



Northern Trust

ANNUAL REPORT
TO SHAREHOLDERS

2019


CONSOLIDATED FINANCIAL HIGHLIGHTS

	2019	2018	PERCENT CHANGE ¹
For the Year Ended December 31 (\$ in millions)			
Revenues (Fully Taxable Equivalent Basis ²)	\$ 6,105.9	\$ 6,001.4	2 %
Net Income	1,492.2	1,556.4	(4)
Dividends Declared on Common Stock	565.9	439.1	29
Dividends Declared on Preferred Stock	46.4	46.4	—
Per Common Share			
Net Income — Basic	\$ 6.66	\$ 6.68	— %
Net Income — Diluted	6.63	6.64	—
Cash Dividends Declared per Common Share	2.60	1.94	34
Book Value — End of Period	46.82	43.95	7
Market Price — End of Period	106.24	83.59	27
At Year-End (\$ in millions)			
Earning Assets	\$ 125,236.6	\$ 122,847.3	2 %
Total Assets	136,828.4	132,212.5	3
Deposits	109,120.6	104,496.8	4
Stockholders' Equity	11,091.0	10,508.3	6
Average Balances (\$ in millions)			
Earning Assets	\$ 107,109.4	\$ 113,731.0	(6) %
Total Assets	117,551.4	122,946.6	(4)
Deposits	89,786.0	95,103.1	(6)
Stockholders' Equity	10,648.4	10,228.9	4
Client Assets at Year-End (\$ in billions)			
Assets Under Custody/Administration	\$ 12,050.4	\$ 10,125.3	19 %
Assets Under Custody	9,233.5	7,593.9	22
Global Custody Assets	5,894.6	4,700.3	25
Assets Under Management	1,231.3	1,069.4	15
Financial Ratios and Metrics			
Return on Average Common Equity	14.9 %	16.2 %	
Return on Average Assets	1.27	1.27	
Dividend Payout Ratio	39.2	29.2	
Net Interest Margin (Fully Taxable Equivalent Basis ²)	1.60	1.46	

CAPITAL RATIOS	DECEMBER 31, 2019		DECEMBER 31, 2018	
	Standardized Approach	Advanced Approach	Standardized Approach	Advanced Approach
Common Equity Tier 1 Capital	12.7 %	13.2 %	12.9 %	13.7 %
Tier 1 Capital	14.5	15.0	14.1	15.0
Total Capital	16.3	16.8	16.1	16.9
Tier 1 Leverage	8.7	8.7	8.0	8.0
Supplementary Leverage	N/A	7.6	N/A	7.0

¹ Percentage change calculations are based on actual balances rather than the rounded amounts presented.

² Revenues and Net Interest Margin are presented on a fully taxable equivalent basis, a non-generally accepted accounting principle financial measure that facilitates the analysis of asset yields.



Michael G. O'Grady
*CHAIRMAN, PRESIDENT AND
CHIEF EXECUTIVE OFFICER*

To My Fellow Shareholders,

As we begin a new decade, the pace of change around us—at our workplaces, in our homes and throughout our communities—continues to accelerate. While it is exciting to consider the possibilities that lie ahead, the time for reflection can often feel elusive. It is at times such as this that I am reminded of the rare privilege I have to be a part of Northern Trust. In my role, I am fortunate to be able to see firsthand the positive impact that our organization has on its various stakeholders each and every day. I am honored, for example, to receive notes from clients who took their valuable time to praise the exceptional service they received from a Northern Trust employee. I also have the opportunity to share our organization's rich history and culture with new employees, volunteer alongside my colleagues at one of countless charitable organizations and events, and represent our firm at various Northern Trust-sponsored cultural exhibits. These are just a few examples of what makes me so proud to be a part of an organization that achieves greater for all of its stakeholders.

As a fellow shareholder, I am pleased to report that 2019 was another very good year for Northern Trust, and that our company remains well-positioned for continued success. This is the result of the prescient decisions and direction of our leaders past and present, and the hard work and thoughtful execution of our employees, day in and day out. As macroeconomic, technological and competitive factors challenge and rapidly transform our industry, our enduring principles of service, expertise and integrity continue to position us to meet our clients' current and future needs.

For more than 130 years, Northern Trust's success has been anchored in one purpose: to serve as our clients' most trusted financial partner, guarding and growing their assets as though they were our own. Trust is easy to say, but challenging to earn. Earning a client's trust requires possessing the capabilities and expertise to solve their problems and help them meet their goals. It means reliably meeting their needs at any time, all of the time and over time. And, it means having the strength—as measured by our capital base, liquidity profile and technology infrastructure—to withstand turbulent conditions. Meeting just one criterion is insufficient. We must meet all of them consistently in order to earn our clients' trust fully.

We focus intensely on addressing the particular needs of particular clients. Our clients are institutions, families and individuals that utilize their investments to achieve their goals. Whether we are working with a sovereign wealth fund seeking to benefit its nation's citizens, a pension plan responsible for the retirement savings of its participants, or a family aspiring to achieve its philanthropic aspirations, we empower our clients with unique insights, exceptional advice and meaningful solutions.

Underpinning this effort is our corporate strategy, which leverages the strengths of our interconnected businesses—wealth management, asset management and asset servicing—to create competitive advantage and synergistic value. Our long-term strategy has four primary components:

LEVERAGE OUR EXCEPTIONAL TALENT AND TECHNOLOGY TO PROVIDE PREMIER, HOLISTIC SERVICES TAILORED TO MEET OUR CLIENTS' NEEDS.

Our client-centric strategy begins with thoroughly understanding our clients' current and anticipated needs and goals. Utilizing our deep expertise across all of our businesses, our employees collaborate with each other, with strategic technology partners and often directly with our clients to develop innovative solutions.

We understand that the primary differentiator of our services is the people who provide them. To develop our talent for the future, we implement strategies to promote a diverse, adaptive and engaged workforce. Investment in training is crucial to developing employees equipped and motivated to provide exceptional service. In addition, we strive to hire employees with specializations in key areas, including technology, fiduciary services and investment management.

To elevate further the advice we provide our clients, we recently established a wealth management center of excellence to harness the collective experience of our firm. Dedicated experts will analyze data and historical outcomes to identify the strategies that have been most effective for our clients and develop advice tailored for the unique needs of selected client segments.

We also utilize technology to develop a deeper understanding of clients' objectives. For example, using the dynamic framework of our proprietary Goals Driven Wealth Management platform, we can quantify a client's specific life aspirations, develop a bespoke financial plan to achieve them, and nimbly adapt the plan to changing conditions.

To accelerate the digitalization of our business, we continue to make significant investments to integrate data and digital capabilities into our services. Our acquisition of Emotomy®, an open-architecture digital investment advice platform, demonstrates our commitment to bringing best-in-class investment solutions and technology to those we serve. And recently, by acquiring a majority stake in our technology partner Parilux, we fast-tracked the roll-out of Front Office Solutions, a digital, cloud-based platform designed specifically to help asset allocators more effectively manage complex, multi-asset class portfolios across both private and public market assets. We began providing these services in 2019 and already have a healthy pipeline of future clients.

Digital services are fueled by data, and one of our most significant investments this year was in Northern Trust Matrix®, our new, event-driven data architecture. By emphasizing a digital-first approach, Matrix enables all participants in the investment chain to benefit from enhanced tools and make faster, more confident decisions. Through additional investment in other emerging technologies, such as blockchain, we continue to keep pace with, or stay ahead of, evolving market trends. For example, we are partnering with Broadridge Financial Solutions, a provider of investor communications and tech-driven solutions, to deliver an industry-wide private equity blockchain solution. We are also partnering with BondEvalue, a leading innovator in the Asia-Pacific fixed income markets, to deliver fractionalized bond ownership to the Singapore market, an industry first.

While our clients' validation, often measured by long, enduring relationships, is among the most important measures of our success, we also take great pride in being recognized externally for the quality of our service. In 2019, the Financial Times Group recognized us as the Best U.S. Private Bank for the ninth time in 11 years and Best Global Private Bank for Succession Planning. We were also recognized as Global Custodian of the Year and Fund Administrator of the Year by renowned industry publications *Global Custodian* and *Global Investor*, respectively.

GROW ORGANICALLY BY CREATING INNOVATIVE NEW SERVICES AND DELIVERING EXCEPTIONAL EXPERIENCES TO NEW CLIENT SEGMENTS.

Each of our businesses continues to see meaningful opportunities to grow. With an increase in assets under management (AUM) of 13 percent and assets under custody and administration (AUC/A) of 16 percent in 2019, our Wealth Management business is accelerating its growth by further penetrating existing client and geographic market

segments and expanding into new markets. Family offices are a prime example; these professionally managed organizations require the sophisticated asset servicing, investment management and advisory capabilities that Northern Trust is uniquely qualified to provide. Ongoing innovations, such as Anchor Analytics™, further solidify our Global Family Office business as a market leader. In the U.S. wealth management market, we have bolstered our presence in the Midwest and Florida, and accelerated our growth in Texas, the West Coast and the Northeast, where our expansion included opening our Philadelphia office.

Our Asset Management business' growth is enhanced by offering solutions in areas of greatest demand. We expanded our quality low-volatility suite of strategies, now available as mutual funds and ETFs in the U.S., collective investment trusts in Europe, diversified funds in Canada and separate accounts globally. We also launched five sustainable funds and strategies in Europe to enable institutional clients to deploy sustainable investment strategies. Our innovative low-carbon strategy is designed to invest at the intersection of low carbon and high quality, while our euro-denominated investment-grade credit environmental, social and governance (ESG) strategy is one of the industry's first. These offerings pair our 30-plus years of ESG innovation with our significant quantitative active, fixed income and index investment capabilities.

Our Corporate & Institutional Services business, a global leader in asset servicing, is responding to the growing complexity of our clients' needs while growing our global client base, a strategy leading to increases in AUC/A and AUM of 19 and 16 percent, respectively, in 2019. In today's environment of lower long-term investment returns, institutional asset owners and managers are seeking strategies to create alpha from their investment and operational activities. By helping them meet their objectives with tailored solutions across the entire asset servicing spectrum, we have won complex, sophisticated global mandates around the world, including new relationships with Funds SA in Australia, Storebrand in Sweden and Anchorage Capital Group in the U.S. We have also extended our capabilities in key areas to support clients even further. Our advanced currency management solutions, for example, help firms like our long-time U.K.-based client Hermes Investment Management focus on their core competencies and improve operational efficiencies. Our outsourced front office trading service, Integrated Trading Solutions, has also been a disruptor in the market, winning a number of new clients including Fundsmith, one of the U.K.'s fastest growing investment managers.

CONTINUALLY IMPROVE OUR PRODUCTIVITY BY DESIGNING AND LEVERAGING A SCALABLE OPERATING MODEL.

While clients overwhelmingly appreciate the quality and efficacy of our services, they also require us to provide them at a competitive price. Accordingly, it is critical for us to find ways to improve our level of productivity constantly. This starts with structuring our business to achieve benefits of scale from the growth of our business. We are currently leveraging

emerging technologies such as robotics and machine learning to further automate and increase our operating efficiency. Additionally, we have embedded an ongoing mindset of carefully ensuring that every dollar we spend results in attractive value for the company. Productivity improvement is no longer confined to periodic programs. Productivity initiatives, investments and the related savings are now further ingrained in our comprehensive planning process and performance measurement.

MAINTAIN OUR FOUNDATIONAL STRENGTH WITH A STRONG, CONSERVATIVE BALANCE SHEET AND A GLOBALLY RESPECTED BRAND.

Even as we pursue new opportunities and leverage cutting-edge technologies, we are proud of the strength that comes from our conservative balance sheet and a distinguished brand that has maintained client trust over more than a century of progress. We do not take our foundational strength for granted; instead we work hard every day to maintain it through prudent financial decisions, clear standards of employee conduct, and the highest levels of cybersecurity and data protection.

By focusing on the disciplined execution of our strategy, we create value for our clients, shareholders, employees and the communities in which we operate. In 2019, the company produced attractive returns for our shareholders, with a return on equity of 14.9 percent, and grew revenues by 2 percent to \$6.11 billion for the year.* Trust fees, our largest source of revenues, totaled \$3.85 billion, up 3 percent. We also continued to grow assets as a result of favorable markets and organic growth. AUC/A ended the year at \$12.1 trillion, up 19 percent from the prior year, while AUM ended the year at \$1.2 trillion, up 15 percent from the prior year. During 2019, we also returned a record \$1.7 billion to common shareholders through dividends and the repurchase of 11.8 million shares.

We understand that for Northern Trust to continue its success, we must also focus on the world beyond our doors. In each of our global locations, our emphasis on sustainable services and operations has substantially reduced our global carbon footprint and greenhouse gas emissions. And through our corporate donations and our employees' volunteering efforts, we have helped strengthen the educational, cultural and social welfare of our communities around the globe.

We are fortunate to have a deep pool of leadership talent, including 11 Management Group members, all of whom bring a diverse array of industry experience and achievements. In the second half of 2019, Chief Financial Officer Biff Bowman and Chief Risk Officer Wilson Leech both announced their retirements, effective in early 2020. We thank them for their unwavering service and congratulate them on their distinguished careers. Jason Tyler, Chief Financial Officer of our Wealth Management business, succeeded Biff, and Mark Gossett, Chief Credit Officer and Head of Market and Liquidity Risk Management, succeeded Wilson.

Our Board of Directors also provides strong governance and tremendous guidance throughout the year. In April, John Rowe stepped down from the Board after serving 17 years, including nine years as lead director. We greatly appreciate the wise counsel that John provided throughout his tenure. We are fortunate that Jay Henderson assumed the role of lead director, and his transition has been seamless.

Even as the global dynamic rapidly shifts around us, Northern Trust constantly strives to be the most trusted partner for the world's most prestigious clients through our combination of unique capabilities, strategies and culture. I extend my warmest thanks to you, our shareholders, as well as to our clients, our employees and all of our other stakeholders. I am grateful for the trust you continue to place in Northern Trust and I am proud to be a part of an organization that achieves greater for all of its stakeholders.

Sincerely,

Michael G. O'Grady

Chairman, President and Chief Executive Officer

MANAGEMENT GROUP

Michael G. O'Grady
Chairman, President and
Chief Executive Officer

Robert P. Browne
Executive Vice President
Chief Investment Officer

Peter B. Cherecwich
President
Corporate & Institutional Services

Steven L. Fradkin
President
Wealth Management

Mark C. Gossett
Executive Vice President
Chief Risk Officer

Susan C. Levy
Executive Vice President
General Counsel and
Corporate Secretary

Teresa A. Parker
Executive Vice President
Corporate & Institutional Services
Europe, Middle East and Africa

Thomas A. South
Executive Vice President
Chief Information Officer

Joyce M. St. Clair
Executive Vice President
Chief Human Resources Officer

Shundrawn A. Thomas
President
Asset Management

Jason J. Tyler
Executive Vice President
Chief Financial Officer

BOARD OF DIRECTORS

Michael G. O'Grady
Chairman, President and
Chief Executive Officer

Linda Walker Bynoe
President and
Chief Executive Officer
Telemat Ltd.
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
President and
Chief Executive Officer
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 LLC
Global risk and information
solutions provider

Jose Luis Prado
Vice Chairman
Evans Food Group, Ltd.
Global food company

Thomas E. Richards
Retired President and
Chief Executive Officer
CDW Corporation
Provider of integrated
information technology
solutions in the United States,
Canada and the United Kingdom

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
Managing Director
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



**NORTHERN
TRUST**

** Revenues are presented on a fully taxable equivalent basis, a non-generally accepted accounting principle financial measure that facilitates the analysis of asset yields.*

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, 2019
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
(State or other jurisdiction of incorporation or organization)

36-2723087
(I.R.S. Employer Identification No.)

50 South La Salle Street
Chicago, Illinois
(Address of principal executive offices)

60603
(Zip Code)

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

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

<u>Title of Each Class</u>	<u>Trading Symbol</u>	<u>Name of Each Exchange On Which Registered</u>
Common Stock, \$1.66 2/3 Par Value	NTRS	The NASDAQ Stock Market LLC
Depository Shares, each representing 1/1,000th interest in a share of Series C Non-Cumulative Perpetual Preferred Stock	NTRSP	The NASDAQ Stock Market LLC
Depository 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 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 28, 2019 (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 28, 2019 as reported by The NASDAQ Stock Market LLC, held by non-affiliates was approximately \$19.2 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, 2020, 209,247,666 shares of common stock, \$1.66 2/3 par value, were outstanding.

Portions of the registrant's Proxy Statement for its 2020 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

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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, 2019, the Bank had consolidated assets of \$135.9 billion and common bank equity capital of \$9.3 billion.

The Corporation was formed as a holding company for the Bank in 1971. The Corporation has a network of offices in 21 U.S. states and Washington, D.C., and across 22 locations in Canada, Europe, the Middle East and the Asia-Pacific region. At December 31, 2019, the Corporation had consolidated total assets of \$136.8 billion and stockholders' equity of \$11.1 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: Corporate & Institutional Services (C&IS) and Wealth Management. Asset management and related services are provided to C&IS 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 C&IS and Wealth Management. Northern Trust reports certain income and expense items not allocated to C&IS and Wealth Management in a third reporting segment, Treasury and Other.

CORPORATE & INSTITUTIONAL SERVICES

C&IS 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, 2019, total C&IS assets under custody/administration, assets under custody, and assets under management were \$11.31 trillion, \$8.50 trillion, and \$917.5 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. The business also includes the Global Family Office, which provides customized services to meet the complex financial needs of individuals and family offices in the United States and throughout the world with assets typically exceeding \$200 million. 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 is one of the largest providers of advisory services in the United States, with assets under custody/administration, assets under custody, and assets under management of \$738.8 billion, \$735.7 billion, and \$313.8 billion, respectively, at December 31, 2019. 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 C&IS 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; 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 C&IS and Wealth Management. As discussed above, Northern Trust managed \$1.23 trillion in assets as of December 31, 2019, including \$917.5 billion for C&IS clients and \$313.8 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. To maintain the Corporation's status as a financial holding company, the Bank and the Corporation must remain "well-capitalized" and "well-managed," and the Bank must have 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, investment adviser, and municipal securities dealer, 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

In May 2018, the U.S. Congress passed, and the President signed, the Economic Growth, Regulatory Relief, and Consumer Protection Act (the Regulatory Relief Act), which amended parts of the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) and directed the Federal Reserve Board and other federal regulators to revise parts of their regulations that implement the Dodd-Frank Act. In October 2019, the Federal Reserve Board and other federal regulators finalized the revisions required by the Regulatory Relief Act. The following items provide a brief description of certain provisions of the Dodd-Frank Act, as implemented through final rules promulgated by the Federal Reserve Board and other agencies and amended by 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 more 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. The Corporation is required to submit its next Section 165(d) resolution plan by July 1, 2021. The FDIC has indicated that the Bank is not required to submit a resolution plan under the CIDI Resolution Plan Rule before the conclusion of a rulemaking regarding the CIDI Resolution Plan Rule requirements.

On March 24, 2017, the Federal Reserve Board and the FDIC provided joint written feedback to the Corporation regarding the resolution plan submitted by the Corporation in December 2015 pursuant to Section 165(d) of the Dodd-Frank Act (the 2015 165(d) Plan). The joint written feedback identified certain "shortcomings" in the Corporation's 2015 165(d) Plan. While the identification of these shortcomings is different from a determination that the plan is not "credible," the Corporation was required to address the shortcomings in a satisfactory manner in the Corporation's resolution plan submitted to the Federal Reserve Board and the FDIC in December 2017 (the 2017 165(d) Plan). On March 29, 2019, the Federal Reserve Board and the FDIC jointly announced that they did not identify shortcomings or deficiencies in the 2017 165(d) Plan.

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.

Separately, the European Union Bank Recovery and Resolution Directive (BRRD), was adopted for European Union credit institutions, including certain of the Bank's subsidiaries and branches, effective January 1, 2015. In accordance with applicable Commission de Surveillance du Secteur Financier (CSSF) guidance, a Simplified Recovery Plan for Northern Trust Global Services SE, a Luxembourg-registered indirect subsidiary of the Bank, has been established and will be reviewed and filed with the CSSF at least biennially. CSSF regulations also require institutions to submit resolution related data on an annual basis, a requirement for which Northern Trust Global Services SE has an established process.

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 for market-making, hedging, certain trading activities in U.S. and foreign sovereign debt, certain trading activities of non-U.S. banking entities trading outside the United States, certain customer-driven matched swaps, 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’s activities as a swap dealer are subject to the CFTC’s rules and regulations, including rules regarding internal and external business conduct standards, reporting and recordkeeping, mandatory clearing for certain swaps, trade documentation and confirmation requirements, 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 SEC’s rules related to security-based swaps are not currently applicable to the Bank’s swap-dealing activity and the Bank’s current trading activity does not mandate its regulation as a security-based swap dealer.

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 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 a capital plan that has been reviewed without objection by the Federal Reserve Board. 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 on the ability of the Bank to pay sufficient dividends to the Corporation.

Various 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 Corporation and other affected bank holding companies may pay dividends, repurchase stock, and make other capital distributions only in accordance with a capital plan to which the Federal Reserve Board has not objected.

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, adverse and severely adverse scenarios provided by the appropriate banking regulator. Results from the Corporation’s and the Bank’s annual company-run stress tests are reported to the appropriate regulators and made publicly available.

The Corporation submitted its most recent capital plan to the Federal Reserve Board in April 2019 as part of the Federal Reserve Board’s 2019 CCAR exercise, and the Federal Reserve Board did not object to the Corporation’s plan and proposed capital actions, including authority to increase its dividend payments and share repurchases, in mid-2019.

The Regulatory Relief Act and the Federal Reserve Board’s tailoring rule implementing changes required by such act did not directly affect the CCAR exercise or capital plan requirements that apply to the Corporation. The Corporation remains subject to annual company-run stress testing, annual supervisory stress testing, and annual capital plan submission requirements.

The Corporation will submit its 2020 capital plan to the Federal Reserve Board by April 6, 2020. The Federal Reserve Board is expected to publish either its objection or non-objection to the 2020 capital plan and proposed capital actions, such as dividend payments and share repurchases, in mid-2020.

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 company-run stress tests on June 21, 2019, and the results of its company-run mid-cycle stress tests on October 31, 2019.

In April 2018, the Federal Reserve Board proposed revisions to the CCAR exercise and DFAST regulations that would in part integrate the forward-looking stress test results with the non-stress capital requirements discussed below by using the results of the annual supervisory stress test to set specific buffer requirements above minimum capital requirements, which restrict capital distributions under the capital rule and establish a single approach to capital distribution limitations. The April 2018 proposal also would replace the 2.5% capital conservation buffer requirement discussed below with a stress capital buffer requirement and establish a stress leverage buffer requirement in addition to the minimum 4% Tier 1 leverage ratio requirement. Under the April 2018 proposal, an institution would be required to maintain capital ratios above its minimum plus its buffer requirements in order to avoid restrictions on its capital distributions and discretionary bonus payments. An institution would be bound by the most stringent distribution limitations, if any, as determined by its capital conservation buffer requirement, its stress leverage buffer requirement and, if applicable, its advanced approaches capital conservation buffer requirement and enhanced supplementary leverage ratio standard.

The April 2018 proposal also would remove the stress testing assumption that an institution would make all planned capital distributions over the planning horizon, including any planned common stock dividends and repurchases of common stock. Instead, the stress buffer requirements would include only four quarters of planned common stock dividends in order to preserve the incentives for an institution to engage in disciplined, forward-looking dividend planning. Further, the April 2018 proposal would adjust the methodology used in the supervisory stress test to assume that the institution takes actions to maintain a constant level of assets, including loans, trading assets, and securities over the planning horizon and assume that the institution's risk-weighted assets and leverage ratio denominator generally remain unchanged over the planning horizon. The April 2018 proposal also would remove the quantitative objection in CCAR and eliminate the 30 percent dividend payout ratio as a criterion for heightened scrutiny of an institution's capital plan. The Federal Reserve Board would retain the CCAR qualitative supervisory review and the ability to object to an institution's capital plan on qualitative grounds based on the adequacy of the institution's capital planning processes for institutions supervised by the Large Institution Supervision Coordination Committee and other large and complex institutions.

As of the date of this filing, the Federal Reserve Board has not finalized the April 2018 proposal, and the Corporation cannot predict whether it will be finalized and whether such finalization would alter the way in which the CCAR exercise and DFAST regulations are applied to the Corporation.

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 final Basel III rules, the Corporation, with the Bank, is one of a small number of "core" banking organizations that are required to use the advanced approaches methodologies to calculate and disclose publicly their 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, 2019, were well above the minimum 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, 2019

	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	12.7%	13.2%	14.5%	15.0%	16.3%	16.8%	8.7%	8.7%	7.6%
The Northern Trust Company	12.3%	13.0%	12.3%	13.0%	14.0%	14.6%	7.3%	7.3%	6.4%
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 and Bank are also subject to a capital conservation buffer, which requires them 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 conservation buffer increased to 2.5% in 2019 from 1.875% in 2018.

A "countercyclical buffer" of 0% to 2.5% of a banking organization's total risk-weighted assets 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%, but certain other jurisdictions in which the Corporation has credit exposures currently have countercyclical buffers set at levels greater than 0%, which slightly increase the weighted average countercyclical buffer to which the Corporation is subject.

As discussed above, in April 2018 the Federal Reserve Board proposed revisions to the Basel III rules that would in part integrate the forward-looking stress test results with the non-stress capital requirements discussed in this section. If implemented, the revisions would establish revised capital requirements for large banking organizations, such as the Corporation, that are institution-specific and risk-sensitive.

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 regulatorily prescribed liquidity stress scenario. As of December 31, 2019, the Corporation and the Bank were in compliance with applicable LCR requirements.

Basel III also introduced the concept of a 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. The NSFR will require certain banking organizations, including the Corporation, to maintain a stable funding profile in relation to the composition of their assets and off-balance-sheet activities. The Federal Reserve Board has proposed, but has not adopted, a final rule implementing the NSFR.

The enhanced prudential standards imposed by the Dodd-Frank Act, as amended by the Regulatory Reform 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, 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.

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. The U.S. Department of the Treasury’s Office of Foreign Assets Control publishes lists of these prohibited parties, known as Specially Designated Nationals and Blocked Persons. If the Corporation or the Bank finds a sanctioned name or jurisdiction on any transaction 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 and disclose privacy policies with respect to consumer information, setting limitations on disclosure to third parties of consumer information, setting standards for protecting client information, and requiring notice of data breaches in certain circumstances. Most states, the European Union (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, a European data protection framework - the General Data Protection Regulation (GDPR) - 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. In the United States, the California Consumer Protection Act (CCPA) was adopted by the State of California and became effective January 1, 2020. The CCPA substantially increases 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.

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, branches and subsidiaries conducting banking and asset servicing businesses in the United Kingdom are authorized to do so pursuant to the UK Financial Services and Markets Act 2000. They are authorized by the Prudential Regulation Authority (PRA) or the Financial Conduct Authority (FCA) and regulated by the FCA and, in some instances, also the PRA. 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, 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, with the establishment of Northern Trust Global Services SE as an EU-domiciled credit institution in Luxembourg in connection with the Corporation's Brexit-related planning, such entity is subject to the prudential supervision of the European Central Bank and the CSSF. Moreover, Northern Trust's non-European branches and subsidiaries conducting financial services activities also may be within the scope of the laws of the EU, given that some EU laws apply to the wider EEA, which includes not only all EU member states but also the non-EU member states Iceland, Liechtenstein and Norway, and because of increasing extraterritorial effect of European legislation.

The following items provide a brief description of certain recently implemented and in-progress regulatory changes in the EU and United Kingdom 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.

Revised Capital Requirements Directive and revised Capital Requirements Regulation. The EU Capital Requirements Directive of June 26, 2013 (CRD) and the EU Capital Requirements Regulation of June 26, 2013 (CRR) govern the legal framework for banking regulation in the EU, including, among other things, own fund requirements. On November 23, 2016, the EU Commission published a proposal for a revision of the CRD (CRD V) and the CRR (CRR II). Formal adoption of CRD V and CRR II by the EU Parliament and European Council has not yet occurred. Further, CRD V and CRR II currently contain mandates for the European Banking Authority (EBA) to produce a number of regulatory technical standards (RTS) and implementing technical standards (ITS), which remain under development.

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. CSDR requires several "Level 2" (or implementing) measures in order for its provisions to take effect fully. A number of these "Level 2" measures were published in 2017. Most recently, on September 13, 2018, the EU Commission Delegated Regulation (EU) 2018/1229 supplementing the CSDR with regard to technical standards on settlement discipline was published in the EU's Official Journal. The Delegated Regulation, which is expected to enter into force on February 1, 2021, sets out measures to prevent and address failed settlements and encourage settlement discipline by monitoring failed settlements, collecting and distributing cash penalties for failed settlements, and specifying the operational details of the buy-in process.

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, subject to certain transitional provisions. SFTR requires adoption of certain "Level 2" measures which were finalized in 2019.

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 United Kingdom 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 United Kingdom. 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, subject to certain transitional provisions. 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.

Market in Financial Instruments Directive. On January 3, 2018, the recast Market in Financial Instruments Directive (MiFID II) became applicable to investment services and activities in the EU. MiFID II, together with the Markets in Financial Instruments Regulation (MiFIR I), repealed and recast the Markets in Financial Instruments Directive (2004/39/EC) (MiFID). Going forward, MiFID II and MiFIR I form the EU legal framework governing the requirements applicable to investment firms, trading venues, data reporting service providers and third-country firms providing investment services or activities in the EU.

Money Market Funds Regulation. On June 30, 2017, an EU regulation on money market funds (MMFR) with a view of making money market funds more resistant to crises and market turbulence was published. Subject to certain transitional provisions, the MMFR became applicable on July 21, 2018 for new money market funds and January 21, 2019 for existing money market funds. It imposes detailed rules relating to the investment policies, risk management and other operational aspects of such funds. Further “Level 2” regulations containing the technical implementation of the MMFR were published in 2018. Technical guidelines to clarify how to comply with certain reporting obligations under MMFR came into force on September 19, 2019.

European Deposit Insurance Scheme. On October 11, 2017, the EU Commission announced that it aimed to complete all parts of the European Banking Union by 2018. The banking union is in place and operational except for the creation of a single European Deposit Insurance Scheme (EDIS). The EDIS will apply to deposit guarantee schemes (DGSs) in EU member states participating in the single supervisory mechanism (SSM) and credit institutions in those member states. The EDIS will not directly affect member states that are not participating in the SSM, such as the United Kingdom, meaning that the Financial Services Compensation Scheme (FSCS), the UK DGS, will not be subject to the EDIS. The EU Council and Parliament continue to consider the legislative proposal for the EDIS regulation, which was published by the EU Commission in November 2015. The EU Commission proposed changes to its approach to the EDIS in its October 2017 communication on completing the banking union but has not yet published any revisions to the text of the EDIS regulation to reflect these changes. The communication also urged the European Parliament and European Council to adopt these measures quickly to complete the banking union however this remains outstanding.

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 introduces the following key changes to the current EU AML regime: (i) EU member states must ensure that registers of ultimate beneficial owners of companies and other legal entities become accessible to the general public; (ii) the current AML regime is 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 are provided; (iii) the threshold for identifying holders of prepaid cards is lowered to €150; and (iv) EU member states will be required to implement enhanced due diligence measures to monitor suspicious transactions involving high-risk countries more strictly.

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 EU Commission Implementing Regulation (EU) 2018/1212 of September 3, 2018 set out minimum requirements for implementing SRD II, which will apply from September 3, 2020.

Depository Books & Records. Following the European Securities and Markets Authority's opinion on asset segregation and application of depository delegation rules to CSDs published on July 20, 2017, and entering into force on April 1, 2020, changes have been introduced by two EU regulations modifying the existing Alternative Investment Fund Managers Directive (AIFMD) and Undertakings for the Collective Investment in Transferable Securities (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 depository and any third party to whom safe-keeping functions have been delegated. The key changes (i) impact the frequency of reconciliations between the depository's internal accounts and records and those of any third party in the custody chain, (ii) require the depository 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. The changes impact Northern Trust's subsidiaries providing depository 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, 2019, each of our non-U.S. banking subsidiaries had capital ratios above their specified minimum requirements.

Staff

Northern Trust employed approximately 19,800 full-time equivalent staff members as of December 31, 2019.

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.

Statistical Disclosure by Bank Holding Companies

The following statistical disclosures, included under Items 6, 7 and 8 of this Annual Report on Form 10-K, are incorporated herein by reference.

- Item 6, "Selected Financial Data," includes the Corporation's consolidated return on average common equity, return on average assets, dividend payout ratio and ratio of average equity to average assets.
- The "Average Consolidated Balance Sheets With Analysis Of Net Interest Income (Interest And Rate On A Fully Taxable Equivalent Basis)" table (Item 7) provides the Average Consolidated Balance Sheets with Analysis of Net Interest Income for the years ended December 31, 2019, 2018 and 2017.
- The "Changes In Net Interest Income" table (Item 7) provides the changes in Net Interest Income for the years ended December 31, 2019 and 2018.
- The "Securities Portfolio" table (Item 7) provides the book values of investments in obligations of the U.S. government, states and political subdivisions, and other held to maturity and available for sale debt securities as of December 31, 2019, 2018 and 2017.
- The "Remaining Maturity and Average Yield of Debt Securities Held to Maturity and Available for Sale" table (Item 7) provides the remaining maturity by major security grouping and yield as of December 31, 2019.
- The "Composition of Loan Portfolio" table (Item 7) provides loans and leases by type as of December 31, 2019, 2018, 2017, 2016 and 2015.
- The "Distribution of Non-U.S. Loans by Type" table (Item 7) as of December 31, 2019, 2018, 2017, 2016 and 2015.
- The "Remaining Maturity of Selected Loans and Leases" table (Item 7) as of December 31, 2019.
- The "Commercial Real Estate Loans" table (Item 7) provides details of loan concentrations as of December 31, 2019 and 2018.
- The "Nonperforming Assets" table (Item 7) provides information about the Corporation's nonaccrual, past due and restructured loans receivable as of December 31, 2019, 2018, 2017, 2016 and 2015.

- The “Allowance and Provision for Credit Losses” section (Item 7) provides a discussion of the factors which influenced management’s judgment in determining the provision for credit losses, as well as information with respect to allowance for credit losses relating to non-U.S. operations for the years ended December 31, 2019, 2018, 2017, 2016 and 2015.
- The “Analysis of Allowance for Credit Losses” table (Item 7) for the years ended December 31, 2019, 2018, 2017, 2016 and 2015.
- The “Allocation of the Allowance for Credit Losses” table (Item 7) provides a breakdown of the allowance for credit losses by loan class and illustrates the proportion of each loan class to total loans for the years ended December 31, 2019, 2018, 2017, 2016 and 2015.
- The "Average Deposits by Type" table (Item 7) as of December 31, 2019, 2018 and 2017.
- The "Distribution of Non-U.S. Deposits by Type" table (Item 7) as of December 31, 2019, 2018 and 2017.
- The "Remaining Maturity of Time Deposits \$100,000 or More" table (Item 7) as of December 31, 2019.
- The "Average Rates Paid on Interest-Related Deposits by Type" table (Item 7) for the years ended December 31, 2019, 2018 and 2017.
- The "Purchased Funds" table (Item 7) as of December 31, 2019, 2018 and 2017.
- The "Selected Average Assets and Liabilities Attributable to Non-U.S. Operations" table (Item 7) for the years ended December 31, 2019, 2018, 2017, 2016 and 2015.
- The "Percent of Non-U.S.-Related Average Assets and Liabilities to Total Consolidated Average Assets" table (Item 7) for the years ended December 31, 2019, 2018, 2017, 2016 and 2015.
- The "Non-U.S. Outstandings" table (Item 7) provides information on non-U.S. outstandings by country that exceed 1.00% of Northern Trust’s assets as of December 31, 2019, 2018 and 2017.
- Note 1, “Summary of Significant Accounting Policies,” (Item 8) provides a discussion of Northern Trust’s policy for placing loans on non-accrual status.
- Note 6, “Loans and Leases,” (Item 8) provides the Corporation’s forgone interest income on nonaccrual loans, as well as a description of the nature of non-U.S. loans as of December 31, 2019 and 2018.
- Note 12, "Deposits," (Item 8) provides the remaining maturity of time deposits \$100,000 or more as of December 31, 2019 and time deposits \$100,000 or more as of December 31, 2018.
- Further discussion of Northern Trust’s management of credit risk with respect to the provision and allowance for credit losses is provided in the following information that is incorporated herein by reference to the notes to the consolidated financial statements provided in Item 8, “Financial Statements and Supplementary Data.”
 - Note 1, “Summary of Significant Accounting Policies”:
 - H. Loans and Leases.
 - I. Allowance for Credit Losses.
 - L. Other Real Estate Owned (OREO).
 - Note 6, “Loans and Leases.”
 - Note 7, “Allowance for Credit Losses.”
 - Note 8, “Concentrations of Credit Risk.”
 - Note 29, “Off-Balance-Sheet Financial Instruments, Guarantees and Other Commitments.”

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 and counterparties 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. Further, 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. We cannot assure you that the risk factors herein or elsewhere in our other reports address all potential risks that we may face.

