] *Negative balance in Cash and Other as of December 31, 2022 primarily relates to due to broker for securities purchased.*

	DECEMBER 31, 2021			
(In Millions)	LEVEL 1	LEVEL 2	LEVEL 3	TOTAL
Domestic Common Stock	$ 17.5	$ —	$ —	$ 17.5
Foreign Common Stock	0.3	—	—	0.3
Domestic Corporate Bonds	—	341.7	—	341.7
Foreign Corporate Bonds	—	60.9	—	60.9
U.S. Government Obligations	—	103.9	—	103.9
Non-U.S. Government Obligations	—	20.0	—	20.0
Domestic Municipal and Provincial Bonds	—	21.0	—	21.0
Foreign Municipal and Provincial Bonds	—	0.3	—	0.3
Collective Trust Funds	—	875.3	—	875.3
Mutual Funds	108.9	—	—	108.9
Cash and Other	8.6	—	—	8.6
Total Assets at Fair Value in the Fair Value Hierarchy	$ 135.3	$ 1,423.1	$ —	$ 1,558.4
Assets Valued at NAV per share				
Northern Trust Private Equity Funds				34.5
Northern Trust Hedge Fund				36.7
Real Estate Funds				79.3
Total Assets at Fair Value				$ 1,708.9

A building block approach is employed for Northern Trust's U.S. Qualified Plan in determining the long-term rate of return for plan assets. Historical markets and long-term historical relationships between equities, fixed income and other asset classes are studied using the widely accepted capital market principle that assets with higher volatility generate a greater return over the long-run. Current market factors such as inflation expectations and interest rates are evaluated before long-term capital market assumptions are determined. The long-term portfolio rate of return is established with consideration given to diversification and rebalancing. The rate is reviewed against peer data and historical returns to verify the return is reasonable and appropriate. Based on this approach and the U.S. Qualified Plan's target asset allocation, the expected long-term rate of return on assets as of the U.S. Qualified Plan's December 31, 2022 measurement date was set at 7.25%.

Postretirement Health Care. Northern Trust maintains an unfunded postretirement health care plan under which those employees who retire at age 55 or older under the provisions of the U.S. defined benefit plan and had attained 15 years of service as of December 31, 2011 may be eligible for subsidized postretirement health care coverage. The provisions of this health care plan may be changed further at the discretion of Northern Trust, which also reserves the right to terminate these benefits at any time.

Northern Trust changed the plan design of its post-retirement health care plan as of January 1, 2021, which resulted in the recognition of a prior service credit of $12.7 million at the time these changes were communicated to participants in August 2020. Concurrently, a further shift in population from active to inactive participants required an adjustment to the amortization period from the average remaining service period of active participants to the average life expectancy of the inactive participants. Prior service credits are being amortized on a straight-line basis over 13.9 years.

The following tables set forth the postretirement health care plan status and amounts included in AOCI at December 31, 2022 and 2021, the net periodic postretirement benefit cost of the plan for 2022 and 2021, and the change in the accumulated postretirement benefit obligation during 2022 and 2021.

TABLE 112: POSTRETIREMENT HEALTH CARE PLAN STATUS

(In Millions)	DECEMBER 31, 2022	2021
Accumulated Postretirement Benefit Obligation at Measurement Date:		
Retirees and Dependents	**$ 8.1**	$ 8.7
Actives Eligible for Benefits	**0.7**	1.5
Net Postretirement Benefit Obligation	**$ 8.8**	$ 10.2

TABLE 113: AMOUNTS INCLUDED IN ACCUMULATED OTHER COMPREHENSIVE INCOME

(In Millions)	DECEMBER 31, 2022	2021
Net Actuarial (Gain) Loss	**$ (5.6)**	$ (5.3)
Prior Service (Credit) Cost	**(10.6)**	(11.5)
Gross Amount in Accumulated Other Comprehensive Income	**(16.2)**	(16.8)
Income Tax Effect	**(4.1)**	(4.2)
Net Amount in Accumulated Other Comprehensive Income	**$ (12.1)**	$ (12.6)

TABLE 114: NET PERIODIC POSTRETIREMENT EXPENSE (BENEFIT)

(In Millions)	FOR THE YEAR ENDED DECEMBER 31, 2022	2021	2020
Service Cost	**$ —**	$ —	$ —
Interest Cost	**0.3**	0.3	0.7
Expected Return on Plan Assets	**—**	—	—
Amortization			
Net Actuarial (Gain) Loss	**(0.3)**	(0.2)	(0.6)
Prior Service (Credit) Cost	**(0.9)**	(0.9)	(0.3)
Net Periodic Postretirement Expense	**$ (0.9)**	$ (0.8)	$ (0.2)

TABLE 115: CHANGE IN ACCUMULATED POSTRETIREMENT BENEFIT OBLIGATION

(In Millions)	FOR THE YEAR ENDED DECEMBER 31, 2022	2021
Beginning Balance	**$ 10.2**	$ 15.7
Service Cost	**—**	—
Interest Cost	**0.3**	0.3
Plan Amendment	**—**	—
Actuarial (Gain) Loss	**1.6**	(3.3)
Net Claims Paid	**(3.3)**	(2.5)
Ending Balance	**$ 8.8**	$ 10.2

Northern Trust uses the aggregate Pri-2012 mortality table with a 2012 base year and proposed future improvements under scale MP-2021, as released by the Society of Actuaries in October 2021. No change to these assumptions was made in 2022 since the Society of Actuaries did not release any updates to its mortality tables and improvement scales in 2022.

TABLE 116: ESTIMATED FUTURE BENEFIT PAYMENTS

(In Millions)		TOTAL POSTRETIREMENT MEDICAL BENEFITS
2023	**$**	**1.2**
2024		**1.1**
2025		**1.1**
2026		**1.0**
2027		**0.9**
2028-2032		**3.8**

The weighted average discount rate used in determining the accumulated postretirement benefit obligation was 5.08% at December 31, 2022, and 2.56% at December 31, 2021. Due to the changes in the plan design as of January 1, 2021, the health care cost trend rate assumptions including the assumption for drug claims, are not currently impacting the measurement of the postretirement health care plan.

Defined Contribution Plans. The Corporation and its subsidiaries maintain various defined contribution plans covering substantially all employees. The Corporation's contribution to the U.S. plan and to certain European-based plans includes a matching component. The expense associated with defined contribution plans is charged to Employee Benefits expense on the consolidated statements of income and totaled $67.2 million in 2022, $65.3 million in 2021, and $62.9 million in 2020.

Note 23 – Share-Based Compensation Plans

Northern Trust recognizes expense for the grant-date fair value of share-based compensation granted to employees and non-employee directors.

Total compensation expense for share-based payment arrangements to employees and the associated tax impacts were as follows for the periods presented.

TABLE 117: TOTAL COMPENSATION EXPENSE FOR SHARE-BASED PAYMENT ARRANGEMENTS TO EMPLOYEES

	FOR THE YEAR ENDED DECEMBER 31,		
(In Millions)	**2022**	2021	2020
Restricted Stock Unit Awards	**$ 96.4**	$ 78.2	$ 78.1
Stock Options	**—**	—	0.5
Performance Stock Units	**28.8**	17.3	12.8
Total Share-Based Compensation Expense	**$ 125.2**	$ 95.5	$ 91.4
Tax Benefits Recognized	**$ 31.4**	$ 24.0	$ 22.9

As of December 31, 2022, there was $91.6 million of unrecognized compensation cost related to unvested share-based compensation arrangements granted under the Corporation's share-based compensation plans. That cost is expected to be recognized as expense over a weighted-average period of approximately 3 years.

The Northern Trust Corporation 2017 Long-Term Incentive Plan (2017 Plan) is administered by the Human Capital and Compensation Committee (Committee) of the Board of Directors. All employees of the Corporation and its subsidiaries and all directors of the Corporation are eligible to receive awards under the 2017 Plan. The 2017 Plan provides for the grant of non-qualified and incentive stock options; tandem and free-standing stock appreciation rights; stock awards in the form of restricted stock, restricted stock units and other stock awards; and performance awards.

Beginning with grants made on February 21, 2017 under the Northern Trust Corporation 2012 Stock Plan (2012 Plan), restricted stock unit and performance stock unit grants continue to vest in accordance with the original terms of the award if the applicable employee retires after satisfying applicable age and service requirements.

Grants are outstanding under the 2017 Plan, the 2012 Plan, and the Amended and Restated Northern Trust Corporation 2002 Stock Plan (2002 Plan). The 2017 Plan was approved by stockholders in April 2017. Upon approval of the 2017 Plan, no additional shares have been or will be granted under the 2012 Plan or 2002 Plan. The total number of shares of the Corporation's common stock authorized for issuance under the 2017 Plan is 20,000,000 plus shares forfeited under the 2012 Plan and 2002 Plan. As of December 31, 2022, shares available for future grant under the 2017 Plan, including shares forfeited under the 2012 Plan and 2002 Plan, totaled 15,034,880.

The following describes Northern Trust's share-based payment arrangements and applies to awards under the 2017 Plan, 2012 Plan and the 2002 Plan, as applicable.

Stock Options. Stock options consist of options to purchase common stock at prices not less than 100% of the fair value thereof on the date the options are granted. Options have a maximum 10 years life and generally vest and become exercisable in 1 year to 4 years after the date of grant. All options terminate at such time as determined by the Committee and as provided in the terms and conditions of the respective option grants. There were no options granted during the years ended December 31, 2022, 2021, and 2020.

The following table provides information about stock options granted, vested, and exercised in the years ended December 31, 2022, 2021, and 2020.

TABLE 118: STOCK OPTIONS GRANTED, VESTED, AND EXERCISED

(In Millions, Except Per Share Information)	FOR THE YEAR ENDED DECEMBER 31, 2022	2021	2020
Grant-Date Fair Value of Stock Options Vested	**$ —**	$ 2.2	$ 4.5
Stock Options Exercised			
Intrinsic Value as of Exercise Date	**3.6**	41.3	13.6
Cash Received	**3.9**	53.8	19.5
Tax Deduction Benefits Realized	**3.5**	41.3	13.4

A summary of the status of stock options at December 31, 2022, and changes during the year then ended, are presented in the following table.

TABLE 119: STATUS OF STOCK OPTIONS AND CHANGES

($ In Millions Except Per Share Information)	SHARES	WEIGHTED AVERAGE EXERCISE PRICE PER SHARE	WEIGHTED AVERAGE REMAINING CONTRACTUAL TERM (YEARS)	AGGREGATE INTRINSIC VALUE
Options Outstanding, December 31, 2021	**509,888**	**$ 71.39**		
Granted	**—**	**—**		
Exercised	**(63,566)**	**61.93**		
Forfeited, Expired or Cancelled	**(4,775)**	**88.06**		
Options Outstanding, December 31, 2022	**441,547**	**$ 72.58**	**2.7**	**$ 7.0**
Options Exercisable, December 31, 2022	**441,547**	**$ 72.58**	**2.7**	**$ 7.0**

Restricted Stock Unit Awards. Restricted stock units may be granted to participants and entitles them to receive a payment in the Corporation's common stock or cash and such other terms and conditions as the Committee deems appropriate. Each restricted stock unit provides the recipient the opportunity to receive one share of stock for each stock unit that vests. The restricted stock units granted in 2022 predominately vest at a rate equal to 25% per year for four years on the first day of the month following the month in which the grant date falls. Restricted stock unit grants totaled 1,061,573, 846,433, and 772,848, with weighted average grant-date fair values of $110.99, $99.31, and $99.58 per share, for the years ended December 31, 2022, 2021, and 2020, respectively. The total fair value of restricted stock units vested during the years ended December 31, 2022, 2021, and 2020, was $75.6 million, $89.4 million, and $100.2 million, respectively.

A summary of the status of outstanding restricted stock unit awards at December 31, 2022, and changes during the year then ended, is presented in the following table.

TABLE 120: OUTSTANDING RESTRICTED STOCK UNIT AWARDS

($ In Millions)	NUMBER	AGGREGATE INTRINSIC VALUE
Restricted Stock Unit Awards Outstanding, December 31, 2021	**2,001,516**	**$ 239.4**
Granted	**1,061,573**	
Distributed	**(767,775)**	
Forfeited	**(52,131)**	
Restricted Stock Unit Awards Outstanding, December 31, 2022	**2,243,183**	**$ 198.5**
Units Convertible, December 31, 2022	**19,526**	**$ 1.7**

The following is a summary of nonvested restricted stock unit awards at December 31, 2022, and changes during the year then ended.

TABLE 121: NONVESTED RESTRICTED STOCK UNIT AWARDS

NONVESTED RESTRICTED STOCK UNITS	NUMBER	WEIGHTED AVERAGE GRANT- DATE FAIR VALUE PER UNIT	WEIGHTED AVERAGE REMAINING VESTING TERM (YEARS)
Nonvested at December 31, 2021	**1,981,990**	**$ 97.56**	**2.3**
Granted	**1,061,573**	**110.99**	
Vested	**(767,775)**	**98.51**	
Forfeited	**(52,131)**	**107.70**	
Nonvested at December 31, 2022	**2,223,657**	**$ 103.41**	**2.4**

Performance Stock Units. Each performance stock unit provides the recipient the opportunity to receive one share of the Corporation's common stock for each stock unit based on the attainment of certain performance criteria over a three-year period. For performance stock unit awards granted in 2020, 2021 and 2022, the number of units that will vest are subject to the attainment of specified performance targets that are a function of average return on equity goals and average return on equity performance relative to that of a performance peer group, each measured over a three-year period. For performance stock units outstanding as of December 31, 2022, the number of performance stock units that will vest ranges from 0% to 150% of the original award granted based on the achievement of both absolute and relative return on equity goals over a three-year period compared to performance targets. Distribution of the shares is then made after vesting.