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,” of this Annual Report on Form 10-K.

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; and fees for other services rendered, 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. 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. For example, poor investment performance in funds or client accounts that we manage or in investment products that we design or provide that is due to underperformance relative to our competitors or benchmarks could 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. Further, 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 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 rates generally remain low relative to historical levels. Low interest rate environments have had in the past, and may have in the future, a negative impact on our net interest margin, which is the difference between what we earn on our assets and the interest rates we pay for deposits and other sources of funding. Low interest rate environments also have historically had a negative impact on our fees earned on certain of our products. For example, in the past, we have from time to time waived certain fees associated with money market mutual funds due to short-term interest rate levels and we may do so in the future if short-term interest rate levels decline. Low net interest margins and fee waivers each negatively impact our earnings.

Conversely, in some circumstances, a rise in interest rates also may affect us negatively. For example, we may be impacted negatively if such an increase were to 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; a decline in the value of securities held in our portfolio of investment securities, resulting in decreased levels of capital and liquidity; or higher funding costs.

Further, 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,” of this Annual Report on Form 10-K 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, which are important factors in our earnings. The actions of the Federal Reserve Board or other regulatory authorities also may reduce the value of financial instruments we hold. 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.

The ultimate impact on us of the United Kingdom’s withdrawal from the European Union remains uncertain.

In June 2016, United Kingdom (UK) voters approved a departure from the European Union (EU), commonly referred to as “Brexit.” Following delivery of the UK’s formal notice of withdrawal in March 2017, a subsequent negotiation period, and approval of a withdrawal agreement by each of the UK and the EU, the UK formally exited the EU on January 31, 2020. The ultimate impact of Brexit on the Corporation and the Bank remains uncertain and will depend on the final terms of the post-Brexit relationships negotiated between the UK and other EU nations. Brexit has contributed, and may continue to contribute, to market volatility, particularly the valuation of the Euro and British pound, and could have significant adverse effects on our businesses, financial condition and results of operations. In conjunction with our Brexit-related preparations, and to mitigate the potential risk that our UK subsidiaries will be unable to retain their EU financial services “passports,” we have implemented certain changes to our organizational structure, including the establishment of an EU-domiciled credit institution in Luxembourg. We have incurred, and may in the future continue to incur, additional costs associated with such measures and unforeseen political, regulatory, or other developments related to Brexit, or operational issues associated with the organizational restructuring related thereto, also may result in additional costs and disruption to our EU banking business.

Uncertainty about 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, personal bankruptcy rates, levels of incurrence of and default on consumer debt, and home prices. Economic challenges faced in various foreign markets, including negative interest rates in some jurisdictions, 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, may 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 and liquidity. 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, we could suffer 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,” of this Annual Report on Form 10-K 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 a few of our businesses, such as securities lending, our fee is calculated as a percentage of our client’s 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 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 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 natural disasters, pandemics, geopolitical events, political unrest 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 we expand our geographic footprint, product pipeline and client types—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, 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 that there is risk in every aspect of 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.

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

Any failure, interruption or breach in the security of our systems could severely disrupt our operations. Our systems involve the use 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 granting 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 theft, loss or other misappropriation of this information. Regulators globally are also introducing the potential for greater monetary fines on institutions that suffer from breaches leading to the theft, loss or other 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 requiring notification of data breaches. For example, the General Data Protection Regulation (GDPR), which became effective in May 2018, establishes new requirements regarding the handling of personal information. Noncompliance with the GDPR may result in monetary penalties of up to 4% of worldwide revenue. In the United States, the California Consumer Privacy Act (CCPA) was adopted by the State of California and became effective January 1, 2020. The CCPA substantially increases the rights of California residents to understand how their personal data is collected and used by commercial businesses and 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. These and other changes in laws or regulations associated with the enhanced protection of personal and other types of information could greatly increase the size of potential fines related to the protection of such information.

Information security risks for large financial institutions like us are significant in part because of the proliferation of new technologies to conduct financial transactions and the increased sophistication and activities 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 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. 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.

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. In addition, our clients often use their own devices, such as computers, smart phones and tablets, to manage their accounts, which may heighten the risk of system failures, interruptions or security breaches.

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. Although we have not to our knowledge suffered a material breach of our systems, we and our clients have been subject to cyber-attacks, and it is possible that we could suffer a material breach in the future. 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, a successful cyber-attack could 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 expect to continue to face a wide variety of cyber-threats, including computer viruses, ransomware and other malicious code, distributed denial of service attacks, phishing attacks, information security breaches or employee or contractor error or malfeasance that could result in the unauthorized release, gathering, monitoring, misuse, loss or destruction of our, our clients' or other parties' confidential, personal, proprietary or other information or otherwise disrupt, compromise or damage our or our clients' or other parties' business assets, operations and activities. Our status as a global financial institution and the nature of our client base may enhance the risk that we are targeted by such cyber-threats. If a breach of our security occurs, we could be the subject of legal claims or proceedings, including regulatory investigations and actions, the market perception of the

effectiveness of our security measures could be harmed, our reputation could suffer and we could lose clients, 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.

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. 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, 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. 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 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.

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. However, these systems and models are inherently limited 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. 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.

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 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 may not comply with their servicing and other contractual obligations to us, 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 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, in which we have been expanding our business activities. Our non-U.S. operations accounted for 31% of our revenue in 2019. 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 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. Failure to control these and other costs could affect our earnings negatively and reduce our competitive position. In October 2017, we announced our “Value for Spend” expense management initiative, with the goal of realizing \$250 million in expense run-rate savings by 2020 through improved organizational alignment, process optimization and strategic sourcing. Although we have made substantial progress toward achieving this goal, we cannot predict its overall effect on our financial condition or results of operations in the future.

Acts of terrorism, natural disasters, global climate change, pandemics and global conflicts may have a negative impact on our business and operations.

Acts of terrorism, natural disasters, global climate change, pandemics, global conflicts or other similar events could have a negative impact on our business and operations. While we have in place business continuity plans, such events could 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, and have a similar impact on our clients, suppliers, third-party vendors and counterparties. These 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.

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 then 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 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 also 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, 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.

Changes in the method pursuant to which the London Interbank Offered Rate (LIBOR) or other interest rate benchmarks are determined could adversely impact our business and results of operations.

Many financial markets currently rely on interbank offered rates (each, an IBOR) as mutually agreed upon reference rates serving as the basis for the pricing and valuation of assets, trading positions, loans and other financial transactions. Following historical concerns about attempted manipulation of IBOR levels, as well as a potential lack of liquidity in the underlying activity that contributes to an IBOR setting, global regulators have signaled interest in replacing existing IBOR rates with alternative reference rates. While there are multiple IBORs, LIBOR is the most widely used interest rate benchmark in the world and serves as the reference rate for our floating-rate funding, certain of the products that we own or offer, various lending and securities transactions in which we are involved, and many derivatives that we use to manage our or our clients' risk. In July 2017, the United Kingdom Financial Conduct Authority, which regulates the process for establishing LIBOR, announced that it intends to stop persuading or compelling banks to submit rates for the calculation of LIBOR to the administrator of LIBOR after 2021, and as a result, the continuation of LIBOR on the current basis cannot be guaranteed after 2021. Any 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. While we are working to facilitate an orderly transition from LIBOR to alternative interest rate benchmarks for us and our clients, 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 potential transition away from the use of LIBOR or other interest rate benchmarks, or uncertainty related to any such potential transition, may cause us to recognize additional costs or experience operational disruptions, 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. For more information on these regulations and other regulatory changes, see "Supervision and Regulation—Liquidity Standards" in Item 1, "Business," of this Annual Report on Form 10-K. 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 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," of this Annual Report on Form 10-K.

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.

Our success with large, complex clients requires substantial liquidity.

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.

Regulatory and Legal Risks

Failure to comply with regulations 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 governmental agencies that have broad supervisory powers and the ability to impose sanctions. In the United States, the Corporation, the Bank and many of the Corporation's other subsidiaries are regulated heavily by bank regulatory agencies at the federal and state levels. These regulations cover a variety of matters ranging from required capital levels to prohibited activities. They are directed specifically at protecting depositors, the federal deposit insurance fund and the banking system as a whole, not our stockholders or other security holders. The Corporation and its subsidiaries also are regulated heavily by bank, securities and other regulators globally and subject to evolving laws and regulations regarding privacy and data protection. 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 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 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 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.

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, as a publicly-held company, we are subject to the risk of claims under the federal securities laws, and volatility in our stock price and those of other financial institutions increases this risk. 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 regulatory enforcement matters.

In the ordinary course of our business, we are subject to various regulatory, governmental and enforcement inquiries, 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 enforcement matters, we may face claims for disgorgement, the imposition of civil and criminal penalties or the imposition of other remedial sanctions, any of which could have an adverse impact on us.

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.

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 do not execute strategic plans successfully, we will not grow as we have planned and our earnings growth will be impacted negatively.

Our growth depends upon successful, consistent execution of our business strategies. A failure to execute these strategies will 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 may 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 if we do not receive the required regulatory approvals, if regulatory approvals are significantly delayed or if other closing conditions are not satisfied.

If we are not able to attract, retain and motivate key 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 key 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. The unexpected loss of services of key 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 key employees, either individually or as a group, could affect our clients' perception of our abilities adversely.

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 to meet client expectations or fiduciary or other obligations, operational failures, litigation, regulatory actions or fines, 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 materially and adversely affect our reputation as well as our ability to attract and retain clients or key employees. 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 would 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. 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 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. Falling behind 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 will 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 require 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

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 December 2017, the Tax Cuts and Jobs Act (H.R. 1) (TCJA) was signed into law. The TCJA introduced a number of changes in then-existing tax law impacting businesses including, among other things, a reduction in the corporate income tax rate from 35% to 21%, disallowance of certain deductions that had previously been allowed, limitations on interest deductions, alteration of the expensing of capital expenditures, adoption of a territorial tax system, assessment of a one-time repatriation tax or “toll-charge” on undistributed earnings and profits of U.S.-owned foreign corporations, and introduction of certain anti-base erosion provisions. The ultimate impact of the TCJA on our financial condition and results of operations in future years remains uncertain and may differ materially from our expectations due to the anticipated issuance of technical guidance regarding certain elements of the TCJA (including elements impacting the U.S. taxes payable on the income of the Corporation’s non-U.S. branches), changes in interpretations and assumptions we have made with respect to the TCJA, and changes to the competitive landscape in which we operate and other factors.

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 or deductions 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 International 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 a capital plan as to which the Federal Reserve Board has not objected. There can be no assurance that the Federal Reserve Board will not object to our future capital plans. In addition to imposing restrictions on our ability to return capital to stockholders, an objection by the Federal Reserve Board to a future capital plan would negatively impact our reputation and investor perceptions of us.

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 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 or elect to defer interest payments on our Floating Rate Capital 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 increase our common stock dividend along with 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" in Item 1, "Business," of this Annual Report on Form 10-K.

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 are two office buildings 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 21 U.S. states and Washington, D.C., and across 22 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 six facilities: a leased facility at 801 South Canal Street in Chicago; a leased facility at 231 South La Salle Street 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 Bank also has leased space at 333 South Wabash Avenue in Chicago, with employees moving into the space in early 2020.

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,” of this Annual Report on Form 10-K and which information is incorporated herein by reference.

ITEM 3 – LEGAL PROCEEDINGS

The information presented under the caption “Legal Proceedings” in Note 26, “Contingent Liabilities,” included under Item 8, “Financial Statements and Supplementary Data,” of this Annual Report on Form 10-K 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 54, joined Northern Trust in 2011 and has served as Chairman of the Board since January 2019, Chief Executive Officer since January 2018 and as President since January 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 43, joined Northern Trust in 2008 and has served as Senior Vice President and Controller since May 2019. Prior to that, Ms. Allnutt served as manager of Global Financial Control from 2014 to April 2019 and led International Accounting Policy and Control from 2013 to 2014.

Robert P. Browne - Mr. Browne, age 54, joined Northern Trust in 2009 as Executive Vice President and Chief Investment Officer. Before joining Northern Trust, Mr. Browne served in various senior investment-related roles at ING Investment Management Holdings N.V.

Peter B. Cherecwich - Mr. Cherecwich, age 55, joined Northern Trust in 2007 and has served as Executive Vice President and President of Corporate & Institutional Services since February 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 58, joined Northern Trust in 1985 and has served as Executive Vice President and President of Wealth Management since September 2014. Prior to that, Mr. Fradkin served as President of Corporate & Institutional Services from 2009 to 2014. He served as Chief Financial Officer from 2004 to 2009.

Mark C. Gossett - Mr. Gossett, age 58, joined Northern Trust in 1983 and has served as Executive Vice President and Chief Risk Officer since February 2020. Prior to that, Mr. Gossett served as Chief Credit Officer and Head of Market and Liquidity Risk from 2014 to January 2020 and as Co-Head of Global Foreign Exchange from 2012 to 2014. Mr. Gossett served as the Chief Risk Officer for 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 62, joined Northern Trust in 2014 and has served as Executive Vice President and General Counsel since that time and as Corporate Secretary since October 2018. 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 59, joined Northern Trust in 1982 and has served as Executive Vice President and President of Corporate & Institutional Services for Europe, Middle East and Africa since June 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 50, joined Northern Trust in 1999 and has served as Executive Vice President and Chief Information Officer since September 2018. Prior to that, Mr. South served as Chief Business Architect from 2014 to 2018 and as Chief Operating Officer for Operations & Technology from 2013 to 2014.

Joyce M. St. Clair - Ms. St. Clair, age 60, joined Northern Trust in 1992 and has served as Executive Vice President and Chief Human Resources Officer since July 2018. Prior to that, Ms. St. Clair served as Executive Vice President and Chief Capital Management Officer from 2015 to 2018, as President of Enterprise Operations from 2014 to 2015, as President of Operations & Technology from 2011 to 2014, and as Chief Risk Officer from 2007 to 2011.

Shundrawn A. Thomas - Mr. Thomas, age 46, joined Northern Trust in 2004 and has served as Executive Vice President and President of Asset Management since October 2017. Prior to that, Mr. Thomas served as Executive Vice President and Head of the Funds and Managed Accounts Group from 2014 to 2017 and as Head of the Exchange-Traded Funds Group from

2010 to 2014. He also previously served as President and Chief Executive Officer of Northern Trust Securities, Inc. from 2009 to 2010 and as Head of Corporate Strategy from 2006 to 2009.

Jason J. Tyler - Mr. Tyler, age 48, joined Northern Trust in 2011 and has served as Executive Vice President and Chief Financial Officer since January 2020. Prior to that, Mr. Tyler served as Chief Financial Officer of Wealth Management from September 2018 to December 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 1,713 shareholders of record as of January 31, 2020.

The following table shows certain information relating to the Corporation’s purchases of common stock for the three months ended December 31, 2019.

TABLE 2: PURCHASES OF COMMON STOCK IN THE FOURTH QUARTER OF 2019

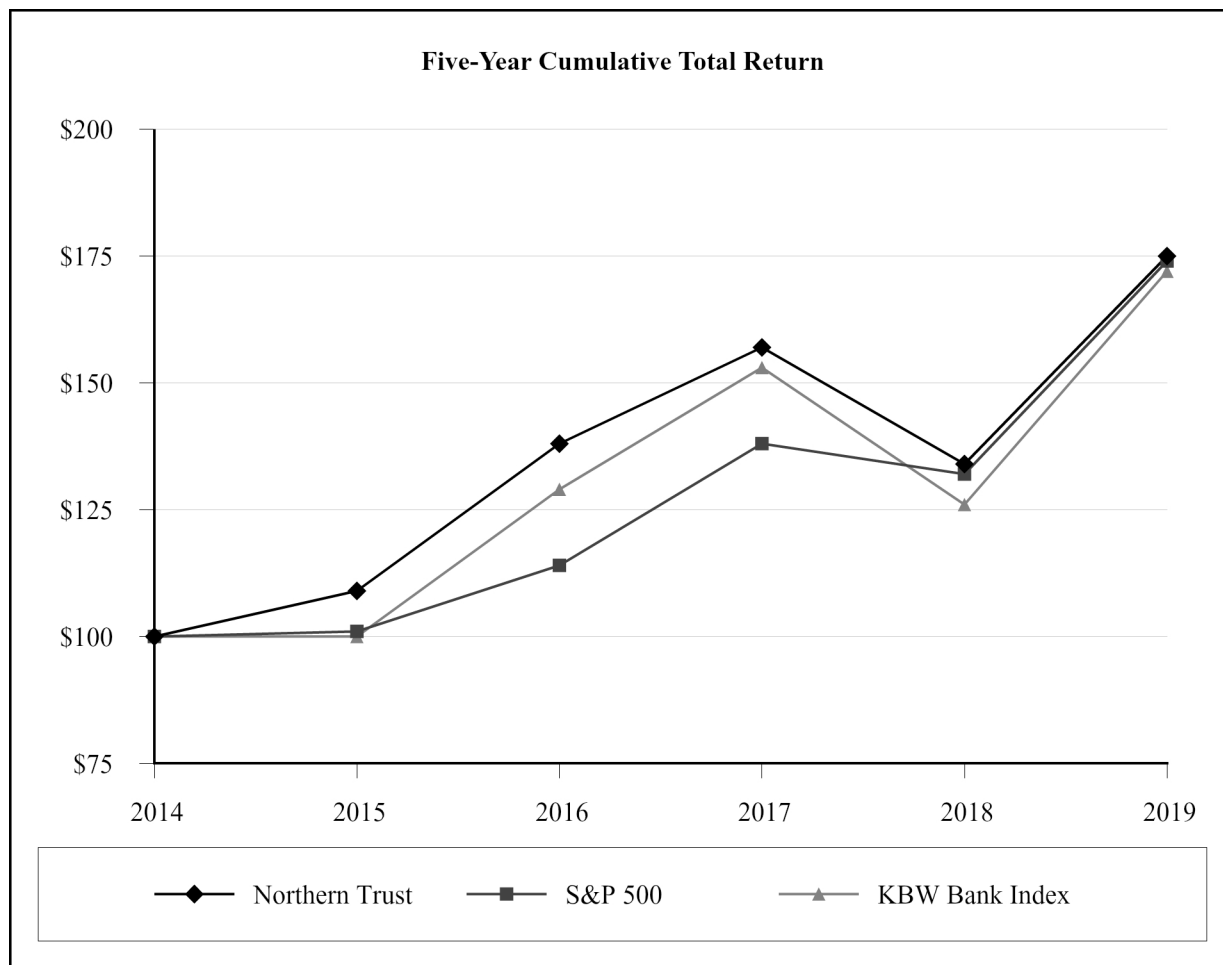
PERIOD	TOTAL NUMBER OF SHARES PURCHASED	AVERAGE PRICE PAID PER SHARE	TOTAL NUMBER OF SHARES PURCHASED AS PART OF A PUBLICLY ANNOUNCED PLAN ⁽¹⁾	MAXIMUM NUMBER OF SHARES THAT MAY YET BE PURCHASED UNDER THE PLAN
October 1 - 31, 2019	1,078,712	\$ 93.17	1,078,712	10,754,957
November 1 - 30, 2019	703,401	106.37	703,401	10,051,556
December 1 - 31, 2019	820,033	107.76	820,033	9,231,523
Total (Fourth Quarter)	2,602,146	\$ 101.34	2,602,146	9,231,523

(1) Repurchases were made pursuant to the repurchase program announced by the Corporation on July 17, 2018 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 program has no expiration date.

COMPARISON OF FIVE-YEAR CUMULATIVE TOTAL RETURN

The graph below 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, 2019. The cumulative total stockholder return assumes the investment of \$100 in the Corporation’s common stock and in each index on December 31, 2014 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, 2014 with Reinvestment of Dividends



	DECEMBER 31,						
	2014	2015	2016	2017	2018	2019	
Northern Trust	\$ 100	\$ 109	\$ 138	\$ 157	\$ 134	\$ 175	
S&P 500	100	101	114	138	132	174	
KBW Bank Index	100	100	129	153	126	172	

ITEM 6 – SELECTED FINANCIAL DATA

	2019	2018	2017	2016	2015	
FOR THE YEAR ENDED DECEMBER 31,						
CONDENSED STATEMENTS OF INCOME (In Millions)						
Noninterest Income	\$ 4,395.2	\$ 4,337.5	\$ 3,946.1	\$ 3,726.9	\$ 3,632.5	
Net Interest Income	1,677.9	1,622.7	1,429.2	1,234.9	1,070.1	
Total Revenue	\$ 6,073.1	\$ 5,960.2	\$ 5,375.3	\$ 4,961.8	\$ 4,702.6	
Provision for Credit Losses	(14.5)	(14.5)	(28.0)	(26.0)	(43.0)	
Noninterest Expense	4,143.5	4,016.9	3,769.4	3,470.7	3,280.6	
Income before Income Taxes	\$ 1,944.1	\$ 1,957.8	\$ 1,633.9	\$ 1,517.1	\$ 1,465.0	
Provision for Income Taxes	451.9	401.4	434.9	484.6	491.2	
Net Income	\$ 1,492.2	\$ 1,556.4	\$ 1,199.0	\$ 1,032.5	\$ 973.8	
Preferred Stock Dividends	46.4	46.4	49.8	23.4	23.4	
Net Income Applicable to Common Stock	\$ 1,445.8	\$ 1,510.0	\$ 1,149.2	\$ 1,009.1	\$ 950.4	
PER COMMON SHARE						
Net Income – Basic	\$ 6.66	\$ 6.68	\$ 4.95	\$ 4.35	\$ 4.03	
– Diluted	6.63	6.64	4.92	4.32	3.99	
Cash Dividends Declared Per Common Share	2.60	1.94	1.60	1.48	1.41	
Book Value – End of Period (EOP)	46.82	43.95	41.28	38.88	36.27	
Market Price – EOP	106.24	83.59	99.89	89.05	72.09	
SELECTED BALANCE SHEET DATA (In Millions)						
<i>At Year End:</i>						
Earning Assets	\$ 125,236.6	\$ 122,847.3	\$ 129,656.6	\$ 115,446.4	\$ 106,848.9	
Total Assets	136,828.4	132,212.5	138,590.5	123,926.9	116,749.6	
Deposits	109,120.6	104,496.8	112,390.8	101,651.7	96,868.9	
Senior Notes	2,573.0	2,011.3	1,497.3	1,496.6	1,497.4	
Long-Term Debt	1,148.1	1,112.4	1,449.5	1,330.9	1,371.3	
Stockholders' Equity	11,091.0	10,508.3	10,216.2	9,770.4	8,705.9	
<i>Average Balances:</i>						
Earning Assets	\$ 107,109.4	\$ 113,731.0	\$ 111,178.3	\$ 107,037.6	\$ 102,249.8	
Total Assets	117,551.4	122,946.6	119,607.4	115,570.3	110,715.1	
Deposits	89,786.0	95,103.1	96,504.8	93,613.9	90,768.0	
Senior Notes	2,389.1	1,704.0	1,496.9	1,496.6	1,497.2	
Long-Term Debt	1,139.0	1,296.8	1,519.4	1,392.4	1,426.4	
Stockholders' Equity	10,648.4	10,228.9	9,980.6	9,085.3	8,624.5	
CLIENT ASSETS (In Billions)						
Assets Under Custody/Administration	\$ 12,050.4	\$ 10,125.3	\$ 10,722.6	\$ 8,541.3	\$ 7,797.0	
Assets Under Custody	9,233.5	7,593.9	8,084.6	6,720.5	6,072.1	
Assets Under Management	1,231.3	1,069.4	1,161.0	942.4	875.3	
SELECTED RATIOS AND METRICS						
<i>Financial Ratios and Metrics:</i>						
Return on Average Common Equity	14.9%	16.2%	12.6%	11.9%	11.5%	
Return on Average Assets	1.27	1.27	1.00	0.89	0.88	
Dividend Payout Ratio	39.2	29.2	32.5	34.3	35.3	
Net Interest Margin ⁽¹⁾	1.60	1.46	1.33	1.18	1.07	
Average Stockholders' Equity to Average Assets	9.1	8.3	8.3	7.9	7.8	
<i>Capital Ratios:</i>						
	DECEMBER 31, 2019		DECEMBER 31, 2018		DECEMBER 31, 2017	
	STANDARDIZED APPROACH	ADVANCED APPROACH	STANDARDIZED APPROACH	ADVANCED APPROACH	STANDARDIZED APPROACH	ADVANCED APPROACH
Common Equity Tier 1 Capital	12.7%	13.2%	12.9%	13.7%	12.6%	13.5%
Tier 1 Capital	14.5	15.0	14.1	15.0	13.8	14.8
Total Capital	16.3	16.8	16.1	16.9	15.8	16.7
Tier 1 Leverage	8.7	8.7	8.0	8.0	7.8	7.8
Supplementary Leverage ⁽²⁾	N/A	7.6	N/A	7.0	N/A	6.8
	DECEMBER 31, 2016		DECEMBER 31, 2015			
	STANDARDIZED APPROACH	ADVANCED APPROACH	STANDARDIZED APPROACH	ADVANCED APPROACH	WELL-CAPITALIZED RATIOS	MINIMUM CAPITAL RATIOS
Common Equity Tier 1 Capital	11.8%	12.4%	10.8%	11.9%	N/A	4.5%
Tier 1 Capital	12.9	13.7	11.4	12.5	6.0	6.0
Total Capital	14.5	15.1	13.2	14.2	10.0	8.0
Tier 1 Leverage	8.0	8.0	7.5	7.5	N/A	4.0
Supplementary Leverage ⁽²⁾	N/A	6.8	N/A	6.2	N/A	3.0

(1) Net interest margin is presented on a fully taxable equivalent (FTE) basis, a non-GAAP financial measure that facilitates the analysis of asset yields. The net interest margin on a GAAP basis and a reconciliation of net interest income on a GAAP basis to net interest income on an FTE basis are presented on page 89.

(2) Effective January 1, 2018, the Corporation and Bank are subject to a minimum supplementary leverage ratio of 3 percent.

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

BUSINESS OVERVIEW

Northern Trust Corporation (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: Corporate & Institutional Services (C&IS) and Wealth Management. Asset management and related services are provided to C&IS 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 21 U.S. states and Washington, D.C., and across 22 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" or similar terms refers to the Corporation and its subsidiaries on a consolidated basis.

FINANCIAL OVERVIEW

Net income decreased \$64.2 million, or 4%, to \$1.49 billion in 2019 from \$1.56 billion in 2018. Earnings per diluted common share was \$6.63 in 2019 compared to \$6.64 in 2018. Return on average common equity decreased to 14.9% in 2019 from 16.2% in 2018.

Revenue increased \$112.8 million, or 2%, to \$6.07 billion in 2019 from \$5.96 billion in the prior year, primarily driven by an increase in trust, investment and other servicing fees of 3%, an increase in net interest income of 3%, and an increase in other operating income of 14%, partially offset by a decrease in foreign exchange trading income of 18%.

Client assets under custody/administration (AUC/A) increased 19% from \$10.13 trillion as of December 31, 2018 to \$12.05 trillion as of December 31, 2019. Client assets under custody, a component of AUC/A, increased 22% from \$7.59 trillion as of December 31, 2018 to \$9.23 trillion as of December 31, 2019. Client assets under custody included \$5.89 trillion of global custody assets as of December 31, 2019, which increased 25% from \$4.70 trillion as of December 31, 2018. Client assets under management increased 15% to \$1.23 trillion as of December 31, 2019 from \$1.07 trillion at December 31, 2018.

Trust, investment and other servicing fees, which represent the largest component of total revenue, increased 3% to \$3.85 billion in 2019, from \$3.75 billion in 2018, primarily due to new business and favorable markets, partially offset by unfavorable currency translation and lower securities lending revenue.

Foreign exchange trading income of \$250.9 million in 2019 decreased 18% from \$307.2 million in 2018, primarily resulting from lower foreign exchange swap activity in Treasury.

Other operating income of \$145.5 million in 2019 increased 14% from \$127.5 million in 2018, primarily due to income related to a bank-owned life insurance program implemented during 2019, higher miscellaneous income, and the prior-year impairment of a community development equity investment previously held at cost, partially offset by a charge related to the decision made in 2019 to sell substantially all of the lease portfolio.

Net interest income on a fully taxable equivalent (FTE) basis of \$1.71 billion in 2019, increased \$46.8 million, or 3%, from \$1.66 billion in 2018, due to an increased net interest margin, partially offset by lower levels of average earning assets. The net interest margin on an FTE basis increased to 1.60% in 2019 from 1.46% in 2018, primarily due to higher short-term interest rates and the impact of lower foreign exchange swap activity.

The provision for credit losses in each of 2019 and 2018 was a credit provision of \$14.5 million. The current-year credit provision reflected a decrease in the inherent reserve related to the residential real estate portfolio due to a reduction in outstanding loans and improved credit quality and reductions to the specific reserve related to the commercial and institutional and residential real estate portfolios, partially offset by an increase in the inherent reserve related to the private client portfolio due to an increase in outstanding loans and lower credit quality. The prior-year credit provision primarily reflected reductions in outstanding loans and undrawn loan commitments and standby letters of credit and improved credit quality across the portfolio. This was partially offset by increases in specific reserves primarily related to the commercial and institutional portfolio. Loans and leases of \$31.4 billion as of December 31, 2019 decreased from \$32.5 billion as of December 31, 2018. Net recoveries for the year ended December 31, 2019 were \$0.7 million, compared to net charge-offs of \$1.1 million for the year ended December 31, 2018. Nonperforming assets decreased to \$86.8 million as of December 31, 2019 from \$117.7 million as of December 31, 2018.

Noninterest expense of \$4.14 billion in 2019 increased \$126.6 million, or 3%, from \$4.02 billion in 2018, primarily reflecting increased compensation, outside services, equipment and software expense, and occupancy expense.

The provision for income taxes in 2019 totaled \$451.9 million, representing an effective tax rate of 23.2%. The provision for income taxes in 2018 totaled \$401.4 million, representing an effective tax rate of 20.5%. The increase in the provision for income taxes was primarily attributable to higher U.S. taxes payable on the income of the Corporation's non-U.S. branches in 2019 as well as income tax benefits recorded in 2018 associated with the timing of tax deductions for software development-related expenses and the implementation of the Tax Cuts and Jobs Act (TCJA) enacted in the fourth quarter of 2017.

Northern Trust continued to maintain a strong capital position during 2019, with all capital ratios exceeding those required for classification as "well-capitalized" under federal bank regulatory capital requirements. Total stockholders' equity increased 6% from \$10.5 billion in 2018 to \$11.1 billion at year-end. During 2019, the Corporation issued and sold 16 million depository shares, each representing 1/1,000th ownership interest in a share of Series E Non-Cumulative Perpetual Preferred Stock for proceeds of \$391.4 million, net of underwriting discounts, commissions, and other issuance costs. These proceeds were subsequently used to fund the redemption of all outstanding shares of the Corporation's Series C Non-Cumulative Perpetual Preferred Stock on January 2, 2020.

During the year ended December 31, 2019, Northern Trust increased its quarterly common stock dividend to \$0.70 per share and repurchased 11.8 million shares of common stock, returning \$1.7 billion in capital to common stockholders, compared to \$1.4 billion during the year ended December 31, 2018.

CONSOLIDATED RESULTS OF OPERATIONS

The following information summarizes our consolidated results of operations for 2019 compared to 2018. For a discussion related to the consolidated results of operations for 2018 compared to 2017, 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, 2018 (2018 Form 10-K), which was filed with the United States Securities and Exchange Commission on February 26, 2019.

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.

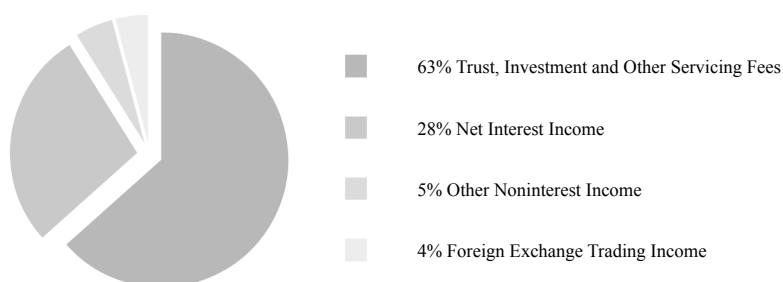
Revenue in 2019 of \$6.07 billion increased 2% from \$5.96 billion in 2018. Noninterest income represented 72% and 73% of total revenue in 2019 and 2018, respectively, and totaled \$4.40 billion in 2019, which increased 1% from \$4.34 billion in 2018.

Noninterest income in 2019 increased primarily reflecting higher trust, investment and other servicing fees and other operating income, partially offset by lower foreign exchange trading income. Trust, investment and other servicing fees of \$3.85 billion in 2019 increased \$98.5 million, or 3%, from \$3.75 billion in 2018, primarily due to new business and favorable markets, partially offset by unfavorable currency translation and lower securities lending revenue. Foreign exchange trading income in 2019 of \$250.9 million decreased \$56.3 million, or 18%, compared with \$307.2 million in 2018, primarily resulting from lower foreign exchange swap activity in Treasury. Other operating income of \$145.5 million in 2019 increased 14% from \$127.5 million in the prior year, primarily due to income related to a bank-owned life insurance program implemented during 2019, higher miscellaneous income, and the prior-year impairment of a community development equity investment previously held at cost, partially offset by a charge related to the decision made in 2019 to sell substantially all of the lease portfolio.

Net interest income on an FTE basis in 2019 of \$1.71 billion increased \$46.8 million, or 3%, from \$1.66 billion in 2018, due to an increased net interest margin, partially offset by lower levels of average earning assets. The net interest margin on an FTE basis increased to 1.60% in 2019 from 1.46% in 2018, primarily due to higher short-term interest rates and the impact of lower foreign exchange swap activity. Average earning assets decreased \$6.6 billion, or 6%, from \$113.7 billion in 2018 to \$107.1 billion in 2019, primarily reflecting lower levels of short-term interest bearing deposits and loans and leases.

Additional information regarding Northern Trust's revenue by type is provided below.

2019 TOTAL REVENUE OF \$6.07 BILLION



Noninterest Income

The components of noninterest income, and a discussion of significant changes during 2019 and 2018, are provided below.

TABLE 3: NONINTEREST INCOME

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Trust, Investment and Other Servicing Fees	\$ 3,852.1	\$ 3,753.7	\$ 3,434.3	3%	9%
Foreign Exchange Trading Income	250.9	307.2	209.9	(18)	46
Treasury Management Fees	44.5	51.8	56.4	(14)	(8)
Security Commissions and Trading Income	103.6	98.3	89.6	5	10
Other Operating Income	145.5	127.5	157.5	14	(19)
Investment Security Losses, net	(1.4)	(1.0)	(1.6)	N/M	N/M
Total Noninterest Income	\$ 4,395.2	\$ 4,337.5	\$ 3,946.1	1%	10%

Trust, Investment and Other Servicing Fees

Trust, investment and other servicing fees were \$3.85 billion in 2019 compared with \$3.75 billion in 2018. Trust, investment and other servicing fees are based primarily on the market value of assets held in custody, managed and 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. For a more detailed discussion of 2019 trust, investment and other servicing fees, refer to the "Reporting Segments and Related Information" section.

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 4: EQUITY MARKET INDICES

	DAILY AVERAGES			YEAR-END		
	2019	2018	CHANGE	2019	2018	CHANGE
S&P 500	2,912	2,746	6%	3,231	2,507	29%
MSCI EAFE (U.S. dollars)	1,891	1,966	(4)	2,037	1,720	18
MSCI EAFE (local currency)	1,118	1,125	(1)	1,190	1,008	18

TABLE 5: FIXED INCOME MARKET INDICES

	AS OF DECEMBER 31,		
	2019	2018	CHANGE
Barclays Capital U.S. Aggregate Bond Index	2,225	2,047	9%
Barclays Capital Global Aggregate Bond Index	512	479	7

ASSETS UNDER CUSTODY/ADMINISTRATION AND ASSETS UNDER MANAGEMENT

AUC/A and assets under management form the primary drivers 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. At December 31, 2019, AUC/A of \$12.05 trillion increased 19% from \$10.13 trillion at December 31, 2018. The increased AUC/A primarily reflected favorable markets and net client inflows. Assets under custody, a component of AUC/A, of \$9.23 trillion at December 31, 2019, increased 22% from \$7.59 trillion at December 31, 2018, and included \$5.89 trillion of global custody assets, compared to \$4.70 trillion at December 31, 2018. The increased assets under custody primarily reflected favorable markets and net client inflows. Assets under management of \$1.23 trillion at the end of 2019 increased 15% from \$1.07 trillion at the end of 2018. The increase primarily reflected favorable markets and net inflows.