Performance stock unit grants totaled 211,906, 204,539, and 205,847 for the years ended December 31, 2022, 2021, and 2020, respectively, with weighted average grant-date fair values of $113.64, $97.77, and $100.83. Performance stock units outstanding at target level performance totaled 607,892, 622,817, and 660,510 at December 31, 2022, 2021, and 2020, respectively. Performance stock units had aggregate intrinsic values of $53.8 million, $74.5 million, and $61.5 million, and weighted average remaining vesting terms of 1.0 year each at December 31, 2022, 2021, and 2020, respectively.

Non-employee Director Stock Awards. Stock units with total values of $1.6 million (14,773 units), $1.5 million (13,968 units), and $1.5 million (20,148 units) were granted to non-employee directors in 2022, 2021, and 2020, respectively, which vest or vested on the date of the annual meeting of the Corporation's stockholders in the following years. Total expense recognized on these grants was $1.7 million, $1.6 million, and $1.6 million in 2022, 2021, and 2020, respectively. Stock units granted to non-employee directors do not have voting rights. Each stock unit entitles a director to one share of common stock at vesting, unless a director elects to defer receipt of the shares. Directors may elect to defer the payment of their annual stock unit grant and cash-based compensation until termination of services as director. Deferred cash compensation is converted into stock units representing shares of common stock of the Corporation. Distributions of deferred stock units are made in stock. For compensation deferred prior to January 1, 2018, distributions of the stock unit accounts that relate to cash-based compensation are made in cash based on the fair value of the stock units at the time of distribution. For compensation deferred on or after January 1, 2018, distributions of the stock unit accounts that relate to cash-based compensation are made in stock.

Note 24 – Cash-Based Compensation Plans

Various incentive plans provide for cash incentives and bonuses to selected employees based upon accomplishment of corporate net income objectives, goals of the reporting segments and support functions, and individual performance. The provision for awards under these plans is charged to Compensation expense and totaled $392.7 million in 2022, $377.1 million in 2021, and $296.2 million in 2020.

Note 25 – Commitments and Contingent Liabilities

Off-Balance Sheet Financial Instruments, Guarantees and Other Commitments. Northern Trust, in the normal course of business, enters into various types of commitments and issues letters of credit to meet the liquidity and credit enhancement needs of its clients. The contractual amounts of these instruments represent the maximum potential credit exposure should the instrument be fully drawn upon and the client default. To control the credit risk associated with entering into commitments and issuing letters of credit, Northern Trust subjects such activities to the same credit quality and monitoring controls as its lending activities. Northern Trust does not believe the total contractual amount of these instruments to be representative of its future credit exposure or funding requirements.

The following table provides details of Northern Trust's off-balance sheet financial instruments as of December 31, 2022 and 2021.

TABLE 122: SUMMARY OF OFF-BALANCE SHEET FINANCIAL INSTRUMENTS

	DECEMBER 31,					
	2022			2021		
($ In Millions)	**ONE YEAR AND LESS**	**OVER ONE YEAR**	**TOTAL**	ONE YEAR AND LESS	OVER ONE YEAR	TOTAL
Undrawn Commitments[1]	**$ 13,639.2**	**$ 17,321.4**	**$ 30,960.6**	$ 9,567.0	$ 17,855.2	$ 27,422.2
Standby Letters of Credit and Financial Guarantees[2][3]	**17,553.0**	**409.9**	**17,962.9**	3,485.6	553.9	4,039.5
Commercial Letters of Credit	**25.4**	**1.3**	**26.7**	68.5	1.1	69.6
Securities Lent with Indemnification	**130,311.0**	**—**	**130,311.0**	170,445.3	—	170,445.3
Unsettled Reverse Repurchase Agreements	**496.8**	**—**	**496.8**	—	—	—
Total Off-Balance Sheet Financial Instruments	**$ 162,025.4**	**$ 17,732.6**	**$ 179,758.0**	$ 183,566.4	$ 18,410.2	$ 201,976.6

[1] These amounts exclude $266.6 million and $366.6 million of commitments participated to others at December 31, 2022 and 2021, respectively.
[2] These amounts include $35.1 million and $30.5 million of standby letters of credit secured by cash deposits or participated to others as of December 31, 2022 and 2021, respectively.
[3] This amount includes a $16.3 billion guarantee to the Fixed Income Clearing Corporation (FICC) under the sponsored member program, without taking into consideration the related collateral, as of December 31, 2022. As of December 31, 2021, there was a $2.3 billion guarantee to the FICC; Northern Trust became a sponsored member during the third quarter of 2021.

Undrawn Commitments generally have fixed expiration dates or other termination clauses. Since a significant portion of the commitments are expected to expire without being drawn upon, the total commitment amount does not necessarily represent future loans or liquidity requirements.

Standby Letters of Credit obligate Northern Trust to meet certain financial obligations of its clients, if, under the contractual terms of the agreement, the clients are unable to do so. These instruments are primarily issued to support public and private financial commitments, including commercial paper, bond financing, initial margin requirements on futures exchanges, and similar transactions. Northern Trust is obligated to meet the entire financial obligation of these agreements and in certain cases is able to recover the amounts paid through recourse against collateral received or other participants.

Financial Guarantees are issued by Northern Trust to guarantee the performance of a client to a third party under certain arrangements.

Commercial Letters of Credit are instruments issued by Northern Trust on behalf of its clients that authorize a third party (the beneficiary) to draw drafts up to a stipulated amount under the specified terms and conditions of the agreement and other similar instruments. Commercial letters of credit are issued primarily to facilitate international trade.

Securities Lent with Indemnification involves Northern Trust lending securities owned by clients to borrowers who are reviewed and approved by the Northern Trust Capital Markets Credit Committee, as part of its securities custody activities and at the direction of its clients. In connection with these activities, Northern Trust has issued indemnifications to certain clients against certain losses that are a direct result of a borrower’s failure to return securities when due, should the value of such securities exceed the value of the collateral required to be posted. Borrowers are required to collateralize fully securities received with cash or marketable securities. As securities are loaned, collateral is maintained at a minimum 100% of the fair value of the securities plus accrued interest. The collateral is revalued on a daily basis. The amount of securities loaned as of December 31, 2022 and 2021 subject to indemnification was $130.3 billion and $170.4 billion, respectively. Because of the credit quality of the borrowers and the requirement to fully collateralize securities borrowed, management believes that the exposure to credit loss from this activity is not significant and no liability was recorded at December 31, 2022, or 2021 related to these indemnifications.

Unsettled Repurchase and Reverse Repurchase Agreements. Northern Trust enters into repurchase agreements and reverse repurchase agreements which may settle at a future date. In repurchase agreements, Northern Trust receives cash from and provides securities as collateral to a counterparty. In reverse repurchase agreements, Northern Trust advances cash to and receives securities as collateral from a counterparty. These transactions are recorded on the consolidated balance sheets on the settlement date. As of December 31, 2022, there were no unsettled repurchase agreements and $496.8 million of unsettled reverse repurchase agreements. As of December 31, 2021, there were no unsettled repurchase or reverse repurchase agreements.

Sponsored Member Program. Northern Trust is an approved Government Securities Division (GSD) netting and sponsoring member in the FICC sponsored member program, through which Northern Trust submits eligible repurchase and reverse repurchase transactions in U.S. government securities between Northern Trust and its sponsored member clients for novation and clearing. Northern Trust may sponsor clients to clear their eligible repurchase transactions with the FICC. As a sponsoring member, Northern Trust guarantees to the FICC the prompt and full payment and performance of its sponsored member clients' respective obligations under the FICC GSD's rules. To mitigate Northern Trust's credit exposure under this guarantee, Northern Trust obtains a security interest in its sponsored member clients' collateral. Please refer to Note 27, "Offsetting of Assets and Liabilities" for additional information on Northern Trust's repurchase and reverse repurchase agreements.

Clearing and Settlement Organizations. The Bank is a participating member of various cash, securities and foreign exchange clearing and settlement organizations. It participates in these organizations on behalf of its clients and on its own behalf as a result of its own activities. A wide variety of cash and securities transactions are settled through these organizations, including those involving U.S. Treasuries, obligations of states and political subdivisions, asset-backed securities, commercial paper, dollar placements, and securities issued by the Government National Mortgage Association.

Certain of these industry clearing and settlement exchanges require their members to guarantee their obligations and liabilities and/or to provide liquidity support in the event other members do not honor their obligations as stipulated in each clearing organization's membership agreement. Exposure related to these agreements varies, primarily as a result of fluctuations in the volume of transactions cleared through the organizations. At December 31, 2022 and 2021, Northern Trust has not recorded any material liabilities under these arrangements as Northern Trust believes the likelihood that a clearing or settlement exchange (of which Northern Trust is a member) would become insolvent is remote. Controls related to these clearing transactions are closely monitored by management to protect the assets of Northern Trust and its clients.

Legal Proceedings. In the normal course of business, the Corporation and its subsidiaries are routinely defendants in or parties to pending and threatened legal actions, and are subject to regulatory examinations, information-gathering requests, investigations, and proceedings, both formal and informal. In certain legal actions, claims for substantial monetary damages are asserted. In regulatory matters, claims for disgorgement, restitution, penalties and/or other remedial actions or sanctions may be sought.

Based on current knowledge, after consultation with legal counsel and after taking into account current accruals, management does not believe that losses, fines or penalties, if any, arising from pending litigation or threatened legal actions or regulatory matters either individually or in the aggregate, after giving effect to applicable reserves and insurance coverage will have a material adverse effect on the consolidated financial position or liquidity of the Corporation, although such matters could have a material adverse effect on the Corporation's operating results for a particular period.

Under GAAP, (i) an event is "probable" if the "future event or events are likely to occur"; (ii) an event is "reasonably possible" if "the chance of the future event or events occurring is more than remote but less than likely"; and (iii) an event is "remote" if "the chance of the future event or events occurring is slight."

The outcome of litigation and regulatory matters is inherently difficult to predict and/or the range of loss often cannot be reasonably estimated, particularly for matters that (i) will be decided by a jury, (ii) are in early stages, (iii) involve uncertainty as to the likelihood of a class being certified or the ultimate size of the class, (iv) are subject to appeals or motions, (v) involve significant factual issues to be resolved, including with respect to the amount of damages, (vi) do not specify the amount of damages sought or (vii) seek very large damages based on novel and complex damage and liability legal theories. Accordingly, the Corporation cannot reasonably estimate the eventual outcome of these pending matters, the timing of their ultimate resolution or what the eventual loss, fines or penalties, if any, related to each pending matter will be.

In accordance with applicable accounting guidance, the Corporation records accruals for litigation and regulatory matters when those matters present loss contingencies that are both probable and reasonably estimable. When loss contingencies are not both probable and reasonably estimable, the Corporation does not record accruals. No material accruals have been recorded for pending litigation or threatened legal actions or regulatory matters.

For a limited number of matters for which a loss is reasonably possible in future periods, whether in excess of an accrued liability or where there is no accrued liability, the Corporation is able to estimate a range of possible loss. As of December 31, 2022, the Corporation has estimated the range of reasonably possible loss for these matters to be from zero to approximately $20 million in the aggregate. The Corporation's estimate with respect to the aggregate range of reasonably possible loss is based upon currently available information and is subject to significant judgment and a variety of assumptions and known and unknown uncertainties. The matters underlying the estimated range will change from time to time, and actual results may vary significantly from the current estimate.

In certain other pending matters, there may be a range of reasonably possible loss (including reasonably possible loss in excess of amounts accrued) that cannot be reasonably estimated for the reasons described above. Such matters are not included in the estimated range of reasonably possible loss discussed above.

In 2015, Northern Trust Fiduciary Services (Guernsey) Limited (NTFS), an indirect subsidiary of the Corporation, was charged by a French investigating magistrate judge with complicity in estate tax fraud in connection with the administration of two trusts for which it serves as trustee. Charges also were brought against a number of other persons and entities related to this matter. In 2017, a French court found no estate tax fraud had occurred and NTFS and all other persons and entities charged were acquitted. The Public Prosecutor's Office of France appealed the court decision and in June 2018 a French appellate court issued its opinion on the matter, acquitting all persons and entities charged, including NTFS. In January 2021, the Cour de Cassation, the highest court in France, reversed the June 2018 appellate court ruling, requiring a re-trial at the appellate court level. The re-trial proceedings in the appellate court are scheduled to commence in September 2023. As trustee, NTFS provided no tax advice and had no involvement in the preparation or filing of the challenged estate tax filings.

Visa Class B Common Shares. Northern Trust, as a member of Visa U.S.A. Inc. (Visa U.S.A.) and in connection with the 2007 restructuring of Visa U.S.A. and its affiliates and the 2008 initial public offering of Visa Inc. (Visa), received certain Visa Class B common shares. The Visa Class B common shares are subject to certain selling restrictions until the final resolution of certain litigation related to interchange fees involving Visa (the covered litigation), at which time the shares are convertible into Visa Class A common shares based on a conversion rate dependent upon the ultimate cost of resolving the covered litigation. Since 2018, Visa has deposited an additional $2.1 billion into an escrow account previously established with respect to the covered litigation. As a result of the additional contributions to the escrow account, the rate at which Visa Class B common shares will convert into Visa Class A common shares was reduced.

In September 2018, Visa reached a proposed class settlement agreement covering damage claims but not injunctive relief claims regarding the covered litigation. In December 2019, the district court granted final approval for the proposed class settlement agreement. Certain merchants have opted out of the class settlement and are pursuing claims separately, while other merchants have appealed the approval order granted by the district court. The ultimate resolution of the covered litigation, the timing for removal of the selling restrictions on the Visa Class B common shares and the rate at which such shares will ultimately convert into Visa Class A common shares are uncertain.