AUC/A by reporting segment were as follows:

TABLE 6: ASSETS UNDER CUSTODY/ADMINISTRATION BY REPORTING SEGMENT

(\$ In Billions)	DECEMBER 31,					CHANGE		FIVE-YEAR COMPOUND GROWTH RATE
	2019	2018	2017	2016	2015	2019 /2018	2018 /2017	
Corporate & Institutional Services	\$ 11,311.6	\$ 9,490.5	\$ 10,066.8	\$ 7,987.0	\$ 7,279.7	19%	(6)%	9%
Wealth Management	738.8	634.8	655.8	554.3	517.3	16	(3)	7
Total Assets Under Custody/Administration	\$ 12,050.4	\$ 10,125.3	\$ 10,722.6	\$ 8,541.3	\$ 7,797.0	19%	(6)%	9%

Assets under custody by reporting segment were as follows:

TABLE 7: ASSETS UNDER CUSTODY BY REPORTING SEGMENT

(\$ In Billions)	DECEMBER 31,					CHANGE		FIVE-YEAR COMPOUND GROWTH RATE
	2019	2018	2017	2016	2015	2019 /2018	2018 / 2017	
Corporate & Institutional Services	\$ 8,497.8	\$ 6,971.0	\$ 7,439.1	\$ 6,176.9	\$ 5,565.8	22%	(6)%	9%
Wealth Management	735.7	622.9	645.5	543.6	506.3	18	(4)	8
Total Assets Under Custody	\$ 9,233.5	\$ 7,593.9	\$ 8,084.6	\$ 6,720.5	\$ 6,072.1	22%	(6)%	9%

Assets under custody were invested as follows:

TABLE 8: ASSETS UNDER CUSTODY BY INVESTMENT TYPE

	DECEMBER 31,				
	2019	2018	2017	2016	2015
Equities	46%	45%	47%	46%	44%
Fixed Income Securities	35	37	35	36	37
Cash and Other Assets	17	16	16	17	17
Securities Lending Collateral	2	2	2	1	2

Assets under management by reporting segment were as follows:

TABLE 9: ASSETS UNDER MANAGEMENT BY REPORTING SEGMENT

(\$ In Billions)	DECEMBER 31,					CHANGE		FIVE-YEAR COMPOUND GROWTH RATE
	2019	2018	2017	2016	2015	2019 / 2018	2018 / 2017	
Corporate & Institutional Services	\$ 917.5	\$ 790.8	\$ 871.2	\$ 694.0	\$ 648.0	16%	(9)%	7%
Wealth Management	313.8	278.6	289.8	248.4	227.3	13	(4)	7
Total Assets Under Management	\$ 1,231.3	\$ 1,069.4	\$ 1,161.0	\$ 942.4	\$ 875.3	15%	(8)%	7%

Assets under management were invested and managed as follows:

TABLE 10: ASSETS UNDER MANAGEMENT BY PRODUCT

	DECEMBER 31,				
	2019	2018	2017	2016	2015
Equities	53%	50%	51%	51%	51%
Fixed Income Securities	16	17	16	17	17
Cash and Other Assets	18	19	19	20	20
Securities Lending Collateral	13	14	14	12	12

TABLE 11: ASSETS UNDER MANAGEMENT BY MANAGEMENT STYLE

	DECEMBER 31,				
	2019	2018	2017	2016	2015
Index	51%	49%	46%	47%	47%
Active	37	38	41	40	40
Multi-Manager	5	5	5	5	4
Other	7	8	8	8	9

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 2019 of \$250.9 million decreased \$56.3 million, or 18%, compared with \$307.2 million in 2018, primarily resulting from lower foreign exchange swap activity in Treasury.

Treasury Management Fees

Treasury management fees, generated from cash and treasury management products and services provided to clients, of \$44.5 million in 2019 decreased 14%, or \$7.3 million, from \$51.8 million in 2018, primarily due to an increase in the earnings credit rate applied to client balances and lower transaction based volumes.

Security Commissions and Trading Income

Security commissions and trading income is generated primarily from securities brokerage services provided by Northern Trust Securities, Inc., and totaled \$103.6 million in 2019, which increased 5%, or \$5.3 million, from \$98.3 million in 2018, primarily due to higher revenue from interest rate swaps and core brokerage, partially offset by lower transition management revenue.

Other Operating Income

The components of other operating income include:

TABLE 12: OTHER OPERATING INCOME

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Loan Service Fees	\$ 48.0	\$ 48.9	\$ 50.7	(2)%	(4)%
Banking Service Fees	45.6	46.4	48.6	(2)	(5)
Other Income	51.9	32.2	58.2	60	(44)
Total Other Operating Income	\$ 145.5	\$ 127.5	\$ 157.5	14 %	(19)%

Other income of \$51.9 million in 2019 increased \$19.7 million or 60%, from \$32.2 million in 2018, primarily due to income related to a bank-owned life insurance program implemented during 2019, higher miscellaneous income, and the prior-year impairment of a community development equity investment previously held at cost, partially offset by a charge related to the decision made in 2019 to sell substantially all of the lease portfolio.

Investment Security Losses, Net

Net investment security losses totaled \$1.4 million and \$1.0 million in 2019 and 2018, respectively. Losses in 2019 and 2018 include \$0.3 million and \$0.5 million of charges related to the other-than-temporary impairment (OTTI) of certain Community Reinvestment Act (CRA) eligible held-to-maturity securities, respectively.

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 banks and interest-bearing deposits with banks, Federal Reserve and other central bank deposits and other, securities, and loans and leases – are financed by a large base of interest-bearing funds that include client deposits, short-term borrowings, senior notes and long-term debt. Earning assets also are funded by net noninterest-related funds, which include demand deposits, and stockholders' equity, reduced by nonearning assets such as noninterest-bearing cash and due from banks, items in process of collection, and buildings and equipment. 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 nonperforming assets and client compensating deposit balances used to pay for services impact net interest income.

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 on page 89.

The following tables present an analysis of average balances and interest rates affecting net interest income and an analysis of net interest income changes.

TABLE 13: AVERAGE CONSOLIDATED BALANCE SHEETS WITH ANALYSIS OF NET INTEREST INCOME (INTEREST AND RATE ON A FULLY TAXABLE EQUIVALENT BASIS)

(\$ In Millions)	2019			2018			2017		
	INTEREST	AVERAGE BALANCE	RATE ⁽⁶⁾	INTEREST	AVERAGE BALANCE	RATE ⁽⁶⁾	INTEREST	AVERAGE BALANCE	RATE ⁽⁶⁾
AVERAGE EARNING ASSETS									
Federal Reserve and Other Central Bank Deposits and Other ⁽¹⁾	\$ 181.7	\$ 18,527.7	0.98%	\$ 207.1	\$ 23,899.3	0.87%	\$ 155.1	\$ 23,903.9	0.65%
Interest-Bearing Due from and Deposits with Banks ⁽²⁾	72.4	5,996.7	1.21	70.0	6,022.8	1.16	63.8	7,143.3	0.89
Federal Funds Sold and Securities Purchased under Agreements to Resell	17.9	847.8	2.11	33.3	1,498.8	2.22	27.5	1,850.2	1.48
Securities									
U.S. Government	110.4	5,296.5	2.09	108.3	5,737.1	1.89	89.4	6,342.5	1.41
Obligations of States and Political Subdivisions	24.4	980.5	2.49	13.9	725.2	1.91	13.1	887.3	1.48
Government Sponsored Agency	583.6	22,634.1	2.58	456.0	20,682.7	2.20	283.2	17,987.0	1.57
Other ⁽³⁾	381.6	21,773.3	1.75	367.5	23,136.5	1.59	253.3	19,498.9	1.30
Total Securities	1,100.0	50,684.4	2.17	945.7	50,281.5	1.88	639.0	44,715.7	1.43
Loans and Leases ⁽⁴⁾	1,160.7	31,052.8	3.74	1,106.5	32,028.6	3.45	929.8	33,565.2	2.77
Total Earning Assets	2,532.7	107,109.4	2.36	2,362.6	113,731.0	2.08	1,815.2	111,178.3	1.63
Allowance for Credit Losses Assigned to Loans and Leases	—	(111.4)	—	—	(126.3)	—	—	(156.8)	—
Cash and Due from Banks and Other Central Bank Deposits ⁽⁵⁾	—	2,393.6	—	—	2,534.3	—	—	2,583.1	—
Buildings and Equipment	—	425.6	—	—	438.5	—	—	466.0	—
Client Security Settlement Receivables	—	1,070.4	—	—	1,002.0	—	—	891.6	—
Goodwill	—	682.5	—	—	642.5	—	—	544.0	—
Other Assets	—	5,981.3	—	—	4,724.6	—	—	4,101.2	—
Total Assets	\$ —	\$117,551.4	—%	\$ —	\$122,946.6	—%	\$ —	\$119,607.4	—%
AVERAGE SOURCE OF FUNDS									
Deposits									
Savings, Money Market, and Other	\$ 160.8	\$ 16,577.8	0.97%	\$ 82.0	\$ 15,149.3	0.54%	\$ 24.3	\$ 15,575.6	0.16%
Savings Certificates and Other Time	16.2	867.5	1.86	7.8	870.6	0.90	9.4	1,273.4	0.74
Non-U.S. Offices – Interest-Bearing	311.9	54,885.2	0.57	294.8	58,556.6	0.50	148.4	56,583.2	0.26
Total Interest-Bearing Deposits	488.9	72,330.5	0.68	384.6	74,576.5	0.52	182.1	73,432.2	0.25
Short-Term Borrowings	214.0	9,358.9	2.29	208.2	10,783.5	1.93	67.1	6,696.0	1.00
Senior Notes	72.6	2,389.1	3.04	53.4	1,704.0	3.13	46.9	1,496.9	3.13
Long-Term Debt	38.3	1,139.0	3.36	45.0	1,296.8	3.47	39.2	1,519.4	2.58
Floating Rate Capital Debt	8.2	277.6	2.98	7.5	277.6	2.72	4.9	277.5	1.75
Total Interest-Related Funds	822.0	85,495.1	0.96	698.7	88,638.4	0.79	340.2	83,422.0	0.41
Interest Rate Spread	—	—	1.40	—	—	1.29	—	—	1.22
Demand and Other Noninterest-Bearing Deposits	—	17,455.5	—	—	20,526.6	—	—	23,072.6	—
Other Liabilities	—	3,952.4	—	—	3,552.7	—	—	3,132.2	—
Stockholders' Equity	—	10,648.4	—	—	10,228.9	—	—	9,980.6	—
Total Liabilities and Stockholders' Equity	\$ —	\$117,551.4	—%	\$ —	\$122,946.6	—%	\$ —	\$119,607.4	—%
Net Interest Income/Margin (FTE Adjusted)	\$ 1,710.7	\$ —	1.60%	\$ 1,663.9	\$ —	1.46%	\$ 1,475.0	\$ —	1.33%
Net Interest Income/Margin (Unadjusted)	\$ 1,677.9	\$ —	1.57%	\$ 1,622.7	\$ —	1.43%	\$ 1,429.2	\$ —	1.29%
Net Interest Income/Margin Components (FTE Adjusted)									
U.S.	\$ 1,127.3	\$ 86,071.2	1.31%	\$ 1,079.9	\$ 88,717.0	1.22%	\$ 1,076.4	\$ 90,090.3	1.19%
Non-U.S.	583.4	21,038.2	2.77	584.0	25,014.0	2.33	398.6	21,088.0	1.89
Consolidated	\$ 1,710.7	\$107,109.4	1.60%	\$ 1,663.9	\$113,731.0	1.46%	\$ 1,475.0	\$111,178.3	1.33%

Note: Net Interest Income (FTE Adjusted) includes adjustments to a fully taxable equivalent basis for loans and securities. Such adjustments are based on a blended federal and state tax rate of 24.8%. Total taxable equivalent interest adjustments amounted to \$32.8 million in 2019, \$41.2 million in 2018 and \$45.8 million in 2017. 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 within Other Assets and Other Liabilities, respectively.

(1) Federal Reserve and Other Central Bank Deposits and Other includes collateral deposits with certain securities depositories and clearing houses, which are classified in Other Assets in the consolidated balance sheets.

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

(3) Other securities include certain community development investments and Federal Home Loan Bank and Federal Reserve stock, which are classified in Other Assets in the consolidated balance sheets.

(4) Average balances include nonaccrual loans. Lease financing receivable balances are reduced by deferred income.

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

(6) 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 14: CHANGES IN NET INTEREST INCOME

(INTEREST AND RATE ON A FULLY TAXABLE EQUIVALENT BASIS)	2019/2018 CHANGE DUE TO			2018/2017 CHANGE DUE TO		
	AVERAGE BALANCE	RATE	TOTAL	AVERAGE BALANCE	RATE	TOTAL
(In Millions)						
Increase (Decrease) in Interest Income						
Money Market Assets						
Federal Reserve and Other Central Bank Deposits and Other	\$ (58.1)	\$ 32.7	\$ (25.4)	—	\$ 52.0	\$ 52.0
Interest-Bearing Due from and Deposits with Banks	(0.3)	2.7	2.4	(6.7)	12.9	6.2
Federal Funds Sold and Securities Purchased under Agreements to Resell	(13.9)	(1.5)	(15.4)	(3.5)	9.3	5.8
Securities						
U.S. Government	(5.4)	7.5	2.1	(7.3)	26.2	18.9
Obligations of States and Political Subdivisions	5.7	4.8	10.5	(1.4)	2.2	0.8
Government Sponsored Agency	45.1	82.5	127.6	47.0	125.8	172.8
Other	(20.0)	34.1	14.1	52.0	62.2	114.2
Loans and Leases	(77.9)	132.1	54.2	(20.5)	197.2	176.7
Total	\$ (124.8)	\$ 294.9	\$ 170.1	\$ 59.6	\$ 487.8	\$ 547.4
Deposits						
Savings and Money Market	\$ 8.3	\$ 70.5	\$ 78.8	(0.7)	\$ 58.4	\$ 57.7
Savings Certificates and Other Time	—	8.4	8.4	(4.8)	3.2	(1.6)
Non-U.S. Offices Time	(13.9)	31.0	17.1	5.3	141.1	146.4
Short-Term Borrowings	(14.1)	19.9	5.8	55.9	85.2	141.1
Senior Notes	20.6	(1.4)	19.2	6.5	—	6.5
Subordinated Notes						
Long-Term Debt	(5.5)	(1.2)	(6.7)	(5.8)	11.6	5.8
Floating Rate Capital Debt	—	0.7	0.7	—	2.6	2.6
Total	\$ (4.6)	\$ 127.9	\$ 123.3	\$ 56.4	\$ 302.1	\$ 358.5
(Decrease) Increase in Net Interest Income	\$ (120.2)	\$ 167.0	\$ 46.8	\$ 3.2	\$ 185.7	\$ 188.9

Note: 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.

An analysis of net interest income on an FTE basis, major balance sheet components impacting net interest income and related ratios are provided below.

TABLE 15: ANALYSIS OF NET INTEREST INCOME (FTE)

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Interest Income – GAAP	\$ 2,499.9	\$ 2,321.4	\$ 1,769.4	8 %	31%
FTE Adjustment	32.8	41.2	45.8	(20)	(10)
Interest Income – FTE	2,532.7	2,362.6	1,815.2	7	30
Interest Expense	822.0	698.7	340.2	18	105
Net Interest Income – FTE Adjusted	1,710.7	1,663.9	1,475.0	3	13
Net Interest Income – GAAP	1,677.9	1,622.7	1,429.2	3	14
AVERAGE BALANCE					
Earning Assets	\$ 107,109.4	\$ 113,731.0	\$ 111,178.3	(6)%	2%
Interest-Related Funds	85,495.1	88,638.4	83,422.0	(4)	6
Net Noninterest-Related Funds	21,614.3	25,092.6	27,756.3	(14)	(10)
CHANGE IN PERCENTAGE					
AVERAGE RATE					
Earning Assets	2.36%	2.08%	1.63%	0.28	0.45
Interest-Related Funds	0.96	0.79	0.41	0.17	0.38
Interest Rate Spread	1.40	1.29	1.22	0.11	0.07
Total Source of Funds	0.77	0.62	0.31	0.15	0.31
Net Interest Margin – GAAP	1.57%	1.43%	1.29%	0.14	0.14
Net Interest Margin – FTE	1.60%	1.46%	1.33%	0.14	0.13

Refer to pages 38 and 39 for additional analysis of net interest income.

Net interest income in 2019 of \$1.68 billion increased \$55.2 million, or 3%, from \$1.62 billion in 2018. Net interest income on an FTE basis for 2019 was \$1.71 billion, which increased \$46.8 million, or 3%, from \$1.66 billion in 2018, due to an increased net interest margin, partially offset by lower levels of average earning assets. Average earning assets decreased \$6.6 billion, or 6%, to \$107.1 billion in 2019 from \$113.7 billion in 2018. The net interest margin in 2019 was 1.57%, which increased from 1.43% in 2018. The net interest margin on an FTE basis in 2019 was 1.60%, which increased from 1.46% in 2018.

Average earning assets decreased primarily reflecting lower levels of short-term interest bearing deposits and loans and leases. Federal Reserve and Other Central Bank Deposits and Other averaged \$18.5 billion in 2019, which decreased \$5.4 billion, or 22%, from \$23.9 billion in 2018. Interest-Bearing Due From and Deposits with Banks averaged \$6.0 billion in each of 2019 and 2018. Loans and leases averaged \$31.1 billion, which decreased \$975.8 million, or 3%, from \$32.0 billion in 2018. Securities, inclusive of Federal Reserve and Federal Home Loan Bank stock and certain community development investments which are classified in Other Assets in the consolidated balance sheets, averaged \$50.7 billion, which increased \$402.9 million, or 1%, from \$50.3 billion in 2018.

Funding of the balance sheet reflected lower levels of non-U.S. interest-bearing deposits and demand and other noninterest-bearing deposits, partially offset by increases in U.S. interest-bearing deposits. Average interest-bearing deposits decreased \$2.3 billion, or 3%, to \$72.3 billion in 2019 from \$74.6 billion in 2018. Average demand and other noninterest-bearing deposits decreased \$3.0 billion, or 15%, to \$17.5 billion in 2019 from \$20.5 billion in 2018.

Stockholders' equity averaged \$10.6 billion in 2019, compared with \$10.2 billion in 2018. The increased stockholders' equity of \$419.5 million, or 4%, was primarily attributable to current-year earnings, the issuance of preferred stock, and accumulated other comprehensive income since the prior-year period, partially offset by the repurchase of common stock pursuant to the Corporation's share repurchase program and dividend declarations. During the year ended December 31, 2019, the Corporation increased its quarterly common stock dividend by 27% to \$0.70 per share and repurchased 11.8 million shares, returning \$1.7 billion in capital to common stockholders, compared to \$1.4 billion in 2018.

Under the Corporation's 2019 capital plan, which was reviewed without objection by the Federal Reserve, the Corporation may repurchase up to \$828.5 million of common stock after December 31, 2019, through June 30, 2020.

Provision for Credit Losses

The provision for credit losses was a credit provision of \$14.5 million in each of 2019 and 2018. The current-year credit provision primarily reflected a decrease in the inherent reserve related to the residential real estate portfolio due to a reduction in outstanding loans and improved credit quality and reductions to the specific reserve related to the commercial and institutional and residential real estate portfolios, partially offset by an increase in the inherent reserve related to the private client portfolio due to an increase in outstanding loans and lower credit quality. The prior-year credit provision primarily reflected reductions in outstanding loans and undrawn loan commitments and standby letters of credit and improved credit quality across the portfolio. This was partially offset by increases in specific reserves primarily related to the commercial and institutional portfolio.

Nonperforming assets at December 31, 2019 decreased 26% from the prior year-end. Residential real estate, commercial and institutional, commercial real estate, private client, and non-U.S. loans accounted for 85%, 9%, 4%, 1%, and 1% respectively, of nonperforming loans and leases at December 31, 2019. For further discussion of the allowance and provision for credit losses, refer to the "Asset Quality" section.

Noninterest Expense

Noninterest expense for 2019 of \$4.14 billion increased \$126.6 million, or 3%, from \$4.02 billion in 2018, primarily reflecting increased compensation, outside services, equipment and software expense, and occupancy expense.

The components of noninterest expense and a discussion of significant changes during 2019 and 2018 are provided below.

TABLE 16: NONINTEREST EXPENSE

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Compensation	\$ 1,859.0	\$ 1,806.9	\$ 1,733.7	3%	4%
Employee Benefits	355.2	356.7	319.9	—	12
Outside Services	774.5	739.4	668.4	5	11
Equipment and Software	612.1	582.2	524.0	5	11
Occupancy	212.9	201.1	191.8	6	5
Other Operating Expense	329.8	330.6	331.6	—	—
Total Noninterest Expense	\$ 4,143.5	\$ 4,016.9	\$ 3,769.4	3%	7%

Compensation

Compensation expense, the largest component of noninterest expense, of \$1.86 billion in 2019 increased \$52.1 million, or 3%, compared to \$1.81 billion in 2018, primarily reflecting higher salary expense driven by staff growth and base pay adjustments, partially offset by lower incentive expense. Staff on a full-time equivalent basis totaled approximately 19,800 at December 31, 2019, up 5% from approximately 18,800 at December 31, 2018.

Employee Benefits

Employee benefits expense of \$355.2 million in 2019 decreased slightly from \$356.7 million in 2018, primarily reflecting lower retirement plan and medical expenses, partially offset by higher payroll taxes.

Outside Services

Outside services expense of \$774.5 million in 2019 increased \$35.1 million, or 5%, from \$739.4 million in 2018, primarily due to higher technical services costs as well as consulting and legal services, partially offset by lower sub-custodian expenses.

Equipment and Software

Equipment and software expense of \$612.1 million in 2019 increased \$29.9 million, or 5%, compared to \$582.2 million in 2018, primarily reflecting higher software support costs, software disposition, depreciation and amortization, and maintenance costs.

Occupancy

Occupancy expense of \$212.9 million in 2019 increased \$11.8 million, or 6%, from \$201.1 million in 2018, primarily due to higher rent and building operating costs associated with executing workplace real estate strategies.

Other Operating Expense

Other operating expense of \$329.8 million in 2019 decreased slightly from \$330.6 million in 2018. The components of other operating expense are as follows:

TABLE 17: OTHER OPERATING EXPENSE

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Business Promotion	\$ 104.2	\$ 98.3	\$ 95.4	6 %	3 %
FDIC Insurance Premiums	9.9	27.4	34.7	(64)	(21)
Staff Related	42.8	33.6	42.8	27	(22)
Other Intangibles Amortization	16.6	17.4	11.4	(4)	52
Other Expenses	156.3	153.9	147.3	2	4
Total Other Operating Expense	\$ 329.8	\$ 330.6	\$ 331.6	— %	— %

Other operating expense in the current year compared to the prior year primarily reflects decreased FDIC insurance premiums, partially offset by higher staff-related expense and business promotion expense.

Provision for Income Taxes

Provisions for income tax and effective tax rates are impacted by levels of pre-tax income as well as nonrecurring items such as the resolution of tax matters and changes in income tax rates and tax laws. The 2019 provision for income taxes was \$451.9 million, representing an effective rate of 23.2%. This compares with a provision for income taxes of \$401.4 million and an effective rate of 20.5% in 2018.

The increase in the provision for income taxes was primarily attributable to higher U.S. taxes payable on the income of the Corporation's non-U.S. branches in 2019 as well as income tax benefits recorded in 2018 associated with the timing of tax deductions for software development-related expenses and the implementation of the Tax Cuts and Jobs Act (TCJA) enacted in the fourth quarter of 2017.

The TCJA was enacted on December 22, 2017, and reduced the U.S. federal corporate tax rate from 35% to 21%. It also required companies to pay a mandatory deemed repatriation tax on earnings of foreign subsidiaries that were previously tax deferred. At December 31, 2017, Northern Trust made a reasonable estimate as to the impact of the TCJA. During 2018, Northern Trust completed the related calculations and additional analyses associated with the implementation of the TCJA, resulting in a number of adjustments to the 2018 tax provision as follows:

TABLE 18: IMPACT OF TAX CUTS AND JOBS ACT

(In Millions)	2018	2017
Federal Taxes on Mandatory Deemed Repatriation	\$ (16.8)	\$ 150.0
Impact Related to Federal Deferred Taxes	12.7	(210.0)
Other Adjustments	(0.7)	6.9
Provision (Benefit) for Income Taxes	\$ (4.8)	\$ (53.1)

Adjustments in the above table included a tax benefit of \$16.8 million resulting from an adjustment to the Corporation's 2017 income tax provision for mandatory deemed repatriation with respect to the pre-2018 earnings of its non-U.S. subsidiaries, offset by a \$12.7 million net provision recorded associated with the repricing of deferred taxes.

As a result of the TCJA, earnings which had been reinvested indefinitely outside of the United States were deemed to have been repatriated to the United States and were subject to a repatriation tax. As of December 31, 2018, Northern Trust's repatriation tax was \$133.2 million.

See Note 22, "Income Taxes," to the consolidated financial statements 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 results of operations by reporting segment for 2019 compared to 2018. For a discussion related to the results of operations by reporting segment for 2018 compared to 2017, refer to Part II, Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations in our 2018 Form 10-K, which was filed with the United States Securities and Exchange Commission on February 26, 2019.

Northern Trust is organized around its two client-focused reporting segments: C&IS and Wealth Management. Asset management and related services are provided to C&IS 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 C&IS 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. 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," to the consolidated financial statements provided in Item 8, "Financial Statements and Supplementary Data." 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.

Effective January 1, 2019, Northern Trust implemented several enhancements to its FTP methodology, including the allocation of contingent liquidity charges to C&IS and Wealth Management client instruments and products. These methodology enhancements affect the results of each reporting segment. Due to the lack of historical information, segment results for periods ended prior to January 1, 2019 have not been revised to reflect the methodology enhancements.

Also effective January 1, 2019, all revenues, expenses and average assets are allocated to C&IS 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.

For reporting periods ended prior to January 1, 2019, income and expense associated with the wholesale funding activities and investment portfolios of the Corporation and the Bank, as well as certain corporate-based expense, executive-level compensation and nonrecurring items, were not allocated to C&IS and Wealth Management, and were reported in Treasury and Other.

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 reflects the earnings and average assets for the Corporation.

TABLE 19: CONSOLIDATED FINANCIAL INFORMATION

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Noninterest Income					
Trust, Investment and Other Servicing Fees	\$ 3,852.1	\$ 3,753.7	\$ 3,434.3	3 %	9 %
Foreign Exchange Trading Income	250.9	307.2	209.9	(18)	46
Other Noninterest Income	292.2	276.6	301.9	6	(8)
Total Noninterest Income	4,395.2	4,337.5	3,946.1	1	10
Net Interest Income ⁽¹⁾	1,710.7	1,663.9	1,475.0	3	13
Revenue ⁽¹⁾	6,105.9	6,001.4	5,421.1	2	11
Provision for Credit Losses	(14.5)	(14.5)	(28.0)	N/M	N/M
Noninterest Expense	4,143.5	4,016.9	3,769.4	3	7
Income before Income Taxes ⁽¹⁾	1,976.9	1,999.0	1,679.7	(1)	19
Provision for Income Taxes ⁽¹⁾	484.7	442.6	480.7	10	(8)
Net Income	\$ 1,492.2	\$ 1,556.4	\$ 1,199.0	(4)%	30 %
Average Assets	\$ 117,551.4	\$ 122,946.6	\$ 119,607.4	(4)%	3 %

(1) Stated on an FTE basis. The consolidated figures include \$32.8 million, \$41.2 million, and \$45.8 million of FTE adjustments for 2019, 2018, and 2017, respectively.

Corporate & Institutional Services

C&IS 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 C&IS for the years ended December 31, 2019, 2018, and 2017 on a management-reporting basis.

TABLE 20: C&IS RESULTS OF OPERATIONS

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Noninterest Income					
Trust, Investment and Other Servicing Fees	\$ 2,211.5	\$ 2,173.1	\$ 1,984.6	2 %	9 %
Foreign Exchange Trading Income	232.2	233.4	197.9	(1)	18
Other Noninterest Income	178.2	183.0	176.1	(3)	4
Total Noninterest Income	2,621.9	2,589.5	2,358.6	1	10
Net Interest Income ⁽¹⁾	918.7	992.2	733.8	(7)	35
Revenue ⁽¹⁾	3,540.6	3,581.7	3,092.4	(1)	16
Provision for Credit Losses	1.9	1.9	3.4	—	(44)
Noninterest Expense	2,605.5	2,421.4	2,194.5	8	10
Income before Income Taxes ⁽¹⁾	933.2	1,158.4	894.5	(19)	30
Provision for Income Taxes ⁽¹⁾	219.4	255.3	279.5	(14)	(9)
Net Income	\$ 713.8	\$ 903.1	\$ 615.0	(21)%	47 %
Percentage of Consolidated Net Income	48%	58%	51%		
Average Assets	\$ 87,557.1	\$ 82,996.5	\$ 80,105.6	5 %	4 %

(1) Stated on an FTE basis.

C&IS net income decreased 21% in 2019 compared to 2018 primarily due to higher noninterest expense, partially offset by lower net interest income.

C&IS Trust, Investment and Other Servicing Fees

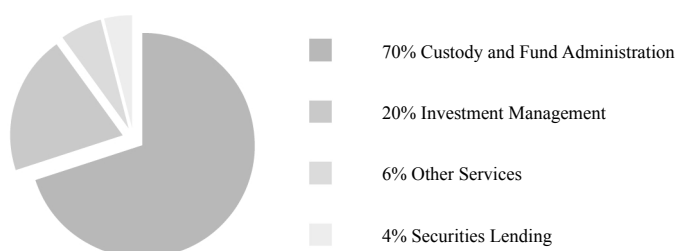
C&IS trust, investment and other servicing fees are primarily attributable to services related to custody, fund administration, investment management, and securities lending. Custody and fund administration fees are driven primarily by values of client assets under custody/administration, transaction volumes, and 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, which are based generally on client assets under management, are based primarily on market values throughout a period.

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 services fee category in C&IS 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.

Provided below are the components of C&IS trust, investment and other servicing fees.

TABLE 21: C&IS TRUST, INVESTMENT AND OTHER SERVICING FEES

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Custody and Fund Administration	\$ 1,549.3	\$ 1,501.1	\$ 1,342.1	3%	12%
Investment Management	445.7	436.8	403.5	2	8
Securities Lending	87.2	102.0	96.4	(15)	6
Other	129.3	133.2	142.6	(3)	(7)
Total Trust, Investment and Other Servicing Fees	\$ 2,211.5	\$ 2,173.1	\$ 1,984.6	2%	10%

2019 C&IS TRUST, INVESTMENT, AND OTHER SERVICING FEES


Custody and fund administration fees, the largest component of trust, investment and other servicing fees, increased \$48.2 million, or 3%, from 2018 to 2019 primarily due to new business, partially offset by unfavorable currency translation and markets. Fees from investment management increased \$8.9 million, or 2%, from 2018 to 2019 primarily due to new business and favorable markets. Securities lending revenue decreased \$14.8 million, or 15% from 2018 to 2019, primarily driven by lower spreads and loan volumes.

Provided below is a breakdown of the C&IS assets under custody and under management.

TABLE 22: C&IS ASSETS UNDER CUSTODY

(\$ In Billions)	DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
North America	\$ 4,516.0	\$ 3,693.4	\$ 3,972.1	22%	(7)%
Europe, Middle East, and Africa	2,998.5	2,538.6	2,602.4	18	(2)
Asia Pacific	820.3	589.2	697.1	39	(15)
Securities Lending	163.0	149.8	167.5	9	(11)
Total Assets Under Custody	\$ 8,497.8	\$ 6,971.0	\$ 7,439.1	22%	(6)%

2019 C&IS ASSETS UNDER CUSTODY

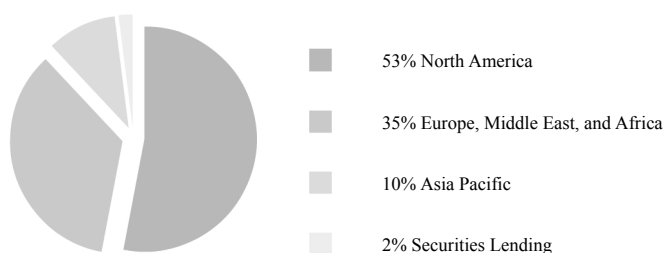
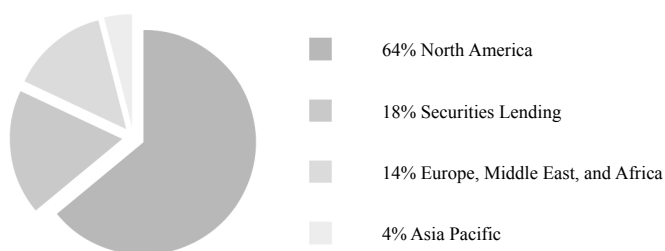


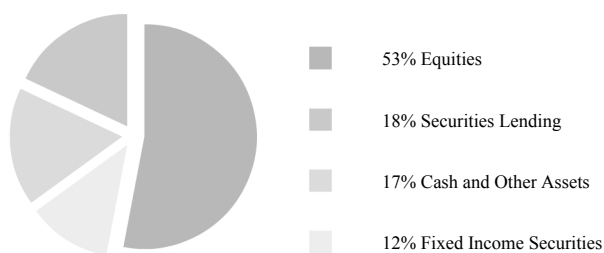
TABLE 23: C&IS ASSETS UNDER MANAGEMENT

(\$ In Billions)	DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
North America	\$ 588.4	\$ 493.1	\$ 533.5	19%	(8)%
Europe, Middle East, and Africa	125.2	113.3	127.3	11	(11)
Asia Pacific	40.9	34.6	42.9	18	(19)
Securities Lending	163.0	149.8	167.5	9	(11)
Total Assets Under Management	\$ 917.5	\$ 790.8	\$ 871.2	16%	(9)%

2019 C&IS ASSETS UNDER MANAGEMENT



2019 C&IS ASSETS UNDER MANAGEMENT BY INVESTMENT TYPE



C&IS assets under custody of \$8.50 trillion at December 31, 2019, increased 22% from \$6.97 trillion at December 31, 2018. Assets under management increased 16% to \$917.5 billion at December 31, 2019, from \$790.8 billion at December 31, 2018.

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 \$163.0 billion and \$149.8 billion at December 31, 2019 and 2018, respectively.

C&IS Foreign Exchange Trading Income

Foreign exchange trading income of \$232.2 million in 2019, decreased \$1.2 million, or 1%, from \$233.4 million in 2018, primarily due to lower foreign exchange swap activity in Treasury, partially offset by the enhanced segment reporting methodology beginning January 1, 2019.

C&IS Other Noninterest Income

Other noninterest income for 2019 of \$178.2 million decreased \$4.8 million, or 3%, from \$183.0 million in 2018, primarily due to a decrease in other operating income and treasury management fees, partially offset by the enhanced segment reporting methodology beginning January 1, 2019.

C&IS Net Interest Income

Net interest income on an FTE basis, inclusive of the FTP methodology enhancements described above, decreased \$73.5 million, or 7%, in 2019 to \$918.7 million from \$992.2 million in 2018, primarily reflecting higher charges due to the FTP methodology enhancements and a decrease in the net interest margin, partially offset by an increase in average earning assets. Net interest margin on an FTE basis decreased to 1.26% from 1.29%. Average earning assets of \$79.1 billion, increased \$2.2 billion, or 3%, from \$76.9 billion in the prior year. The earning assets in C&IS consisted primarily of intercompany assets and loans and leases. Funding sources were primarily comprised of non-U.S. custody-related interest-bearing deposits, which averaged \$54.9 billion in 2019, increased from \$54.2 billion in 2018.

C&IS Provision for Credit Losses

The provision for credit losses was a provision of \$1.9 million for both 2019 and 2018. The 2019 provision reflected an increase to the inherent reserve for outstanding loans due to lower credit quality, partially offset by a decrease to the specific reserve related to standby letters of credit and outstanding loans. The 2018 provision reflected increases to the specific reserve related to standby letters of credit, partially offset by reductions in standby letters of credit and undrawn loan commitments and improved credit quality resulting in a reduction of the inherent allowance.

C&IS Noninterest Expense

Total C&IS 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, of \$2.61 billion in 2019, increased \$184.1 million, or 8%, from \$2.42 billion in 2018. The increase primarily reflects higher expense allocations, including those due to the enhanced segment reporting methodology beginning January 1, 2019, and higher compensation expense, partially offset by lower other operating expenses.

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. The business also includes the Global Family Office, which provides customized services to meet the complex financial needs of individuals and family offices in the United States and throughout the world with assets typically exceeding \$200 million. 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 is one of the largest providers of advisory services in the United States with assets under custody/administration, assets under custody, and assets under management of \$738.8 billion, \$735.7 billion, and \$313.8 billion, respectively, at December 31, 2019. 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, 2019, 2018, and 2017 on a management-reporting basis.

TABLE 24: WEALTH MANAGEMENT RESULTS OF OPERATIONS

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Noninterest Income					
Trust, Investment and Other Servicing Fees	\$ 1,640.6	\$ 1,580.6	\$ 1,449.7	4 %	9 %
Foreign Exchange Trading Income	18.7	4.2	3.1	N/M	35
Other Noninterest Income	131.1	102.7	103.9	28	(1)
Total Noninterest Income	1,790.4	1,687.5	1,556.7	6	8
Net Interest Income ⁽¹⁾	792.0	816.5	736.2	(3)	11
Revenue ⁽¹⁾	2,582.4	2,504.0	2,292.9	3	9
Provision for Credit Losses	(16.4)	(16.4)	(31.4)	N/M	N/M
Noninterest Expense	1,531.6	1,460.0	1,405.3	5	4
Income before Income Taxes ⁽¹⁾	1,067.2	1,060.4	919.0	1	15
Provision for Income Taxes ⁽¹⁾	271.1	262.1	347.2	3	(25)
Net Income	\$ 796.1	\$ 798.3	\$ 571.8	— %	40 %
Percentage of Consolidated Net Income	53%	51%	48%		
Average Assets	\$ 29,994.3	\$ 26,163.7	\$ 26,599.9	15 %	(2)%

(1) Stated on an FTE basis.