In June 2016 and 2015, Northern Trust recorded a $123.1 million and $99.9 million net gain on the sale of 1.1 million and 1.0 million of its Visa Class B common shares, respectively. These sales do not affect Northern Trust's risk related to the impact of the covered litigation on the rate at which such shares will ultimately convert into Visa Class A common shares. Northern Trust continued to hold approximately 4.1 million Visa Class B common shares, which are recorded at their original cost basis of zero, as of both December 31, 2022 and 2021.

Note 26 – Derivative Financial Instruments

Northern Trust is a party to various derivative financial instruments that are used in the normal course of business to meet the needs of its clients, as part of its trading activity for its own account; and as part of its risk management activities. These instruments may include foreign exchange contracts, interest rate contracts, total return swap contracts, and swaps related to the sale of certain Visa Class B common shares. Please refer to Note 1, "Summary of Significant Accounting Policies" for the significant accounting policies for derivative financial instruments.

Foreign exchange contracts are agreements to exchange specific amounts of currencies at a future date, at a specified rate of exchange. Foreign exchange contracts are entered into primarily to meet the foreign exchange needs of clients. Foreign exchange contracts are also used for trading and risk management purposes. For risk management purposes, Northern Trust uses foreign exchange contracts to reduce its exposure to changes in foreign exchange rates relating to certain forecasted non-functional currency denominated revenue and expenditure transactions, foreign-currency-denominated assets and liabilities, including debt securities and net investments in non-U.S. affiliates.

Interest rate contracts include swap and option contracts. Interest rate swap contracts involve the exchange of fixed and floating rate interest payment obligations without the exchange of the underlying principal amounts. Northern Trust enters into interest rate swap contracts with its clients and also may utilize such contracts to reduce or eliminate the exposure to changes in the cash flows or fair value of hedged assets or liabilities due to changes in interest rates. Interest rate option contracts may include caps, floors, collars and swaptions, and provide for the transfer or reduction of interest rate risk, typically in exchange for a fee. Northern Trust enters into option contracts primarily as a seller of interest rate protection to clients. Northern Trust receives a fee at the outset of the agreement for the assumption of the risk of an unfavorable change in interest rates. This assumed interest rate risk is then mitigated by entering into an offsetting position with an outside counterparty. Northern Trust may also purchase or enter into option contracts for risk management purposes including to reduce the exposure to changes in the cash flows of hedged assets due to changes in interest rates.

The following table shows the notional and fair values of all derivative financial instruments as of December 31, 2022 and 2021.

TABLE 123: NOTIONAL AND FAIR VALUES OF DERIVATIVE FINANCIAL INSTRUMENTS

	DECEMBER 31, 2022			DECEMBER 31, 2021		
		FAIR VALUE			FAIR VALUE	
(In Millions)	NOTIONAL VALUE	ASSET[1]	LIABILITY[2]	NOTIONAL VALUE	ASSET[1]	LIABILITY[2]
Derivatives Designated as Hedging under GAAP						
Interest Rate Contracts						
Fair Value Hedges	**$ 4,622.0**	**$ 58.5**	**$ 32.7**	$ 4,430.5	$ 7.6	$ 8.7
Foreign Exchange Contracts						
Cash Flow Hedges	**150.9**	**7.4**	**5.7**	3,697.9	61.8	12.6
Net Investment Hedges	**3,765.0**	**283.5**	**12.7**	4,161.8	183.3	12.3
Total Derivatives Designated as Hedging under GAAP	**$ 8,537.9**	**$ 349.4**	**$ 51.1**	$ 12,290.2	$ 252.7	$ 33.6
Derivatives Not Designated as Hedging under GAAP						
Non-Designated Risk Management Derivatives						
Foreign Exchange Contracts	**$ 55.9**	**$ 0.1**	**$ 0.1**	$ 109.9	$ 0.2	$ 0.6
Other Financial Derivatives[3]	**717.7**	**0.3**	**34.8**	738.5	—	37.5
Total Non-Designated Risk Management Derivatives	**$ 773.6**	**$ 0.4**	**$ 34.9**	$ 848.4	$ 0.2	$ 38.1
Client-Related and Trading Derivatives						
Foreign Exchange Contracts	**$ 288,994.6**	**$ 3,219.1**	**$ 3,169.0**	$ 315,532.3	$ 1,962.1	$ 1,973.3
Interest Rate Contracts	**12,378.2**	**163.5**	**399.1**	11,570.1	132.4	90.2
Total Client-Related and Trading Derivatives	**$ 301,372.8**	**$ 3,382.6**	**$ 3,568.1**	$ 327,102.4	$ 2,094.5	$ 2,063.5
Total Derivatives Not Designated as Hedging under GAAP	**$ 302,146.4**	**$ 3,383.0**	**$ 3,603.0**	$ 327,950.8	$ 2,094.7	$ 2,101.6
Total Gross Derivatives	**$ 310,684.3**	**$ 3,732.4**	**$ 3,654.1**	$ 340,241.0	$ 2,347.4	$ 2,135.2
Less: Netting[4]		**2,810.7**	**1,865.9**		1,533.8	1,283.5
Total Derivative Financial Instruments		**$ 921.7**	**$ 1,788.2**		$ 813.6	$ 851.7

(1) *Derivative assets are reported in Other Assets on the consolidated balance sheets.*
(2) *Derivative liabilities are reported in Other Liabilities on the consolidated balance sheets.*
(3) *This line includes swaps related to sales of certain Visa Class B common shares and total return swap contracts.*
(4) *See further detail in Note 27, "Offsetting of Assets and Liabilities."*

Notional amounts of derivative financial instruments do not represent credit risk, and are not recorded on the consolidated balance sheets. They are used merely to express the volume of this activity. Northern Trust's credit-related risk of loss is limited to the positive fair value of the derivative instrument, net of any collateral received, which is significantly less than the notional amount.

Hedging Derivative Instruments Designated under GAAP. Northern Trust uses derivative instruments to hedge its exposure to foreign currency, interest rate, and equity price. Certain hedging relationships are formally designated and qualify for hedge accounting under GAAP as fair value, cash flow or net investment hedges. Other derivatives that are entered into for risk management purposes as economic hedges are not formally designated as hedges and changes in fair value are recognized currently in Other Operating Income within the consolidated statements of income (see below section "Derivative Instruments Not Designated as Hedging under GAAP").

Fair Value Hedges. Derivatives are designated as fair value hedges to limit Northern Trust's exposure to changes in the fair value of assets and liabilities due to movements in interest rates.

Cash Flow Hedges. Derivatives are also designated as cash flow hedges in order to minimize the variability in cash flows of earning assets or forecasted transactions caused by movements in interest or foreign exchange rates.

There were no material gains or losses reclassified into earnings during the years ended December 31, 2022, 2021, and 2020 as a result of the discontinuance of cash flow hedges of forecasted transactions that were no longer probable of occurring. It is estimated that net gains of $1.7 million will be reclassified into net income within the next twelve months relating to cash flow hedges of foreign-currency-denominated transactions. As of December 31, 2022, 8 months was the maximum length of time over which the exposure to variability in future cash flows of forecasted foreign-currency-denominated transactions was being hedged.

The following table provides fair value and cash flow hedge derivative gains and losses recognized in income during the years ended December 31, 2022, 2021 and 2020.

TABLE 124: LOCATION AND AMOUNT OF FAIR VALUE AND CASH FLOW HEDGE DERIVATIVE GAINS AND LOSSES RECORDED IN INCOME

(in Millions)	INTEREST INCOME			INTEREST EXPENSE			OTHER OPERATING INCOME		
For the Year Ended December 31,	**2022**	2021	2020	**2022**	2021	2020	**2022**	2021	2020
Total amounts on the consolidated statements of income	**$2,877.7**	$1,406.5	$1,643.5	**$ 990.5**	$ 23.8	$ 200.3	**$ 191.3**	$ 243.9	$ 194.0
Gains (Losses) on fair value hedges recognized on									
Interest Rate Contracts									
Recognized on derivatives	**82.8**	39.1	(66.3)	**(373.4)**	(161.6)	100.2	**—**	—	—
Recognized on hedged items	**(82.8)**	(39.1)	66.3	**373.4**	161.6	(100.2)	**—**	—	—
Amounts related to interest settlements on derivatives	**(4.4)**	(16.2)	(13.2)	**24.1**	57.1	29.9	**—**	—	—
Total gains (losses) recognized on fair value hedges	**$ (4.4)**	$ (16.2)	$ (13.2)	**$ 24.1**	$ 57.1	$ 29.9	**$ —**	$ —	$ —
Gains (Losses) on cash flow hedges recognized on									
Foreign Exchange Contracts									
Net gains (losses) reclassified from AOCI to net income	**$ 0.6**	$ 10.5	$ 27.4	**$ —**	$ —	$ —	**$ (4.3)**	$ (6.0)	$ 0.2
Interest Rate Contracts									
Net gains (losses) reclassified from AOCI to net income	**—**	—	0.5	**—**	—	—	**—**	—	—
Total gains (losses) reclassified from AOCI to net income on cash flow hedges	**$ 0.6**	$ 10.5	$ 27.9	**$ —**	$ —	$ —	**$ (4.3)**	$ (6.0)	$ 0.2

The following table provides the impact of fair value hedge accounting on the carrying value of the designated hedged items as of December 31, 2022 and 2021.

TABLE 125: HEDGED ITEMS IN FAIR VALUE HEDGES

(In Millions)	**DECEMBER 31, 2022**		DECEMBER 31, 2021	
	CARRYING VALUE OF THE HEDGED ITEMS	**CUMULATIVE HEDGE ACCOUNTING BASIS ADJUSTMENT(1)(3)**	CARRYING VALUE OF THE HEDGED ITEMS	CUMULATIVE HEDGE ACCOUNTING BASIS ADJUSTMENT(2)(3)
Available for Sale Debt Securities(4)	**$ 1,820.8**	**$ (60.2)**	$ 1,677.4	$ 11.1
Senior Notes and Long-Term Subordinated Debt	**2,746.2**	**(294.0)**	2,745.6	59.5
Total	**$ 4,567.0**	**$ (354.2)**	$ 4,423.0	$ 70.6

(1) The cumulative hedge accounting basis adjustment includes $7.3 million related to discontinued hedging relationships of AFS debt securities as of December 31, 2022. There are no amounts related to discontinued hedging relationships in the cumulative hedge accounting basis adjustment of senior notes and long-term debt as of December 31, 2022.
(2) The cumulative hedge accounting basis adjustment includes $9.6 million related to discontinued hedging relationships of AFS debt securities as of December 31, 2021. There were no amounts related to discontinued hedging relationships in the cumulative hedge accounting basis adjustment of senior notes and long-term debt as of December 31, 2021.
(3) Positive (negative) amounts related to AFS securities represent cumulative fair value hedge basis adjustments that will reduce (increase) net interest income in future periods. Positive (negative) amounts related to Senior Notes and Long-Term Subordinated Debt represent cumulative fair value hedge basis adjustments that will increase (reduce) net interest income in future periods.
(4) Carrying value represents amortized cost.

Net Investment Hedges. Certain foreign exchange contracts are designated as net investment hedges to minimize Northern Trust's exposure to variability in the foreign currency translation of net investments in non-U.S. branches and subsidiaries. Net investment hedge gains of $278.7 million and $186.6 million were recognized in AOCI related to foreign exchange contracts for the years ended December 31, 2022 and 2021, respectively.

Derivative Instruments Not Designated as Hedging under GAAP. Northern Trust's derivative instruments that are not designated as hedging under GAAP include derivatives for purposes of client-related and trading activities, as well as other risk management purposes. These activities consist principally of providing foreign exchange services to clients in connection with Northern Trust's global custody business. However, in the normal course of business, Northern Trust also engages in trading of currencies for its own account.

Non-designated risk management derivatives include foreign exchange contracts entered into to manage the foreign currency risk of non-U.S.-dollar-denominated assets and liabilities, the net investment in certain non-U.S. affiliates, commercial loans, and forecasted foreign-currency-denominated transactions. Swaps related to sales of certain Visa Class B common shares were entered into pursuant to which Northern Trust retains the risks associated with the ultimate conversion of the Visa Class B common shares into Visa Class A common shares. Total return swaps are entered into to manage the equity price risk associated with certain investments.

Changes in the fair value of derivative instruments not designated as hedges under GAAP are recognized currently in income. The following table provides the location and amount of gains and losses recorded on the consolidated statements of income for the years ended December 31, 2022, 2021, and 2020 for derivative instruments not designated as hedges under GAAP.

TABLE 126: LOCATION AND AMOUNT OF GAINS AND LOSSES RECORDED IN INCOME FOR DERIVATIVES NOT DESIGNATED AS HEDGING UNDER GAAP

(In Millions)	DERIVATIVE GAINS (LOSSES) LOCATION RECOGNIZED IN INCOME	AMOUNT OF DERIVATIVE GAINS (LOSSES) RECOGNIZED IN INCOME		
		2022	2021	2020
Non-designated risk management derivatives				
Foreign Exchange Contracts	Other Operating Income	**$ (3.1)**	$ 1.2	$ 6.4
Other Financial Derivatives[1]	Other Operating Income	**(22.2)**	(21.3)	(18.3)
Gains (Losses) from non-designated risk management derivatives		**$ (25.3)**	$ (20.1)	$ (11.9)
Client-related and trading derivatives				
Foreign Exchange Contracts	Foreign Exchange Trading Income	**$ 288.6**	$ 292.6	$ 290.4
Interest Rate Contracts	Security Commissions and Trading Income	**9.6**	15.7	22.4
Gains (Losses) from client-related and trading derivatives		**$ 298.2**	$ 308.3	$ 312.8
Total gains (losses) from derivatives not designated as hedging under GAAP		**$ 272.9**	$ 288.2	$ 300.9

[1] This line includes swaps related to the sale of certain Visa Class B common shares and total return swap contracts.