Wealth Management net income decreased slightly in 2019, primarily reflecting higher noninterest expense and lower net interest income, partially offset by higher trust, investment and other servicing fees, other noninterest income, and foreign exchange trading income.

Wealth Management Trust, Investment and Other Servicing Fees

Provided below is a summary of Wealth Management trust, investment and other servicing fees and assets under custody and under management.

TABLE 25: WEALTH MANAGEMENT TRUST, INVESTMENT AND OTHER SERVICING FEES

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Central	\$ 619.3	\$ 607.8	\$ 575.5	2%	6%
East	422.2	401.7	356.2	5	13
West	330.9	320.0	291.7	3	10
Global Family Office	268.2	251.1	226.3	7	11
Total Trust, Investment and Other Servicing Fees	\$ 1,640.6	\$ 1,580.6	\$ 1,449.7	4%	9%

2019 WEALTH MANAGEMENT FEES

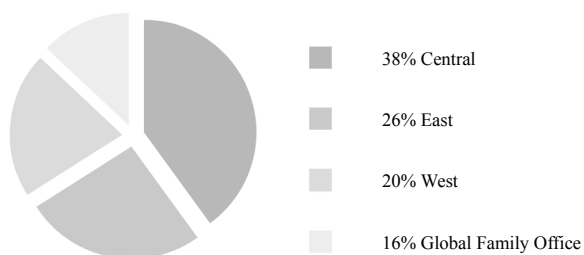


TABLE 26: WEALTH MANAGEMENT ASSETS UNDER CUSTODY

(\$ In Billions)	DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Global Family Office	\$ 474.1	\$ 405.5	\$ 422.9	17%	(4)%
Central	115.1	88.2	94.8	31	(7)
East	81.7	72.7	70.5	12	3
West	64.8	56.5	57.3	15	(1)
Total Assets Under Custody	\$ 735.7	\$ 622.9	\$ 645.5	18%	(4)%

2019 WEALTH MANAGEMENT ASSETS UNDER CUSTODY

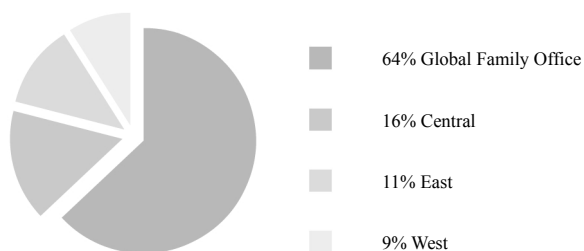
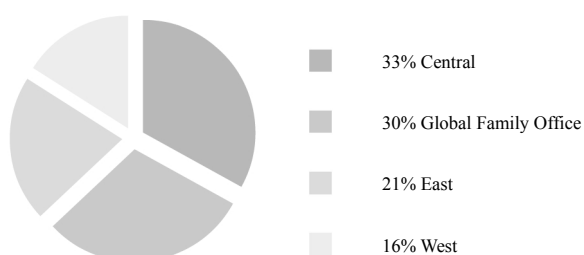
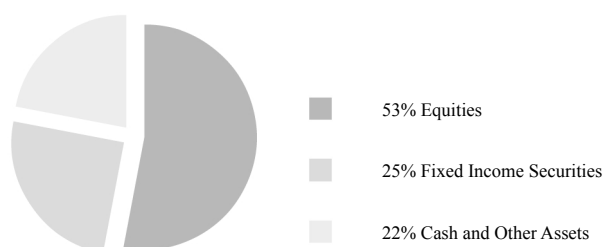


TABLE 27: WEALTH MANAGEMENT ASSETS UNDER MANAGEMENT

(\$ In Billions)	DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Central	\$ 104.4	\$ 96.2	\$ 102.1	9%	(6)%
Global Family Office	94.2	83.5	87.1	13	(4)
East	66.8	57.0	57.0	17	—
West	48.4	41.9	43.6	16	(4)
Total Assets Under Management	\$ 313.8	\$ 278.6	\$ 289.8	13%	(4)%

2019 WEALTH MANAGEMENT ASSETS UNDER MANAGEMENT



2019 WEALTH MANAGEMENT ASSETS UNDER MANAGEMENT BY INVESTMENT TYPE

The Wealth Management regions shown above 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 specialized asset management, investment consulting, global custody, fiduciary, and private banking services to ultra-wealthy domestic and international clients.

Wealth Management fee income is calculated primarily based on market values. Wealth Management trust, investment and other servicing fees of \$1.64 billion in 2019 increased \$60.0 million, or 4%, from \$1.58 billion in 2018. The results in 2019 benefited from new business and favorable markets.

At December 31, 2019, assets under custody in Wealth Management were \$735.7 billion compared with \$622.9 billion at December 31, 2018. Assets under management were \$313.8 billion at December 31, 2019 compared to \$278.6 billion at the previous year end.

Wealth Management Foreign Exchange Trading Income

Foreign exchange trading income of \$18.7 million in 2019 increased \$14.5 million from \$4.2 million in 2018, primarily due to the enhanced segment reporting methodology beginning January 1, 2019.

Wealth Management Other Noninterest Income

Other noninterest income for 2019 of \$131.1 million, increased \$28.4 million, or 28%, from \$102.7 million in 2018, primarily due to the enhanced segment reporting methodology beginning January 1, 2019.

Wealth Management Net Interest Income

Net interest income on an FTE basis, inclusive of the FTP methodology enhancements described above, of \$792.0 million for 2019 decreased \$24.5 million, or 3%, from \$816.5 million in 2018, primarily attributable to a decrease in the net interest margin, partially offset by an increase in earning assets. Net interest margin on an FTE basis decreased to 3.06% from 3.16%, reflecting lower yields on earning assets. Average earning assets of \$28.0 billion in 2019, increased \$2.1 billion, or 8%, in the current year from \$25.9 billion in 2018.

Wealth Management Provision for Credit Losses

The provision for credit losses was a credit provision of \$16.4 million in both 2019 and 2018. The 2019 credit provision was primarily driven by a reduction in outstanding loans and improved credit quality in the residential real estate portfolio, which resulted in a reduction of the inherent allowance. The 2018 credit provision was primarily driven by improved credit quality and reductions in outstanding loans, standby letters of credit, and undrawn commitments, which resulted in a reduction of the inherent allowance.

Wealth Management Noninterest Expense

Total 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, of \$1.53 billion in 2019 increased \$71.6 million, or 5%, from \$1.46 billion in the prior year. The increase primarily reflects higher expense allocations, including those due to the enhanced segment reporting methodology beginning January 1, 2019, increased compensation expense and outside services expense, partially offset by lower other operating expense.

Treasury and Other

Beginning January 1, 2019, Treasury and Other includes income and expenses associated with non-recurring activities such as certain costs associated with acquisitions, divestitures, litigation, restructuring, and tax adjustments. For reporting periods ended prior to January 1, 2019, income and expense associated with the wholesale funding activities and investment portfolios of the Corporation and the Bank, as well as certain corporate-based expense, executive-level compensation and nonrecurring items, were not allocated to C&IS and Wealth Management, and are reported in Treasury and Other. Treasury and Other information for 2019 is not directly comparable to prior period information due to the enhanced segment reporting methodology beginning January 1, 2019.

The following table summarizes the results of operations of Treasury and Other for the years ended December 31, 2019, 2018, and 2017 on a management-reporting basis.

TABLE 28: TREASURY AND OTHER RESULTS OF OPERATIONS

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Noninterest Income	\$ (17.1)	\$ 60.5	\$ 30.8	N/M	96%
Net Interest Income ⁽¹⁾	—	(144.8)	5.0	N/M	N/M
Revenue ⁽¹⁾	(17.1)	(84.3)	35.8	N/M	N/M
Noninterest Expense	6.4	135.5	169.6	N/M	(20)
Income (Loss) before Income Taxes ⁽¹⁾	(23.5)	(219.8)	(133.8)	N/M	N/M
Provision (Benefit) for Income Taxes ⁽¹⁾	(5.8)	(74.8)	(146.0)	N/M	N/M
Net Income	\$ (17.7)	\$ (145.0)	\$ 12.2	N/M	N/M
Percentage of Consolidated Net Income	(1)%	(9)%	1%		
Average Assets	\$ —	\$ 13,786.4	\$ 12,901.9	N/M	7%

(1) Stated on an FTE basis.

Treasury and Other noninterest income in 2019 was an expense of \$17.1 million, which decreased from \$60.5 million in 2018 primarily due to the enhanced segment reporting methodology beginning January 1, 2019.

Beginning January 1, 2019, net interest income and average assets are allocated to the C&IS and Wealth Management reporting segments. Accordingly, net interest income on an FTE basis in 2019 was zero, compared to net interest expense of \$144.8 million in 2018.

Treasury and Other noninterest expense in 2019 of \$6.4 million decreased \$129.1 million from \$135.5 million in 2018 due to the enhanced segment reporting methodology beginning January 1, 2019.

Asset Management

Asset Management, through the Corporation's various subsidiaries, supports the C&IS 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; 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 C&IS and Wealth Management.

At December 31, 2019, Northern Trust managed \$1.23 trillion in assets for personal and institutional clients, including \$917.5 billion for C&IS clients and \$313.8 billion for Wealth Management clients. The following table presents consolidated assets under management as of December 31, 2019, 2018 and 2017 by investment type.

TABLE 29: CONSOLIDATED ASSETS UNDER MANAGEMENT BY INVESTMENT TYPE

(\$ In Billions)	DECEMBER 31,			CHANGE	
	2019	2018	2017	2019 / 2018	2018 / 2017
Equities	\$ 650.8	\$ 534.2	\$ 592.3	22%	(10)%
Fixed Income Securities	193.8	178.3	183.5	9	(3)
Cash and Other Assets	223.6	207.0	217.5	8	(5)
Securities Lending Collateral	163.1	149.9	167.7	9	(11)
Total Assets Under Management	\$ 1,231.3	\$ 1,069.4	\$ 1,161.0	15%	(8)%

Assets under management increased \$161.9 billion, or 15%, to \$1.23 trillion at year-end 2019 from \$1.07 trillion at year-end 2018. The increase primarily reflected favorable markets and net inflows. The following table presents activity in consolidated assets under management by product during the years ended December 31, 2019, 2018 and 2017.

TABLE 30: ACTIVITY IN CONSOLIDATED ASSETS UNDER MANAGEMENT BY PRODUCT

(\$ In Billions)	2019	2018	2017
Balance as of January 1,	\$ 1,069.4	\$ 1,161.0	\$ 942.4
Inflows by Product			
Equities	193.6	174.7	192.1
Fixed Income Securities	48.1	63.7	68.1
Cash and Other Assets	551.6	484.3	407.9
Securities Lending Collateral	260.5	165.6	132.4
Total Inflows	1,053.8	888.3	800.5
Outflows by Product			
Equities	(205.5)	(179.2)	(185.7)
Fixed Income Securities	(49.7)	(72.5)	(57.2)
Cash and Other Assets	(541.0)	(487.4)	(384.0)
Securities Lending Collateral	(247.3)	(183.3)	(76.7)
Total Outflows	(1,043.5)	(922.4)	(703.6)
Net Inflows (Outflows)	10.3	(34.1)	96.9
Market Performance, Currency and Other			
Market Performance and Other	151.1	(49.3)	111.6
Currency	0.5	(8.2)	10.1
Total Market Performance, Currency and Other	151.6	(57.5)	121.7
Balance as of December 31,	\$ 1,231.3	\$ 1,069.4	\$ 1,161.0

CONSOLIDATED BALANCE SHEET REVIEW

Total assets were \$136.8 billion and \$132.2 billion at December 31, 2019 and 2018, respectively, and averaged \$117.6 billion in 2019 compared with \$122.9 billion in 2018. 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.

Interest-bearing client deposits totaled \$82.8 billion and \$81.8 billion at December 31, 2019 and 2018, respectively, and averaged \$72.3 billion in 2019 compared to \$74.6 billion in 2018. Noninterest-bearing client deposits totaled \$26.3 billion and \$22.7 billion, respectively, and averaged \$17.5 billion in 2019 compared with \$20.5 billion in 2018.

Total stockholders' equity was \$11.1 billion and \$10.5 billion at December 31, 2019 and 2018, respectively, and averaged \$10.6 billion in 2019 compared with \$10.2 billion in 2018. The increase in stockholders' equity was primarily attributable to earnings, the issuance of preferred stock, and accumulated other comprehensive income since the prior year, partially offset by the repurchase of common stock pursuant to the Corporation's share repurchase program and dividend declarations. During

2019, the Corporation issued and sold 16 million depository shares, each representing 1/1,000th ownership interest in a share of Series E Non-Cumulative Perpetual Preferred Stock for proceeds of \$391.4 million, net of underwriting discounts, commissions, and other issuance costs. These proceeds were subsequently used to fund the redemption of all outstanding shares of the Corporation's Series C Non-Cumulative Perpetual Preferred Stock on January 2, 2020.

Asset Quality

The following information summarizes our asset quality for 2019 compared to 2018. For a discussion related to our asset quality for 2018 compared to 2017, refer to Part II, Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations in our 2018 Form 10-K, which was filed with the United States Securities and Exchange Commission on February 26, 2019.

Securities Portfolio

The following table presents the book values of Northern Trust's held to maturity, available for sale, and trading investment securities by type as of December 31, 2019, 2018 and 2017. For additional information relating to the securities portfolio, refer to Note 4, "Securities," provided in Item 8, "Financial Statements and Supplementary Data."

TABLE 31: SECURITIES PORTFOLIO

(\$ In Millions)	DECEMBER 31,		
	2019	2018	2017
Debt Securities Held to Maturity			
U.S. Government	\$ 138.8	\$ 101.6	\$ 35.0
Obligations of States and Political Subdivisions	10.1	18.9	34.6
Government Sponsored Agency	4.1	4.5	5.8
Other	12,131.5	14,229.0	12,973.6
Total Debt Securities Held to Maturity	12,284.5	14,354.0	13,049.0
Debt Securities Available for Sale			
U.S. Government	4,549.1	5,185.3	5,700.3
Obligations of States and Political Subdivisions	1,615.3	655.9	746.4
Government Sponsored Agency	23,271.2	22,424.6	18,676.6
Asset-Backed	4,128.2	3,244.9	2,726.4
Auction Rate	—	—	4.3
Other	5,312.5	5,378.1	5,888.1
Total Debt Securities Available for Sale	38,876.3	36,888.8	33,742.1
Trading Account	0.3	0.3	0.5
Total Debt Securities at Year-End	\$ 51,161.1	\$ 51,243.1	\$ 46,791.6
Average Total Securities	\$ 50,684.4	\$ 50,281.5	\$ 44,715.7

The following table presents the remaining maturity and average yield of Northern Trust's held to maturity and available for sale debt securities by security type as of December 31, 2019.

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

(\$ in Millions)	DECEMBER 31, 2019								
	ONE YEAR OR LESS		ONE TO FIVE YEARS		FIVE TO TEN YEARS		OVER TEN YEARS		AVERAGE MATURITY
	BOOK	YIELD	BOOK	YIELD	BOOK	YIELD	BOOK	YIELD	
Debt Securities Held to Maturity									
U.S. Government	\$ 138.8	1.52%	\$ —	—%	\$ —	—%	\$ —	—%	1 mo.
Obligations of States and Political Subdivisions	8.1	4.71	2.0	5.47	—	—	—	—	7 mos.
Government Sponsored Agency	0.6	4.81	1.7	4.81	1.2	4.81	0.6	4.74	64 mos.
Other – Fixed	3,843.7	0.99	5,771.5	0.80	62.0	1.92	102.6	1.79	20 mos.
– Floating	563.1	0.94	1,534.5	1.33	254.1	1.04	—	—	43 mos.
Total Debt Securities Held to Maturity	4,554.3	1.00	7,309.7	0.92	317.3	1.22	103.2	1.81	24 mos.
Debt Securities Available for Sale									
U.S. Government	1,898.4	1.53	2,098.3	1.75	552.4	1.78	—	—	30 mos.
Obligations of States and Political Subdivisions	80.1	1.49	85.4	2.73	1,449.8	2.60	—	—	87 mos.
Government Sponsored Agency	5,005.0	2.35	9,728.8	2.34	5,869.4	2.29	2,668.0	2.09	59 mos.
Asset-Backed – Fixed	882.6	2.02	1,589.2	2.54	576.2	3.23	—	—	34 mos.
Asset-Backed – Floating	49.1	2.10	569.9	3.06	451.9	2.94	9.3	1.11	120 mos.
Other – Fixed	549.8	2.05	3,328.8	2.49	40.8	2.02	—	—	35 mos.
– Floating	417.1	2.09	911.3	1.95	64.7	2.16	—	—	25 mos.
Total Debt Securities Available for Sale	\$ 8,882.1	2.10%	\$18,311.7	2.32%	\$ 9,005.2	2.40%	\$ 2,677.3	2.09%	53 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.

As of December 31, 2019, Northern Trust had no holdings of the securities of any single issuer greater than 10% of stockholders' equity, except for U.S. government, government agencies, government corporations, government-sponsored agencies, and non-U.S. sovereign securities. See Note 4, "Securities," to the consolidated financial statements provided in Item 8, "Financial Statements and Supplementary Data," for more information on securities.

Northern Trust maintains a high quality debt securities portfolio, with 81% of the combined available for sale, held to maturity, and trading account portfolios at December 31, 2019 composed of U.S. Treasury and government-sponsored agency securities and triple-A rated corporate notes, asset-backed securities, covered bonds, sub-sovereign, supranational, sovereign & non-U.S. agency bonds, commercial mortgage-backed securities and obligations of states and political subdivisions. The remaining portfolio was composed of corporate notes, negotiable certificates of deposit, obligations of states and political subdivisions, and other securities, of which as a percentage of the total securities portfolio, 9% were rated double-A, 3% were rated below double-A, and 7% were not rated by Moody's Investors Service or Standard and Poor's. As of December 31, 2019, securities not explicitly rated were grouped where possible under the credit rating of the issuer of the security.

At December 31, 2019, 23% of corporate debt was rated triple-A, 32% was rated double-A, and 45% was rated below double-A or not rated. Securities classified as "other asset-backed" at December 31, 2019 had average lives of less than 5 years, and 100% were rated triple-A.

Unrealized losses within the debt securities portfolio at December 31, 2019 were \$189.5 million as compared to \$357.1 million at December 31, 2018, primarily reflecting higher market rates since purchase; 26% of the corporate debt portfolio is backed by guarantees provided by U.S. and non-U.S. governmental entities. There were \$0.3 million and \$0.5 million of losses recognized in 2019 and 2018, respectively, in connection with the write-down of CRA securities determined to be OTTI.

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 held by the counterparty until the repurchase.

Loans and Leases

During 2017, the Corporation implemented a change in the classification of certain loans and leases to enhance the consistency of its reporting across various regulatory regimes. As a result, the loan and lease balances for periods ended prior to January 1, 2017 below have been adjusted to conform to the presentation for periods ended after such date. The adjustments generally reflected reclassification of loans and leases from the commercial and institutional class to the residential real estate class. There was no impact on total loans and leases previously reported.

The following table presents the amounts outstanding of loans and leases by segment and class as of December 31, 2019 and the preceding four year-ends.

TABLE 33: COMPOSITION OF LOAN PORTFOLIO

(\$ In Millions)	DECEMBER 31,				
	2019	2018	2017	2016	2015
Commercial					
Commercial and Institutional	\$ 8,915.6	\$ 8,728.1	\$ 9,042.2	\$ 9,287.4	\$ 9,307.5
Commercial Real Estate	3,378.0	3,228.8	3,482.7	4,002.5	3,848.8
Non-U.S.	1,751.0	2,701.6	1,538.5	1,877.8	1,137.7
Lease Financing, net	65.6	90.7	229.2	293.9	544.4
Other	164.0	426.0	265.4	205.1	194.1
Total Commercial	14,274.2	15,175.2	14,558.0	15,666.7	15,032.5
Personal					
Private Client	11,068.7	10,733.3	10,753.1	10,052.0	9,136.4
Residential Real Estate	5,999.6	6,514.0	7,247.6	8,077.5	8,974.7
Other	67.1	67.5	33.5	25.9	37.3
Total Personal	17,135.4	17,314.8	18,034.2	18,155.4	18,148.4
Total Loans and Leases	\$ 31,409.6	\$ 32,490.0	\$ 32,592.2	\$ 33,822.1	\$ 33,180.9

The following table presents the amounts outstanding of non-U.S. loans by type as of December 31, 2019 and the preceding four year-ends.

TABLE 34: DISTRIBUTION OF NON-U.S. LOANS BY TYPE

(In Millions)	DECEMBER 31,				
	2019	2018	2017	2016	2015
Commercial	\$ 183.5	\$ 117.4	\$ 289.5	\$ 318.0	\$ 335.2
Banks	—	—	—	26.2	8.5
Other	1,567.5	2,584.2	1,249.0	1,533.6	794.0
Total	\$ 1,751.0	\$ 2,701.6	\$ 1,538.5	\$ 1,877.8	\$ 1,137.7

Note: Non-U.S. loans primarily include short duration advances related to the processing of custodied client investments.

The following table presents the remaining maturity of selected loans and leases as of December 31, 2019.

TABLE 35: REMAINING MATURITY OF SELECTED LOANS AND LEASES

(In Millions)	DECEMBER 31, 2019			
	TOTAL	ONE YEAR OR LESS	ONE TO FIVE YEARS	OVER FIVE YEARS
U.S. (Excluding Residential Real Estate and Private Client Loans):				
Commercial and Institutional	\$ 8,915.6	\$ 2,096.7	\$ 5,757.9	\$ 1,061.0
Commercial Real Estate	3,378.0	540.2	2,171.7	666.1
Lease Financing, net	65.6	—	23.0	42.6
Other-Commercial	164.0	164.0	—	—
Other-Personal	67.1	67.1	—	—
Total U.S.	12,590.3	2,868.0	7,952.6	1,769.7
Non-U.S.	1,751.0	1,531.0	169.8	50.2
Total Selected Loans and Leases	\$ 14,341.3	\$ 4,399.0	\$ 8,122.4	\$ 1,819.9
Interest Rate Sensitivity of Loans and Leases:				
Fixed Rate	\$ 7,127.0	\$ 2,235.6	\$ 3,757.7	\$ 1,133.7
Variable Rate	7,214.3	2,163.4	4,364.7	686.2
Total	\$ 14,341.3	\$ 4,399.0	\$ 8,122.4	\$ 1,819.9

Residential Real Estate

The residential real estate loan portfolio is primarily composed of mortgages and home equity credit lines provided as an accommodation to clients. Residential real estate loans totaled \$6.0 billion at December 31, 2019, or 20% of total U.S. loans and leases, compared with \$6.5 billion, or 22% of total U.S. loans and leases, at December 31, 2018. All residential real estate loans are underwritten utilizing Northern Trust's credit policies, which do not support the origination of loan types generally considered to be of high risk in nature, such as option adjustable rate mortgage loans, subprime loans, loans with initial "teaser" rates, and loans with excessively high loan-to-value ratios. Residential real estate loans consist of traditional first lien mortgages and equity credit lines that generally require a loan-to-collateral value of no more than 65% to 80% at inception. Appraisals of supporting collateral for residential real estate loans are obtained at loan origination and upon refinancing or default or when otherwise considered warranted. Residential real estate collateral appraisals are performed and reviewed by independent third parties.

Of the total \$6.0 billion in residential real estate loans at December 31, 2019, \$1.6 billion were in Florida, \$1.2 billion were in California, and \$1.0 billion were in the greater Chicago area, with the remainder distributed throughout the other geographic regions within the United States served by Northern Trust. Legally binding undrawn commitments to extend residential real estate credit, which are primarily equity credit lines, totaled \$714.2 million and \$824.0 million at December 31, 2019 and 2018, respectively.

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 owners through guarantees also is 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 Arizona 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.

The following table provides additional detail regarding commercial real estate loan types:

TABLE 36: COMMERCIAL REAL ESTATE LOANS

(\$ In Millions)	DECEMBER 31,	
	2019	2018
Commercial Mortgages:		
Office	\$ 754.3	\$ 811.2
Apartment/Multi-family	646.5	490.7
Retail	573.3	529.7
Industrial / Warehouse	278.0	254.9
Other	420.1	426.6
Total Commercial Mortgages	2,672.2	2,513.1
Construction, Acquisition and Development Loans	432.1	420.6
Single Family Investment	95.5	127.0
Other Commercial Real Estate Related	178.2	168.1
Total Commercial Real Estate Loans	\$ 3,378.0	\$ 3,228.8

At December 31, 2019, legally binding commitments to extend credit and standby letters of credit to commercial real estate borrowers totaled \$301.6 million and \$9.2 million, respectively. At December 31, 2018, legally binding commitments to extend credit and standby letters of credit to commercial real estate borrowers totaled \$331.4 million and \$8.5 million, respectively.

Nonperforming Assets and 90 Days Past Due Loans

During 2017, the Corporation implemented a change in the classification of certain loans and leases to enhance the consistency of its reporting across various regulatory regimes. As a result, the loan and lease balances for periods ended prior to January 1, 2017 below have been adjusted to conform to the presentation for periods ended after such date. The adjustments generally reflected reclassification of loans and leases from the commercial and institutional class to the residential real estate class. There was no impact on total loans and leases previously reported.

Nonperforming assets consist of nonperforming loans and leases 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, renegotiations and renewals. The following table presents nonperforming assets and loans that were delinquent 90 days or more and still accruing at December 31, 2019 and each of the prior four year-ends.

TABLE 37: NONPERFORMING ASSETS

(\$ In Millions)	DECEMBER 31,				
	2019	2018	2017	2016	2015
Nonperforming Loans and Leases					
Commercial					
Commercial and Institutional	\$ 7.6	\$ 6.8	\$ 26.0	\$ 9.2	\$ 18.1
Commercial Real Estate	3.6	6.9	8.3	11.6	16.7
Non-U.S.	0.5	0.4	—	—	—
Total Commercial	11.7	14.1	34.3	20.8	34.8
Personal					
Residential Real Estate	71.4	95.0	116.4	139.1	144.9
Private Client	0.5	0.2	—	0.3	0.4
Total Personal	71.9	95.2	116.4	139.4	145.3
Total Nonperforming Loans and Leases	83.6	109.3	150.7	160.2	180.1
Other Real Estate Owned	3.2	8.4	4.6	5.2	8.2
Total Nonperforming Assets	\$ 86.8	\$ 117.7	\$ 155.3	\$ 165.4	\$ 188.3
90 Day Past Due Loans Still Accruing	\$ 7.4	\$ 16.4	\$ 8.0	\$ 31.0	\$ 7.1
Nonperforming Loans and Leases to Total Loans and Leases	0.27%	0.34%	0.46%	0.47%	0.54%
Allowance for Credit Losses Assigned to Loans and Leases to Nonperforming Loans and Leases	1.3x	1.0x	0.9x	1.0x	1.1x

Nonperforming assets of \$86.8 million as of December 31, 2019 decreased \$30.9 million, or 26% from \$117.7 million at December 31, 2018, reflecting decreases in the residential real estate portfolio driven by payoffs and payments, partially offset by new nonperforming assets. Changes in the level of nonperforming 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 specific allowance and the quantitative and qualitative factors used in the determination of the inherent allowance levels within the allowance for credit losses.

Allowance and Provision for Credit Losses

During 2017, the Corporation implemented a change in the classification of certain loans and leases to enhance the consistency of its reporting across various regulatory regimes. The allowance for credit losses as of and prior to December 31, 2016 remains unadjusted, as the impact of the reclassification on the allowance was immaterial.

TABLE 38: ANALYSIS OF ALLOWANCE FOR CREDIT LOSSES

(\$ in Millions)	2019	2018	2017	2016	2015
Balance at Beginning of Year	\$ 138.2	\$ 153.8	\$ 192.0	\$ 233.3	\$ 295.9
Charge-Offs					
Commercial					
Commercial and Institutional	2.9	0.1	10.3	15.8	9.2
Commercial Real Estate	0.1	0.8	1.1	0.8	3.9
Total Commercial	3.0	0.9	11.4	16.6	13.1
Personal					
Residential Real Estate	3.2	7.3	8.0	10.4	16.7
Private Client	0.3	1.9	2.1	0.3	0.9
Total Personal	3.5	9.2	10.1	10.7	17.6
Total Charge-Offs	6.5	10.1	21.5	27.3	30.7
Recoveries					
Commercial					
Commercial and Institutional	0.3	1.5	3.7	3.3	1.7
Commercial Real Estate	0.6	0.2	1.8	1.5	3.8
Total Commercial	0.9	1.7	5.5	4.8	5.5
Personal					
Residential Real Estate	5.7	6.7	5.4	6.6	4.5
Private Client	0.6	0.6	0.4	0.7	1.2
Total Personal	6.3	7.3	5.8	7.3	5.7
Total Recoveries	7.2	9.0	11.3	12.1	11.2
Net Charge-Offs (Recoveries)	(0.7)	1.1	10.2	15.2	19.5
Provision for Credit Losses	(14.5)	(14.5)	(28.0)	(26.0)	(43.0)
Effect of Foreign Exchange Rates	—	—	—	(0.1)	(0.1)
Net Change in Allowance	(13.8)	(15.6)	(38.2)	(41.3)	(62.6)
Balance at End of Year	\$ 124.4	\$ 138.2	\$ 153.8	\$ 192.0	\$ 233.3
Allowance Assigned To:					
Loans and Leases	\$ 104.5	\$ 112.6	\$ 131.2	\$ 161.0	\$ 193.8
Undrawn Commitments and Standby Letters of Credit	19.9	25.6	22.6	31.0	39.5
Total Allowance for Credit Losses	\$ 124.4	\$ 138.2	\$ 153.8	\$ 192.0	\$ 233.3
Loans and Leases at Year-End	\$ 31,409.6	\$ 32,490.0	\$ 32,592.2	\$ 33,822.1	\$ 33,180.9
Average Total Loans and Leases	\$ 31,052.8	\$ 32,028.6	\$ 33,565.2	\$ 34,043.5	\$ 33,016.1
As a Percent of Year-End Loans and Leases					
Net Loan Charge-Offs	— %	—%	0.03%	0.04%	0.06%
Provision for Credit Losses	(0.05)	(0.04)	(0.09)	(0.08)	(0.13)
Allowance at Year-End Assigned to Loans and Leases	0.33	0.35	0.40	0.48	0.58
As a Percent of Average Loans and Leases					
Net Loan Charge-Offs	— %	—%	0.03%	0.04%	0.06%
Allowance at Year-End Assigned to Loans and Leases	0.34	0.35	0.39	0.47	0.59

The provision for credit losses is the charge to current period earnings that is determined by management, through a disciplined credit review process, to be the amount needed to maintain the allowance for credit losses at an appropriate level to absorb probable credit losses that have been identified with specific borrower relationships (specific loss component) and for probable losses that are believed to be inherent in the loan and lease portfolios, undrawn commitments, and standby letters of credit (inherent loss component).

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. There was no allowance for credit losses relating to non-U.S. operations for years 2016 through 2019. For 2015, there was a \$3.3 million allowance for credit losses at the beginning of the year, a credit provision of \$3.3 million during the year, and no allowance for credit losses as of December 31, 2015.

The following table shows the specific portion of the allowance and the allocated inherent portion of the allowance and its components by loan category at December 31, 2019, and at each of the prior four year-ends.

TABLE 39: ALLOCATION OF THE ALLOWANCE FOR CREDIT LOSSES

(\$ In Millions)	2019		2018		2017		2016		2015	
	ALLOWANCE AMOUNT	PERCENT OF LOANS TO TOTAL LOANS	ALLOWANCE AMOUNT	PERCENT OF LOANS TO TOTAL LOANS	ALLOWANCE AMOUNT	PERCENT OF LOANS TO TOTAL LOANS	ALLOWANCE AMOUNT	PERCENT OF LOANS TO TOTAL LOANS	ALLOWANCE AMOUNT	PERCENT OF LOANS TO TOTAL LOANS
Specific Allowance	\$ 6.9	—%	\$ 10.0	—%	\$ 5.4	—%	\$ 2.1	—%	\$ 3.1	—%
Allocated Inherent Allowance										
Commercial										
Commercial and Institutional	35.3	28	33.5	27	34.7	27	34.7	27	40.4	28
Commercial Real Estate	33.0	11	35.5	10	43.3	11	69.2	12	69.5	12
Lease Financing, net	0.1	—	0.1	—	0.2	1	0.4	1	1.9	2
Non-U.S.	—	6	—	8	—	5	—	5	—	3
Other	0.2	1	2.7	2	1.5	1	0.6	1	—	1
Total Commercial	68.6	46	71.8	47	79.7	45	104.9	46	111.8	46
Personal										
Residential Real Estate	27.0	19	45.8	20	57.3	22	69.0	24	96.2	27
Private Client	20.5	35	9.2	33	9.5	33	13.8	30	19.7	27
Other	1.4	—	1.4	—	1.9	—	2.2	—	2.5	—
Total Personal	48.9	54	56.4	53	68.7	55	85.0	54	118.4	54
Total Allocated Inherent Allowance	\$ 117.5	100%	\$ 128.2	100%	\$ 148.4	100%	\$ 189.9	100%	\$ 230.2	100%
Total Allowance for Credit Losses	\$ 124.4	100%	\$ 138.2	100%	\$ 153.8	100%	\$ 192.0	100%	\$ 233.3	100%
Allowance Assigned to:										
Loans and Leases	\$ 104.5		\$ 112.6		\$ 131.2		\$ 161.0		\$ 193.8	
Undrawn Commitments and Standby Letters of Credit	19.9		25.6		22.6		31.0		39.5	
Total Allowance for Credit Losses	\$ 124.4		\$ 138.2		\$ 153.8		\$ 192.0		\$ 233.3	
Allowance Assigned to Loans and Leases to Total Loans and Leases	0.33%		0.35%		0.40%		0.48%		0.58%	

Specific Component of the Allowance: The amount of specific allowance is determined through an individual evaluation of loans and lending-related commitments considered impaired taking into consideration expected future cash flows, collateral value, and other factors that may impact the borrower's ability to pay.

The specific allowance component decreased \$3.1 million from \$10.0 million at December 31, 2018 to \$6.9 million at December 31, 2019, primarily attributable to standby letters of credit and outstanding loans in the commercial and institutional portfolio and outstanding loans in the residential real estate portfolios.

Inherent Component of the Allowance: The inherent component of the allowance addresses exposure relating to probable but unidentified credit-related losses. The inherent component of the allowance also covers the credit exposure associated with undrawn loan commitments and standby letters of credit. To estimate the allowance for credit losses on these instruments, management uses conversion rates to determine the estimated amount that will be drawn and assigns an allowance factor determined in accordance with the methodology utilized for outstanding loans.

The inherent portion of the allowance decreased \$10.7 million to \$117.5 million at December 31, 2019, compared with \$128.2 million at December 31, 2018, primarily due to a reduction in outstanding loans and improved credit quality within the residential real estate portfolio, partially offset by an increase in the inherent reserve related to the private client portfolio due to an increase in outstanding loans and lower credit quality.

Overall Allowance: The evaluation of the specific component and the inherent component above resulted in a total allowance for credit losses of \$124.4 million at December 31, 2019, compared with \$138.2 million at the end of 2018. The allowance of \$104.5 million assigned to loans and leases, as a percentage of total loans and leases, was 0.33% at December 31, 2019, which decreased from a \$112.6 million allowance assigned to loans and leases, representing 0.35% of total loans and leases at December 31, 2018. Allowances assigned to undrawn loan commitments and standby letters of credit totaled \$19.9 million and \$25.6 million at December 31, 2019 and 2018, respectively, and are included in Other Liabilities in the consolidated balance sheets.

Provision: The provision for credit losses was a credit provision of \$14.5 million and net recoveries totaled \$0.7 million in 2019. This compares with a credit provision of \$14.5 million and net charge-offs of \$1.1 million in 2018.

Impaired Loans

A loan is impaired when, based on current information and events, it is probable that a creditor will be unable to collect all amounts due according to the contractual terms of the loan agreement or when its terms have been modified as a concession resulting from the debtor's financial difficulties, referred to as a troubled debt restructuring. As of December 31, 2019, impaired loans totaled \$92.2 million and included \$82.6 million of loans deemed troubled debt restructurings as compared to total impaired loans of \$116.2 million at December 31, 2018, which included \$99.8 million of loans deemed troubled debt restructurings. Impaired loans had \$5.0 million and \$7.2 million of the allowance for credit losses allocated to them at December 31, 2019, and 2018, respectively. Impaired loans are measured based upon the loan's market price, the present value of expected future cash flows, discounted at the loan's effective interest rate, or at the fair value of the collateral if the loan is collateral dependent. If the loan valuation is less than the recorded value of the loan, dependent upon the level of certainty of loss, either a specific allowance is established or a charge-off is recorded for the difference. Smaller balance (individually less than \$1 million as of December 31, 2019) homogeneous loans are collectively evaluated for impairment and excluded from impaired loan disclosures as allowed under applicable accounting standards.

Capital Expenditures

Capital expenditures in 2019 included continued investments to enhance Northern Trust's software and hardware capabilities, the opening of new offices, and the expansion and renovation of several existing offices. Capital expenditures for 2019 totaled \$599.8 million, of which \$441.8 million was for software, \$73.7 million was for computer hardware, \$77.7 million was for building and leasehold improvements, and \$6.6 million was for furnishings. These capital expenditures principally support, enhance, and protect Northern Trust's investment management, asset servicing and asset management systems and capabilities, and deliver innovative solutions to better serve our clients. Additional capital expenditures committed for technology systems will result in future expense for the depreciation of hardware and amortization of software. Software amortization and depreciation on computer hardware and machinery 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 2018 totaled \$506.0 million, of which \$408.4 million was for software, \$62.0 million was for computer hardware, \$29.9 million was for building and leasehold improvements, and \$5.7 million was for furnishings.

Deposits

The following tables present deposit information as of December 31, 2019, 2018 and 2017.

TABLE 40: AVERAGE DEPOSITS BY TYPE

(In Millions)	DECEMBER 31,		
	2019	2018	2017
U.S. Offices			
Demand and Noninterest-Bearing			
Individuals, Partnerships, Corporations, and Other	\$ 11,890.4	\$ 14,303.4	\$ 16,412.0
Correspondent Banks	29.9	58.2	60.3
Total Demand and Noninterest-Bearing	11,920.3	14,361.6	16,472.3
Interest-Bearing			
Savings, Money Market, and Other	16,577.8	15,149.3	15,575.6
Savings Certificates less than \$100,000	96.5	109.3	130.1
Savings Certificates \$100,000 and more	445.1	434.2	717.3
Other	325.9	327.1	426.0
Total Interest-Bearing	17,445.3	16,019.9	16,849.0
Total U.S. Offices	29,365.6	30,381.5	33,321.3
Non-U.S. Offices			
Noninterest-Bearing	5,535.2	6,165.0	6,600.3
Interest-Bearing	54,885.2	58,556.6	56,583.2
Total Non-U.S. Offices	60,420.4	64,721.6	63,183.5
Total Deposits	\$ 89,786.0	\$ 95,103.1	\$ 96,504.8

TABLE 41: DISTRIBUTION OF NON-U.S. DEPOSITS BY TYPE

(In Millions)	DECEMBER 31,		
	2019	2018	2017
Commercial	\$ 66,265.7	\$ 69,899.2	\$ 70,987.1
Non-U.S. Governments and Official Institutions	6,081.8	4,612.7	4,246.0
Banks	126.7	161.9	305.5
Other Time	—	—	6.3
Other Demand	103.5	14.3	6.1
Total	\$ 72,577.7	\$ 74,688.1	\$ 75,551.0

TABLE 42: REMAINING MATURITY OF TIME DEPOSITS \$100,000 OR MORE

(In Millions)	DECEMBER 31, 2019		
	U.S. OFFICE	NON-U.S. OFFICES	TOTAL
	CERTIFICATES OF DEPOSIT	OTHER TIME	
3 Months or Less	\$ 320.6	\$ 1,008.1	\$ 1,328.7
Over 3 Months through 6 Months	132.9	10.8	143.7
Over 6 Months through 12 Months	220.1	—	220.1
Over 12 Months	212.9	—	212.9
Total	\$ 886.5	\$ 1,018.9	\$ 1,905.4

TABLE 43: AVERAGE RATES PAID ON INTEREST-RELATED DEPOSITS BY TYPE

	DECEMBER 31,		
	2019	2018	2017
Interest-Related Deposits – U.S. Offices			
Savings, Money Market, and Other	0.97%	0.54%	0.16%
Savings Certificates less than \$100,000	0.87	0.17	0.15
Savings Certificates \$100,000 and more	1.55	0.76	0.46
Other Time	2.59	1.80	1.38
Total U.S. Offices Interest-Related Deposits	1.01	0.56	0.20
Total Non-U.S. Offices Interest-Related Deposits	0.57	0.50	0.26
Total Interest-Related Deposits	0.68	0.52	0.25

Short-Term Borrowings

The following tables present short-term borrowing information as of December 31, 2019, 2018 and 2017. For additional information relating to short-term borrowings, refer to Note 5, "Securities Purchased Under Agreements to Resell and Securities Sold Under Agreements to Repurchase," provided in Item 8, "Financial Statements and Supplementary Data."

TABLE 44: PURCHASED FUNDS**Federal Funds Purchased
(Overnight Borrowings)**

(In Millions)	DECEMBER 31,		
	2019	2018	2017
Balance on December 31	\$ 552.9	\$ 2,594.2	\$ 2,286.1
Highest Month-End Balance	1,979.5	4,395.8	2,286.1
Year – Average Balance	1,267.4	2,762.8	1,102.6
– Average Rate	2.05%	1.82%	0.95%
Average Rate at Year-End	0.77%	2.25%	1.17%

Securities Sold under Agreements to Repurchase

(In Millions)	DECEMBER 31,		
	2019	2018	2017
Balance on December 31	\$ 489.7	\$ 168.3	\$ 834.0
Highest Month-End Balance	489.7	981.3	834.0
Year – Average Balance	339.0	525.2	738.9
– Average Rate	1.89%	1.48%	0.81%
Average Rate at Year-End	1.43%	2.32%	1.29%

Other Borrowings

(Includes Treasury Investment Program Balances, Term Federal Funds Purchased and Other Short-Term Borrowings)

(In Millions)	DECEMBER 31,		
	2019	2018	2017
Balance on December 31	\$ 6,744.8	\$ 7,901.7	\$ 6,051.1
Highest Month-End Balance	7,879.1	7,901.7	7,040.4
Year – Average Balance	7,752.5	7,495.5	4,854.5
– Average Rate	2.34%	2.00%	1.04%
Average Rate at Year-End	1.68%	2.38%	1.38%

Total Purchased Funds

(In Millions)	DECEMBER 31,		
	2019	2018	2017
Balance on December 31	\$ 7,787.4	\$ 10,664.2	\$ 9,171.2
Year – Average Balance	9,358.9	10,783.5	6,696.0
– Average Rate	2.29%	1.93%	1.00%

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. See also Note 33, "Reporting Segments and Related Information," provided in Item 8, "Financial Statements and Supplementary Data."

TABLE 45: SELECTED AVERAGE ASSETS AND LIABILITIES ATTRIBUTABLE TO NON-U.S. OPERATIONS

(In Millions)	2019	2018	2017	2016	2015
Total Assets	\$ 27,240.7	\$ 30,781.3	\$ 26,510.1	\$ 24,031.0	\$ 29,411.2
Time Deposits with Banks	3,896.5	3,943.2	5,013.4	6,331.3	13,712.9
Loans	1,721.1	2,054.6	2,014.8	1,894.3	1,759.4
Non-U.S. Investments	15,420.6	19,016.1	14,047.8	10,255.7	8,590.8
Total Liabilities	62,110.3	66,008.5	64,267.3	57,270.0	54,521.0
Deposits	60,419.7	64,721.6	63,183.5	56,139.8	52,981.2

TABLE 46: PERCENT OF NON-U.S.-RELATED AVERAGE ASSETS AND LIABILITIES TO TOTAL CONSOLIDATED AVERAGE ASSETS

	2019	2018	2017	2016	2015
Assets	23%	25%	22%	21%	27%
Liabilities	53%	54%	54%	50%	49%

NON-U.S. OUTSTANDINGS

As used in this discussion and the following table, 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 Market Credit Committee oversees country-risk analyses and imposes limits to country exposure.

The following table provides information on non-U.S. outstandings by country that exceed 1.00% of Northern Trust's assets.

TABLE 47: NON-U.S. OUTSTANDINGS

(In Millions)	BANKS	COMMERCIAL AND OTHER	TOTAL
AT DECEMBER 31, 2019			
Japan	\$ 1,300	\$ 2,334	\$ 3,634
Canada	1,079	337	1,416
Germany	429	1,120	1,549
AT DECEMBER 31, 2018			
Japan	\$ 391	\$ 4,858	\$ 5,249
Canada	1,328	359	1,687
France	1,470	468	\$ 1,938
AT DECEMBER 31, 2017			
Japan	\$ 510	\$ 3,375	\$ 3,885
Canada	1,437	196	1,633

Note: Countries whose aggregate outstandings totaled between 0.75% and 1.00% of total assets were as follows: France with aggregate outstandings of \$1.2 billion at December 31, 2019; Germany with aggregate outstandings of \$1.2 billion and Australia with aggregate outstandings of \$1.3 billion at December 31, 2018; Germany with aggregate outstandings of \$1.3 billion and France with aggregate outstandings of \$1.3 billion at December 31, 2017.

LIQUIDITY AND CAPITAL RESOURCES

Liquidity

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 C&IS and Wealth Management businesses, wholesale funding from the capital markets, maturities of short-term investments, 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, 2019, the Bank had over \$38.0 billion 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. Liquidity supports a variety of activities, including client withdrawals, purchases of securities, net loan growth, and draws on commitments to extend credit. 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 69% of total assets as of December 31, 2019. The market value of unencumbered securities at the Bank, which include those placed at the Federal Reserve discount window, totaled \$46.7 billion at December 31, 2019. The Corporation and the Bank each satisfied the U.S. liquidity coverage ratio requirements during 2019.

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, dividend payments from the Bank, and interest earned on investment securities and money market assets. On May 3, 2019, the Corporation issued \$500 million of 3.15% senior notes, due May 3, 2029. The Corporation also received \$2.0 billion of dividends from the Bank in 2019. Dividends from the Bank are subject to certain restrictions, as discussed in further detail in Note 32, "Restrictions on Subsidiary Dividends and Loans or Advances," to the consolidated financial statements provided in Item 8, "Financial Statements and Supplementary Data."

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 2019 were \$1.1 billion of common stock repurchases and \$529.7 million of common stock dividends.

The Corporation's liquidity, defined as the amount of cash and highly marketable assets, was \$2.6 billion and \$866.8 million at December 31, 2019 and 2018, respectively. During, and at year-end, 2019 and 2018, 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 2019 and 2018 was \$1.96 billion and \$887.0 million, respectively. The cash flows of the Corporation are shown in Note 35, "Northern Trust Corporation (Corporation only)," to the consolidated financial statements provided in Item 8, "Financial Statements and Supplementary Data."

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, 2019, provided below, allow Northern Trust to access capital markets on favorable terms.

TABLE 48: NORTHERN TRUST CREDIT RATINGS AS OF DECEMBER 31, 2019

	CREDIT RATING		
	STANDARD & POOR'S	MOODY'S	FITCH RATINGS
Northern Trust Corporation:			
Senior Debt	A+	A2	AA-
Subordinated Debt	A	A2	A+
Preferred Stock	BBB+	Baa1	BBB
Trust Preferred Capital Securities	BBB+	A3	BBB+
Outlook	Stable	Stable	Stable
The Northern Trust Company:			
Short-Term Deposit	A-1+	P-1	F1+
Long-Term Deposit	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 28, "Offsetting of Assets and Liabilities," to the consolidated financial statements 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, 2019, the net maximum amount of these termination payments that Northern Trust could have been required to pay was \$439.1 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, 2019, that would be triggered by a significant downgrade in its debt ratings.

Statements of Cash Flows

For the year ended December 31, 2019, net cash provided by operating activities was \$2.6 billion, primarily reflecting period earnings and lower net collateral deposited with derivative counterparties.

Net cash provided by operating activities for the year ended December 31, 2018, was \$1.8 billion, primarily reflecting period earnings and the impact of other operating activities and non-cash charges such as amortization of computer software, partially offset by higher net collateral deposited with derivative counterparties.

Net cash used in investing activities was \$3.4 billion for the year ended December 31, 2019, primarily reflecting higher levels of deposits with the Federal Reserve and other central banks, net purchases of debt securities available for sale, and the purchase of bank-owned life insurance policies in 2019, partially offset by the net proceeds from the maturity and redemption of debt securities held to maturity and lower levels of loans and leases.

Net cash provided by investing activities was \$4.3 billion for the year ended December 31, 2018, primarily reflecting decreased levels of deposits with the Federal Reserve and other central banks and lower interest-bearing deposits with banks, partially offset by net purchases of debt securities available for sale and held to maturity and the net change in other investing activities.

For the year ended December 31, 2019, net cash provided by financing activities totaled \$0.6 billion, primarily reflecting higher levels of total deposits, proceeds from the issuance by the Corporation of 3.15% senior notes, and proceeds from the Series E Non-Cumulative Perpetual Preferred Stock issuance, partially offset by lower federal funds purchased, lower short-term other borrowings, and the repurchase of common stock pursuant to the Corporation's share repurchase program. The increase in total deposits was primarily attributable to higher levels of domestic interest-bearing client deposits and non-U.S. office noninterest-bearing deposits, partially offset by lower levels of non-U.S. interest-bearing deposits.

For the year ended December 31, 2018, net cash used in financing activities totaled \$5.8 billion, primarily reflecting decreased levels of total deposits, the repurchase of common stock pursuant to the Corporation's share repurchase program,

lower securities sold under agreements to repurchase, dividends paid on common and preferred stock, and repayments of the 6.50% subordinated notes previously issued by the Bank and due August 2018, partially offset by higher short-term other borrowings and the proceeds from the issuance by the Corporation of 3.65% senior notes. The decrease in total deposits was primarily attributable to lower levels of non-interest bearing domestic and non-U.S. office client deposits and lower domestic interest-bearing client deposits.

Regulatory Environment

Northern Trust actively follows regulatory developments and regularly evaluates its liquidity risk management framework against proposed rulemaking and industry best practices in order to comply with applicable regulations and further enhance its liquidity policies. Please refer to "Liquidity Standards" under "Supervision and Regulation" in Item 1, "Business," of this Annual Report on Form 10-K for a discussion of applicable liquidity standards.

Contractual Obligations

The following table shows Northern Trust's contractual obligations as of December 31, 2019.

TABLE 49: CONTRACTUAL OBLIGATIONS AS OF DECEMBER 31, 2019

(\$ In Millions)	PAYMENT DUE BY PERIOD				
	TOTAL	ONE YEAR AND LESS	1-3 YEARS	3-5 YEARS	OVER 5 YEARS
Senior Notes ⁽¹⁾	\$ 2,573.0	\$ 499.9	\$ 998.8	\$ —	\$ 1,074.3
Subordinated Debt ⁽¹⁾	1,148.1	—	—	—	1,148.1
Floating Rate Capital Debt ⁽¹⁾	277.7	—	—	—	277.7
Operating Leases ⁽²⁾	695.7	101.3	164.3	130.1	300.0
Purchase Obligations ⁽³⁾	720.1	287.7	349.7	80.3	2.4
Total Contractual Obligations	\$ 5,414.6	\$ 888.9	\$ 1,512.8	\$ 210.4	\$ 2,802.5

Note: Obligations as shown do not include deposit liabilities or interest requirements on funding sources.

(1) Refer to Note 13, "Senior Notes and Long-Term Debt," and Note 14, "Floating Rate Capital Debt," to the consolidated financial statements provided in Item 8, "Financial Statements and Supplementary Data," for further details.

(2) Refer to Note 10, "Lease Commitments," to the consolidated financial statements provided in Item 8, "Financial Statements and Supplementary Data," for further details.

(3) Purchase obligations consist of enforceable and legally binding agreements to purchase products or services at specified significant terms.

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 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, and the impact on credit ratings.

Capital levels were strengthened in 2019 as average stockholders' equity increased \$419.5 million, or 4%, reaching \$10.6 billion. Total stockholders' equity was \$11.1 billion at December 31, 2019, as compared to \$10.5 billion at December 31, 2018. During 2019, the Corporation issued and sold 16 million depositary shares, each representing 1/1,000th ownership interest in a share of Series E Non-Cumulative Perpetual Preferred Stock for proceeds of \$391.4 million, net of underwriting discounts, commissions, and other issuance costs. These proceeds were subsequently used to fund the redemption of all outstanding shares of the Corporation's Series C Non-Cumulative Perpetual Preferred Stock on January 2, 2020. In July 2019, the Board increased the quarterly common stock dividend by 17% to \$0.70 per common share. Common dividends totaling \$565.9 million were declared in 2019. During the year ended December 31, 2019, the Corporation repurchased 11.8 million shares of common stock, including 0.6 million shares withheld related to share-based compensation, at an average price per share of \$93.40. Preferred dividends totaling \$46.4 million were declared in 2019.

In accordance with Basel III requirements, capital ratios are calculated using both the standardized and advanced approaches. For each ratio, the lower of the result 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, 2019 and 2018.

TABLE 50: CAPITAL ADEQUACY

(\$ In Millions)	DECEMBER 31, 2019		DECEMBER 31, 2018	
	STANDARDIZED APPROACH	ADVANCED APPROACH	STANDARDIZED APPROACH	ADVANCED APPROACH
Common Equity Tier 1 Capital				
Common Stockholders' Equity	\$ 9,817.5	\$ 9,817.5	\$ 9,626.3	\$ 9,626.3
Net Unrealized (Gains) Losses on Debt Securities Available for Sale	—	—	—	—
Net Unrealized (Gains) Losses on Cash Flow Hedges	—	—	—	—
Goodwill and Other Intangible Assets, net of Deferred Tax Liability	(776.1)	(776.1)	(767.6)	(767.6)
Pension and Other Postretirement Benefit Adjustments	—	—	—	—
Other	(142.7)	(142.7)	(128.9)	(128.9)
Total Common Equity Tier 1	8,898.7	8,898.7	8,729.8	8,729.8
Additional Tier 1 Capital				
Preferred Stock	1,273.4	1,273.4	882.0	882.0
Other	(20.1)	(20.1)	(15.1)	(15.1)
Total Additional Tier 1 Capital	1,253.3	1,253.3	866.9	866.9
Total Tier 1 Capital	10,152.0	10,152.0	9,596.7	9,596.7
Tier 2 Capital				
Qualifying Allowance for Credit Losses	124.4	—	138.2	—
Qualifying Subordinated Debt	1,099.5	1,099.5	1,099.4	1,099.4
Floating Rate Capital	80.8	80.8	107.7	107.7
Total Tier 2 Capital	1,304.7	1,180.3	1,345.3	1,207.1
Total Risk-Based Capital	\$ 11,456.7	\$ 11,332.3	\$ 10,942.0	\$ 10,803.8
Risk-Weighted Assets ⁽¹⁾	\$ 70,088.3	\$ 67,526.9	\$ 67,837.1	\$ 63,914.8
Total Assets – End of Period (EOP)	136,828.4	136,828.4	132,212.5	132,212.5
Adjusted Average Fourth Quarter Assets ⁽²⁾	117,165.7	117,165.7	120,402.6	120,402.6
Total Loans and Leases – EOP	31,409.6	31,409.6	32,490.0	32,490.0
Common Stockholders' Equity to:				
Total Loans and Leases – EOP	31.26%	31.26%	29.63%	29.63%
Total Assets – EOP	7.18	7.18	7.28	7.28
Risk-Based Capital Ratios				
Common Equity Tier 1 Capital	12.7%	13.2%	12.9%	13.7%
Tier 1 Capital	14.5	15.0	14.1	15.0
Total Capital (Tier 1 and Tier 2)	16.3	16.8	16.1	16.9
Tier 1 Leverage	8.7	8.7	8.0	8.0
Supplementary Leverage ⁽³⁾	N/A	7.6	N/A	7.0

(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.

(3) Effective January 1, 2018, the Corporation and Bank are subject to a minimum supplementary leverage ratio of 3 percent.

As of December 31, 2019 and 2018, the Corporation's capital ratios exceeded the minimum requirements for classification as "well-capitalized" under applicable U.S. regulatory requirements. 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" section of Item 1, "Business," and Note 34, "Regulatory Capital Requirements," to the consolidated financial statements provided in Item 8, "Financial Statements and Supplementary Data."

As of December 31, 2019, the Corporation's common equity Tier 1 capital ratio as calculated under the advanced approaches methodologies would have been 13.2% on a fully phased-in basis, while the Corporation's common equity Tier 1 capital ratio under the standardized approach would have been 12.7% on a fully phased-in basis.

OFF-BALANCE-SHEET ARRANGEMENTS

Assets Under Custody/Administration and Assets Under Management

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.

Commitments, Letters of Credit, and Securities Lent with Indemnification

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 potential credit exposure should the instrument be drawn fully 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. The following table provides details of Northern Trust's off-balance-sheet financial instruments as of December 31, 2019 and 2018.

TABLE 51: SUMMARY OF OFF-BALANCE-SHEET FINANCIAL INSTRUMENTS WITH CONTRACT AMOUNTS

(\$ In Millions)	DECEMBER 31,	
	2019	2018
Undrawn Commitments to Extend Credit		
One Year and Less	\$ 7,500.2	\$ 7,629.9
Over One Year	16,906.0	17,393.1
Total	\$ 24,406.2	\$ 25,023.0
Standby Letters of Credit and Financial Guarantees	\$ 2,416.7	\$ 2,486.2
Commercial Letters of Credit	32.3	32.3
Custody Securities Lent with Indemnification	138,085.9	128,904.8

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, 2019.

TABLE 52: UNDRAWN COMMITMENTS TO EXTEND CREDIT BY INDUSTRY SECTOR

AS OF DECEMBER 31, 2019 (\$ In Millions)	COMMITMENT EXPIRATION			
	TOTAL COMMITMENTS	ONE YEAR AND LESS	OVER ONE YEAR	OUTSTANDING LOANS
Commercial				
Commercial and Institutional				
Finance and Insurance	\$ 3,664.3	\$ 1,786.8	\$ 1,877.5	\$ 2,412.2
Holding Companies	—	—	—	30.7
Manufacturing	6,659.7	780.1	5,879.6	1,479.1
Mining	747.5	224.6	522.9	15.1
Public Administration	58.2	4.3	53.9	53.6
Retail Trade	749.7	192.0	557.7	145.7
Services	5,817.1	2,352.1	3,465.0	3,807.0
Transportation and Warehousing	285.1	—	285.1	247.8
Utilities	1,259.5	—	1,259.5	10.6
Wholesale Trade	710.8	71.2	639.6	390.7
Other Commercial	200.7	131.2	69.5	323.1
Commercial and Institutional ⁽¹⁾	20,152.6	5,542.3	14,610.3	8,915.6
Commercial Real Estate	301.6	102.5	199.1	3,378.0
Lease Financing, net	—	—	—	65.6
Non-U.S.	1,144.3	587.8	556.5	1,751.0
Other	87.5	87.5	—	164.0
Total Commercial	21,686.0	6,320.1	15,365.9	14,274.2
Personal				
Residential Real Estate	714.2	119.4	594.8	5,999.6
Private Client	1,970.2	1,024.9	945.3	11,068.7
Other	35.8	35.8	—	67.1
Total Personal	2,720.2	1,180.1	1,540.1	17,135.4
Total	\$ 24,406.2	\$ 7,500.2	\$ 16,906.0	\$ 31,409.6

(1) Commercial and Institutional industry sector information is presented on the basis of the North American Industry Classification System (NAICS).

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. Standby letters of credit and financial guarantees of \$2.4 billion and \$2.5 billion at December 31, 2019 and 2018, respectively, include \$44.5 million and \$72.3 million, respectively, of standby letters of credit secured by cash deposits or participated to others.

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.

As part of its securities custody activities and at the direction of its clients, Northern Trust lends securities owned by clients to borrowers who are reviewed and approved by the Northern Trust Capital Markets Credit Committee. 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 of 100% of the fair value of the securities plus accrued interest. The collateral is revalued on a daily basis. The amount of securities loaned subject to indemnification was \$138.1 billion and \$128.9 billion at December 31, 2019 and 2018, 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, 2019, or 2018 related to these indemnifications.

Additional information about Northern Trust's off-balance-sheet financial instruments is included in Note 29, "Off-Balance-Sheet Financial Instruments, Guarantees and Other Commitments" to the consolidated financial statements provided in Item 8, "Financial Statements and Supplementary Data."

Variable Interest Entities

Variable Interest Entities (VIEs) are defined within GAAP as entities which either have a total equity investment that is insufficient to permit the entity to finance its activities without additional subordinated financial support or whose equity investors lack the characteristics of a controlling financial interest. Investors that finance a VIE through debt or equity interests, or other counterparties that provide other forms of support, such as guarantees, subordinated fee arrangements, or certain types of derivative contracts, 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 and a variable interest that could potentially be significant to the entity is deemed to be the VIE's primary beneficiary and is required to consolidate the VIE.

Leveraged Leases. In leveraged leasing transactions, Northern Trust acts as lessor of the underlying asset subject to the lease and typically funds 20-30% of the asset's cost via an equity ownership in a trust with the remaining 70-80% provided by third-party non-recourse debt holders. In such transactions, the trusts, which are VIEs, are created to provide the lessee use of the property with substantially all of the rights and obligations of ownership. The lessee's maintenance and operation of the leased property has a direct effect on the fair value of the underlying property, and the lessee also has the ability to increase the benefits it can receive and limit the losses it can suffer by the manner in which it uses the property. As a result, Northern Trust has determined that it is not the primary beneficiary of the leveraged lease trust VIEs given it lacks the power to direct the activities that most significantly impact the economic performance of the leveraged lease trust VIEs.

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.

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.

CRITICAL ACCOUNTING ESTIMATES

Our significant accounting policies are described in Note 1, "Summary of Significant Accounting Policies," to the consolidated financial statements 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 represents management's estimate of probable losses which have been incurred as of the date of the consolidated financial statements. The loan and lease portfolio and other lending-related credit exposures are regularly reviewed to evaluate the level of the allowance for credit losses. In determining an appropriate allowance level, Northern Trust evaluates the allowance necessary for impaired loans and lending-related commitments and estimates losses inherent in other lending-related credit exposures.

The allowance for credit losses consists of the following components:

Specific Allowance: The specific allowance is determined through an individual evaluation of loans and lending-related commitments considered impaired taking into consideration expected future cash flows, collateral value, and other factors that may impact the borrower's ability to pay. For impaired loans where the amount of specific 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.

Inherent Allowance: The inherent allowance estimation methodology is based on internally developed loss data specific to the Northern Trust loan and lease 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 type, loan size, and borrower rating. For each segment, the probability of default over a loss emergence period and a loss given default are derived from the historical data and applied to the total exposure at default to determine a quantitative inherent allowance. The estimated allowance is reviewed by the Loan Loss Reserve Committee within a qualitative adjustment framework to determine an appropriate adjustment to the quantitative inherent allowance for each segment of the loan portfolio. In determining the appropriate adjustment, management applies judgment by assessing internal risk factors, potential limitations in the quantitative methodology and environmental factors that are not contemplated in the quantitative methodology. The Loan Loss Reserve Committee is comprised of representatives from Credit Risk Management, the reporting segments and Corporate Finance.

The quarterly analysis of the specific and inherent 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 of, and adjustment for, changes in estimated credit loss levels. 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 on at least an annual basis and modified as considered appropriate.

Loans, leases and other extensions of credit deemed uncollectible are charged to the allowance for credit losses. Subsequent recoveries, if any, are credited to the allowance. Determinations as to whether loan balances for which the collectability is in question are charged-off or a specific reserve is established based on management's assessment as to the level of certainty regarding the amount of loss. The provision for credit losses, which is charged to income, is the amount necessary to adjust the allowance for credit losses to the level deemed to be appropriate through the above process. 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.

Management's estimates utilized in establishing an appropriate level of allowance for credit losses are not dependent on any single assumption. Management evaluates numerous variables, many of which are interrelated or dependent on other assumptions and estimates, in determining an appropriate allowance level. Due to the inherent imprecision in accounting estimates, other estimates or assumptions could reasonably have been used in 2019 and changes in estimates are reasonably likely to occur from period to period.

Additionally, as an integral part of their examination process, various federal and state regulatory agencies also review the allowance for credit losses. These agencies may require that certain loan balances be classified differently or charged off when their credit evaluations differ from those of management, based on their judgments about information available to them at the time of their examination. However, management believes that the allowance for credit losses adequately addresses these uncertainties and has been established at an appropriate level to cover probable losses which have occurred as of the date of the consolidated financial statements.

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 actuarially-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 pension 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 future working lifetime of eligible participants. As a result, differences between the estimates made in the calculation of periodic pension expense and the projected pension 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. pension plans in 2019, Northern Trust utilized a discount rate of 4.47% for both the U.S. Qualified Plan and the U.S. Non-qualified Plan. The rate of increase in the compensation level is based on a graded schedule from 9.00% to 2.50% that averaged 4.39%. The expected long-term rate of return on U.S. Qualified Plan assets was 6.00%.

In evaluating possible revisions to pension-related assumptions for the U.S. pension plans as of Northern Trust's December 31, 2019 measurement date, the following were considered:

- **Discount Rate:** Northern Trust estimates the discount rate for its U.S. pension plans by applying the projected cash flows for future benefit payments 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 3.37% at December 31, 2019 for the U.S. Qualified and Non-qualified plans, a decrease from 4.47% at December 31, 2018.
- **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 4.97%.
- **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 decreased from 6.00% for 2019 to 5.25% for 2020.
- **Mortality Table:** As of December 31, 2019, Northern Trust has 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-2019, which was also released by the Society of Actuaries in October 2019. This assumption was updated at December 31, 2019 from improvement scale MP-2018. The updated improvement scale applies to annuity payments only and results in generally lower projected mortality improvements than estimated by the MP-2018 improvement scale. Mortality assumptions on lump sum payments remain static and continue to be in line with the IRS prescribed table for minimum lump sums in 2020.

Net pension expense in 2020 is expected to increase by approximately \$30.6 million, primarily driven by the decrease in discount rate and expected rate of return.

In order to illustrate the sensitivity of these assumptions on the expected U.S. pension plans' periodic pension expense in 2020 and the projected benefit obligation as of December 31, 2019, the following table is presented to show the effect of increasing or decreasing each of these assumptions by 25 basis points.

TABLE 53: SENSITIVITY OF U.S. PENSION PLANS ASSUMPTIONS

(\$ In Millions)	25 BASIS POINT INCREASE	25 BASIS POINT DECREASE
Increase (Decrease) in 2020 Pension Expense		
Discount Rate Change	\$ (4.2)	\$ 4.4
Compensation Level Change	2.0	(2.0)
Rate of Return on Plan Assets Change	(3.7)	3.7
Increase (Decrease) in 2019 Projected Benefit Obligation		
Discount Rate Change	(51.8)	54.8
Compensation Level Change	8.9	(8.6)

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 2019 plan year. Northern Trust contributed \$50.0 million to the U.S. Qualified Plan at the beginning of 2018, retrospectively for the 2017 plan year. The minimum required contribution to the U.S. Qualified Plan is expected to be zero in 2020. The maximum deductible contribution is estimated at \$275 million for 2020.

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, 2019, approximately 29% of Northern Trust's total assets and approximately 1% of its total liabilities were carried on the consolidated balance sheets at fair value. As discussed more fully in Note 3, "Fair Value Measurements," to the consolidated financial statements 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 11% of Northern Trust's assets carried at fair value are classified as Level 1. Northern Trust typically does not hold equity securities or other instruments that are actively traded on an exchange.

Approximately 89% of Northern Trust's assets and 99% 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 available for sale make up 97% of Level 2 assets with the remaining 3% primarily consisting of derivative financial instruments. Level 2 liabilities are comprised solely of derivative financial instruments.

Northern Trust's Level 2 assets include available for sale and trading account 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," to the consolidated financial statements provided in Item 8, "Financial Statements and Supplementary Data."

As of December 31, 2019, 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%, 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, 2019, 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 26, "Contingent Liabilities," provided in Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K for further information.

While Northern Trust believes its valuation methods for its assets and liabilities carried at fair value are appropriate and consistent with other market participants, 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

On January 1, 2020, Northern Trust adopted ASU No. 2016-13, "Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments" (ASU 2016-13). ASU 2016-13 significantly changes the way impairment of financial instruments is recognized by requiring immediate recognition of estimated credit losses expected to occur over the remaining life of financial instruments. The main provisions of ASU 2016-13 include (1) replacing the "incurred loss" approach under current GAAP with an "expected loss" model for instruments measured at amortized cost, (2) requiring entities to record an allowance for available-for-sale debt securities rather than reduce the carrying amount of the investments, as is required by the other-than-temporary-impairment model under current GAAP, and (3) a simplified accounting model for purchased credit-impaired debt securities and loans.

In conjunction with the adoption of ASU 2016-13, Northern Trust expects an increase in the allowance for credit losses of less than \$20 million. This change in accounting principle will be applied prospectively by increasing the allowance for credit losses on January 1, 2020, with a corresponding cumulative effect adjustment to decrease retained earnings, net of income taxes. Periods prior to the adoption date will not be adjusted. Northern Trust also expects that the Corporation and the Bank's capital ratios will not be materially impacted by the adoption of this standard.

In August 2018, the FASB issued ASU No. 2018-15, "Intangibles - Goodwill and Other - Internal - Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract (a consensus of the FASB Emerging Issues Task Force)" (ASU 2018-15). ASU 2018-15 aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software (and hosting arrangements that include an internal use software license). ASU 2018-15 is effective for fiscal years beginning after December 15, 2019, and interim periods within those fiscal years, although early adoption is permitted. ASU 2018-15 is not expected to have a significant impact on Northern Trust's consolidated financial condition or results of operations.

RISK MANAGEMENT

Risk Management Overview

Northern Trust employs an integrated risk management framework to support its business decisions and the execution of its corporate strategies. The framework provides a methodology to identify, assess, monitor, measure, manage and report 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, market, liquidity, 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 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 diagram below 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 54: RISK GOVERNANCE STRUCTURE

Northern Trust Corporation Board of Directors					
Audit Committee	Business Risk Committee	Capital Governance Committee	Compensation and Benefits Committee		

Global Enterprise Risk Committee (GERC)					
Credit Risk Committee	Operational Risk Committee	Fiduciary Risk Committee	Compliance & Ethics Oversight Committee	Market & Liquidity Risk Committee	Model Risk Oversight 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 Compensation and Benefits Committee. The Board of Directors approves Northern Trust's risk management framework and Corporate Risk Appetite Statement. The Business Risk Committee assumes primary responsibility and oversight with respect to credit risk, operational risk, fiduciary risk, compliance risk, market risk, liquidity risk, and strategic risk. The Audit Committee provides oversight with respect to financial reporting and legal risk, while the Compensation and Benefits Committee oversees the development and operation of Northern Trust's incentive compensation program. The Compensation and Benefits 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 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 adequacy 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 and the Risk Management executive leadership team of Northern Trust, together with the Chief Financial Officer, Head of Capital and Resolution Planning, General Counsel and Chief Audit Executive, 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. 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 Operational Risk Committee (ORC) provides independent oversight and is responsible for setting the operational risk-related policies and developing 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 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 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.

In addition to the aforementioned committees, Northern Trust deploys 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 senior management.

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, Global Compliance Testing and Basel Independent Verification 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. 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. Lastly, Basel Independent Verification promotes rigor and accuracy in Northern Trust's ongoing compliance with Basel III requirements and adherence to Enhanced Prudential Standards, including liquidity stress testing. 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 advanced systems 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 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 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 counterparty-related exposures. 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 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 or hedge fund leveraging.

Credit Risk Framework and Governance

The Credit Risk Management function is the focal point of the credit risk framework and, while independent of the businesses, 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 relationship-based credit culture. This function also monitors adherence to corporate policies, standards, programs, and external regulations.

The Credit Risk Management function provides a system of checks and balances for Northern Trust's diverse credit-related activities by monitoring these activities and practices and promoting their uniform application throughout Northern Trust.

The credit risk framework provides authorities 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 individual authority because of amount, rating, term or other conditions, are referred to the relevant Group Credit Approval Committee. Credit decisions involving exposure in excess of these limits require the approval of the Senior Credit Committee. The Capital Markets Credit Committee has sole credit authority for the approval, modification, or renewal of credit exposure to all wholesale market counterparties.

The CRC establishes and monitors credit-related policies and programs throughout Northern Trust and promotes their uniform application. The Chief Credit Officer reports directly to the CRO and chairs the CRC. Independent oversight and review of the credit risk framework also is provided by Risk Control.

Credit Risk Measurement

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 credit risk. Calculations include entity-specific information about the obligor's or counterparty's probability of default and exposure-specific information about loss given default, exposure at default and maturity.

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 the "Off-Balance-Sheet Arrangements" section and in Note 29, "Off-Balance-Sheet Financial Instruments, Guarantees and Other Commitments" to the consolidated financial statements provided in Item 8, "Financial Statements and Supplementary Data."

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 nonperforming status or charged off. Northern Trust maintains a loan portfolio watch list for adversely classified credit exposures that includes all nonperforming 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 effectiveness of management's implementation of the 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 over-the-counter (OTC) currency and interest rate derivatives, and from indemnified securities lending 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 and indemnified securities lending 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 operational requirements, the characteristics of the contract type and the portfolio size and complexity.