Note 27 – Offsetting of Assets and Liabilities

The following table provides information regarding the offsetting of derivative assets and of securities purchased under agreements to resell within the consolidated balance sheets as of December 31, 2022 and 2021.

TABLE 127: OFFSETTING OF DERIVATIVE ASSETS AND SECURITIES PURCHASED UNDER AGREEMENTS TO RESELL

	DECEMBER 31, 2022				
(In Millions)	GROSS RECOGNIZED ASSETS	GROSS AMOUNTS OFFSET IN THE BALANCE SHEET(3)	NET AMOUNTS PRESENTED IN THE BALANCE SHEET	GROSS AMOUNTS NOT OFFSET IN THE BALANCE SHEET(4)	NET AMOUNT(5)
Derivative Assets(1)					
Foreign Exchange Contracts Over the Counter (OTC)	**$ 2,928.9**	**$ 2,666.4**	**$ 262.5**	**$ 5.0**	**$ 257.5**
Interest Rate Swaps OTC	**217.6**	**144.3**	**73.3**	**—**	**73.3**
Interest Rate Swaps Exchange Cleared	**4.4**	**—**	**4.4**	**—**	**4.4**
Other Financial Derivative	**0.3**	**—**	**0.3**	**—**	**0.3**
Total Derivatives Subject to a Master Netting Arrangement	**3,151.2**	**2,810.7**	**340.5**	**5.0**	**335.5**
Total Derivatives Not Subject to a Master Netting Arrangement	**581.2**	**—**	**581.2**	**—**	**581.2**
Total Derivatives	**3,732.4**	**2,810.7**	**921.7**	**5.0**	**916.7**
Securities Purchased under Agreements to Resell(2)	**$ 12,494.2**	**$ 11,423.9**	**$ 1,070.3**	**$ 1,070.3**	**$ —**

	DECEMBER 31, 2021				
(In Millions)	GROSS RECOGNIZED ASSETS	GROSS AMOUNTS OFFSET IN THE BALANCE SHEET(3)	NET AMOUNTS PRESENTED IN THE BALANCE SHEET	GROSS AMOUNTS NOT OFFSET IN THE BALANCE SHEET(4)	NET AMOUNT(5)
Derivative Assets(1)					
Foreign Exchange Contracts OTC	$ 1,762.7	$ 1,530.7	$ 232.0	$ 2.8	$ 229.2
Interest Rate Swaps OTC	140.0	3.1	136.9	—	136.9
Total Derivatives Subject to a Master Netting Arrangement	1,902.7	1,533.8	368.9	2.8	366.1
Total Derivatives Not Subject to a Master Netting Arrangement	444.7	—	444.7	—	444.7
Total Derivatives	2,347.4	1,533.8	813.6	2.8	810.8
Securities Purchased under Agreements to Resell(2)	$ 2,078.9	$ 1,392.5	$ 686.4	$ 686.4	$ —

(1) Derivative assets are reported in Other Assets on the consolidated balance sheets. Other Assets (excluding derivative assets) totaled $8.9 billion and $7.8 billion as of December 31, 2022 and 2021, respectively.
(2) Offsetting of Securities Purchased under Agreements to Resell relates to our involvement in FICC.
(3) Including cash collateral received from counterparties.
(4) Including financial assets accepted as collateral which are received from counterparties.
(5) Northern Trust did not possess any cash collateral that was not offset on the consolidated balance sheets that could have been used to offset the net amounts presented on the consolidated balance sheets as of December 31, 2022 and 2021.

The following table provides information regarding the offsetting of derivative liabilities and of securities sold under agreements to repurchase within the consolidated balance sheets as of December 31, 2022 and 2021.

TABLE 128: OFFSETTING OF DERIVATIVE LIABILITIES AND SECURITIES SOLD UNDER AGREEMENTS TO REPURCHASE

	DECEMBER 31, 2022				
(In Millions)	GROSS RECOGNIZED LIABILITIES	GROSS AMOUNTS OFFSET IN THE BALANCE SHEET[3]	NET AMOUNTS PRESENTED IN THE BALANCE SHEET	GROSS AMOUNTS NOT OFFSET IN THE BALANCE SHEET[4]	NET AMOUNT[5]
Derivative Liabilities[1]					
Foreign Exchange Contracts OTC	$ **2,082.3**	$ **1,826.7**	$ **255.6**	$ **—**	$ **255.6**
Interest Rate Swaps OTC	**426.5**	**5.9**	**420.6**	**—**	**420.6**
Interest Rate Swaps Exchange Cleared	**5.3**	**—**	**5.3**	**—**	**5.3**
Other Financial Derivatives	**34.8**	**33.3**	**1.5**	**—**	**1.5**
Total Derivatives Subject to a Master Netting Arrangement	**2,548.9**	**1,865.9**	**683.0**	**—**	**683.0**
Total Derivatives Not Subject to a Master Netting Arrangement	**1,105.2**	**—**	**1,105.2**	**—**	**1,105.2**
Total Derivatives	**3,654.1**	**1,865.9**	**1,788.2**	**—**	**1,788.2**
Securities Sold under Agreements to Repurchase[2]	$ **11,991.1**	$ **11,423.9**	$ **567.2**	$ **567.2**	$ **—**

	DECEMBER 31, 2021				
(In Millions)	GROSS RECOGNIZED LIABILITIES	GROSS AMOUNTS OFFSET IN THE BALANCE SHEET[3]	NET AMOUNTS PRESENTED IN THE BALANCE SHEET	GROSS AMOUNTS NOT OFFSET IN THE BALANCE SHEET[4]	NET AMOUNT[5]
Derivative Liabilities[1]					
Foreign Exchange Contracts OTC	$ 1,430.1	$ 1,234.5	$ 195.6	$ —	$ 195.6
Interest Rate Swaps OTC	98.7	48.1	50.6	—	50.6
Interest Rate Swaps Exchange Cleared	0.2	—	0.2	—	0.2
Other Financial Derivatives	37.5	0.9	36.6	—	36.6
Total Derivatives Subject to a Master Netting Arrangement	1,566.5	1,283.5	283.0	—	283.0
Total Derivatives Not Subject to a Master Netting Arrangement	568.7	—	568.7	—	568.7
Total Derivatives	2,135.2	1,283.5	851.7	—	851.7
Securities Sold under Agreements to Repurchase[2]	$ 1,924.4	$ 1,392.5	$ 531.9	$ 531.9	$ —

(1) Derivative liabilities are reported in Other Liabilities on the consolidated balance sheets. Other Liabilities (excluding derivative liabilities) totaled $3.2 billion and $3.3 billion as of December 31, 2022 and 2021, respectively.
(2) Offsetting of Securities Sold under Agreements to Repurchase relates to our involvement in FICC.
(3) Including cash collateral deposited with counterparties.
(4) Including financial assets accepted as collateral which are deposited with counterparties.
(5) Northern Trust did not place any cash collateral with counterparties that was not offset on the consolidated balance sheets that could have been used to offset the net amounts presented on the consolidated balance sheets as of December 31, 2022 and 2021.

All of Northern Trust’s securities sold under agreements to repurchase (repurchase agreements) and securities purchased under agreements to resell (reverse repurchase agreements) involve the transfer of financial assets in exchange for cash subject to a right and obligation to repurchase those assets for an agreed upon amount. In the event of a repurchase failure, the cash or financial assets are available for offset. All of Northern Trust’s repurchase agreements and reverse repurchase agreements are subject to a master netting arrangement, which sets forth the rights and obligations for repurchase and offset. Under the master netting arrangement, Northern Trust is entitled to set off receivables from and collateral placed with a single counterparty against obligations owed to that counterparty. In addition, collateral held by Northern Trust can be offset against receivables from that counterparty. Northern Trust’s repurchase agreements and reverse repurchase agreements, other than those in which the counterparty is FICC, do not meet the requirements to net under GAAP.

Derivative asset and liability positions with a single counterparty can be offset against each other in cases where legally enforceable master netting arrangements or similar agreements exist. Derivative assets and liabilities can be further offset by cash collateral received from, and deposited with, the transacting counterparty. The basis for this view is that, upon termination of transactions subject to a master netting arrangement or similar agreement, the individual derivative receivables do not represent resources to which general creditors have rights and individual derivative payables do not represent claims that are equivalent to the claims of general creditors.

Credit risk associated with derivative instruments relates to the failure of the counterparty and the failure of Northern Trust to pay based on the contractual terms of the agreement, and is generally limited to the unrealized fair value gains and losses on these instruments, net of any collateral received or deposited. The amount of credit risk will increase or decrease during the lives of the instruments as interest rates, foreign exchange rates, or equity prices fluctuate. Northern Trust's risk is controlled by limiting such activity to an approved list of counterparties and by subjecting such activity to the same credit and quality controls as are followed in lending and investment activities. Credit Support Annexes and other similar agreements are currently in place with a number of Northern Trust's counterparties which mitigate the aforementioned credit risk associated with derivative activity conducted with those counterparties by requiring that significant net unrealized fair value gains be supported by collateral placed with Northern Trust.

Additional cash collateral received from and deposited with derivative counterparties totaling $131.8 million and $26.3 million, respectively, as of December 31, 2022, and $93.5 million and $43.4 million, respectively, as of December 31, 2021, was not offset against derivative assets and liabilities on the consolidated balance sheets as the amounts exceeded the net derivative positions with those counterparties.

Certain master netting arrangements Northern Trust enters into with derivative counterparties contain credit risk-related contingent features in which the counterparty has the option to declare Northern Trust in default and accelerate cash settlement of net derivative liabilities with the counterparty in the event Northern Trust's credit rating falls below specified levels. The aggregate fair value of all derivative instruments with credit-risk-related contingent features that were in a liability position was $190.9 million and $111.5 million at December 31, 2022 and 2021, respectively. Cash collateral amounts deposited with derivative counterparties on those dates included $55.1 million and $84.2 million, respectively, posted against these liabilities, resulting in a net maximum amount of termination payments that could have been required at December 31, 2022 and 2021 of $135.8 million and $27.3 million, respectively. Accelerated settlement of these liabilities would not have a material effect on the consolidated financial position or liquidity of Northern Trust.

Note 28 – Variable Interest Entities

Variable Interest Entities (VIEs) are defined within GAAP as entities which either (1) lack sufficient equity at risk to permit the entity to finance its activities without additional subordinated financial support, (2) have equity investors that lack attributes typical of an equity investor, such as the ability to make significant decisions through voting rights affecting the entity's operations, or the obligation to absorb expected losses or the right to receive residual returns of the entity, or (3) are structured with voting rights that are disproportionate to the equity investor's obligation to absorb losses or right to receive returns, and substantially all of the activities are conducted on behalf of the holder of the equity investment at risk with disproportionately few voting rights. Investors that finance a VIE through debt or equity interests are variable interest holders in the entity and the variable interest holder, if any, that has both the power to direct the activities that most significantly impact the entity's economic performance and, through its variable interest, the obligation to absorb losses or the right to receive returns that could potentially be significant to the entity is deemed to be the VIE's primary beneficiary and is required to consolidate the VIE.

Tax Credit Structures. Northern Trust invests in qualified affordable housing projects and community development entities (collectively, community development projects) that are designed to generate a return primarily through the realization of tax credits. The community development projects are formed as limited partnerships and limited liability companies in which Northern Trust invests as a limited partner/investor member through equity contributions. The economic performance of the community development projects, some of which are VIEs, is subject to the performance of their underlying investment and their ability to operate in compliance with the rules and regulations necessary for the qualification of tax credits generated by equity investments. Northern Trust has determined that it is not the primary beneficiary of any community development project VIEs as it lacks the power to direct the activities that most significantly impact the economic performance of the underlying investments or to affect their ability to operate in compliance with the rules and regulations necessary for the qualification of tax credits generated by equity investments. This power is held by the general partners and managing members who exercise full and exclusive control of the operations of the community development project VIEs.

Northern Trust's maximum exposure to loss as a result of its involvement with community development projects is limited to the carrying amounts of its investments, including any undrawn commitments. As of December 31, 2022 and 2021, the carrying amounts of these investments in community development projects that generate tax credits, included in Other Assets on the consolidated balance sheets, totaled $904.3 million and $916.8 million, respectively, of which $867.2 million and $880.0 million are VIEs as of December 31, 2022 and 2021, respectively. As of December 31, 2022 and 2021, liabilities related to unfunded commitments on investments in tax credit community development projects, included in Other Liabilities on the consolidated balance sheets, totaled $218.9 million and $289.3 million, respectively, of which $210.1 million and $280.5 million related to undrawn commitments on VIEs as of December 31, 2022 and 2021, respectively.

Northern Trust's funding requirements are limited to its invested capital and undrawn commitments for future equity contributions. Northern Trust has no exposure to loss from liquidity arrangements and no obligation to purchase assets of the community development projects.

Tax credits and other tax benefits attributable to community development projects totaled $99.1 million and $87.2 million, respectively, as of December 31, 2022 and 2021.

Investment Funds. Northern Trust acts as asset manager for various funds in which clients of Northern Trust are investors. As an asset manager of funds, Northern Trust earns a competitively priced fee that is based on assets managed and varies with each fund's investment objective. Based on its analysis, Northern Trust has determined that it is not the primary beneficiary of these VIEs under GAAP.