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: Northern Trust's primary risk mitigation approaches include the requirement of collateral. Residential and commercial real estate exposures are typically secured by properly margined mortgages on the property. In cases where loans to commercial or certain Wealth Management 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. Northern Trust has elected to take the credit risk mitigation capital benefit of netting within its regulatory capital calculation at this time.

Guarantees: Personal and corporate guarantees are often taken to facilitate potential collection efforts and to protect Northern Trust's claims relative to other creditors. Northern Trust has elected not to take the credit risk mitigation capital benefit of guarantors within its regulatory capital calculation at this time.

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, product design and delivery difficulties, potential legal actions, or other catastrophes to result in losses. This includes the potential that continuity of service and resiliency may be impacted.

Operational risk includes 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 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 reduce future loss events. The Operational Risk Management function is responsible for defining the operational risk framework and providing independent oversight of the framework 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 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 structured risk management process used by Northern Trust's businesses to analyze the risks that are present in their respective business environments and to assess the adequacy of associated internal controls.

- **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 high-severity 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.
- **Outsourcing Risk Management Program** - a program that provides processes for appropriate risk assessment, measurement, monitoring and management of outsourced technology and business process outsourcing.
- **Information Security and Technology Risk Management** - a program that communicates and implements compliance and risk management processes and controls to address information security, including cyber threats and technology risks to the organization.
- **Business Continuity and Disaster Recovery Management Program** - a program designed to minimize business impact and support the resumption of mission critical functions for clients following an incident.
- **Physical Security** - a program that provides for the 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.

As discussed in Risk Control, 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 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 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.

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 99.9th percentile of the aggregate loss distribution over a one-year time horizon.

Information Security and Technology Management

Effective management of risks related to the confidentiality, integrity and availability of information is crucial in an environment of increasing cyber threat and requires a structured approach to establish and communicate expectations and required practices. Northern Trust's information security and technology risk management framework includes a comprehensive governance structure and an Information Security and Technology Risk Management Policy and Program approved by the Business Risk Committee. The framework is supported by an organizational structure that reflects support from executive management and includes risk committees comprised of members from across the businesses, including the Information Security and Technology Risk Committee (ISTRC). The ISTRC is chaired by the Chief Information Risk Officer, who regularly reports to the Business Risk Committee on the status of the Information Security and Technology Risk Management Program.

In addition to a strong 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 and other means provided to them to safeguard electronic information and business systems within their care. Training and awareness programs to educate employees on information security are ongoing and include multiple approaches such as mandatory computer-based training, phishing simulations, and the designation of individuals as Information Security and Privacy Champions within the businesses. 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 various 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 security program maturity assessments, penetration tests, security assessments and reviews of Northern Trust's susceptibility to social engineering attacks such as spear phishing. Northern Trust operates a global security operations center for threat identification and response. This center aggregates security threat information from systems and platforms across the businesses, and alerts the organization in accordance with its documented Cyber Incident Response Plan.

The Cyber Incident Response Plan is used to respond to cybersecurity incidents. A cybersecurity incident is defined as an incident caused by damaging activity, which requires actions to prevent and respond to disruptions, denials, compromises or exfiltration that impact the confidentiality, integrity and availability of the assets of Northern Trust or its clients. 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 and 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 controls and procedures also address cybersecurity incidents and include elements to ensure that there is an analysis of potential disclosure obligations arising from any such incidents. Northern Trust also maintains compliance programs to address the applicability of restrictions on securities trading while in possession of material, nonpublic information, including in instances in which such information may relate to cybersecurity incidents.

Business Resiliency and Continuity Management

Northern Trust's business resiliency approach encompasses business continuity and disaster recovery processes enterprise-wide (including staff, technology and facilities) to ensure that following a disaster or business interruption Northern Trust resumes mission-critical business and economic functions and fulfills all regulatory and legal requirements.

Northern Trust's business resiliency 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, resiliency 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 their critical 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 strength of 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.

Northern Trust has also begun exploring the integration of climate-related scenario analyses into its broader risk management program to help align with certain recommendations of the Task Force on Climate Related Financial Disclosures (TCFD). Conducting such climate-related scenario analyses and assessing the magnitude of climate-related financial risks and opportunities related to Northern Trust's global assets are intended to position the organization to navigate uncertain climate futures more effectively.

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 level.

Fiduciary Risk Framework and Governance

The 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 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

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.

Liquidity Risk Overview

Northern Trust maintains a strong liquidity position and conservative 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. 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, 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) 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, 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 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 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.

Market Risk

There are two types of market risk, interest rate risk and trading risk. Interest rate risk is the potential for movements in interest rates to cause changes in net interest income and the market value of equity. 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. 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 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 indirectly impact the MVE. To mitigate interest rate risk, the structure of 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 interest rate risk in the banking book:

- repricing, which arises from differences in the maturity and repricing terms of assets and liabilities;
- yield curve, which arises from changes in the shape of the yield curve;
- basis, 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, 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 securities;
- sale of debt securities that are classified as available for sale;
- issuance of senior notes and subordinated notes;
- collateralized borrowings from the Federal Home Loan Bank;
- placing and taking Eurodollar time deposits; 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 upward and 100 basis point downward movements in interest rates relative to forward rates. Each rate movement is assumed to occur gradually over a one-year period.

TABLE 55: NET INTEREST INCOME SENSITIVITY AS OF DECEMBER 31, 2019

(\$ In Millions)	INCREASE/(DECREASE) ESTIMATED IMPACT ON NEXT TWELVE MONTHS OF NET INTEREST INCOME
INCREASE IN INTEREST RATES ABOVE MARKET IMPLIED FORWARD RATES	
100 Basis Points	\$ 70
200 Basis Points	85
DECREASE IN INTEREST RATES BELOW MARKET IMPLIED FORWARD RATES	
100 Basis Points	(77)

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 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 a 100 basis point shock down from current market implied forward rates.

TABLE 56: MARKET VALUE OF EQUITY SENSITIVITY AS OF DECEMBER 31, 2019

(\$ In Millions)	INCREASE/(DECREASE) ESTIMATED IMPACT ON MARKET VALUE OF EQUITY
INCREASE IN INTEREST RATES ABOVE MARKET IMPLIED FORWARD RATES	
100 Basis Points	\$ (203)
200 Basis Points	(773)
DECREASE IN INTEREST RATES BELOW MARKET IMPLIED FORWARD RATES	
100 Basis Points	45

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 growing 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 a variety of high confidence levels, of the potential loss in value that might be incurred if an adverse shift in non-U.S. currency exchange 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 vended 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 table below 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 57: GLOBAL FOREIGN CURRENCY VALUE-AT-RISK

(\$ In Millions)	TOTAL VaR (FX AND IR DRIVERS)		FX VaR (FX DRIVERS ONLY)		IR VaR (IR DRIVERS ONLY)	
	2019	2018	2019	2018	2019	2018
FOR THE YEAR ENDED DECEMBER 31,						
High	\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.2	\$ 0.2	\$ 0.3
Low	—	0.1	—	—	—	—
Average	0.1	0.1	0.1	0.1	0.1	0.1
As of December 31,	0.1	0.1	0.1	0.1	0.1	0.1

During 2019, Northern Trust experienced one day of actual GFX trading loss in excess of the daily GFX VaR estimate. During 2018, 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 negligible. Northern Trust's broker-dealer subsidiary, Northern Trust Securities, Inc., maintains a small portfolio of trading securities held for customer accommodation purposes, which averaged \$1.2 million for the year ended December 31, 2019.

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 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 includes the following three subcategories:

- Macroeconomic and geopolitical risk, which centers on events or themes that would have a significant, detrimental impact on financial markets, and by extension, financial services firms. Episodes of this kind would tend to have general, as opposed to idiosyncratic, consequences.
- Business risk, which arises from change in the following areas:
 - Internal: situations within Northern Trust that threaten business continuity, profitability, or the achievement of strategic objectives
 - Secular: behavioral or technological change that affects clients and renders a Northern Trust process or service obsolete
 - Competitive: new products or shifts in the industry landscape that challenge Northern Trust's performance
 - Regulatory: changes to prudential or fiscal policy that have an adverse impact on Northern Trust or its clients
- Reputation risk is a residual risk which arises from negative perception on the part of clients, counterparties, stockholders, investors, debt holders, market analysts, regulators, staff, or other relevant parties that adversely affects Northern Trust's ability to conduct its business. Reputation risk can arise from a range of risk events and is not limited to strategic risk.

Strategic Risk Framework and Governance

Northern Trust maintains a framework that consists of risk management policies and practices designed to identify, analyze, and limit (where possible) the impact of strategic risk. The Strategic Risk Management function is responsible for defining this framework and providing independent oversight of its application across Northern Trust. In furtherance of this effort, Northern Trust has established governance around its strategic planning processes to review and challenge strategic decisions.

In addition, Northern Trust maintains a Global Stress Testing Framework which guides stress testing exercises across the company. Enterprise stress testing, a component of this effort, is specifically designed to look at the prospective impact of internal and external shocks on the organization. Northern Trust also maintains the Global Emergency Response Plan, which guides its reaction to adverse external events if they arise.

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

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, including, for example, actual or potential changes to international trade policy;
- 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;
- 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 decline in the value of securities held in Northern Trust’s investment portfolio, particularly asset-backed securities, 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 cyber-security, data security, human errors or omissions, pricing or valuation of securities, fraud, systems performance or defects, systems interruptions, and breakdowns in processes or internal controls;
- Northern Trust’s success in responding to and investing in changes and advancements in technology;
- 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;
- changes in the method pursuant to which the London Interbank Offered Rate (LIBOR) or other interest rate benchmarks are determined;
- the pace and extent of continued globalization of investment activity and growth in worldwide financial assets;
- changes in interest rates or in the monetary or other policies of various regulatory authorities or central banks;
- 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;

- geopolitical risks, risks related to global climate change and the risks of extraordinary events such as natural disasters, pandemics, terrorist events and war, and the responses of the United States and other countries to those events;
- the departure of the United Kingdom from the European Union, commonly referred to as “Brexit,” and any negative effects thereof on global economic conditions, global financial markets, and our business and results of operations;
- 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;
- Northern Trust’s success in recruiting and retaining the necessary personnel to support business growth and expansion and maintain sufficient expertise to support increasingly complex products and services;
- Northern Trust’s success in implementing its expense management initiatives, including its “Value for Spend” initiative;
- 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. 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 58: RECONCILIATION TO FULLY TAXABLE EQUIVALENT

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,								
	2019			2018			2017		
	REPORTED	FTE ADJ.	FTE	REPORTED	FTE ADJ.	FTE	REPORTED	FTE ADJ.	FTE
Interest Income	\$ 2,499.9	\$ 32.8	\$ 2,532.7	\$ 2,321.4	\$ 41.2	\$ 2,362.6	\$ 1,769.4	\$ 45.8	\$ 1,815.2
Interest Expense	822.0	—	822.0	698.7	—	698.7	340.2	—	340.2
Net Interest Income	\$ 1,677.9	\$ 32.8	\$ 1,710.7	\$ 1,622.7	\$ 41.2	\$ 1,663.9	\$ 1,429.2	\$ 45.8	\$ 1,475.0
Net Interest Margin	1.57%		1.60%	1.43%		1.46%	1.29%		1.33%
Total Revenue	\$ 6,073.1	\$ 32.8	\$ 6,105.9	\$ 5,960.2	\$ 41.2	\$ 6,001.4	\$ 5,375.3	\$ 45.8	\$ 5,421.1

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,					
	2016			2015		
	REPORTED	FTE ADJ.	FTE	REPORTED	FTE ADJ.	FTE
Interest Income	\$ 1,416.9	\$ 25.1	\$ 1,442.0	\$ 1,224.0	\$ 25.3	\$ 1,249.3
Interest Expense	182.0	—	182.0	153.9	—	153.9
Net Interest Income	\$ 1,234.9	\$ 25.1	\$ 1,260.0	\$ 1,070.1	\$ 25.3	\$ 1,095.4
Net Interest Margin	1.15%		1.18%	1.05%		1.07%
Total Revenue	\$ 4,961.8	\$ 25.1	\$ 4,986.9	\$ 4,702.6	\$ 25.3	\$ 4,727.9

Quarterly Financial Data (Unaudited)

The following table presents quarterly financial data for years ended 2019 and 2018.

TABLE 59: QUARTERLY FINANCIAL DATA (UNAUDITED)

STATEMENTS OF INCOME	2019				2018			
	FOURTH QUARTER	THIRD QUARTER	SECOND QUARTER	FIRST QUARTER	FOURTH QUARTER	THIRD QUARTER	SECOND QUARTER	FIRST QUARTER
(\$ In Millions Except Per Share Information)								
Trust, Investment and Other Servicing Fees	\$ 992.2	\$ 975.5	\$ 955.5	\$ 928.9	\$ 933.9	\$ 939.2	\$ 942.9	\$ 937.7
Other Noninterest Income	134.7	144.7	133.7	130.0	152.7	126.9	149.9	154.3
Net Interest Income								
Interest Income	576.1	620.8	640.2	662.8	648.6	599.2	567.7	505.9
Interest Expense	155.3	203.1	222.8	240.8	231.4	191.0	154.4	121.9
Net Interest Income	420.8	417.7	417.4	422.0	417.2	408.2	413.3	384.0
Provision for Credit Losses	(1.0)	(7.0)	(6.5)	—	(4.0)	(9.0)	1.5	(3.0)
Noninterest Expense	1,072.3	1,036.3	1,006.2	1,028.7	1,021.9	1,002.3	997.4	995.3
Provision for Income Taxes	105.3	124.0	117.5	105.1	76.0	106.5	116.8	102.1
Net Income	\$ 371.1	\$ 384.6	\$ 389.4	\$ 347.1	\$ 409.9	\$ 374.5	\$ 390.4	\$ 381.6
Preferred Stock Dividends	5.8	17.4	5.9	17.3	5.9	17.3	5.9	17.3
Net Income Applicable to Common Stock	\$ 365.3	\$ 367.2	\$ 383.5	\$ 329.8	\$ 404.0	\$ 357.2	\$ 384.5	\$ 364.3
PER COMMON SHARE								
Net Income – Basic	\$ 1.71	\$ 1.70	\$ 1.76	\$ 1.49	\$ 1.81	\$ 1.59	\$ 1.69	\$ 1.59
– Diluted	1.70	1.69	1.75	1.48	1.80	1.58	1.68	1.58
AVERAGE BALANCE SHEET ASSETS								
Cash and Due from Banks	\$ 2,292.6	\$ 2,551.5	\$ 2,784.3	\$ 1,940.7	\$ 2,400.9	\$ 2,702.9	\$ 2,440.5	\$ 2,593.2
Federal Reserve and Other Central Bank Deposits and Other ⁽¹⁾	17,230.0	17,524.9	19,236.2	20,163.2	21,762.6	22,889.6	24,512.8	26,495.1
Interest-Bearing Due from and Deposits with Banks ⁽²⁾	6,073.9	5,656.5	5,811.9	6,452.2	5,228.9	5,410.3	6,556.9	6,920.4
Federal Funds Sold and Securities Purchased under Agreements to Resell	945.9	816.9	650.9	978.1	1,334.3	1,775.2	1,417.1	1,467.1
Securities ⁽³⁾	51,919.0	50,024.9	48,911.2	51,889.3	52,228.6	50,820.8	49,692.4	48,335.7
Loans and Leases	30,990.8	30,935.9	31,098.9	31,189.4	31,623.8	31,798.9	32,235.4	32,468.0
Allowance for Credit Losses Assigned to Loans and Leases	(105.5)	(111.2)	(115.1)	(114.0)	(120.3)	(127.6)	(126.4)	(131.0)
Other Assets	8,758.6	8,952.7	7,980.6	6,917.8	6,855.4	6,885.5	7,138.0	6,344.8
Total Assets	\$ 118,105.3	\$ 116,352.1	\$ 116,358.9	\$ 119,416.7	\$ 121,314.2	\$ 122,155.6	\$ 123,866.7	\$ 124,493.3
LIABILITIES AND STOCKHOLDERS' EQUITY								
Deposits								
Demand and Other Noninterest-Bearing	\$ 17,462.9	\$ 16,687.3	\$ 17,826.5	\$ 17,858.4	\$ 19,211.2	\$ 19,430.5	\$ 21,484.7	\$ 22,022.9
Savings, Money Market, and Other	18,130.2	17,802.7	15,950.9	14,372.8	14,349.1	14,787.6	15,565.0	15,916.4
Savings Certificates and Other Time	919.0	898.9	888.6	761.4	721.1	810.5	896.6	1,058.5
Non-U.S. Offices – Interest-Bearing	52,925.8	53,631.5	54,679.9	58,377.2	58,873.9	58,473.2	57,684.5	59,199.7
Total Deposits	89,437.9	89,020.4	89,345.9	91,369.8	93,155.3	93,501.8	95,630.8	98,197.5
Short-Term Borrowings	8,770.5	8,768.8	9,427.6	10,494.0	10,987.9	11,380.7	11,336.2	9,405.3
Senior Notes	2,584.6	2,587.7	2,361.4	2,014.1	1,996.5	1,818.0	1,497.6	1,497.4
Long-Term Debt	1,154.0	1,156.7	1,131.6	1,112.9	1,099.6	1,254.4	1,410.8	1,426.5
Floating Rate Capital Debt	277.7	277.7	277.6	277.6	277.6	277.6	277.5	277.5
Other Liabilities	4,948.0	3,853.0	3,276.7	3,719.5	3,498.5	3,648.5	3,511.7	3,551.4
Stockholders' Equity	10,932.6	10,687.8	10,538.1	10,428.8	10,298.8	10,274.6	10,202.1	10,137.7
Total Liabilities and Stockholders' Equity	\$ 118,105.3	\$ 116,352.1	\$ 116,358.9	\$ 119,416.7	\$ 121,314.2	\$ 122,155.6	\$ 123,866.7	\$ 124,493.3

(1) Federal Reserve and Other Central Bank Deposits and Other includes collateral deposits with certain securities depositories and clearing houses, which are classified in Other Assets in the consolidated balance sheets as of December 31, 2019, and 2018.

(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 in the consolidated balance sheets as of December 31, 2019, and 2018.

(3) Securities include Federal Reserve and Federal Home Loan Bank stock and certain community development investments which are classified in Other Assets in the consolidated balance sheets as of December 31, 2019 and 2018.

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,” of this Annual Report on Form 10-K.

ITEM 8 – FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

In addition to the Report of Independent Registered Public Accounting Firm and the consolidated financial statements and accompanying notes provided below, the table titled “Quarterly Financial Data (Unaudited)” in Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in this Form 10-K is incorporated herein by reference.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

TO THE STOCKHOLDERS AND BOARD OF DIRECTORS OF 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, 2019 and 2018, 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, 2019, 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, 2019 and 2018, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2019, 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, 2019 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 25, 2020 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 judgment. 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 related to loans and leases collectively evaluated for inherent impairment

As discussed in Notes 1 and 7 to the consolidated financial statements, the Corporation’s allowance for credit losses related to loans and leases collectively evaluated for inherent impairment (ALLL) was \$99.5 million of a total allowance for credit losses of \$104.5 million as of December 31, 2019. The ALLL is estimated using a historical loss methodology that estimates the probability of default and loss given default for all loans and leases. The ALLL also incorporates adjustments in accordance with the Corporation’s qualitative adjustment framework.

We identified the assessment of the ALLL as a critical audit matter because it involved significant measurement uncertainty regarding complex auditor judgment, and knowledge and experience in the industry. In addition, auditor judgment was required to evaluate the sufficiency of audit evidence obtained. The assessment of the ALLL encompassed the evaluation of the ALLL methodology, including the methodologies used to estimate the probability of default and loss given default, and their key factors and assumptions, including the borrower ratings, the historical observation period, and the loss emergence period. The assessment also included an evaluation of the ALLL calculations.

The primary procedures we performed to address this critical audit matter included the following. We tested certain internal controls over the Corporation's ALLL process, including controls related to the (1) development of the ALLL methodology, (2) determination of key factors and assumptions used to estimate the probability of default and loss given default, and (3) calculations of the ALLL estimate. We evaluated the Corporation's process to develop the ALLL estimate by testing certain source 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 industry knowledge and experience, who assisted in:

- evaluating the Corporation's ALLL methodology for compliance with U.S. generally accepted accounting principles,
- testing the historical observation period assumption used in the probability of default and loss given default methodologies to evaluate the length of the periods,
- testing borrower ratings for a selection of loan relationships by evaluating financial performance of the borrower and underlying collateral,
- evaluating the methodology used to develop the probability of default, loss emergence period, and loss given default assumptions, and
- evaluating the ALLL calculations, including testing the mathematical accuracy of certain key assumption calculations.

We evaluated the collective results of the procedures performed to assess the sufficiency of the audit evidence obtained related to the Corporation's ALLL.

KPMG LLP

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

CHICAGO, ILLINOIS
FEBRUARY 25, 2020

CONSOLIDATED BALANCE SHEETS

(In Millions Except Share Information)	DECEMBER 31,	
	2019	2018
ASSETS		
Cash and Due from Banks	\$ 4,459.2	\$ 4,581.6
Federal Reserve and Other Central Bank Deposits	33,886.0	30,080.2
Interest-Bearing Deposits with Banks	4,877.1	4,264.2
Federal Funds Sold and Securities Purchased under Agreements to Resell	712.8	1,165.2
Debt Securities		
Available for Sale	38,876.3	36,888.8
Held to Maturity (Fair value of \$12,249.3 and \$14,267.0)	12,284.5	14,354.0
Trading Account	0.3	0.3
Total Debt Securities	51,161.1	51,243.1
Loans and Leases		
Commercial	14,274.2	15,175.2
Personal	17,135.4	17,314.8
Total Loans and Leases (Net of unearned income of \$14.1 and \$13.2)	31,409.6	32,490.0
Allowance for Credit Losses Assigned to Loans and Leases	(104.5)	(112.6)
Buildings and Equipment	483.3	428.2
Client Security Settlement Receivables	845.7	1,646.1
Goodwill	696.8	669.3
Other Assets	8,401.3	5,757.2
Total Assets	\$ 136,828.4	\$ 132,212.5
LIABILITIES		
Deposits		
Demand and Other Noninterest-Bearing	\$ 14,114.7	\$ 14,508.0
Savings, Money Market and Other Interest-Bearing	21,441.5	14,612.0
Savings Certificates and Other Time	986.7	688.7
Non U.S. Offices — Noninterest-Bearing	12,177.4	8,220.1
— Interest-Bearing	60,400.3	66,468.0
Total Deposits	109,120.6	104,496.8
Federal Funds Purchased	552.9	2,594.2
Securities Sold Under Agreements to Repurchase	489.7	168.3
Other Borrowings	6,744.8	7,901.7
Senior Notes	2,573.0	2,011.3
Long-Term Debt	1,148.1	1,112.4
Floating Rate Capital Debt	277.7	277.6
Other Liabilities	4,830.6	3,141.9
Total Liabilities	125,737.4	121,704.2
STOCKHOLDERS' EQUITY		
Preferred Stock, No Par Value; Authorized 10,000,000 shares:		
Series C, outstanding shares of 16,000	388.5	388.5
Series D, outstanding shares of 5,000	493.5	493.5
Series E, outstanding shares of 16,000	391.4	—
Common Stock, \$1.66 2/3 Par Value; Authorized 560,000,000 shares; Outstanding shares of 209,709,046 and 219,012,050	408.6	408.6
Additional Paid-In Capital	1,013.1	1,068.5
Retained Earnings	11,656.7	10,776.8
Accumulated Other Comprehensive Loss	(194.7)	(453.7)
Treasury Stock (35,462,478 and 26,159,474 shares, at cost)	(3,066.1)	(2,173.9)
Total Stockholders' Equity	11,091.0	10,508.3
Total Liabilities and Stockholders' Equity	\$ 136,828.4	\$ 132,212.5

See accompanying notes to consolidated financial statements on pages 98-166.

CONSOLIDATED STATEMENTS OF INCOME

(In Millions Except Share Information)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Noninterest Income			
Trust, Investment and Other Servicing Fees	\$ 3,852.1	\$ 3,753.7	\$ 3,434.3
Foreign Exchange Trading Income	250.9	307.2	209.9
Treasury Management Fees	44.5	51.8	56.4
Security Commissions and Trading Income	103.6	98.3	89.6
Other Operating Income	145.5	127.5	157.5
Investment Security Gains (Losses), net (Note)	(1.4)	(1.0)	(1.6)
Total Noninterest Income	4,395.2	4,337.5	3,946.1
Net Interest Income			
Interest Income	2,499.9	2,321.4	1,769.4
Interest Expense	822.0	698.7	340.2
Net Interest Income	1,677.9	1,622.7	1,429.2
Provision for Credit Losses	(14.5)	(14.5)	(28.0)
Net Interest Income after Provision for Credit Losses	1,692.4	1,637.2	1,457.2
Noninterest Expense			
Compensation	1,859.0	1,806.9	1,733.7
Employee Benefits	355.2	356.7	319.9
Outside Services	774.5	739.4	668.4
Equipment and Software	612.1	582.2	524.0
Occupancy	212.9	201.1	191.8
Other Operating Expense	329.8	330.6	331.6
Total Noninterest Expense	4,143.5	4,016.9	3,769.4
Income before Income Taxes	1,944.1	1,957.8	1,633.9
Provision for Income Taxes	451.9	401.4	434.9
NET INCOME	\$ 1,492.2	\$ 1,556.4	\$ 1,199.0
Preferred Stock Dividends	46.4	46.4	49.8
Net Income Applicable to Common Stock	\$ 1,445.8	\$ 1,510.0	\$ 1,149.2
PER COMMON SHARE			
Net Income – Basic	\$ 6.66	\$ 6.68	\$ 4.95
– Diluted	6.63	6.64	4.92
Average Number of Common Shares Outstanding – Basic	214,525,547	223,148,335	228,257,664
– Diluted	215,601,149	224,488,326	229,654,401
Note: Changes in Other-Than-Temporary-Impairment (OTTI) Losses	\$ (0.3)	\$ (0.5)	\$ (0.2)
Other Security Gains (Losses), net	(1.1)	(0.5)	(1.4)
Investment Security Gains (Losses), net	\$ (1.4)	\$ (1.0)	\$ (1.6)

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Net Income	\$ 1,492.2	\$ 1,556.4	\$ 1,199.0
Other Comprehensive Income (Loss) (Net of Tax and Reclassifications)			
Net Unrealized Gains (Losses) on Debt Securities Available for Sale	228.9	(22.3)	(42.4)
Net Unrealized Gains (Losses) on Cash Flow Hedges	(7.7)	(1.4)	(1.6)
Net Foreign Currency Adjustments	49.9	22.2	16.7
Net Pension and Other Postretirement Benefit Adjustments	(12.1)	(12.6)	(17.0)
Other Comprehensive Income (Loss)	259.0	(14.1)	(44.3)
Comprehensive Income	\$ 1,751.2	\$ 1,542.3	\$ 1,154.7

See accompanying notes to consolidated financial statements on pages 98-166.

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, 2017	\$ 882.0	\$ 408.6	\$ 1,035.8	\$ 8,908.4	\$ (370.0)	\$ (1,094.4)	\$ 9,770.4
Net income	—	—	—	1,199.0	—	—	1,199.0
Other Comprehensive Income (Loss) (Net of Tax and Reclassifications)	—	—	—	—	(44.3)	—	(44.3)
Dividends:							
Common stock, \$1.60 per share	—	—	—	(372.5)	—	—	(372.5)
Preferred stock	—	—	—	(49.8)	—	—	(49.8)
Stock Options and Awards	—	—	—	—	—	225.1	225.1
Stock Purchased	—	—	—	—	—	(523.1)	(523.1)
Treasury Stock Transactions — Stock Options and Awards	—	—	(117.1)	—	—	—	(117.1)
Stock Options and Awards — Amortization	—	—	128.5	—	—	—	128.5
Balance at December 31, 2017	\$ 882.0	\$ 408.6	\$ 1,047.2	\$ 9,685.1	\$ (414.3)	\$ (1,392.4)	\$ 10,216.2
Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income	—	—	—	25.3	(25.3)	—	—
Change in Accounting Principle	—	—	—	(4.5)	—	—	(4.5)
Net income	—	—	—	1,556.4	—	—	1,556.4
Other Comprehensive Income (Loss) (Net of Tax and Reclassifications)	—	—	—	—	(14.1)	—	(14.1)
Dividends Declared:							
Common Stock, \$1.94 per share	—	—	—	(439.1)	—	—	(439.1)
Preferred Stock	—	—	—	(46.4)	—	—	(46.4)
Stock Options and Awards	—	—	—	—	—	142.8	142.8
Stock Purchased	—	—	—	—	—	(924.3)	(924.3)
Treasury Stock Transactions — Stock Options and Awards	—	—	(110.2)	—	—	—	(110.2)
Stock Options and Awards — Amortization	—	—	131.5	—	—	—	131.5
Balance at December 31, 2018	\$ 882.0	\$ 408.6	\$ 1,068.5	\$ 10,776.8	\$ (453.7)	\$ (2,173.9)	\$ 10,508.3
Net income	—	—	—	1,492.2	—	—	1,492.2
Other Comprehensive Income (Loss) (Net of Tax and Reclassifications)	—	—	—	—	259.0	—	259.0
Dividends:							
Common Stock, \$2.60 per share	—	—	—	(565.9)	—	—	(565.9)
Preferred Stock	—	—	—	(46.4)	—	—	(46.4)
Issuance of Preferred Stock, Series E	391.4	—	—	—	—	—	391.4
Stock Options and Awards	—	—	—	—	—	208.0	208.0
Stock Purchased	—	—	—	—	—	(1,100.2)	(1,100.2)
Treasury Stock Transactions — Stock Options and Awards	—	—	(163.9)	—	—	—	(163.9)
Stock Options and Awards — Amortization	—	—	108.5	—	—	—	108.5
Balance at December 31, 2019	\$ 1,273.4	\$ 408.6	\$ 1,013.1	\$ 11,656.7	\$ (194.7)	\$ (3,066.1)	\$ 11,091.0

See accompanying notes to consolidated financial statements on pages 98-166.

CONSOLIDATED STATEMENTS OF CASH FLOWS

FOR THE YEAR ENDED DECEMBER 31,

(In Millions)	2019	2018	2017
CASH FLOWS FROM OPERATING ACTIVITIES			
Net Income	\$ 1,492.2	\$ 1,556.4	\$ 1,199.0
Adjustments to Reconcile Net Income to Net Cash Provided by Operating Activities			
Investment Security Losses, net	1.4	1.0	1.6
Amortization and Accretion of Securities and Unearned Income, net	64.6	95.9	105.0
Provision for Credit Losses	(14.5)	(14.5)	(28.0)
Depreciation on Buildings and Equipment	103.2	108.6	101.2
Amortization of Computer Software	339.1	334.9	309.1
Amortization of Intangibles	16.6	17.4	11.4
Change in Accrued Income Taxes	(70.7)	(130.0)	36.2
Pension Plan Contributions	(6.1)	(74.5)	(14.5)
Deferred Income Tax Provision	34.3	10.5	(76.1)
Change in Receivables	(50.3)	(197.0)	(119.3)
Change in Interest Payable	(23.6)	28.5	10.7
Change in Collateral With Derivative Counterparties, net	1,154.0	(699.6)	486.2
Other Operating Activities, net	(448.2)	729.9	(302.1)
Net Cash Provided by Operating Activities	2,592.0	1,767.5	1,720.4
CASH FLOWS FROM INVESTING ACTIVITIES			
Net Change in Federal Funds Sold and Securities Purchased under Agreements to Resell	486.3	105.7	678.9
Change in Interest-Bearing Deposits with Banks	(614.6)	1,073.8	(467.7)
Net Change in Federal Reserve and Other Central Bank Deposits	(3,683.2)	9,679.6	(12,748.7)
Purchases of Debt Securities – Held to Maturity	(14,154.3)	(21,463.1)	(11,955.2)
Proceeds from Maturity and Redemption of Debt Securities – Held to Maturity	16,290.9	20,036.7	9,924.8
Purchases of Debt Securities – Available for Sale	(12,811.0)	(12,596.9)	(9,780.0)
Proceeds from Sale, Maturity and Redemption of Debt Securities – Available for Sale	11,057.2	8,958.7	10,103.4
Change in Loans and Leases	1,087.9	66.1	1,451.0
Purchases of Buildings and Equipment	(158.0)	(97.6)	(91.6)
Purchases and Development of Computer Software	(441.8)	(408.4)	(381.2)
Change in Client Security Settlement Receivables	821.0	(49.7)	(592.6)
Acquisition of a Business, Net of Cash Received	(10.5)	(104.2)	(188.5)
Bank-Owned Life Insurance Policy Premiums	(1,500.0)	—	—
Other Investing Activities, net	225.1	(873.6)	25.8
Net Cash (Used in) Provided by Investing Activities	(3,405.0)	4,327.1	(14,021.6)
CASH FLOWS FROM FINANCING ACTIVITIES			
Change in Deposits	4,263.6	(6,163.2)	8,523.6
Change in Federal Funds Purchased	(2,041.3)	308.1	2,081.2
Change in Securities Sold under Agreements to Repurchase	320.9	(665.2)	360.5
Change in Short-Term Other Borrowings	(1,184.5)	1,860.9	967.7
Proceeds from Senior Notes	498.0	497.9	350.0
Repayments of Senior Notes	—	(314.3)	(208.7)
Proceeds from Issuance of Preferred Stock - Series E	392.5	—	—
Treasury Stock Purchased	(1,100.2)	(924.3)	(523.1)
Net Proceeds from Stock Options	44.0	32.6	108.0
Cash Dividends Paid on Common Stock	(529.7)	(405.4)	(356.8)
Cash Dividends Paid on Preferred Stock	(46.4)	(46.4)	(49.8)
Other Financing Activities, net	(1.0)	1.1	0.1
Net Cash Provided by (Used In) Financing Activities	615.9	(5,818.2)	11,252.7
Effect of Foreign Currency Exchange Rates on Cash	74.7	(212.9)	234.6
Change in Cash and Due from Banks	(122.4)	63.5	(813.9)
Cash and Due from Banks at Beginning of Year	4,581.6	4,518.1	5,332.0
Cash and Due from Banks at End of Year	\$ 4,459.2	\$ 4,581.6	\$ 4,518.1
SUPPLEMENTAL DISCLOSURES OF CASH FLOW INFORMATION			
Interest Paid	\$ 845.5	\$ 670.2	\$ 328.8
Income Taxes Paid	437.0	493.5	441.2
Transfers from Loans to OREO	3.5	11.4	8.2
Transfers to Leases Held For Sale from Leases	53.6	—	—

See accompanying notes to consolidated financial statements on pages 98-166.

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.

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: Corporate & Institutional Services (C&IS) and Wealth Management. Asset management and related services are provided to C&IS and Wealth Management clients primarily by the Asset Management business.

C&IS 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: global 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. The business also includes the Global Family Office, which provides customized services to meet the complex financial needs of individuals and family offices in the U.S. and throughout the world with assets typically exceeding \$200 million. 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 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 as currency translation gains (losses), net. 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. *Securities Available for Sale* 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 securities available for sale are determined on a specific identification

basis and are reported within other security gains (losses), net, in the consolidated statements of income. Interest income is recorded on the accrual basis, adjusted for the amortization of premium and accretion of discount.

Securities Held to Maturity 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.

Securities Held for Trading are stated at fair value. Realized and unrealized gains and losses on securities held for trading are reported in the consolidated statements of income within security commissions and trading 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 30, "Variable Interest Entities," are reported at amortized cost using the effective yield method or proportional amortization method and amortized over the lives of the related tax credits and other tax benefits.

Other-Than-Temporary Impairment (OTTI). A security is considered to be other-than-temporarily impaired if the present value of cash flows expected to be collected are less than the security's amortized cost basis (the difference being defined as the credit loss) or if the fair value of the security is less than the security's amortized cost basis and the investor intends, or more-likely-than-not will be required, to sell the security before recovery of the security's amortized cost basis. If OTTI exists, the charge to earnings is limited to the amount of credit loss if the investor does not intend to sell the security, and it is more-likely-than-not that it will not be required to sell the security, before recovery of the security's amortized cost basis. Any remaining difference between fair value and amortized cost is recognized in AOCI, net of applicable taxes. Otherwise, the entire difference between fair value and amortized cost is charged to earnings.

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 held by the counterparty until the repurchase.

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 on the consolidated balance sheets at fair value within Other Assets and Other Liabilities. 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 in 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 on the consolidated statements of cash flows within the line item, "other operating activities, net," 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. 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. 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. 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, a "long-haul" method of accounting, 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. 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 probable losses.

Recognition of Income. Interest income on loans 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 nonperforming and interest income is recorded on a cash basis. 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 nonperforming, interest accrued but not collected is reversed against interest income in the current period. Interest collected on nonperforming 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. Nonperforming 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.

Impaired Loans. A loan is considered to be impaired when, based on current information and events, management determines that it is probable that Northern Trust will be unable to collect all amounts due according to the contractual terms of the loan agreement. Impaired loans are identified through ongoing credit management and risk rating processes, including the formal review of past due and watch list credits. Payment performance and delinquency status are critical factors in identifying impairment for all loans and leases, particularly those within the residential real estate, private client and personal-other classes. Other key factors considered in identifying impairment of loans and leases within the commercial and institutional, lease financing, net, non-U.S., and commercial-other classes relate to the borrower's ability to perform under the terms of the obligation as measured through the assessment of future cash flows, including consideration of collateral value, market value, and other factors. A loan is also considered to be impaired if its terms have been modified as a concession by Northern Trust or a bankruptcy court resulting from the debtor's financial difficulties, referred to as a troubled debt restructuring (TDR). All TDRs are reported as impaired loans in the calendar year of their restructuring. In subsequent years, a TDR may cease being reported as impaired 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 performing status if it satisfies the six-payment-period performance requirement; however, it will remain reported as impaired. Impairment is measured based upon the present value of expected future cash flows, discounted at the loan's original effective interest rate, the fair value of the collateral if the loan is collateral dependent, or the loan's observable market value. If the loan valuation is less than the recorded value of the loan, based on the certainty of loss, either a specific allowance is established, or a charge-off is recorded, for the difference. Smaller balance (individually less than \$1 million) homogeneous loans are collectively evaluated for impairment and excluded from impaired loan disclosures as allowed under applicable accounting standards. Northern Trust's accounting policies for material impaired loans is consistent across all classes of loans and leases.

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.

Direct Financing and Leveraged Leases. Unearned lease income from direct financing and leveraged leases is recognized using the interest method. This method provides a constant rate of return on the unrecovered investment over the life of the lease. The rate of return and the allocation of income over the lease term are recalculated from the inception of the lease if during the lease term assumptions regarding the amount or timing of estimated cash flows change. Lease residual values are established at the inception of the lease based on in-house valuations and market analyses provided by outside parties. Lease residual values are reviewed at least annually for OTTI. A decline in the estimated residual value of a leased asset determined to be other-than-temporary would be recorded in the period in which the decline is identified as a reduction of interest income.

I. Allowance for Credit Losses. The allowance for credit losses represents management's estimate of probable losses which have occurred as of the date of the consolidated financial statements. The loan and lease portfolio and other lending-related credit exposures are regularly reviewed to evaluate the level of the allowance for credit losses. In determining an appropriate allowance level, Northern Trust evaluates the allowance necessary for impaired loans and lending-related commitments and also estimates losses inherent in other lending-related credit exposures. The allowance for credit losses consists of the following components:

Specific Allowance. The specific allowance is determined through an individual evaluation of loans and lending-related commitments considered impaired 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 impaired loans where the amount of specific 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.

Inherent Allowance. The inherent allowance estimation methodology is based on internally developed loss data specific to the Northern Trust loan and lease portfolio. The estimation methodology and the related qualitative adjustment framework

segregate the loan and lease portfolio into homogeneous segments. For each segment, the probability of default and the loss given default are applied to the total exposure at default to determine a quantitative inherent allowance. The quantitative inherent allowance is then reviewed within the qualitative adjustment framework, where management applies judgment by assessing internal risk factors, potential limitations in the quantitative methodology and environmental factors that are not fully contemplated in the quantitative methodology to compute an adjustment to the quantitative inherent allowance for each segment of the loan portfolio.

The results of the inherent allowance estimation methodology are reviewed quarterly by Northern Trust's Loan Loss Reserve Committee, which includes representatives from Credit Risk Management, reporting segment management, and Corporate Finance.

Loans, leases, and other extensions of credit deemed uncollectible are charged to the allowance for credit losses. Subsequent recoveries, if any, are credited to the allowance. Northern Trust's policies relative to the charging-off of uncollectible loans and leases are consistent across both loan and lease segments. Determinations as to whether loan balances for which the collectability is in question are charged-off or a specific reserve is established are based on management's assessment as to the level of certainty regarding the amount of loss. The provision for credit losses, which is charged to income, is the amount necessary to adjust the allowance for credit losses to the level determined to be appropriate through the above processes. Actual losses may vary from current estimates and the amount of the provision for credit losses may be either greater or less than actual net charge-offs.

Northern Trust analyzes its exposure to credit losses from both on-balance-sheet and off-balance-sheet activity using a consistent methodology.

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 a credit conversion factor. The proportionate amount of the quantitative methodology calculation after any required adjustment in the qualitative framework results in the required allowance for undrawn loan commitments and standby letters of credit as of the reporting date.

The portion of the allowance assigned to loans and leases is reported as a contra asset, directly following loans and leases in the consolidated balance sheets. The portion of the allowance assigned to undrawn loan commitments and standby letters of credit is reported in Other Liabilities in the consolidated balance sheets.

J. Standby Letters of Credit. Fees on standby letters of credit are recognized in other operating 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. Leased properties meeting certain criteria are capitalized and amortized using the straight-line method over the lease period.

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 that may be required to the carrying value of these assets and gains or losses realized from asset sales are recorded within other operating expense.

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 licenses that are not hosted by Northern Trust 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 in 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.

Q. Cash Flow Statements. Cash and cash equivalents have been defined as “Cash and Due from Banks”.

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. Funded pension and postretirement benefits are reported in Other Assets and unfunded pension and postretirement benefits are reported in Other Liabilities. Plan assets and benefit obligations are measured annually at December 31. 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. Pension costs are recognized ratably over the estimated working lifetime of eligible participants.

S. Share-Based Compensation Plans. Northern Trust recognizes as compensation expense the grant-date fair value of stock and stock unit awards and other share-based compensation granted to employees within 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. The fair value of stock options is estimated on the date of grant using the Black-Scholes option pricing model. The model utilizes weighted-average assumptions regarding the period of time that options granted are expected to be outstanding (expected term) based primarily on the historical exercise behavior attributable to previous option grants, the estimated yield from dividends paid on the Corporation’s stock over the expected term of the options, the historical volatility of Northern Trust’s stock price and the implied volatility of traded options on Northern Trust stock, and a risk free interest rate based on the U.S. Treasury yield curve at the time of grant for a period equal to the expected term of the options granted.

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 paid on a current basis for restricted stock units granted prior to February 21, 2017 that are not yet vested. Dividend equivalents are accrued for performance stock unit awards, most restricted stock units granted on or after February 21, 2017 and director awards not yet vested, and are paid upon vesting. Certain restricted stock units granted on or after February 20, 2018 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.

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 has issued certain restricted stock unit awards, which are unvested share-based payment awards that contain nonforfeitable rights to dividends or dividend equivalents. These units are considered participating securities. Accordingly, 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, 2019, Northern Trust adopted ASU No. 2016-02, “Leases (Topic 842)” (ASU 2016-02). ASU 2016-02 introduces a lessee model that brings most leases on the balance sheet, with certain specified scope exceptions. Specifically within the lessee model under ASU 2016-02, a lessee is required to recognize on the balance sheet a liability to make future lease payments, known as the lease liability, and a right-of-use asset (ROU asset) representing its right to use the underlying asset over the lease term. Upon adoption, Northern Trust elected the package of practical expedients available under ASU 2016-02, which allowed Northern Trust to forego a reassessment of (1) whether any expired or existing contracts are or contain leases, (2) lease classification for any expired or existing leases, and (3) the initial direct costs for any existing leases. As a result of adopting ASU 2016-02, Northern Trust recognized operating lease liabilities and ROU assets of approximately \$530 million and \$480 million, respectively. Northern Trust did not restate comparative periods for the effects of applying ASU 2016-02. There was no significant impact to Northern Trust’s consolidated results of operations. Please refer to Note 10, “Lease Commitments” for further information.

On January 1, 2019, Northern Trust adopted ASU No. 2017-08, “Receivables-Nonrefundable Fees and Other Costs (Subtopic 310-20): Premium Amortization on Purchased Callable Securities” (ASU 2017-08). ASU 2017-08 amends the amortization period for certain callable debt securities held at a premium and shortens the amortization period for the premium to the earliest call date. Upon adoption of ASU 2017-08, there was no significant impact to Northern Trust’s consolidated financial condition or results of operations.

On January 1, 2019, Northern Trust adopted ASU No. 2018-16, “Derivatives and Hedging (Topic 815): Inclusion of the Secured Overnight Financing Rate (SOFR) Overnight Index Swap (OIS) Rate as a Benchmark Interest Rate for Hedge Accounting Purposes” (ASU 2018-16). ASU 2018-16 permits use of the OIS rate based on SOFR as a U.S. benchmark interest rate for hedge accounting purposes under Topic 815. Upon adoption of ASU 2018-16, there was no significant impact to Northern Trust’s consolidated financial condition or results of operations.

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 between fair value levels occurred during the years ended December 31, 2019, or 2018.

Level 1 – Quoted, active market prices for identical assets or liabilities. Northern Trust’s Level 1 assets are comprised of available for sale 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 available for sale and 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, 2019, Northern Trust’s available for sale debt securities portfolio included 1,704 Level 2 securities with an aggregate market value of \$34.3 billion. All 1,704 debt securities were valued by external pricing vendors. As of December 31, 2018, Northern Trust’s available for sale debt securities portfolio included 1,479 Level 2 debt securities with an aggregate market value of \$31.7 billion. All 1,479 debt securities were valued by external pricing vendors. Trading

account debt securities, which totaled \$0.3 million as of December 31, 2019 and 2018, were all valued using 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 swap also requires 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 swap 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 26, "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, C&IS 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, 2019 and 2018, 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 60: LEVEL 3 SIGNIFICANT UNOBSERVABLE INPUTS

DECEMBER 31, 2019				
FINANCIAL INSTRUMENT	FAIR VALUE	VALUATION TECHNIQUE	UNOBSERVABLE INPUT	INPUT VALUE
Swaps Related to Sale of Certain Visa Class B Common Shares	\$ 33.4 million	Discounted Cash Flow	Conversion Rate	1.62x
			Visa Class A Appreciation	8.54%
			Expected Duration	RANGE OF INPUTS 1.0 – 3.0 years
DECEMBER 31, 2018				
FINANCIAL INSTRUMENT	FAIR VALUE	VALUATION TECHNIQUE	UNOBSERVABLE INPUT	RANGE OF INPUTS
Swaps Related to Sale of Certain Visa Class B Common Shares	\$ 32.8 million	Discounted Cash Flow	Conversion Rate	1.62x – 1.64x
			Visa Class A Appreciation	7.0% – 11.0%
			Expected Duration	1.5 – 4.0 years

The following presents assets and liabilities measured at fair value on a recurring basis as of December 31, 2019 and 2018, segregated by fair value hierarchy level.

TABLE 61: RECURRING BASIS HIERARCHY LEVELING

(In Millions)	DECEMBER 31, 2019				ASSETS/ LIABILITIES AT FAIR VALUE
	LEVEL 1	LEVEL 2	LEVEL 3	NETTING	
Debt Securities					
Available for Sale					
U.S. Government	\$ 4,549.1	\$ —	\$ —	\$ —	4,549.1
Obligations of States and Political Subdivisions	—	1,615.3	—	—	1,615.3
Government Sponsored Agency	—	23,271.2	—	—	23,271.2
Non-U.S. Government	—	3.3	—	—	3.3
Corporate Debt	—	2,402.7	—	—	2,402.7
Covered Bonds	—	769.9	—	—	769.9
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	—	2,127.6	—	—	2,127.6
Other Asset-Backed	—	3,330.5	—	—	3,330.5
Commercial Mortgage-Backed	—	797.7	—	—	797.7
Other	—	9.0	—	—	9.0
Total Available for Sale	4,549.1	34,327.2	—	—	38,876.3
Trading Account	—	0.3	—	—	0.3
Total Available for Sale and Trading Debt Securities	4,549.1	34,327.5	—	—	38,876.6
Other Assets					
Derivative Assets					
Foreign Exchange Contracts	—	3,234.8	—	(2,334.1)	900.7
Interest Rate Contracts	—	152.9	—	(3.9)	149.0
Total Derivative Assets	—	3,387.7	—	(2,338.0)	1,049.7
Other Liabilities					
Derivative Liabilities					
Foreign Exchange Contracts	—	3,182.2	—	(1,548.6)	1,633.6
Interest Rate Contracts	—	97.4	—	(57.3)	40.1
Other Financial Derivatives ⁽¹⁾	—	—	33.4	(12.5)	20.9
Total Derivative Liabilities	\$ —	\$ 3,279.6	\$ 33.4	\$ (1,618.4)	\$ 1,694.6

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, 2019, derivative assets and liabilities shown above also include reductions of \$1,136.8 million and \$417.2 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.

DECEMBER 31, 2018

(In Millions)	LEVEL 1	LEVEL 2	LEVEL 3	NETTING	ASSETS/ LIABILITIES AT FAIR VALUE
Debt Securities					
Available for Sale					
U.S. Government	\$ 5,185.3	\$ —	\$ —	\$ —	5,185.3
Obligations of States and Political Subdivisions	—	655.9	—	—	655.9
Government Sponsored Agency	—	22,424.6	—	—	22,424.6
Non-U.S. Government	—	142.2	—	—	142.2
Corporate Debt	—	2,294.7	—	—	2,294.7
Covered Bonds	—	829.3	—	—	829.3
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	—	2,096.2	—	—	2,096.2
Other Asset-Backed	—	2,657.7	—	—	2,657.7
Commercial Mortgage Backed	—	587.2	—	—	587.2
Other	—	15.7	—	—	15.7
Total Available for Sale	5,185.3	31,703.5	—	—	36,888.8
Trading Account	—	0.3	—	—	0.3
Total Available for Sale and Trading Debt Securities	5,185.3	31,703.8	—	—	36,889.1
Other Assets					
Derivative Assets					
Foreign Exchange Contracts	—	2,466.1	—	(1,308.8)	1,157.3
Interest Rate Contracts	—	96.1	—	(47.0)	49.1
Other Financial Derivative ⁽¹⁾	—	1.3	—	(1.3)	—
Total Derivatives Assets	—	2,563.5	—	(1,357.1)	1,206.4
Other Liabilities					
Derivative Liabilities					
Foreign Exchange Contracts	—	2,262.5	—	(1,751.7)	510.8
Interest Rate Contracts	—	93.1	—	(43.4)	49.7
Other Financial Derivative ⁽²⁾	—	—	32.8	(1.2)	31.6
Total Derivative Liabilities	\$ —	\$ 2,355.6	\$ 32.8	\$ (1,796.3)	\$ 592.1

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, 2018, derivative assets and liabilities shown above also include reductions of \$134.5 million and \$573.7 million, respectively, as a result of cash collateral received from and deposited with derivative counterparties.

(1) This line consists of a total return swap contract.

(2) 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, 2019 and 2018.

TABLE 62: CHANGES IN LEVEL 3 LIABILITIES

LEVEL 3 LIABILITIES (In Millions)	SWAPS RELATED TO SALE OF CERTAIN VISA CLASS B COMMON SHARES	
	2019	2018
Fair Value at January 1	\$ 32.8	\$ 29.7
Total (Gains) Losses:		
Included in Earnings ⁽¹⁾	17.1	19.8
Purchases, Issues, Sales, and Settlements		
Settlements	(16.5)	(16.7)
Fair Value at December 31	\$ 33.4	\$ 32.8
Unrealized (Gains) Losses Included in Earnings Related to Financial Instruments Held at December 31 ⁽¹⁾	\$ 12.3	\$ 13.3

(1) Gains (losses) are recorded in other operating income within the consolidated statements of income.

For the years ended December 31, 2019 and 2018, there were no liabilities transferred into or out of Level 3.

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, 2019 and 2018, all of which were categorized as Level 3 under the fair value hierarchy, were comprised of impaired 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, and were subject to adjustments to reflect management's judgment as to realizable value. 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.

Collateral-based impaired loans that have been adjusted to fair value totaled \$8.0 million at December 31, 2019. Collateral-based impaired loans and OREO assets that have been adjusted to fair value totaled \$24.9 million and \$0.4 million, respectively, at December 31, 2018. Assets measured at fair value on a nonrecurring basis reflect management's judgment as to realizable value.

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, 2019 and 2018, 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 63: LEVEL 3 NONRECURRING BASIS SIGNIFICANT UNOBSERVABLE INPUTS

DECEMBER 31, 2019				
FINANCIAL INSTRUMENT	FAIR VALUE	VALUATION TECHNIQUE	UNOBSERVABLE INPUT	RANGE OF DISCOUNTS APPLIED
Loans	\$8.0 million	Market Approach	Discount to reflect realizable value	15.0% – 30.0%

DECEMBER 31, 2018				
FINANCIAL INSTRUMENT	FAIR VALUE	VALUATION TECHNIQUE	UNOBSERVABLE INPUT	RANGE OF DISCOUNTS APPLIED
Loans	\$24.9 million	Market Approach	Discount to reflect realizable value	15.0% – 30.0%
OREO	\$0.4 million	Market Approach	Discount to reflect realizable value	15.0% – 30.0%

The following tables summarize the fair values of all financial instruments.

TABLE 64: FAIR VALUE OF FINANCIAL INSTRUMENTS

(In Millions)	DECEMBER 31, 2019				
	BOOK VALUE	TOTAL FAIR VALUE	LEVEL 1	LEVEL 2	LEVEL 3
ASSETS					
Cash and Due from Banks	\$ 4,459.2	\$ 4,459.2	\$ 4,459.2	\$ —	\$ —
Federal Reserve and Other Central Bank Deposits	33,886.0	33,886.0	—	33,886.0	—
Interest-Bearing Deposits with Banks	4,877.1	4,877.1	—	4,877.1	—
Federal Funds Sold and Securities Purchased under Agreements to Resell	712.8	712.8	—	712.8	—
Debt Securities					
Available for Sale ⁽¹⁾	38,876.3	38,876.3	4,549.1	34,327.2	—
Held to Maturity	12,284.5	12,249.3	138.8	12,110.5	—
Trading Account	0.3	0.3	—	0.3	—
Loans (excluding Leases)					
Held for Investment	31,239.5	31,517.8	—	—	31,517.8
Client Security Settlement Receivables	845.7	845.7	—	845.7	—
Other Assets					
Federal Reserve and Federal Home Loan Bank Stock	301.2	301.2	—	301.2	—
Community Development Investments	749.3	749.3	—	749.3	—
Employee Benefit and Deferred Compensation	199.5	207.6	131.0	76.6	—
LIABILITIES					
Deposits					
Demand, Noninterest-Bearing, Savings, Money Market and Other Interest-Bearing	\$ 47,733.6	\$ 47,733.6	\$ 47,733.6	\$ —	\$ —
Savings Certificates and Other Time	986.7	994.2	—	994.2	—
Non U.S. Offices Interest-Bearing	60,400.3	60,400.3	—	60,400.3	—
Federal Funds Purchased	552.9	552.9	—	552.9	—
Securities Sold Under Agreements to Repurchase	489.7	489.7	—	489.7	—
Other Borrowings	6,744.8	6,745.9	—	6,745.9	—
Senior Notes	2,573.0	2,593.0	—	2,593.0	—
Long-Term Debt					
Subordinated Debt	1,148.1	1,169.5	—	1,169.5	—
Floating Rate Capital Debt	277.7	262.1	—	262.1	—
Other Liabilities					
Standby Letters of Credit	25.5	25.5	—	—	25.5
Loan Commitments	32.3	32.3	—	—	32.3
DERIVATIVE INSTRUMENTS					
Asset/Liability Management					
Foreign Exchange Contracts					
Assets	\$ 83.1	\$ 83.1	\$ —	\$ 83.1	\$ —
Liabilities	24.1	24.1	—	24.1	—
Interest Rate Contracts					
Assets	20.5	20.5	—	20.5	—
Liabilities	21.1	21.1	—	21.1	—
Other Financial Derivatives					
Liabilities ⁽²⁾	33.4	33.4	—	—	33.4
Client-Related and Trading					
Foreign Exchange Contracts					
Assets	3,151.7	3,151.7	—	3,151.7	—
Liabilities	3,158.1	3,158.1	—	3,158.1	—
Interest Rate Contracts					
Assets	132.4	132.4	—	132.4	—
Liabilities	76.3	76.3	—	76.3	—

(1) Refer to the table located on page 107 for the disaggregation of available for sale debt securities.

(2) This line consists of swaps related to the sale of certain Visa Class B common shares.

DECEMBER 31, 2018

FAIR VALUE

(In Millions)	BOOK VALUE	TOTAL FAIR VALUE	LEVEL 1	LEVEL 2	LEVEL 3
ASSETS					
Cash and Due from Banks	\$ 4,581.6	\$ 4,581.6	\$ 4,581.6	\$ —	\$ —
Federal Reserve and Other Central Bank Deposits	30,080.2	30,080.2	—	30,080.2	—
Interest-Bearing Deposits with Banks	4,264.2	4,264.2	—	4,264.2	—
Federal Funds Sold and Securities Purchased under Agreements to Resell	1,165.2	1,165.2	—	1,165.2	—
Debt Securities					
Available for Sale ⁽¹⁾	36,888.8	36,888.8	5,185.3	31,703.5	—
Held to Maturity	14,354.0	14,267.0	101.6	14,165.4	—
Trading Account	0.3	0.3	—	0.3	—
Loans (excluding Leases)					
Held for Investment	32,287.0	32,339.2	—	—	32,339.2
Client Security Settlement Receivables	1,646.1	1,646.1	—	1,646.1	—
Other Assets					
Federal Reserve and Federal Home Loan Bank Stock	300.3	300.3	—	300.3	—
Community Development Investments	606.6	606.6	—	606.6	—
Employee Benefit and Deferred Compensation	202.3	194.5	125.0	69.5	—
LIABILITIES					
Deposits					
Demand, Noninterest-Bearing, Savings, Money Market and Other Interest-Bearing	\$ 37,340.1	\$ 37,340.1	\$ 37,340.1	\$ —	\$ —
Savings Certificates and Other Time	688.7	691.8	—	691.8	—
Non U.S. Offices Interest-Bearing	66,468.0	66,468.0	—	66,468.0	—
Federal Funds Purchased	2,594.2	2,594.2	—	2,594.2	—
Securities Sold Under Agreements to Repurchase	168.3	168.3	—	168.3	—
Other Borrowings	7,901.7	7,904.1	—	7,904.1	—
Senior Notes	2,011.3	1,994.4	—	1,994.4	—
Long-Term Debt					
Subordinated Debt	1,112.4	1,089.7	—	1,089.7	—
Floating Rate Capital Debt	277.6	253.5	—	253.5	—
Other Liabilities					
Standby Letters of Credit	30.8	30.8	—	—	30.8
Loan Commitments	34.3	34.3	—	—	34.3
DERIVATIVE INSTRUMENTS					
Asset/Liability Management					
Foreign Exchange Contracts					
Assets	\$ 306.7	\$ 306.7	\$ —	\$ 306.7	\$ —
Liabilities	72.5	72.5	—	72.5	—
Interest Rate Contracts					
Assets	30.0	30.0	—	30.0	—
Liabilities	24.5	24.5	—	24.5	—
Other Financial Derivatives					
Assets ⁽²⁾	1.3	1.3	—	1.3	—
Liabilities ⁽³⁾	32.8	32.8	—	—	32.8
Client-Related and Trading					
Foreign Exchange Contracts					
Assets	2,159.4	2,159.4	—	2,159.4	—
Liabilities	2,190.0	2,190.0	—	2,190.0	—
Interest Rate Contracts					
Assets	66.1	66.1	—	66.1	—
Liabilities	68.6	68.6	—	68.6	—

(1) Refer to the table located on page 108 for the disaggregation of available for sale debt securities.

(2) This line consists of a total return swap contract.

(3) This line consists of swaps related to the sale of certain Visa Class B common shares.

Note 4 – Securities

Debt Securities Available for Sale. The following tables provide the amortized cost, fair values, and remaining maturities of debt securities available for sale.

TABLE 65: RECONCILIATION OF AMORTIZED COST TO FAIR VALUE OF DEBT SECURITIES AVAILABLE FOR SALE

(In Millions)	DECEMBER 31, 2019			
	AMORTIZED COST	GROSS UNREALIZED GAINS	GROSS UNREALIZED LOSSES	FAIR VALUE
U.S. Government	\$ 4,527.5	\$ 26.7	\$ 5.1	\$ 4,549.1
Obligations of States and Political Subdivisions	1,604.0	24.6	13.3	1,615.3
Government Sponsored Agency	23,247.5	101.8	78.1	23,271.2
Non-U.S. Government	3.3	—	—	3.3
Corporate Debt	2,378.9	27.8	4.0	2,402.7
Covered Bonds	766.3	4.4	0.8	769.9
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	2,091.3	37.4	1.1	2,127.6
Other Asset-Backed	3,324.5	11.3	5.3	3,330.5
Commercial Mortgage-Backed	769.9	28.7	0.9	797.7
Other	9.0	—	—	9.0
Total	\$ 38,722.2	\$ 262.7	\$ 108.6	\$ 38,876.3

(In Millions)	DECEMBER 31, 2018			
	AMORTIZED COST	GROSS UNREALIZED GAINS	GROSS UNREALIZED LOSSES	FAIR VALUE
U.S. Government	\$ 5,203.1	\$ 21.8	\$ 39.6	\$ 5,185.3
Obligations of States and Political Subdivisions	657.6	2.0	3.7	655.9
Government Sponsored Agency	22,522.7	52.4	150.5	22,424.6
Non-U.S. Government	143.3	—	1.1	142.2
Corporate Debt	2,312.6	3.2	21.1	2,294.7
Covered Bonds	832.7	1.4	4.8	829.3
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	2,087.8	11.9	3.5	2,096.2
Other Asset-Backed	2,678.9	1.7	22.9	2,657.7
Commercial Mortgage-Backed	587.4	4.0	4.2	587.2
Other	15.7	—	—	15.7
Total	\$ 37,041.8	\$ 98.4	\$ 251.4	\$ 36,888.8

TABLE 66: REMAINING MATURITY OF DEBT SECURITIES AVAILABLE FOR SALE

DECEMBER 31, 2019 (In Millions)	ONE YEAR OR LESS		ONE TO FIVE YEARS		FIVE TO TEN YEARS		OVER TEN YEARS		TOTAL	
	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value
U.S. Government	\$ 1,899.0	\$ 1,898.4	\$ 2,075.9	\$ 2,098.3	\$ 552.6	\$ 552.4	\$ —	\$ —	\$ 4,527.5	\$ 4,549.1
Obligations of States and Political Subdivisions	80.0	80.1	83.0	85.4	1,441.0	1,449.8	—	—	1,604.0	1,615.3
Government Sponsored Agency	4,994.1	5,005.0	9,714.1	9,728.8	5,870.0	5,869.4	2,669.3	2,668.0	23,247.5	23,271.2
Non-U.S. Government	—	—	3.3	3.3	—	—	—	—	3.3	3.3
Corporate Debt	341.8	341.7	1,981.5	2,005.5	55.6	55.5	—	—	2,378.9	2,402.7
Covered Bonds	281.0	281.6	485.3	488.3	—	—	—	—	766.3	769.9
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	333.9	334.6	1,707.4	1,743.1	50.0	49.9	—	—	2,091.3	2,127.6
Other Asset-Backed	885.1	885.3	1,977.3	1,984.8	452.8	451.1	9.3	9.3	3,324.5	3,330.5
Commercial Mortgage-Backed	46.6	46.4	167.9	174.2	555.4	577.1	—	—	769.9	797.7
Other	9.0	9.0	—	—	—	—	—	—	9.0	9.0
Total	\$ 8,870.5	\$ 8,882.1	\$ 18,195.7	\$ 18,311.7	\$ 8,977.4	\$ 9,005.2	\$ 2,678.6	\$ 2,677.3	\$ 38,722.2	\$ 38,876.3

Note: Mortgage-backed and asset-backed securities are included in the above table taking into account anticipated future prepayments.

Debt Securities Held to Maturity. The following tables provide the amortized cost, fair values and remaining maturities of debt securities held to maturity.

TABLE 67: RECONCILIATION OF AMORTIZED COST TO FAIR VALUES OF DEBT SECURITIES HELD TO MATURITY

(In Millions)	DECEMBER 31, 2019			
	AMORTIZED COST	GROSS UNREALIZED GAINS	GROSS UNREALIZED LOSSES	FAIR VALUE
U.S. Government	\$ 138.8	\$ —	\$ —	\$ 138.8
Obligations of States and Political Subdivisions	10.1	0.2	—	10.3
Government Sponsored Agency	4.1	0.2	—	4.3
Non-U.S. Government	4,076.0	5.3	2.5	4,078.8
Corporate Debt	405.1	1.4	0.3	406.2
Covered Bonds	3,006.7	16.1	2.4	3,020.4
Certificates of Deposit	262.9	—	—	262.9
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	3,285.4	21.7	2.1	3,305.0
Other Asset-Backed	804.3	0.7	0.3	804.7
Other	291.1	0.1	73.3	217.9
Total	\$ 12,284.5	\$ 45.7	\$ 80.9	\$ 12,249.3

(In Millions)	DECEMBER 31, 2018			
	AMORTIZED COST	GROSS UNREALIZED GAINS	GROSS UNREALIZED LOSSES	FAIR VALUE
U.S. Government	\$ 101.6	\$ —	\$ —	\$ 101.6
Obligations of States and Political Subdivisions	18.9	0.6	—	19.5
Government Sponsored Agency	4.5	0.2	—	4.7
Non-U.S. Government	6,488.2	2.1	8.7	6,481.6
Corporate Debt	472.9	0.4	1.8	471.5
Covered Bonds	2,877.6	9.6	9.3	2,877.9
Certificates of Deposit	45.1	—	—	45.1
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	2,966.8	5.8	12.3	2,960.3
Other Asset-Backed	1,146.4	—	4.0	1,142.4
Other	232.0	—	69.6	162.4
Total	\$ 14,354.0	\$ 18.7	\$ 105.7	\$ 14,267.0

TABLE 68: REMAINING MATURITY OF DEBT SECURITIES HELD TO MATURITY

December 31, 2019 (In Millions)	ONE YEAR OR LESS		ONE TO FIVE YEARS		FIVE TO TEN YEARS		OVER TEN YEARS		TOTAL	
	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value
U.S. Government	\$ 138.8	\$ 138.8	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ 138.8	\$ 138.8
Obligations of States and Political Subdivisions	8.1	8.2	2.0	2.1	—	—	—	—	10.1	10.3
Government Sponsored Agency	0.6	0.6	1.7	1.8	1.2	1.2	0.6	0.7	4.1	4.3
Non-U.S. Government	2,757.9	2,757.8	1,318.1	1,321.0	—	—	—	—	4,076.0	4,078.8
Corporate Debt	45.9	46.2	359.2	360.0	—	—	—	—	405.1	406.2
Covered Bonds	599.8	601.6	2,406.9	2,418.8	—	—	—	—	3,006.7	3,020.4
Certificates of Deposit	262.9	262.9	—	—	—	—	—	—	262.9	262.9
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	577.8	577.8	2,691.5	2,711.4	16.1	15.8	—	—	3,285.4	3,305.0
Other Asset-Backed	151.9	152.0	398.3	398.7	254.1	254.0	—	—	804.3	804.7
Other	10.6	10.5	132.0	119.3	45.9	39.7	102.6	48.4	291.1	217.9
Total	\$ 4,554.3	\$ 4,556.4	\$ 7,309.7	\$ 7,333.1	\$ 317.3	\$ 310.7	\$ 103.2	\$ 49.1	\$12,284.5	\$12,249.3

Note: Mortgage-backed and asset-backed securities are included in the above table taking into account anticipated future prepayments.

Debt securities held to maturity consist of securities that management intends to, and Northern Trust has the ability to, hold until maturity. During the twelve months ended December 31, 2019 and 2018, approximately \$160.8 million and \$287.9 million respectively of securities reflected in Other Asset-Backed, Covered Bonds, Sub-Sovereign, Supranational and Non-U.S. Agency Bonds, and Corporate Debt were transferred from available for sale to held to maturity.

Investment Security Gains and Losses. Proceeds of \$1.2 billion, \$307.3 million, and \$2.2 billion in 2019, 2018, and 2017, respectively, from the sale of debt securities resulted in the following gains and losses shown below.

TABLE 69: INVESTMENT SECURITY GAINS AND LOSSES

(In Millions)	DECEMBER 31,		
	2019	2018	2017
Gross Realized Debt Securities Gains	\$ 2.4	\$ 1.5	\$ 0.2
Gross Realized Debt Securities Losses	(3.5)	(2.0)	(1.6)
Changes in Other-Than-Temporary Impairment Losses ⁽¹⁾	(0.3)	(0.5)	(0.2)
Net Investment Security (Losses)/Gains	\$ (1.4)	\$ (1.0)	\$ (1.6)

(1) Other-than-temporary Impairment Losses relate to certain Community Reinvestment Act (CRA) eligible held to maturity debt securities

Debt Securities with Unrealized Losses. The following table provides information regarding debt securities that had been in a continuous unrealized loss position for less than 12 months and for 12 months or longer as of December 31, 2019 and 2018.

TABLE 70: DEBT SECURITIES WITH UNREALIZED LOSSES

AS OF DECEMBER 31, 2019 (In Millions)	LESS THAN 12 MONTHS		12 MONTHS OR LONGER		TOTAL	
	FAIR VALUE	UNREALIZED LOSSES	FAIR VALUE	UNREALIZED LOSSES	FAIR VALUE	UNREALIZED LOSSES
U.S. Government	\$ 252.2	\$ 2.7	\$ 899.8	\$ 2.4	\$ 1,152.0	\$ 5.1
Obligations of States and Political Subdivisions	902.5	13.3	—	—	902.5	13.3
Government Sponsored Agency	5,405.0	35.6	7,818.4	42.5	13,223.4	78.1
Non-U.S. Government	3,620.2	2.5	—	—	3,620.2	2.5
Corporate Debt	410.4	1.3	492.8	3.0	903.2	4.3
Covered Bonds	646.8	3.2	—	—	646.8	3.2
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	1,302.0	3.1	155.2	0.1	1,457.2	3.2
Other Asset-Backed	706.9	2.1	1,164.9	3.5	1,871.8	5.6
Commercial Mortgage-Backed	62.8	0.7	59.3	0.2	122.1	0.9
Other	54.1	26.7	164.0	46.6	218.1	73.3
Total	\$ 13,362.9	\$ 91.2	\$ 10,754.4	\$ 98.3	\$ 24,117.3	\$ 189.5

AS OF DECEMBER 31, 2018 (In Millions)	LESS THAN 12 MONTHS		12 MONTHS OR LONGER		TOTAL	
	FAIR VALUE	UNREALIZED LOSSES	FAIR VALUE	UNREALIZED LOSSES	FAIR VALUE	UNREALIZED LOSSES
U.S. Government	\$ —	\$ —	\$ 2,862.0	\$ 39.6	\$ 2,862.0	\$ 39.6
Obligations of States and Political Subdivisions	169.6	2.4	279.6	1.3	449.2	3.7
Government Sponsored Agency	8,368.8	33.5	6,822.4	117.0	15,191.2	150.5
Non-U.S. Government	5,065.2	0.8	1,274.0	9.0	6,339.2	9.8
Corporate Debt	712.7	4.1	1,097.4	18.8	1,810.1	22.9
Covered Bonds	646.4	3.7	696.9	10.4	1,343.3	14.1
Sub-Sovereign, Supranational and Non-U.S. Agency Bonds	1,105.0	4.6	1,189.2	11.2	2,294.2	15.8
Other Asset-Backed	2,507.8	15.9	954.9	11.0	3,462.7	26.9
Commercial Mortgage-Backed	22.8	0.1	274.4	4.1	297.2	4.2
Other	50.5	18.8	112.6	50.8	163.1	69.6
Total	\$ 18,648.8	\$ 83.9	\$ 15,563.4	\$ 273.2	\$ 34,212.2	\$ 357.1

As of December 31, 2019, 1,289 debt securities with a combined fair value of \$24.1 billion were in an unrealized loss position, with their unrealized losses totaling \$189.5 million. Unrealized losses of \$78.1 million and \$13.3 million related to government sponsored agency and obligations of states and political subdivisions, respectively, are primarily attributable to changes in market rates since their purchase.

The majority of the \$73.3 million of unrealized losses in debt securities classified as “other” at December 31, 2019 related to debt securities primarily purchased at a premium or par by Northern Trust to fulfill its obligations under the CRA. Unrealized losses on these CRA-related securities are attributable to yields that are below market rates for the purpose of supporting institutions and programs that benefit low- to moderate-income communities within Northern Trust’s market area. The remaining unrealized losses on Northern Trust’s securities portfolio as of December 31, 2019 were attributable to changes in overall market interest rates, increased credit spreads, or reduced market liquidity. As of December 31, 2019, Northern Trust did not intend to sell any investment in an unrealized loss position and it was more likely than not that Northern Trust would not be required to sell any such investment before the recovery of its amortized cost basis, which may be maturity.

Security impairment reviews are conducted quarterly to identify and evaluate securities that have indications of possible OTTI. A determination as to whether a security’s decline in market value is other-than-temporary 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 other-than-temporary include, but are not limited to, the length of time the security has been impaired; 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 it 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 OTTI has occurred.