Some of the funds for which Northern Trust acts as asset manager comply or operate in accordance with requirements that are similar to those in Rule 2a-7 of the Investment Company Act of 1940 for registered money market funds and therefore the funds are exempt from the consolidation requirements in ASC 810-10. Northern Trust voluntarily waived $64.2 million of money market fund fees for the year ended December 31, 2022 related to certain competitive factors. Northern Trust voluntarily waived $287.8 million of money market mutual fund fees for the year ended December 31, 2021 related to the low-interest-rate environment and certain competitive factors. Northern Trust does not have any contractual obligations to provide financial support to the funds. Any potential future support of the funds will be at the discretion of Northern Trust after an evaluation of the specific facts and circumstances.

Periodically, Northern Trust makes seed capital investments to certain funds. As of December 31, 2022, Northern Trust had $19.9 million of investments valued using net asset value per share and included in Other Assets and had no unfunded commitments related to seed capital investments. As of December 31, 2021, Northern Trust had no seed capital investments and no unfunded commitments related to seed capital investments.

Note 29 – Pledged and Restricted Assets

Pledged Assets. Certain of Northern Trust's subsidiaries, as required or permitted by law, pledge assets to secure public and trust deposits, repurchase agreements and borrowings, as well as for other purposes, including support for securities settlement, primarily related to client activities, and for derivative contracts.

The following table presents Northern Trust's pledged assets.

TABLE 129: TYPE OF PLEDGED ASSETS

	FOR THE YEAR ENDED DECEMBER 31,	
(In Billions)	**2022**	2021
Securities		
Obligations of States and Political Subdivisions	**$ 3.2**	$ 3.7
Government Sponsored Agency and Other Securities	**28.2**	35.6
Loans	**11.8**	15.3
Total Pledged Assets	**$ 43.2**	$ 54.6

Collateral required for these purposes totaled $8.7 billion and $5.6 billion at December 31, 2022 and 2021, respectively.

The following table presents the AFS debt securities pledged as collateral that are included in pledged assets.

TABLE 130: FAIR VALUE OF AVAILABLE FOR SALE DEBT SECURITIES INCLUDED IN PLEDGED ASSETS

	SECURITIES SOLD UNDER AGREEMENTS TO REPURCHASE		DERIVATIVE CONTRACTS	
(In Millions)	**DECEMBER 31, 2022**	DECEMBER 31, 2021	**DECEMBER 31, 2022**	DECEMBER 31, 2021
Debt Securities				
Available for Sale	**$ 464.7**	$ 524.1	**$ 34.7**	$ 17.6

The secured parties to these transactions have the right to repledge or sell the securities as it relates to $464.7 million and $524.1 million of the pledged collateral as of December 31, 2022 and 2021, respectively.

Northern Trust accepts financial assets as collateral that it may, in some instances, be permitted to repledge or sell. The collateral is generally obtained under certain reverse repurchase agreements and derivative contracts.

The following table presents the fair value of securities accepted as collateral.

TABLE 131: ACCEPTED COLLATERAL

	FOR THE YEAR ENDED DECEMBER 31,	
(In Millions)	**2022**	2021
Collateral that may be repledged or sold		
Reverse repurchase agreements[1]	**$ 12,119.4**	$ 1,457.0
Derivative contracts	**5.0**	2.8
Collateral that may not be repledged or sold		
Reverse repurchase agreements	**450.0**	650.0
Total Collateral Accepted[2]	**$ 12,574.4**	$ 2,109.8

(1) The fair value of securities collateral that was repledged or sold totaled $11.5 billion at December 31, 2022. There was $1.4 billion repledged or sold collateral at December 31, 2021.

(2) Higher total accepted collateral was due to increased sponsored member program activity.

Restricted Assets. Certain cash may be restricted in terms of usage or withdrawal. As a result of current events involving Ukraine and the Russian Federation and related sanctions and legal restrictions in place, cash balances denominated in Russian rubles received for the benefit of certain clients in our Asset Servicing business are subject to distribution restrictions. As of December 31, 2022, these balances totaled $330.4 million and are reported in Cash and Due from Banks on the consolidated balance sheet.

At December 31, 2022 and 2021, Northern Trust held cash of $574.2 million and $641.6 million, respectively, to meet non-U.S. reserve requirements. As a result of the economic environment arising from the COVID-19 pandemic, the Federal Reserve reduced the U.S. reserve requirement to zero percent on March 26, 2020. There were no deposits required to meet Federal Reserve Bank reserve requirements at December 31, 2022 and 2021.

Note 30 – Restrictions on Subsidiary Dividends and Loans or Advances

Various federal and state statutory provisions limit the amount of dividends the Bank can pay to the Corporation without regulatory approval. Approval of the Federal Reserve Board is required for payment of any dividend by a state-chartered bank that is a member of the Federal Reserve System if the total of all dividends declared by the bank in any calendar year would exceed the total of its retained net income (as defined by regulatory agencies) for that year combined with its retained net income for the preceding two years. In addition, a state member bank may not pay a dividend in an amount greater than its “undivided profits,” as defined, without regulatory and stockholder approval.

Under Illinois law, an Illinois state bank, prior to paying a dividend, must carry over to surplus at least one-tenth of its net profits since the date of the declaration of the last preceding dividend, until the bank’s surplus is equal to its capital. In addition, an Illinois state bank may not pay any dividend in an amount greater than its net profits then on hand, after deduction of losses and bad debts (defined as debts due to a state bank on which interest is past due and unpaid for a period of six months or more, unless the same are well secured and in the process of collection).

The Bank is also prohibited under federal law from paying any dividends if the Bank is undercapitalized or if the payment of the dividends would cause the Bank to become undercapitalized. In addition, the federal regulatory agencies are authorized to prohibit a bank or bank holding company from engaging in an unsafe or unsound banking practice. The payment of dividends could, depending on the financial condition of the Bank, be deemed to constitute an unsafe or unsound practice. The Dodd-Frank Act and Basel III impose additional restrictions on the ability of banking institutions to pay dividends (e.g., the Corporation may pay dividends only in accordance with the capital plan rules and capital adequacy standards of the Federal Reserve).

Under federal law, financial transactions by the Bank, the Corporation’s insured banking subsidiary, with the Corporation and its affiliates that are in the form of loans or extensions of credit, investments, guarantees, derivative transactions, repurchase agreements, securities lending transactions or purchases of assets, are restricted. These transactions must be on terms and conditions that are, or in good faith would be, offered to non-affiliated companies (i.e. on terms not less favorable to the Bank than market terms). Further, extensions of credit must be secured fully with qualifying collateral and are limited to 10% of the Bank’s capital and surplus for transactions with a single affiliate and to 20% of the Bank’s capital and surplus with all affiliates. Other state and federal laws may limit the transfer of funds by the Corporation’s banking subsidiaries to the Corporation and certain of its affiliates.

Note 31 – Reporting Segments and Related Information

Segment Information. In 2022, the Corporation changed the name of its Corporate and Institutional Services segment to "Asset Servicing." This change has not had, and is not expected in the future to have, any impact upon the methodology by which the Corporation allocates revenue and expense to each of its reporting segments.

Northern Trust is organized around its two client-focused reporting segments: Asset Servicing and Wealth Management. Asset management and related services are provided to Asset Servicing and Wealth Management clients primarily by the Asset Management business. The revenue and expenses of Asset Management and certain other support functions are allocated fully to Asset Servicing and Wealth Management.

Reporting segment financial information, presented on an internal management-reporting basis, is determined by accounting systems used to allocate revenue and expense to each segment, and incorporates processes for allocating assets, liabilities, equity and the applicable interest income and expense utilizing a funds transfer pricing (FTP) methodology. Under the methodology, assets and liabilities receive a funding charge or credit that considers interest rate risk, liquidity risk, and other product characteristics on an instrument level. Additionally, segment information is presented on an FTE basis as management believes an FTE presentation provides a clearer indication of net interest income. The adjustment to an FTE basis has no impact on Net Income.

Equity is allocated to the reporting segments based on a variety of factors including, but not limited to, risk, regulatory considerations, and internal metrics. Allocations of capital and certain corporate expense may not be representative of levels that would be required if the segments were independent entities. The accounting policies used for management reporting are consistent with those described in Note 1, "Summary of Significant Accounting Policies." Transfers of income and expense items are recorded at cost; there is no consolidated profit or loss on sales or transfers between reporting segments. Northern Trust's presentations are not necessarily consistent with similar information for other financial institutions.

Revenues, expenses and average assets are allocated to Asset Servicing and Wealth Management, with the exception of non-recurring activities such as certain costs associated with acquisitions, divestitures, litigation, restructuring, and tax adjustments not directly attributable to a specific reporting segment, which are reported within the Other segment.

Reporting segment results are subject to reclassification when organizational changes are made. The results are also subject to refinements in revenue and expense allocation methodologies, which are typically reflected on a prospective basis.

Asset Servicing. Asset Servicing is a leading global provider of asset servicing and related services to corporate and public retirement funds, foundations, endowments, fund managers, insurance companies, sovereign wealth funds, and other institutional investors around the globe. Asset servicing and related services encompass a full range of capabilities including but not limited to: custody; fund administration; investment operations outsourcing; investment management; investment risk and analytical services; employee benefit services; securities lending; foreign exchange; treasury management; brokerage services; transition management services; banking; and cash management. Client relationships are managed through the Bank and the Bank's and the Corporation's other subsidiaries, including support from locations in North America, Europe, the Middle East, and the Asia-Pacific region.

Wealth Management. Wealth Management focuses on high-net-worth individuals and families, business owners, executives, professionals, retirees, and established privately-held businesses in its target markets. In supporting these targeted segments, Wealth Management provides trust, investment management, custody, and philanthropic services; financial consulting; guardianship and estate administration; family business consulting; family financial education; brokerage services; and private and business banking. Wealth Management also includes Global Family Office, which provides customized services, including but not limited to: investment consulting; global custody; fiduciary; and private banking; family office consulting, and technology solutions, to meet the complex financial and reporting needs of ultra-high-net-worth individuals and family offices across the globe. Wealth Management services are delivered by multidisciplinary teams through a network of offices in 19 U.S. states and Washington, D.C., as well as offices in London, Guernsey, and Abu Dhabi.

Other. Income and expenses associated with non-recurring activities such as certain costs associated with acquisitions, divestitures, litigation, restructuring, and tax adjustments are included within Other.

The following tables reflect the earnings contribution and average assets of Northern Trust's reporting segments for the years ended December 31, 2022, 2021, and 2020. Segment results are stated on an FTE basis which has no impact on net income. Financial measures stated on an FTE basis includes FTE adjustments of $45.6 million, $35.6 million, and $34.4 million for 2022, 2021, and 2020, respectively.

TABLE 132: ASSET SERVICING RESULTS OF OPERATIONS

($ In Millions)	FOR THE YEAR ENDED DECEMBER 31, 2022	2021	2020
Noninterest Income			
Trust, Investment and Other Servicing Fees	**$ 2,496.3**	$ 2,487.3	$ 2,321.6
Foreign Exchange Trading Income	**281.0**	279.0	276.3
Other Noninterest Income	**250.7**	261.2	222.5
Total Noninterest Income	**3,028.0**	3,027.5	2,820.4
Net Interest Income[(1)]	**1,072.7**	637.2	665.5
Revenue[(1)]	**4,100.7**	3,664.7	3,485.9
Provision for Credit Losses	**2.4**	(33.8)	38.1
Noninterest Expense	**3,092.7**	2,863.0	2,752.7
Income before Income Taxes[(1)]	**1,005.6**	835.5	695.1
Provision for Income Taxes[(1)]	**243.2**	194.1	174.4
Net Income	**$ 762.4**	$ 641.4	$ 520.7
Percentage of Consolidated Net Income	**57 %**	41 %	43 %
Average Assets	**$ 115,646.4**	$ 120,883.2	$ 104,790.6

[(1)] Financial measures stated on an FTE basis.

TABLE 133: WEALTH MANAGEMENT RESULTS OF OPERATIONS

($ In Millions)	FOR THE YEAR ENDED DECEMBER 31, 2022	2021	2020
Noninterest Income			
Trust, Investment and Other Servicing Fees	**$ 1,936.3**	$ 1,873.8	$ 1,673.4
Foreign Exchange Trading Income	**7.6**	13.6	14.1
Other Noninterest Income	**137.7**	188.2	168.0
Total Noninterest Income	**2,081.6**	2,075.6	1,855.5
Net Interest Income[(1)]	**860.1**	781.1	812.1
Revenue[(1)]	**2,941.7**	2,856.7	2,667.6
Provision for Credit Losses	**9.6**	(47.7)	86.9
Noninterest Expense	**1,815.5**	1,651.1	1,559.7
Income before Income Taxes[(1)]	**1,116.6**	1,253.3	1,021.0
Provision for Income Taxes[(1)]	**310.0**	317.0	291.8
Net Income	**$ 806.6**	$ 936.3	$ 729.2
Percentage of Consolidated Net Income	**60 %**	61 %	60 %
Average Assets	**$ 36,905.5**	$ 35,480.0	$ 32,020.5

[(1)] Financial measures stated on an FTE basis.

TABLE 134: OTHER RESULTS OF OPERATIONS

($ In Millions)	FOR THE YEAR ENDED DECEMBER 31, 2022	2021	2020
Noninterest Income	**$ (235.6)**	$ (21.3)	$ (18.3)
Net Interest Income[(1)]	**—**	—	—
Revenue[(1)]	**(235.6)**	(21.3)	(18.3)
Noninterest Expense	**74.7**	21.8	35.8
Income (Loss) before Income Taxes[(1)]	**(310.3)**	(43.1)	(54.1)
Provision (Benefit) for Income Taxes[(1)]	**(77.3)**	(10.7)	(13.5)
Net Income	**$ (233.0)**	$ (32.4)	$ (40.6)
Percentage of Consolidated Net Income	**(17)%**	(2)%	(3)%
Average Assets	**$ —**	$ —	$ —

[(1)] Financial measures stated on an FTE basis.

TABLE 135: CONSOLIDATED FINANCIAL INFORMATION

(In Millions)	FOR THE YEAR ENDED DECEMBER 31, 2022	2021	2020
Noninterest Income			
Trust, Investment and Other Servicing Fees	**$ 4,432.6**	$ 4,361.1	$ 3,995.0
Foreign Exchange Trading Income	**288.6**	292.6	290.4
Other Noninterest Income	**152.8**	428.1	372.2
Total Noninterest Income	**4,874.0**	5,081.8	4,657.6
Net Interest Income	**1,887.2**	1,382.7	1,443.2
Revenue	**6,761.2**	6,464.5	6,100.8
Provision for Credit Losses	**12.0**	(81.5)	125.0
Noninterest Expense	**4,982.9**	4,535.9	4,348.2
Income before Income Taxes	**1,766.3**	2,010.1	1,627.6
Provision for Income Taxes	**430.3**	464.8	418.3
Net Income	**$ 1,336.0**	$ 1,545.3	$ 1,209.3
Average Assets	**$ 152,551.9**	$ 156,363.2	$ 136,811.1

Geographic Area Information. Northern Trust's non-U.S. activities are primarily related to its asset servicing, asset management, foreign exchange, cash management, and commercial banking businesses. The operations of Northern Trust are managed on a reporting segment basis and include components of both U.S and non-U.S. source income and assets. Non-U.S. source income and assets are not separately identified in Northern Trust's internal management reporting system. However, Northern Trust is required to disclose non-U.S. activities based on the domicile of the customer. Due to the complex and integrated nature of Northern Trust's activities, it is difficult to segregate with precision revenues, expenses and assets between U.S. and non-U.S.-domiciled customers. Therefore, certain subjective estimates and assumptions have been made to allocate revenues, expenses and assets between U.S. and non-U.S. operations.

For purposes of this disclosure, all foreign exchange trading income has been allocated to non-U.S. operations. Interest expense is allocated to non-U.S. operations based on specifically matched or pooled funding. Allocations of indirect noninterest expenses, when made, are based on various methods such as time, space, and number of employees.

The following table summarizes Northern Trust's performance based on the allocation process described above without regard to guarantors or the location of collateral.

TABLE 136: DISTRIBUTION OF TOTAL ASSETS AND OPERATING PERFORMANCE

(In Millions)	TOTAL ASSETS	% OF TOTAL	TOTAL REVENUE[1]	% OF TOTAL	INCOME BEFORE INCOME TAXES	% OF TOTAL	NET INCOME	% OF TOTAL
2022								
Non-U.S.	**$ 35,991.3**	**23 %**	**$ 2,273.3**	**34 %**	**$ 560.9**	**32 %**	**$ 420.2**	**31 %**
U.S.	**119,045.4**	**77 %**	**4,487.9**	**66 %**	**1,205.4**	**68 %**	**915.8**	**69 %**
Total	**$ 155,036.7**	**100 %**	**$ 6,761.2**	**100 %**	**$ 1,766.3**	**100 %**	**$ 1,336.0**	**100 %**
2021								
Non-U.S.	$ 38,555.3	21 %	$ 2,017.5	31 %	$ 569.4	28 %	$ 426.7	28 %
U.S.	145,334.5	79 %	4,447.0	69 %	1,440.7	72 %	1,118.6	72 %
Total	$ 183,889.8	100 %	$ 6,464.5	100 %	$ 2,010.1	100 %	$ 1,545.3	100 %
2020								
Non-U.S.	$ 38,393.8	23 %	$ 1,737.6	28 %	$ 404.0	25 %	$ 302.6	25 %
U.S.	131,610.1	77 %	4,363.2	72 %	1,223.6	75 %	906.7	75 %
Total	$ 170,003.9	100 %	$ 6,100.8	100 %	$ 1,627.6	100 %	$ 1,209.3	100 %

[1] *Total revenue is comprised of net interest income and noninterest income.*

Note 32 – Regulatory Capital Requirements

The Corporation and the Bank are subject to various regulatory capital requirements administered by the federal bank regulatory authorities. Under these requirements, banks must maintain specific risk-based capital and leverage ratios in order to be classified as "well-capitalized." The regulatory capital requirements impose certain restrictions upon banks that meet minimum capital requirements but are not "well-capitalized" and obligate the federal bank regulatory authorities to take "prompt corrective action" with respect to banks that do not maintain such minimum ratios. Such prompt corrective action could have a direct material effect on a bank's financial statements.

As of December 31, 2022 and 2021, the Bank had capital ratios above the levels required for classification as a "well-capitalized" institution and had not received any regulatory notification of a lower classification. The results of the 2022 Dodd-Frank Act Stress Test, published by the Federal Reserve Board on June 23, 2022, resulted in Northern Trust's stress capital buffer and effective Common Equity Tier 1 capital ratio minimum requirement remaining constant at 2.5% and 7.0%, respectively, for the 2022 Capital Plan cycle, which began on October 1, 2022.

Additionally, Northern Trust's subsidiary banks located outside the U.S. are subject to regulatory capital requirements in the jurisdictions in which they operate. As of December 31, 2022 and 2021, Northern Trust's non-U.S. banking subsidiaries had capital ratios above their specified minimum requirements. There were no conditions or events since December 31, 2022, that management believes have adversely affected the capital categorization of any Northern Trust subsidiary bank. The following table provides capital ratios for the Corporation and the Bank determined by Basel III phased in requirements.

TABLE 137: RISK-BASED AND LEVERAGE CAPITAL AMOUNTS AND RATIOS

($ In Millions)	**DECEMBER 31, 2022**				DECEMBER 31, 2021			
	STANDARDIZED APPROACH		**ADVANCED APPROACH**		STANDARDIZED APPROACH		ADVANCED APPROACH	
	BALANCE	**RATIO**	**BALANCE**	**RATIO**	BALANCE	RATIO	BALANCE	RATIO
Common Equity Tier 1 Capital								
Northern Trust Corporation	**$ 9,539.7**	**10.8 %**	**$ 9,539.7**	**11.5 %**	$ 10,277.1	11.9 %	$ 10,277.1	13.2 %
The Northern Trust Company	**10,111.2**	**11.6**	**10,111.2**	**12.4**	10,315.7	12.0	10,315.7	13.5
Minimum to qualify as well-capitalized:								
Northern Trust Corporation	**N/A**	**N/A**	**N/A**	**N/A**	N/A	N/A	N/A	N/A
The Northern Trust Company	**5,684.4**	**6.5**	**5,286.2**	**6.5**	5,578.7	6.5	4,964.5	6.5
Tier 1 Capital								
Northern Trust Corporation	**10,397.4**	**11.8**	**10,397.4**	**12.5**	11,142.2	12.9	11,142.2	14.3
The Northern Trust Company	**10,111.2**	**11.6**	**10,111.2**	**12.4**	10,315.7	12.0	10,315.7	13.5
Minimum to qualify as well-capitalized:								
Northern Trust Corporation	**5,286.5**	**6.0**	**4,990.9**	**6.0**	5,177.6	6.0	4,668.4	6.0
The Northern Trust Company	**6,996.2**	**8.0**	**6,506.1**	**8.0**	6,866.1	8.0	6,110.2	8.0
Total Capital								
Northern Trust Corporation	**12,245.5**	**13.9**	**12,045.9**	**14.5**	12,126.8	14.1	11,942.0	15.3
The Northern Trust Company	**11,766.8**	**13.5**	**11,567.2**	**14.2**	11,158.4	13.0	10,973.7	14.4
Minimum to qualify as well-capitalized:								
Northern Trust Corporation	**8,810.8**	**10.0**	**8,318.1**	**10.0**	8,629.3	10.0	7,780.7	10.0
The Northern Trust Company	**8,745.3**	**10.0**	**8,132.6**	**10.0**	8,582.6	10.0	7,637.8	10.0
Tier 1 Leverage								
Northern Trust Corporation	**10,397.4**	**7.1**	**10,397.4**	**7.1**	11,142.2	6.9	11,142.2	6.9
The Northern Trust Company	**10,111.2**	**6.9**	**10,111.2**	**6.9**	10,315.7	6.4	10,315.7	6.4
Minimum to qualify as well-capitalized:								
Northern Trust Corporation	**N/A**	**N/A**	**N/A**	**N/A**	N/A	N/A	N/A	N/A
The Northern Trust Company	**7,323.8**	**5.0**	**7,323.8**	**5.0**	8,019.5	5.0	8,019.5	5.0
Supplementary Leverage[(1)]								
Northern Trust Corporation	**N/A**	**N/A**	**10,397.4**	**7.9**	N/A	N/A	11,142.2	8.2
The Northern Trust Company	**N/A**	**N/A**	**10,111.2**	**7.7**	N/A	N/A	10,315.7	7.6
Minimum to qualify as well-capitalized:								
Northern Trust Corporation	**N/A**	**N/A**	**N/A**	**N/A**	N/A	N/A	N/A	N/A
The Northern Trust Company	**N/A**	**N/A**	**3,931.5**	**3.0**	N/A	N/A	4,081.7	3.0

(1) In November 2019, the Federal Reserve Board and other U.S. federal banking agencies adopted a final rule that established a deduction for central bank deposits from the total leverage exposures of custodial banking organizations, including the Corporation and the Bank, equal to the lesser of (i) the total amount of funds the custodial banking organization and its consolidated subsidiaries have on deposit at qualifying central banks and (ii) the total amount of client funds on deposit at the custodial banking organization that are linked to fiduciary or custodial and safekeeping accounts. The rule became effective on April 1, 2020.

The supplementary leverage ratios at December 31, 2022 and December 31, 2021 for the Corporation and the Bank reflect the impact of the final rule.

Under the final Basel III rules, the Corporation and the Bank are required to calculate and publicly disclose risk-based capital ratios using two methodologies: an advanced approach and a standardized approach. Under the advanced approach, credit RWA are based on internal credit models and parameters. Additionally, the advanced approach incorporates operational risk RWA. Under the standardized approach, RWA are based on supervisory prescribed risk weights that are primarily dependent on counterparty type and asset class.

Pursuant to the Federal Reserve Board's implementation in the final Basel III rules of a provision of the Dodd-Frank Act, the capital adequacy of the Corporation and the Bank is assessed based on the lower of the advanced approach or standardized approach capital ratios.

Note 33 – Northern Trust Corporation (Corporation only)

Condensed financial information is presented in the following tables. Investments in wholly-owned subsidiaries are carried on the equity method of accounting.

TABLE 138: CONDENSED BALANCE SHEETS

(In Millions)	DECEMBER 31, 2022	2021
ASSETS		
Cash on Deposit with Subsidiary Bank	**$ 601.4**	$ 1,731.7
Advances to Wholly-Owned Subsidiaries – Banks	**4,010.0**	2,810.0
Investments in Wholly-Owned Subsidiaries – Banks	**10,897.1**	11,120.9
– Nonbank	**194.7**	185.3
Other Assets	**1,226.3**	890.2
Total Assets	**$ 16,929.5**	$ 16,738.1
LIABILITIES		
Senior Notes	**$ 2,724.2**	$ 2,505.5
Long-Term Debt	**2,066.2**	1,145.7
Other Liabilities	**879.6**	1,070.1
Total Liabilities	**5,670.0**	4,721.3
STOCKHOLDERS' EQUITY		
Preferred Stock	**884.9**	884.9
Common Stock	**408.6**	408.6
Additional Paid-in Capital	**983.5**	939.3
Retained Earnings	**13,798.5**	13,117.3
Accumulated Other Comprehensive Income (Loss)	**(1,569.2)**	(35.6)
Treasury Stock	**(3,246.8)**	(3,297.7)
Total Stockholders' Equity	**11,259.5**	12,016.8
Total Liabilities and Stockholders' Equity	**$ 16,929.5**	$ 16,738.1

TABLE 139: CONDENSED STATEMENTS OF INCOME

(In Millions)	FOR THE YEAR ENDED DECEMBER 31, 2022	2021	2020
OPERATING INCOME			
Dividends – Bank Subsidiaries	**$ —**	$ 751.1	$ 900.0
– Nonbank Subsidiaries	**—**	8.3	—
Intercompany Interest and Other Charges	**112.8**	20.1	46.5
Interest and Other Income	**(5.7)**	32.3	19.1
Total Operating Income	**107.1**	811.8	965.6
OPERATING EXPENSES			
Interest Expense	**132.3**	71.3	104.2
Other Operating Expenses	**11.9**	36.7	26.2
Total Operating Expenses	**144.2**	108.0	130.4
Income (Loss) before Income Taxes and Equity in Undistributed Net Income of Subsidiaries	**(37.1)**	703.8	835.2
Benefit for Income Taxes	**16.9**	25.7	28.2
Income (Loss) before Equity in Undistributed Net Income of Subsidiaries	**(20.2)**	729.5	863.4
Equity in Undistributed Net Income of Subsidiaries – Banks	**1,338.5**	803.3	326.0
– Nonbank	**17.7**	12.5	19.9
Net Income	**$ 1,336.0**	$ 1,545.3	$ 1,209.3
Preferred Stock Dividends	**41.8**	41.8	56.2
Net Income Applicable to Common Stock	**$ 1,294.2**	$ 1,503.5	$ 1,153.1

TABLE 140: CONDENSED STATEMENTS OF CASH FLOWS

	FOR THE YEAR ENDED DECEMBER 31,		
(In Millions)	**2022**	2021	2020
CASH FLOWS FROM OPERATING ACTIVITIES			
Net Income	**$ 1,336.0**	$ 1,545.3	$ 1,209.3
Adjustments to Reconcile Net Income to Net Cash (Used in) Provided by Operating Activities			
Equity in Undistributed Net Income of Subsidiaries	**(1,356.2)**	(815.8)	(345.9)
Change in Prepaid Expenses	**(3.8)**	0.1	398.5
Change in Accrued Income Taxes	**36.6**	2.2	3.7
Other Operating Activities, net	**(608.2)**	236.6	300.3
Net Cash (Used in) Provided by Operating Activities	**(595.6)**	968.4	1,565.9
CASH FLOWS FROM INVESTING ACTIVITIES			
Investments in and Advances to Subsidiaries, net	**(1,200.1)**	(140.0)	(800.0)
Other Investing Activities, net	**(0.1)**	5.1	1.8
Net Cash Used in Investing Activities	**(1,200.2)**	(134.9)	(798.2)
CASH FLOWS FROM FINANCING ACTIVITIES			
Proceeds from Senior Notes and Long-Term Debt	**1,988.8**	—	993.2
Repayments of Senior Notes	**(500.0)**	(500.0)	(508.6)
Repayment of Floating Rate Capital Debt	**—**	(278.8)	—
Redemption of Preferred Stock - Series C	**—**	—	(400.0)
Treasury Stock Purchased	**(35.4)**	(267.6)	(299.8)
Net Proceeds from Stock Options	**3.9**	53.8	19.5
Cash Dividends Paid on Common Stock	**(750.2)**	(583.3)	(584.6)
Cash Dividends Paid on Preferred Stock	**(46.5)**	(41.8)	(45.9)
Other Financing Activities, net	**4.9**	(0.1)	15.4
Net Cash Provided by (Used in) Financing Activities	**665.5**	(1,617.8)	(810.8)
Net Change in Cash on Deposit with Subsidiary Bank	**(1,130.3)**	(784.3)	(43.1)
Cash on Deposit with Subsidiary Bank at Beginning of Year	**1,731.7**	2,516.0	2,559.1
Cash on Deposit with Subsidiary Bank at End of Year	**$ 601.4**	$ 1,731.7	$ 2,516.0

Note 34 – Subsequent Event

As of December 31, 2022, the Corporation intended to sell certain available-for-sale debt securities that were in an unrealized loss position. The securities were written down to their fair value of $2.1 billion with a $213.0 million loss recognized in Investment Security Gains (Losses), net on the consolidated statements of income. In January 2023, the securities were subsequently sold resulting in an incremental $6.9 million gain upon sale as compared to the fair value recorded on the consolidated balance sheets at December 31, 2022.

ITEM 9 – CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A – CONTROLS AND PROCEDURES

Disclosure Controls and Procedures

As of December 31, 2022, the Corporation's management, with the participation of the Corporation's Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of the Corporation's disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) that are designed to ensure that information required to be disclosed by the Corporation in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms. Based on such evaluation, such officers have concluded that, as of December 31, 2022, the Corporation's disclosure controls and procedures are effective.

Management's Report on Internal Control Over Financial Reporting

Management of the Corporation is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) to provide reasonable assurance to the Corporation's management and Board of Directors regarding the preparation of reliable published financial statements. This internal control includes monitoring mechanisms, and actions are taken to correct deficiencies identified.

Management assessed the Corporation's internal control over financial reporting as of December 31, 2022, based on the criteria for effective internal control over financial reporting described in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this assessment, management concluded that, as of December 31, 2022, the Corporation maintained effective internal control over financial reporting. Additionally, KPMG LLP, the independent registered public accounting firm that audited the Corporation's consolidated financial statements as of, and for the year ended, December 31, 2022, included in this Annual Report on Form 10-K, has issued an attestation report on the effectiveness of the Corporation's internal control over financial reporting as of December 31, 2022.

Changes in Internal Control Over Financial Reporting

There have been no changes in the Corporation's internal control over financial reporting identified in connection with the evaluation required by Rules 13a-15 and 15d-15 under the Exchange Act during the last fiscal quarter that have materially affected, or are reasonably likely to materially affect, the Corporation's internal control over financial reporting.

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Northern Trust Corporation:

Opinion on Internal Control Over Financial Reporting

We have audited Northern Trust Corporation and subsidiaries' (the Corporation) internal control over financial reporting as of December 31, 2022, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Corporation maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Corporation as of December 31, 2022 and 2021, the related consolidated statements of income, comprehensive income, changes in stockholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2022, and the related notes (collectively, the consolidated financial statements), and our report dated February 28, 2023 expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

The Corporation's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Corporation's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Corporation in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ KPMG LLP

Chicago, Illinois
February 28, 2023

ITEM 9B – OTHER INFORMATION

Not applicable.

ITEM 9C – DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

ITEM 10 – DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information called for by this item is incorporated by reference to "Supplemental Item – Information About Our Executive Officers" in Part I of this Annual Report on Form 10-K, as well as the following sections of the Corporation's definitive Proxy Statement for the 2023 Annual Meeting of Stockholders: "Item 1 – Election of Directors," "Information about the Nominees for Director," "Security Ownership by Directors and Executive Officers," "Corporate Governance – Code of Business Conduct and Ethics," "Corporate Governance – Director Nominations and Qualifications and Proxy Access," "Board and Board Committee Information – Audit Committee" and "Board and Board Committee Information – Board Committees."

ITEM 11 – EXECUTIVE COMPENSATION

The information called for by this item is incorporated herein by reference to the "Compensation Discussion and Analysis," "Human Capital and Compensation Committee Report," "Executive Compensation," and "Director Compensation" sections of the Corporation's definitive Proxy Statement for the 2023 Annual Meeting of Stockholders.

ITEM 12 – SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information called for by this item is incorporated herein by reference to the "Security Ownership by Directors and Executive Officers," "Security Ownership of Certain Beneficial Owners," and "Equity Compensation Plan Information" sections of the Corporation's definitive Proxy Statement for the 2023 Annual Meeting of Stockholders.

ITEM 13 – CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

The information called for by this item is incorporated herein by reference to the "Board and Board Committee Information," "Corporate Governance – Director Independence" and the "Corporate Governance – Related Person Transactions Policy" sections of the Corporation's definitive Proxy Statement for the 2023 Annual Meeting of Stockholders.

ITEM 14 – PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information called for by this item is incorporated herein by reference to the "Audit Matters" section of the Corporation's definitive Proxy Statement for the 2023 Annual Meeting of Stockholders.

PART IV

ITEM 15 – EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

ITEM 15(a)(1) AND (2) – NORTHERN TRUST CORPORATION AND SUBSIDIARIES LIST OF FINANCIAL STATEMENTS AND FINANCIAL STATEMENT SCHEDULES

The following financial statements of the Corporation and its Subsidiaries included in Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K are incorporated herein by reference.

For Northern Trust Corporation and Subsidiaries:
Consolidated Balance Sheets - December 31, 2022 and 2021
Consolidated Statements of Income - Years Ended December 31, 2022, 2021, and 2020
Consolidated Statements of Comprehensive Income - Years Ended December 31, 2022, 2021, and 2020
Consolidated Statements of Changes in Stockholders' Equity - Years Ended December 31, 2022, 2021, and 2020
Consolidated Statements of Cash Flows - Years Ended December 31, 2022, 2021, and 2020
Notes to Consolidated Financial Statements
Report of Independent Registered Public Accounting Firm (KPMG LLP, Chicago, IL, Auditor Firm ID: 185)

Financial statement schedules have been omitted for the reason that they are not required or are not applicable.

ITEM 15(a)(3) – EXHIBITS

Exhibit Number	Description
3.1	Restated Certificate of Incorporation of Northern Trust Corporation, as amended to date (incorporated herein by reference to Exhibit 3.1 to the Corporation's Current Report on Form 8-K filed April 19, 2006).
3.2	Certificate of Designation of Series D Non-Cumulative Perpetual Preferred Stock of Northern Trust Corporation, dated August 4, 2016 (incorporated herein by reference to Exhibit 3.1 to the Corporation's Current Report on Form 8-K filed August 8, 2016).
3.3	Certificate of Designation of Series E Non-Cumulative Perpetual Preferred Stock of Northern Trust Corporation, dated October 31, 2019 (incorporated herein by reference to Exhibit 3.1 to the Corporation's Current Report on Form 8-K filed November 5, 2019).
3.4	By-laws of Northern Trust Corporation, as amended November 15, 2022 (incorporated herein by reference to Exhibit 3.1 to the Corporation's Current Report on Form 8-K filed November 18, 2022).
4.1	Deposit Agreement, dated August 8, 2016, among Northern Trust Corporation, Wells Fargo Bank, N.A., as depositary (which, effective February 1, 2018, was succeeded by Equiniti Trust Company), and the holders from time to time of the depositary receipts described therein (incorporated by reference to Exhibit 4.2 to the Corporation's Current Report on Form 8-K filed August 8, 2016).
4.2	Deposit Agreement, dated November 5, 2019, among Northern Trust Corporation, Equiniti Trust Company, as depositary, and the holders from time to time of the depositary receipts described therein (incorporated by reference to Exhibit 4.2 to the Corporation's Current Report on Form 8-K filed November 5, 2019).
4.3	Description of securities registered pursuant to Section 12 of the Securities Exchange Act of 1934.
4.4	Certain instruments defining the rights of the holders of long-term debt of the Corporation and certain of its subsidiaries, none of which authorize a total amount of indebtedness in excess of 10% of the total assets of the Corporation and its subsidiaries on a consolidated basis, have not been filed as exhibits. The Corporation hereby agrees to furnish a copy of any of these agreements to the SEC upon request.

Exhibit Number	Description
10.1**	Deferred Compensation Plans Trust Agreement, dated May 11, 1998, between Northern Trust Corporation and Harris Trust and Savings Bank as Trustee (which, effective August 31, 1999, was succeeded by U.S. Trust Company, N.A., which effective June 1, 2009, was succeeded by Evercore Trust Company, N.A., and, which, effective October 19, 2017, was succeeded by Newport Trust Company) regarding the Supplemental Employee Stock Ownership Plan for Employees of The Northern Trust Company, the Supplemental Thrift-Incentive Plan for Employees of The Northern Trust Company, the Supplemental Pension Plan for Employees of The Northern Trust Company, and the Northern Trust Corporation Deferred Compensation Plan (incorporated herein by reference to Exhibit 10(iv) to the Corporation's Quarterly Report on Form 10-Q for the quarter ended June 30, 1998).
(i)**	Amendment, dated August 31, 1999 (incorporated herein by reference to Exhibit 10(vi) to the Corporation's Quarterly Report on Form 10-Q for the quarter ended September 30, 1999).
(ii)**	Second Amendment, dated as of May 16, 2000 (incorporated herein by reference to Exhibit 10(v) to the Corporation's Quarterly Report on Form 10-Q for the quarter ended June 30, 2000).
10.2**	Northern Trust Corporation Supplemental Employee Stock Ownership Plan, as amended and restated effective as of January 1, 2008 (incorporated herein by reference to Exhibit 10(vi) to the Corporation's Annual Report on Form 10-K for the fiscal year ended December 31, 2008).
(i)**	Amendment Number One, dated December 28, 2022 and effective January 1, 2023.
10.3**	Northern Trust Corporation Supplemental Thrift-Incentive Plan, as amended and restated effective as of January 1, 2008 (incorporated herein by reference to Exhibit 10(vii) to the Corporation's Annual Report on Form 10-K for the fiscal year ended December 31, 2008).
(i)**	Amendment Number One, dated October 29, 2009 and effective January 1, 2010 (incorporated herein by reference to Exhibit 10(vi)(1) to the Corporation's Annual Report on Form 10-K for the fiscal year ended December 31, 2009).
(ii)**	Amendment Number Two, dated August 6, 2015 and effective January 1, 2015 (incorporated herein by reference to Exhibit 10.1 to the Corporation's Quarterly Report on Form 10-Q for the quarter ended September 30, 2015).
(iii)**	Amendment Number Three, dated December 28, 2022 and effective January 1, 2023.
10.4**	Northern Trust Corporation Supplemental Pension Plan, as amended and restated effective January 1, 2009 (incorporated herein by reference to Exhibit 10(viii) to the Corporation's Annual Report on Form 10-K for the fiscal year ended December 31, 2008).
(i)**	Amendment Number One, dated December 28, 2022 and effective January 1, 2023.
10.5**	Northern Trust Corporation Deferred Compensation Plan, as amended and restated effective as of October 18, 2021 (incorporated herein by reference to Exhibit 10.2 to the Corporation's Quarterly Report on Form 10-Q for the quarter ended September 30, 2021).
10.6**	Northern Trust Corporation 2012 Stock Plan (incorporated herein by reference to Exhibit 10.1 to the Corporation's Current Report on Form 8-K filed April 19, 2012).
(i)**	Form of Director Stock Unit Agreement (incorporated herein by reference to Exhibit 10(iii) to the Corporation's Quarterly Report on Form 10-Q for the quarter ended March 31, 2012).
(ii)**	Form of Director Prorated Stock Agreement (incorporated herein by reference to Exhibit 10(iv) to the Corporation's Quarterly Report on Form 10-Q for the quarter ended March 31, 2012).
(iii)**	Form of New Director Stock Unit Agreement (incorporated herein by reference to Exhibit 10(v) to the Corporation's Quarterly Report on Form 10-Q for the quarter ended March 31, 2012).
(iv)**	Form of 2013 Executive Stock Option Terms and Conditions (incorporated herein by reference to Exhibit 10.7(xii) to the Corporation's Annual Report on Form 10-K for the fiscal year ended December 31, 2012).
(v)**	Form of 2014 Executive Stock Option Terms and Conditions (incorporated herein by reference to Exhibit 10.7(xi) to the Corporation's Annual Report on Form 10-K for the fiscal year ended December 31, 2013).
(vi)**	Form of 2017 Stock Option Award Terms and Conditions, as amended (incorporated herein by reference to Exhibit 10.7(x) to the Corporation's Annual Report on Form 10-K for the year ended December 31, 2017).

Exhibit Number	Description
10.7**	Northern Trust Corporation Management Performance Plan, as amended and restated effective October 16, 2012 (incorporated herein by reference to Exhibit 10(viii) to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended September 30, 2012).
10.8**	Northern Trust Corporation 1997 Stock Plan for Non-Employee Directors (incorporated herein by reference to Exhibit 10(xix) to the Corporation’s Annual Report on Form 10-K for the fiscal year ended December 31, 1998).
10.9**	Northern Trust Corporation 1997 Deferred Compensation Plan for Non-Employee Directors, as amended and restated effective as of July 15, 2014 (incorporated herein by reference to Exhibit 10.1 to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended June 30, 2014).
10.10**	Northern Trust Corporation 2018 Deferred Compensation Plan for Non-Employee Directors (incorporated herein by reference to Exhibit 10.11 to the Corporation's Annual Report on Form 10-K for the year ended December 31, 2017).
10.11**	Northern Trust Corporation Key Officer Change in Control Severance Plan (incorporated herein by reference to Exhibit 10.2 to the Corporation’s Current Report on Form 8-K filed April 28, 2017).
10.12**	Northern Trust Corporation Executive Change in Control Severance Plan (incorporated herein by reference to Exhibit 10.1 to the Corporation’s Current Report on Form 8-K filed April 28, 2017).
10.13**	Form of Non-Solicitation Agreement and Confidentiality Agreement (incorporated herein by reference to Exhibit 10(iii) to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2009).
10.14**	Northern Trust Corporation 2017 Long-Term Incentive Plan (incorporated herein by reference to Exhibit 10.1 to the Corporation’s Current Report on Form 8-K filed April 26, 2017).
(i)**	Form of Director Stock Unit Agreement (incorporated herein by reference to Exhibit 10.10 to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2017).
(ii)**	Form of Director Stock Unit Agreement (prorated) (incorporated herein by reference to Exhibit 10.11 to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2017).
(iii)**	Form of 2020 Performance Stock Unit Award Terms and Conditions (incorporated herein by reference to Exhibit 10.1 to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2020).
(iv)**	Form of 2021 Performance Stock Unit Award Terms and Conditions (incorporated herein by reference to Exhibit 10.1 to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2021).
(v)**	Form of 2022 Performance Stock Unit Award Terms and Conditions (incorporated herein by reference to Exhibit 10.1 to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2022).
(vi)**	Form of 2019 Stock Unit Award Terms and Conditions (incorporated herein by reference to Exhibit 10.2 to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2019).
(vii)**	Form of 2020 Stock Unit Award Terms and Conditions (incorporated herein by reference to Exhibit 10.2 to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2020).
(viii)**	Form of 2021 Stock Unit Award Terms and Conditions (incorporated herein by reference to Exhibit 10.2 to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2021).
(ix)**	Form of 2022 Stock Unit Award Terms and Conditions (incorporated herein by reference to Exhibit 10.2 to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2022).
10.15**	Northern Trust Corporation Wealth Planning and Tax Consulting Services Plan, as amended and restated effective January 1, 2021 (incorporated herein by reference to Exhibit 10.1 to the Corporation’s Quarterly Report on Form 10-Q for the quarter ended September 30, 2021).
10.16**	Northern Trust Corporation Non-Employee Director Compensation Plan, as amended (incorporated herein by reference to Exhibit 10.17 to the Corporation’s Annual Report on Form 10-K for the year ended December 31, 2021).
10.17**	Northern Partners Incentive Plan, as amended and restated on February 22, 2022 (incorporated herein by reference to Exhibit 10.18 to the Corporation’s Annual Report on Form 10-K for the year ended December 31, 2021).

Exhibit Number	Description
10.18**	Letter Agreement with Frederick H. Waddell, dated January 23, 2019 (incorporated herein by reference to Exhibit 10.26 to the Corporation's Annual Report on Form 10-K for the year ended December 31, 2018).
10.19**	The Northern Trust Company Death Benefit Plan (incorporated herein by reference to Exhibit 10.1 to the Corporation's Quarterly Report on Form 10-Q for the quarter ended June 30, 2019).
(i)**	Amendment Number One to The Northern Trust Company Death Benefit Plan, dated July 11, 2019 and effective May 17, 2019 (incorporated herein by reference to Exhibit 10.20(i) to the Corporation's Annual Report on Form 10-K for the year ended December 31, 2020).
(ii)**	Amendment Number Two to The Northern Trust Company Death Benefit Plan, dated July 29, 2019 and effective May 17, 2019 (incorporated herein by reference to Exhibit 10.20(ii) to the Corporation's Annual Report on Form 10-K for the year ended December 31, 2020).
(iii)**	Amendment Number Three to The Northern Trust Company Death Benefit Plan, dated March 18, 2020 and effective May 17, 2019 (incorporated herein by reference to Exhibit 10.20(iii) to the Corporation's Annual Report on Form 10-K for the year ended December 31, 2020).
(iv)**	Amendment Number Four to The Northern Trust Company Death Benefit Plan, dated June 22, 2022 and effective May 4, 2022.
10.20	Transition Agreement by and between Northern Trust Corporation and Shundrawn A. Thomas, dated as of May 3, 2022 (incorporated herein by reference to Exhibit 10.1 to the Corporation's Current Report on Form 8-K filed May 3, 2022).
21	Subsidiaries of the Registrant.
23	Consent of Independent Registered Public Accounting Firm.
31.1	Rule 13a-14(a)/15d-14(a) Certification of CEO Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Rule 13a-14(a)/15d-14(a) Certification of CFO Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32	Certifications of CEO and CFO Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101	Includes the following financial and related information from the Corporation's Annual Report on Form 10-K for the fiscal year ended December 31, 2022, formatted in Inline Extensible Business Reporting Language (iXBRL): (i) the Consolidated Balance Sheets, (ii) the Consolidated Statements of Income, (iii) the Consolidated Statements of Comprehensive Income, (iv) the Consolidated Statements of Changes in Stockholders' Equity, (v) the Consolidated Statements of Cash Flows, and (vi) Notes to Consolidated Financial Statements.
104	The cover page from this Annual Report on Form 10-K, formatted in Inline XBRL.

*** Indicates a management contract or a compensatory plan or agreement.*

ITEM 16 – FORM 10-K SUMMARY

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this Annual Report on Form 10-K to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: February 28, 2023

Northern Trust Corporation

(Registrant)

By: /s/ Michael G. O’Grady

Michael G. O’Grady

Chairman and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this Annual Report on Form 10-K has been signed below by the following persons on behalf of the Registrant and in the capacities and on the date indicated.

Signature	Capacity
/s/ Michael G. O'Grady *Michael G. O’Grady*	Chairman and Chief Executive Officer (Principal Executive Officer)
/s/ Jason J. Tyler *Jason J. Tyler*	Executive Vice President and Chief Financial Officer (Principal Financial Officer)
/s/ Lauren Allnutt *Lauren Allnutt*	Executive Vice President and Controller (Principal Accounting Officer)
/s/ Linda Walker Bynoe *Linda Walker Bynoe*	Director
/s/ Susan Crown *Susan Crown*	Director
/s/ Dean M. Harrison *Dean M. Harrison*	Director
/s/ Jay L. Henderson *Jay L. Henderson*	Director
/s/ Marcy S. Klevorn *Marcy S. Klevorn*	Director
/s/ Siddharth N. (Bobby) Mehta *Siddharth N. (Bobby) Mehta*	Director
/s/ Jose Luis Prado *Jose Luis Prado*	Director
/s/ Martin P. Slark *Martin P. Slark*	Director
/s/ David H.B. Smith, Jr. *David H.B. Smith, Jr.*	Director
/s/ Donald Thompson *Donald Thompson*	Director
/s/ Charles A. Tribbett, III *Charles A. Tribbett, III*	Director

Date: February 28, 2023

Exhibit 31.1

Certification of CEO Pursuant to
Section 302 of the Sarbanes-Oxley Act of 2002

I, Michael G. O'Grady, certify that:

1. I have reviewed this report on Form 10-K for the year ended December 31, 2022 of Northern Trust Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 28, 2023

/s/ Michael G. O'Grady

Michael G. O'Grady
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

Certification of CFO Pursuant to
Section 302 of the Sarbanes-Oxley Act of 2002

I, Jason J. Tyler, certify that:

1. I have reviewed this report on Form 10-K for the year ended December 31, 2022 of Northern Trust Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
    (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 28, 2023

/s/ Jason J. Tyler

Jason J. Tyler
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32

**Certifications of CEO and CFO Pursuant to
18 U.S.C. Section 1350, as Adopted Pursuant to
Section 906 of the Sarbanes-Oxley Act of 2002**

In connection with the Annual Report of Northern Trust Corporation (the "Corporation") on Form 10-K for the period ended December 31, 2022 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), Michael G. O'Grady, as Chief Executive Officer of the Corporation, and Jason J. Tyler, as Chief Financial Officer of the Corporation, each hereby certifies, pursuant to 18 U.S.C. section 1350, as adopted pursuant to section 906 of the Sarbanes-Oxley Act of 2002, to the best of his knowledge, that:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Corporation.

/s/ Michael G. O'Grady

Michael G. O'Grady
Chief Executive Officer
(Principal Executive Officer)
February 28, 2023

/s/ Jason J. Tyler

Jason J. Tyler
Chief Financial Officer
(Principal Financial Officer)
February 28, 2023

This certification accompanies the Report pursuant to section 906 of the Sarbanes-Oxley Act of 2002 and shall not be deemed filed by Northern Trust Corporation for purposes of section 18 of the Securities Exchange Act of 1934.

BOARD OF DIRECTORS

Michael G. O'Grady
Chairman and Chief Executive Officer
Northern Trust Corporation

Linda Walker Bynoe
President and Chief Executive Officer
Telemat Limited LLC
Project management and consulting firm

Susan Crown
Chairman and Chief Executive Officer
Owl Creek Partners, LLC
Private equity firm
Chairman and Founder
Susan Crown Exchange Inc.
Social investment organization

Dean M. Harrison
Executive Chairman
Northwestern Memorial HealthCare
Primary teaching affiliate of Northwestern University Feinberg School of Medicine and parent corporation of Northwestern Memorial Hospital

Jay L. Henderson
Retired Vice Chairman, Client Service
PricewaterhouseCoopers LLP
Professional services firm

Marcy S. Klevorn
Retired Executive Vice President and President, Mobility
Ford Motor Company
Global automaker

Siddharth N. (Bobby) Mehta
Retired President and Chief Executive Officer
TransUnion
Global risk and information solutions provider

Jose Luis Prado
Chairman of the Board
Tropicale Foods Group
Manufacturer of frozen foods
Executive Chairman
Palmex Alimentos
Manufacturer of snack product ingredients

Martin P. Slark
Retired Chief Executive Officer
Molex LLC
Manufacturer of electronic, electrical, and fiber optic interconnection products and systems

David H. B. Smith Jr.
Executive Vice President, Policy & Legal Affairs and General Counsel
Mutual Fund Directors Forum
Nonprofit membership organization for investment company directors

Donald Thompson
Founder and Chief Executive Officer
Cleveland Avenue, LLC
Food and beverage accelerator and investment company
Retired President and Chief Executive Officer
McDonald's Corporation
Global foodservice retailer

Charles A. Tribbett III
Vice Chairman
Russell Reynolds Associates
Global executive recruiting firm

Advisory Director

Lord Charles D. Powell of Bayswater KCMG
Former private secretary and advisor on foreign affairs and defense to Prime Ministers Margaret Thatcher and John Major

MANAGEMENT GROUP

Michael G. O'Grady
Chairman and Chief Executive Officer

Peter B. Cherecwich
President – Asset Servicing

Steven L. Fradkin
President – Wealth Management

Mark C. Gossett
Executive Vice President
Chief Risk Officer

Susan C. Levy
Executive Vice President
General Counsel

Teresa A. Parker
Executive Vice President
President – Europe, Middle East and Africa

Thomas A. South
Executive Vice President
Chief Information Officer

Alexandria Taylor
Executive Vice President
Chief Human Resources Officer

Jason J. Tyler
Executive Vice President
Chief Financial Officer

CORPORATE INFORMATION

ANNUAL MEETING

The 2023 Annual Meeting of Stockholders will be held on Tuesday, April 25, 2023, at 10:30 A.M. (Central Time). If you plan to attend the Annual Meeting, please review the information regarding attendance contained in the proxy statement relating to the Annual Meeting.

STOCK LISTING

The common stock of Northern Trust Corporation is traded on the NASDAQ Global Select Market under the symbol "NTRS".

STOCK TRANSFER AGENT, REGISTRAR, AND DIVIDEND DISBURSING AGENT

EQ Shareowner Services
1110 Centre Pointe Curve, Suite 101
Mendota Heights, MN 55120
General Phone Number: 1-800-468-9716
Internet Site: shareowneronline.com

AVAILABLE INFORMATION

Through our website at northerntrust.com, we make available free of charge our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and all other reports and all amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, as soon as reasonably practicable after we file such material with, or furnish such material to, the SEC. The contents of our website, the website of the SEC or any other website referenced herein are not a part of this document.

INVESTOR RELATIONS

Email: investor_relations@ntrs.com

NORTHERNTRUST.COM

Information about the Corporation, including financial performance and products and services, is available on Northern Trust's website at northerntrust.com.