While all securities are considered, the process for identifying credit impairment within CRA-eligible mortgage-backed securities, a security type for which Northern Trust has recognized OTTI in 2019 and 2018, incorporates an expected loss approach using discounted cash flows on the underlying collateral pools. To evaluate whether an unrealized loss on a CRA-eligible mortgage-backed security is other-than-temporary, a calculation of the security's present value is made using current pool data, the current delinquency pipeline, default rates and loan loss severities based on the historical performance of the mortgage pools, and Northern Trust's outlook for the housing market and the overall economy. If the present value of the collateral pools were found to be less than the current amortized cost of the security, a credit-related OTTI loss would be recorded in earnings equal to the difference between the two amounts.

Impairments of CRA-eligible mortgage-backed securities are influenced by a number of factors, including but not limited to, U.S. economic and housing market performance, pool credit enhancement level, year of origination, and estimated credit quality of the collateral. The factors used in estimating losses related to CRA-eligible mortgage-backed securities vary by year of loan origination and collateral quality.

There were \$0.3 million and \$0.5 million of OTTI losses recognized in 2019 and 2018, respectively. There were \$0.2 million OTTI losses recognized during the year ended December 31, 2017.

Credit Losses on Debt Securities. The table below provides information regarding total other-than-temporarily impaired debt securities, including noncredit-related amounts recognized in other comprehensive income and net impairment losses recognized in earnings, for the years ended December 31, 2019, 2018, and 2017.

TABLE 71: NET IMPAIRMENT LOSSES RECOGNIZED IN EARNINGS

(In Millions)	DECEMBER 31,		
	2019	2018	2017
Changes in Other-Than-Temporary Impairment Losses ⁽¹⁾	\$ (0.3)	\$ (0.5)	(0.2)
Noncredit-related Losses Recorded in / (Reclassified from) OCI ⁽²⁾	—	—	—
Net Impairment Losses Recognized in Earnings	\$ (0.3)	\$ (0.5)	(0.2)

(1) For initial other-than-temporary impairments in the respective period, the balance includes the excess of the amortized cost over the fair value of the impaired securities. For subsequent impairments of the same security, the balance includes any additional changes in fair value of the security subsequent to its most recently recorded OTTI.

(2) For initial other-than-temporary impairments in the respective period, the balance includes the portion of the excess of amortized cost over the fair value of the impaired securities that was recorded in OCI. For subsequent impairments of the same security, the balance includes additional changes in OCI for that security subsequent to its most recently recorded OTTI.

Provided in the table below are the cumulative credit-related losses recognized in earnings on debt securities other-than-temporarily impaired.

TABLE 72: CUMULATIVE CREDIT-RELATED LOSSES ON DEBT SECURITIES HELD

(In Millions)	YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Cumulative Credit-Related Losses on Debt Securities Held – Beginning of Year	\$ 4.1	\$ 3.6	\$ 3.4
Plus: Losses on Newly Identified Impairments	0.2	0.4	0.1
Additional Losses on Previously Identified Impairments	0.1	0.1	0.1
Less: Current and Prior Period Losses on Debt Securities Sold or Matured During the Year	—	—	—
Cumulative Credit-Related Losses on Debt Securities Held – End of Year	\$ 4.4	\$ 4.1	\$ 3.6

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 held by the counterparty until the repurchase.

The following tables summarize information related to securities purchased under agreements to resell and securities sold under agreements to repurchase.

TABLE 73: SECURITIES PURCHASED UNDER AGREEMENTS TO RESELL

(\$ In Millions)	2019	2018
Balance at December 31	\$ 707.8	\$ 1,031.2
Average Balance During the Year	835.0	1,478.3
Average Interest Rate Earned During the Year	2.10%	2.22%
Maximum Month-End Balance During the Year	\$ 1,290.0	\$ 1,942.0

TABLE 74: SECURITIES SOLD UNDER AGREEMENTS TO REPURCHASE

(\$ In Millions)	2019	2018
Balance at December 31	\$ 489.7	\$ 168.3
Average Balance During the Year	339.0	525.2
Average Interest Rate Paid During the Year	1.89%	1.48%
Maximum Month-End Balance During the Year	\$ 489.7	\$ 981.3

TABLE 75: REPURCHASE AGREEMENTS ACCOUNTED FOR AS SECURED BORROWINGS

(\$ In Millions)	Remaining Contractual Maturity of the Agreements	
	Overnight and Continuous	
	December 31, 2019	December 31, 2018
Repurchase Agreements		
U.S. Treasury and Agency Securities	\$ 489.7	\$ 168.3
Total Borrowings	489.7	168.3
Gross Amount of Recognized Liabilities for Repurchase Agreements in Note 28	489.7	168.3
Amounts related to agreements not included in Note 28	—	—

Note 6 – Loans and Leases

Amounts outstanding for loans and leases, by segment and class, are shown below.

TABLE 76: LOANS AND LEASES

(In Millions)	DECEMBER 31,	
	2019	2018
Commercial		
Commercial and Institutional	\$ 8,915.6	\$ 8,728.1
Commercial Real Estate	3,378.0	3,228.8
Non-U.S.	1,751.0	2,701.6
Lease Financing, net	65.6	90.7
Other	164.0	426.0
Total Commercial	14,274.2	15,175.2
Personal		
Private Client	11,068.7	10,733.3
Residential Real Estate	5,999.6	6,514.0
Other	67.1	67.5
Total Personal	17,135.4	17,314.8
Total Loans and Leases	\$ 31,409.6	\$ 32,490.0
Allowance for Credit Losses Assigned to Loans and Leases	(104.5)	(112.6)
Net Loans and Leases	\$ 31,305.1	\$ 32,377.4

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, 2019 and 2018, equity credit lines totaled \$448.5 million and \$655.5 million, respectively, and equity credit lines for which first liens were held by Northern Trust represented 97% and 95%, respectively, of the total equity credit lines as of those dates.

Included within the non-U.S., commercial-other, and personal-other classes are short duration advances, primarily related to the processing of custodied client investments, totaling \$1.1 billion and \$2.2 billion at December 31, 2019 and 2018, respectively. Demand deposit overdrafts reclassified as loan balances totaled \$90.4 million and \$152.5 million at December 31, 2019 and 2018, respectively. As of December 31, 2019, there were no loans and \$53.6 million of leases classified as held for sale related to the decision to sell substantially all of the lease portfolio. As of December 31, 2018, there were no loans or leases classified as held for sale.

The components of the net investment in direct finance and leveraged leases are as follows:

TABLE 77: DIRECT FINANCE AND LEVERAGED LEASES

(In Millions)	DECEMBER 31,	
	2019	2018
Direct Finance Leases		
Lease Receivable	\$ 1.5	\$ 9.8
Residual Value	21.3	23.8
Initial Direct Costs	0.2	0.3
Unearned Income	—	—
Investment in Direct Finance Leases	23.0	33.9
Leveraged Leases		
Net Rental Receivable	19.1	33.9
Residual Value	33.1	33.3
Unearned Income	(9.6)	(10.4)
Investment in Leveraged Leases	42.6	56.8
Lease Financing, net	\$ 65.6	\$ 90.7

The following schedule reflects the future minimum lease payments to be received over the next five years under direct finance leases.

TABLE 78: FUTURE MINIMUM LEASE PAYMENTS

(In Millions)	FUTURE MINIMUM LEASE PAYMENTS	
2020	\$	3.7
2021		2.1
2022		—
2023		—
2024		—

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 at December 31, 2019 and 2018 are provided below, segregated by borrower ratings into "1 to 3", "4 to 5", and "6 to 9" (watch list), categories.

TABLE 79: BORROWER RATINGS

(In Millions)	DECEMBER 31, 2019				DECEMBER 31, 2018			
	1 TO 3 CATEGORY	4 TO 5 CATEGORY	6 TO 9 CATEGORY (WATCH LIST)	TOTAL	1 TO 3 CATEGORY	4 TO 5 CATEGORY	6 TO 9 CATEGORY (WATCH LIST)	TOTAL
Commercial								
Commercial and Institutional	\$ 5,890.8	\$ 2,912.9	\$ 111.9	\$ 8,915.6	\$ 5,477.4	\$ 3,159.8	\$ 90.9	\$ 8,728.1
Commercial Real Estate	1,126.8	2,237.3	13.9	3,378.0	1,209.6	1,992.2	27.0	3,228.8
Non-U.S.	717.0	883.2	150.8	1,751.0	1,625.3	1,075.3	1.0	2,701.6
Lease Financing, net	53.6	12.0	—	65.6	78.3	12.4	—	90.7
Other	69.5	94.5	—	164.0	203.3	222.7	—	426.0
Total Commercial	7,857.7	6,139.9	276.6	14,274.2	8,593.9	6,462.4	118.9	15,175.2
Personal								
Private Client	5,455.3	5,573.0	40.4	11,068.7	6,321.1	4,403.2	9.0	10,733.3
Residential Real Estate	2,638.1	3,185.4	176.1	5,999.6	2,745.0	3,502.3	266.7	6,514.0
Other	28.5	38.6	—	67.1	32.2	35.3	—	67.5
Total Personal	8,121.9	8,797.0	216.5	17,135.4	9,098.3	7,940.8	275.7	17,314.8
Total Loans and Leases	\$ 15,979.6	\$ 14,936.9	\$ 493.1	\$31,409.6	\$ 17,692.2	\$ 14,403.2	\$ 394.6	\$32,490.0

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 nonperforming credits, are expected to exhibit minimally acceptable 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.

The following table provides balances and delinquency status of performing and nonperforming loans and leases by segment and class, as well as the other real estate owned and total nonperforming asset balances, as of December 31, 2019 and 2018.

TABLE 80: DELINQUENCY STATUS

(In Millions)	CURRENT	30 – 59 DAYS PAST DUE	60 – 89 DAYS PAST DUE	90 DAYS OR MORE PAST DUE	TOTAL PERFORMING	NONPERFORMING	TOTAL LOANS AND LEASES
December 31, 2019							
Commercial							
Commercial and Institutional	\$ 8,892.7	\$ 4.1	\$ 10.0	\$ 1.2	\$ 8,908.0	\$ 7.6	\$ 8,915.6
Commercial Real Estate	3,363.3	2.4	4.0	4.7	3,374.4	3.6	3,378.0
Non-U.S.	1,750.3	0.2	—	—	1,750.5	0.5	1,751.0
Lease Financing, net	65.6	—	—	—	65.6	—	65.6
Other	164.0	—	—	—	164.0	—	164.0
Total Commercial	14,235.9	6.7	14.0	5.9	14,262.5	11.7	14,274.2
Personal							
Private Client	11,025.3	33.1	9.5	0.3	11,068.2	0.5	11,068.7
Residential Real Estate	5,902.3	19.8	4.9	1.2	5,928.2	71.4	5,999.6
Other	67.1	—	—	—	67.1	—	67.1
Total Personal	16,994.7	52.9	14.4	1.5	17,063.5	71.9	17,135.4
Total Loans and Leases	\$ 31,230.6	\$ 59.6	\$ 28.4	\$ 7.4	\$ 31,326.0	\$ 83.6	\$ 31,409.6
					Other Real Estate Owned	\$ 3.2	
					Total Nonperforming Assets	\$ 86.8	
December 31, 2018							
Commercial							
Commercial and Institutional	\$ 8,678.2	\$ 37.4	\$ 4.5	\$ 1.2	\$ 8,721.3	\$ 6.8	\$ 8,728.1
Commercial Real Estate	3,191.5	8.4	15.6	6.4	3,221.9	6.9	3,228.8
Non-U.S.	2,701.2	—	—	—	2,701.2	0.4	2,701.6
Lease Financing, net	90.7	—	—	—	90.7	—	90.7
Other	426.0	—	—	—	426.0	—	426.0
Total Commercial	15,087.6	45.8	20.1	7.6	15,161.1	14.1	15,175.2
Personal							
Private Client	10,681.1	39.5	12.5	—	10,733.1	0.2	10,733.3
Residential Real Estate	6,376.8	27.2	6.2	8.8	6,419.0	95.0	6,514.0
Other	67.5	—	—	—	67.5	—	67.5
Total Personal	17,125.4	66.7	18.7	8.8	17,219.6	95.2	17,314.8
Total Loans and Leases	\$ 32,213.0	\$ 112.5	\$ 38.8	\$ 16.4	\$ 32,380.7	\$ 109.3	\$ 32,490.0
					Other Real Estate Owned	\$ 8.4	
					Total Nonperforming Assets	\$ 117.7	

The following table provides information related to impaired loans by segment and class.

TABLE 81: IMPAIRED LOANS

(In Millions)	AS OF DECEMBER 31, 2019			AS OF DECEMBER 31, 2018		
	RECORDED INVESTMENT	UNPAID PRINCIPAL BALANCE	SPECIFIC ALLOWANCE	RECORDED INVESTMENT	UNPAID PRINCIPAL BALANCE	SPECIFIC ALLOWANCE
With no related specific allowance						
Commercial and Institutional	\$ —	\$ 0.1	\$ —	\$ 0.2	\$ 0.4	\$ —
Commercial Real Estate	2.4	4.4	—	5.8	7.6	—
Residential Real Estate	75.6	102.5	—	76.7	104.7	—
Private Client	1.2	1.2	—	1.7	1.7	—
With a related specific allowance						
Commercial and Institutional	6.8	8.9	2.3	6.4	7.3	3.0
Commercial Real Estate	1.2	1.5	1.1	2.6	2.8	1.1
Residential Real Estate	5.0	5.1	1.6	22.8	26.1	3.1
Total						
Commercial	10.4	14.9	3.4	15.0	18.1	4.1
Personal	81.8	108.8	1.6	101.2	132.5	3.1
Total	\$ 92.2	\$ 123.7	\$ 5.0	\$ 116.2	\$ 150.6	\$ 7.2

(In Millions)	YEAR ENDED DECEMBER 31, 2019		YEAR ENDED DECEMBER 31, 2018	
	AVERAGE RECORDED INVESTMENT	INTEREST INCOME RECOGNIZED	AVERAGE RECORDED INVESTMENT	INTEREST INCOME RECOGNIZED
With no related specific allowance				
Commercial and Institutional	\$ 0.5	\$ —	\$ 6.8	\$ —
Commercial Real Estate	3.5	0.3	6.4	0.2
Residential Real Estate	88.5	1.8	94.9	1.9
Private Client	1.7	0.1	0.6	0.1
With a related specific allowance				
Commercial and Institutional	7.9	—	4.6	—
Commercial Real Estate	1.4	—	2.1	—
Residential Real Estate	16.7	—	9.2	—
Total				
Commercial	13.3	0.3	19.9	0.2
Personal	106.9	1.9	104.7	2.0
Total	\$ 120.2	\$ 2.2	\$ 124.6	\$ 2.2

Note: Average recorded investments in impaired loans are calculated as the average of the month-end impaired loan balances for the period.

Interest income that would have been recorded on nonperforming loans in accordance with their original terms totaled approximately \$7.3 million in 2019, \$8.0 million in 2018, and \$9.1 million in 2017.

There were \$9.1 million and \$12.6 million of aggregate undrawn loan commitments and standby letters of credit at December 31, 2019 and 2018, respectively, issued to borrowers whose loans were classified as nonperforming or impaired.

Troubled Debt Restructurings (TDRs). Included within impaired loans were \$54.9 million and \$64.6 million of nonperforming TDRs and \$27.7 million and \$35.2 million of performing TDRs as of December 31, 2019 and 2018, respectively.

The following table provides, by segment and class, the number of TDR modifications of loans and leases during the years ended December 31, 2019, and 2018, and the recorded investments and unpaid principal balances as of December 31, 2019 and 2018.

TABLE 82: TROUBLED DEBT RESTRUCTURINGS

(\$ In Millions)	NUMBER OF LOANS AND LEASES	RECORDED INVESTMENT	UNPAID PRINCIPAL BALANCE
December 31, 2019			
Commercial			
Commercial and Institutional	1	\$ 7.5	\$ 8.8
Commercial Real Estate	2	—	—
Total Commercial	3	7.5	8.8
Personal			
Residential Real Estate	45	37.4	38.8
Private Client	—	—	—
Total Personal	45	37.4	38.8
Total Loans and Leases	48	\$ 44.9	\$ 47.6

Note: Period-end balances reflect all paydowns and charge-offs during the year.

(\$ In Millions)	NUMBER OF LOANS AND LEASES	RECORDED INVESTMENT	UNPAID PRINCIPAL BALANCE
December 31, 2018			
Commercial			
Commercial and Institutional	1	\$ 0.3	\$ 0.5
Commercial Real Estate	2	2.8	2.8
Total Commercial	3	3.1	3.3
Personal			
Residential Real Estate	48	27.7	30.8
Private Client	1	—	0.1
Total Personal	49	27.7	30.9
Total Loans and Leases	52	\$ 30.8	\$ 34.2

Note: Period-end balances reflect all paydowns and charge-offs during the year.

TDR modifications primarily 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.

During the year ended December 31, 2019, the TDR modifications of loans within residential real estate were primarily other modifications, extensions of term, deferrals of principal, and interest rate concessions. During the year ended December 31, 2019, TDR modifications of loans within commercial and institutional, commercial real estate, and private client classes were other modifications, extensions of term, and deferrals of principal. During the year ended December 31, 2018, the TDR modifications of loans within residential real estate loans were primarily extensions of term, deferrals of principal, other modifications, and interest rate concessions; modifications within commercial and institutional, commercial real estate, and private client classes were primarily extensions of term, deferrals of principal, and other modifications.

There were five loans or leases TDR modifications during the previous twelve-month period which subsequently became nonperforming during the year ended December 31, 2019. The total recorded investment for these loans was approximately \$5.8 million and the unpaid principal balance for these loans was approximately \$6.1 million.

There were four loans or leases TDR modifications during the previous twelve-month period which subsequently became nonperforming during the year ended December 31, 2018. The total recorded investment for these loans was approximately \$2.1 million and the unpaid principal balance for these loans was approximately \$2.4 million.

All loans and leases with TDR modifications are evaluated for impairment. The nature and extent of impairment of TDRs, including those which have experienced a subsequent default, is considered in the determination of an appropriate level of allowance for credit losses.

Northern Trust may obtain physical possession of real estate via foreclosure. As of December 31, 2019 and 2018, Northern Trust held foreclosed real estate properties with a carrying value of \$3.2 million and \$8.4 million, respectively, as a result of obtaining physical possession. In addition, as of December 31, 2019 and 2018, Northern Trust had loans with a carrying value of \$18.1 million and \$10.9 million, respectively, for which formal foreclosure proceedings were in process.

Note 7 – Allowance for Credit Losses

The allowance for credit losses, which represents management's estimate of probable losses related to specific borrower relationships and inherent in the various loan and lease portfolios, undrawn commitments, and standby letters of credit, is determined by management through a disciplined credit review process. Northern Trust's accounting policies related to the estimation of the allowance for credit losses and the charging off of loans, leases and other extensions of credit deemed uncollectible are consistent across both loan and lease segments.

Loans, leases and other extensions of credit deemed uncollectible are charged to the allowance for credit losses. Subsequent recoveries, if any, are credited to the allowance. Determinations as to whether an uncollectible loan is charged off or a specific allowance is established are based on management's assessment as to the level of certainty regarding the amount of loss.

Changes in the allowance for credit losses by segment were as follows:

TABLE 83: CHANGES IN THE ALLOWANCE FOR CREDIT LOSSES

(In Millions)	2019			2018			2017		
	COMMERCIAL	PERSONAL	TOTAL	COMMERCIAL	PERSONAL	TOTAL	COMMERCIAL	PERSONAL	TOTAL
Balance at Beginning of Year	\$ 78.7	\$ 59.5	\$ 138.2	\$ 80.8	\$ 73.0	\$ 153.8	\$ 104.9	\$ 87.1	\$ 192.0
Charge-Offs	(3.0)	(3.5)	(6.5)	(0.9)	(9.2)	(10.1)	(11.4)	(10.1)	(21.5)
Recoveries	0.9	6.3	7.2	1.7	7.3	9.0	5.5	5.8	11.3
Net (Charge-Offs) Recoveries	(2.1)	2.8	0.7	0.8	(1.9)	(1.1)	(5.9)	(4.3)	(10.2)
Provision for Credit Losses	(2.7)	(11.8)	(14.5)	(2.9)	(11.6)	(14.5)	(18.2)	(9.8)	(28.0)
Balance at End of Year	\$ 73.9	\$ 50.5	\$ 124.4	\$ 78.7	\$ 59.5	\$ 138.2	\$ 80.8	\$ 73.0	\$ 153.8
Allowance for Credit Losses Assigned to:									
Loans and Leases	\$ 58.1	\$ 46.4	\$ 104.5	\$ 57.6	\$ 55.0	\$ 112.6	\$ 63.5	\$ 67.7	\$ 131.2
Undrawn Commitments and Standby Letters of Credit	15.8	4.1	19.9	21.1	4.5	25.6	17.3	5.3	22.6
Total Allowance for Credit Losses	\$ 73.9	\$ 50.5	\$ 124.4	\$ 78.7	\$ 59.5	\$ 138.2	\$ 80.8	\$ 73.0	\$ 153.8

The following table provides information regarding the recorded investments in loans and leases and the allowance for credit losses by segment as of December 31, 2019 and 2018.

TABLE 84: RECORDED INVESTMENTS IN LOANS AND LEASES

(In Millions)	COMMERCIAL	PERSONAL	TOTAL
December 31, 2019			
Loans and Leases			
Specifically Evaluated for Impairment	\$ 10.4	\$ 81.8	\$ 92.2
Evaluated for Inherent Impairment	14,263.8	17,053.6	31,317.4
Total Loans and Leases	14,274.2	17,135.4	31,409.6
Allowance for Credit Losses on Credit Exposures			
Specifically Evaluated for Impairment	3.4	1.6	5.0
Evaluated for Inherent Impairment	54.7	44.8	99.5
Allowance Assigned to Loans and Leases	58.1	46.4	104.5
Allowance for Undrawn Exposures			
Commitments and Standby Letters of Credit	15.8	4.1	19.9
Total Allowance for Credit Losses	\$ 73.9	\$ 50.5	\$ 124.4
December 31, 2018			
Loans and Leases			
Specifically Evaluated for Impairment	\$ 15.0	\$ 101.2	\$ 116.2
Evaluated for Inherent Impairment	15,160.2	17,213.6	32,373.8
Total Loans and Leases	15,175.2	17,314.8	32,490.0
Allowance for Credit Losses on Credit Exposures			
Specifically Evaluated for Impairment	4.1	3.1	7.2
Evaluated for Inherent Impairment	53.5	51.9	105.4
Allowance Assigned to Loans and Leases	57.6	55.0	112.6
Allowance for Undrawn Exposures			
Commitments and Standby Letters of Credit	21.1	4.5	25.6
Total Allowance for Credit Losses	\$ 78.7	\$ 59.5	\$ 138.2

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, 2019, 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 \$4.9 billion, federal funds sold and securities purchased under agreements to resell of \$712.8 million, and demand balances maintained at correspondent banks of \$4.3 billion. At December 31, 2018, 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 \$4.3 billion, federal funds sold and securities purchased under agreements to resell of \$1.2 billion, and demand balances maintained at correspondent banks of \$4.5 billion. 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. At December 31, 2019, residential real estate loans totaled \$6.0 billion, or 20% of total U.S. loans and leases at December 31, 2019, compared with \$6.5 billion, or 22% of total U.S. loans and leases at December 31, 2018. 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. Of the \$6.0 billion residential real estate loans at December 31, 2019, \$1.6 billion were in Florida, \$1.2 billion were in California, and \$1.0 billion were in the greater Chicago area, with the remainder distributed throughout the other geographic regions within the U.S. served by Northern Trust. Legally binding undrawn commitments to extend residential real estate credit, which are primarily equity credit lines, totaled \$714.2 million and \$824.0 million at December 31, 2019 and 2018, respectively.

Commercial Real Estate. 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 Arizona 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.

The table below provides additional detail regarding commercial real estate loan types.

TABLE 85: COMMERCIAL REAL ESTATE LOANS

(In Millions)	DECEMBER 31,	
	2019	2018
Commercial Mortgages		
Office	\$ 754.3	\$ 811.2
Apartment/ Multi-family	646.5	490.7
Retail	573.3	529.7
Industrial/ Warehouse	278.0	254.9
Other	420.1	426.6
Total Commercial Mortgages	2,672.2	2,513.1
Construction, Acquisition and Development Loans	432.1	420.6
Single Family Investment	95.5	127.0
Other Commercial Real Estate Related	178.2	168.1
Total Commercial Real Estate Loans	\$ 3,378.0	\$ 3,228.8

Note 9 – Buildings and Equipment

A summary of buildings and equipment is presented below.

TABLE 86: BUILDINGS AND EQUIPMENT

(In Millions)	DECEMBER 31, 2019		
	ORIGINAL COST	ACCUMULATED DEPRECIATION	NET BOOK VALUE
Land and Improvements	\$ 14.5	\$ 0.5	\$ 14.0
Buildings	305.8	156.0	149.8
Equipment	731.0	521.5	209.5
Leasehold Improvements	416.1	306.1	110.0
Total Buildings and Equipment	\$ 1,467.4	\$ 984.1	\$ 483.3

(In Millions)	DECEMBER 31, 2018		
	ORIGINAL COST	ACCUMULATED DEPRECIATION	NET BOOK VALUE
Land and Improvements	\$ 15.4	\$ 1.1	\$ 14.3
Buildings	245.7	148.2	97.5
Equipment	649.9	457.6	192.3
Leasehold Improvements	406.0	281.9	124.1
Total Buildings and Equipment	\$ 1,317.0	\$ 888.8	\$ 428.2

The charge for depreciation amounted to \$103.2 million in 2019, \$108.6 million in 2018, and \$101.2 million in 2017 in the consolidated statements of income.

Note 10 – Lease Commitments

At December 31, 2019, 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 year ended December 31, 2019 were as follows.

TABLE 87: LEASE COST COMPONENTS

(In Millions)	DECEMBER 31, 2019	
Operating Lease Cost	\$	102.2
Variable Lease Cost		38.7
Sublease Income		(6.6)
Total Lease Cost	\$	134.3

The following table presents a maturity analysis of lease liabilities as of December 31, 2019.

TABLE 88: MATURITY OF LEASE LIABILITIES

(In Millions)	MATURITY OF LEASE LIABILITIES
2020	\$ 101.3
2021	85.8
2022	78.5
2023	70.5
2024	59.6
Later Years	300.0
Total Lease Payments	695.7
Less: Imputed Interest	(92.6)
Present Value of Lease Liabilities	\$ 603.1

As of December 31, 2019, Northern Trust had commitments for operating leases in addition to the above that have not yet commenced for approximately \$40.1 million. These operating leases are for the use of office space with lease terms between 9 and 15 years and are expected to commence early 2020 through late 2021.

Northern Trust uses its incremental borrowing rate to determine the present value of lease payments for operating leases. Operating lease 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 in the consolidated balance sheets as of December 31, 2019 are presented in the following table.

TABLE 89: LOCATION AND AMOUNT OF LEASE ASSETS AND LIABILITIES

(In Millions)	LOCATION OF LEASE ASSETS AND LEASE LIABILITIES ON THE BALANCE SHEET	DECEMBER 31, 2019
Assets		
Operating Lease Right-of-Use Asset	Other Assets	\$ 491.6
Liabilities		
Operating Lease Liability	Other Liabilities	\$ 603.1

The weighted-average remaining lease term and weighted-average discount rate applied to leases as of December 31, 2019 were as follows:

TABLE 90: WEIGHTED-AVERAGE REMAINING LEASE TERM AND DISCOUNT RATE

	DECEMBER 31, 2019
Operating Leases	
Weighted-Average Remaining Lease Term	9.2 years
Weighted-Average Discount Rate	3.0%

The following table provides supplemental cash flow information related to leases for the year ended December 31, 2019.

TABLE 91: SUPPLEMENTAL CASH FLOW INFORMATION

(In Millions)	DECEMBER 31, 2019
Supplemental cash flow information	
Cash paid for amounts included in the measurement of lease liabilities - operating cash flows	\$ 101.2
Supplemental non-cash information	
Right-of-use assets obtained in exchange for new operating lease liabilities	\$ 108.3

Under the provisions of Accounting Standards Codification (ASC) Topic 842, Northern Trust has elected not to restate comparative periods in the period of adoption. Therefore, disclosure with respect to minimum annual lease commitments as of December 31, 2018, for all non-cancelable operating leases with a term of one year or more is provided in the table below, as required by ASC Topic 840.

TABLE 92: MINIMUM LEASE PAYMENTS

(In Millions)	FUTURE MINIMUM LEASE PAYMENTS	
2019	\$	98.8
2020		97.8
2021		85.9
2022		77.2
2023		67.7
Later Years		335.7
<hr/>		
Total Minimum Lease Payments		763.1
Less: Sublease Rentals		(23.4)
<hr/>		
Net Minimum Lease Payments	\$	739.7

Operating lease rental expense, net of rental income, is recorded in occupancy expense and amounted to \$79.0 million in 2018, \$76.7 million in 2017, and \$76.1 million in 2016.

Note 11 – Goodwill and Other Intangibles

Goodwill. Changes by reporting segment in the carrying amount of goodwill for the years ended December 31, 2019 and 2018, including the effect of foreign exchange rates on non-U.S.-dollar-denominated balances, were as follows:

TABLE 93: GOODWILL

(In Millions)	CORPORATE & INSTITUTIONAL SERVICES		WEALTH MANAGEMENT		TOTAL
Balance at December 31, 2017	\$	534.5	\$	71.1	\$ 605.6
Goodwill Acquired		71.4		—	71.4
Foreign Exchange Rates		(7.7)		—	(7.7)
<hr/>					
Balance at December 31, 2018	\$	598.2	\$	71.1	\$ 669.3
Goodwill Acquired		23.5		—	23.5
Foreign Exchange Rates		4.0		—	4.0
<hr/>					
Balance at December 31, 2019	\$	625.7	\$	71.1	\$ 696.8

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 Corporate & Institutional Services and Wealth Management. Goodwill was tested for impairment during the fourth quarter of 2019 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 2019.

Other Intangible Assets Subject to Amortization. The gross carrying amount and accumulated amortization of other intangible assets subject to amortization as of December 31, 2019 and 2018 were as follows:

TABLE 94: OTHER INTANGIBLE ASSETS

(In Millions)	DECEMBER 31,	
	2019	2018
Gross Carrying Amount	\$ 207.2	\$ 211.1
Less: Accumulated Amortization	86.6	72.5
Net Book Value	\$ 120.6	\$ 138.6

Other intangible assets consist primarily of the value of acquired client relationships and are included within Other Assets in the consolidated balance sheets. Amortization expense related to other intangible assets was \$16.6 million, \$17.4 million, and \$11.4 million for the years ended December 31, 2019, 2018, and 2017, respectively. Amortization for the years 2020, 2021, 2022, 2023, and 2024 is estimated to be \$16.7 million, \$14.3 million, \$9.7 million, \$9.4 million, and \$9.3 million respectively.

In the third quarter of 2019, Northern Trust completed its acquisition of Belvedere Advisors LLC, a provider of digital investment advisory and asset management services. The purchase price recorded in connection with the closing of the acquisition, which is subject to certain performance-related adjustments over a five-year period after the acquisition date, totaled \$17.6 million inclusive of contingent consideration. Goodwill and developed technology associated with the transaction totaled \$9.3 million and \$8.3 million, respectively.

In the first quarter of 2019, Northern Trust completed the purchase accounting related to its acquisition of BEx LLC, a provider of foreign exchange software solutions. The purchase price recorded in connection with the closing of the acquisition totaled \$37.9 million. Goodwill and developed technology associated with the acquisition totaled \$12.5 million and \$25.0 million, respectively.

Since its acquisition of Omnium LLC in 2011, Northern Trust has made various investments in Citadel Technology LLC's Omnium technology platform. In June 2018, Northern Trust completed its acquisition of such platform, along with associated development resources, for a total purchase price of \$73.0 million. Goodwill and incremental developed technology associated with the acquisition in 2018 totaled \$71.4 million and \$1.6 million, respectively.

Note 12 – Deposits

The table below provides the scheduled maturity of total time deposits in denominations of \$100,000 or greater at December 31, 2019.

TABLE 95: REMAINING MATURITY OF TIME DEPOSITS \$100,000 OR MORE

(In Millions)	DECEMBER 31, 2019			TOTAL
	U.S. OFFICE		NON-U.S. OFFICES	
	CERTIFICATES OF DEPOSIT	OTHER TIME		
1 Year or Less	\$ 673.6	\$ 1,018.9	\$	1,692.5
Over 1 Year to 2 Years	196.6	—		196.6
Over 2 Years to 3 Years	7.4	—		7.4
Over 3 Years to 4 Years	3.8	—		3.8
Over 4 Years to 5 Years	4.2	—		4.2
Over 5 Years	0.9	—		0.9
Total	\$ 886.5	\$ 1,018.9	\$	1,905.4

As of December 31, 2018, there were \$1.3 billion of time deposits in denominations of \$100,000 or greater, of which \$580.9 million were Certificates of Deposit and \$758.6 million were non-U.S.

Note 13 – Senior Notes and Long-Term Debt

Senior Notes. A summary of senior notes outstanding at December 31, 2019 and 2018 is presented below.

TABLE 96: SENIOR NOTES

(\$ In Millions)	DECEMBER 31,		
	RATE	2019	2018
Corporation-Senior Notes ⁽¹⁾⁽³⁾			
Fixed Rate Due Nov. 2020 ⁽⁴⁾	3.45% \$	499.9 \$	499.7
Fixed Rate Due Aug. 2021 ⁽⁵⁾	3.38	499.4	499.1
Fixed Rate Due Aug. 2022 ⁽⁶⁾	2.38	499.4	499.2
Fixed Rate Due Aug. 2028 ⁽⁷⁾⁽¹⁰⁾	3.65	547.2	513.3
Fixed Rate Due May. 2029 ⁽⁸⁾⁽¹⁰⁾	3.15	527.1	—
Total Senior Notes		\$ 2,573.0 \$	2,011.3

Long-Term Debt. A summary of long-term debt outstanding at December 31, 2019 and 2018 is presented below.

TABLE 97: LONG-TERM DEBT

(\$ In Millions)	DECEMBER 31,		
		2019	2018
Corporation-Subordinated Debt ⁽³⁾			
3.95% Notes due Oct. 2025 ⁽¹⁾⁽⁹⁾⁽¹⁰⁾	\$	798.7 \$	763.1
3.375% Fixed-to-Floating Rate Notes due May 2032 ⁽²⁾		349.4	349.3
Total Corporation Subordinated Debt	\$	1,148.1 \$	1,112.4
Long-Term Debt Qualifying as Risk-Based Capital	\$	1,099.5 \$	1,099.5

(1) Not redeemable prior to maturity, except for senior notes due Aug. 2028 and senior notes due May 2029, which are redeemable within three months of maturity.

(2) 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. From, and including, May 8, 2027, the subordinated notes will bear interest at an annual rate equal to three-month LIBOR 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.

(3) As of December 31, 2019, debt issue costs of \$2.2 million and \$1.3 million are included as a direct deduction from the carrying amount of Senior Notes and Long-Term Debt, respectively. Debt issue costs are amortized on a straight-line basis over the life of the Note.

(4) Notes issued at a discount of 0.117%

(5) Notes issued at a discount of 0.437%

(6) Notes issued at a discount of 0.283%

(7) Notes issued at a discount of 0.125%

(8) Notes issued at a discount of 0.094%

(9) Notes issued at a discount of 0.114%

(10) Interest rate swap contracts were entered into to modify the interest expense on these senior and subordinated notes from fixed rates to floating rates. The swaps are recorded as fair value hedges and at December 31, 2019, increases in the carrying values of the senior and subordinated notes outstanding of \$126.9 million were recorded. As of December 31, 2018, net adjustments in the carrying values of subordinated notes outstanding of \$29.3 million were recorded.

Note 14 – Floating Rate Capital Debt

In January 1997, the Corporation issued \$150 million of Floating Rate Capital Securities, Series A, through a statutory business trust wholly owned by the Corporation (NTC Capital I). In April 1997, the Corporation also issued, through a separate wholly owned statutory business trust (NTC Capital II), \$120 million of Floating Rate Capital Securities, Series B. The sole assets of the trusts are subordinated debentures of Northern Trust Corporation that have the same interest rates and maturity dates as the corresponding distribution rates and redemption dates of the Floating Rate Capital Securities. The Series A Securities were issued at a discount to yield 60.5 basis points above the three-month London Interbank Offered Rate (LIBOR) and are due January 15, 2027. The Series B Securities were issued at a discount to yield 67.9 basis points above the three-month LIBOR and are due April 15, 2027.

Under the provisions of the Dodd-Frank Wall Street Reform and Consumer Protection Act, the regulatory capital treatment of these securities is required to be phased out over a period that began on January 1, 2013. In 2019, 30% of these securities are eligible for Tier 2 capital treatment, declining at an incremental 10% a year until they are fully phased out in 2022.

The Corporation has fully, irrevocably and unconditionally guaranteed all payments due on the Series A and B securities. The holders of the Series A and B securities are entitled to receive preferential cumulative cash distributions quarterly in arrears (based on the liquidation amount of \$1,000 per security) at an interest rate equal to the rate on the corresponding

subordinated debentures. The interest rate on the Series A and Series B securities is equal to three-month LIBOR plus 0.52% and 0.59%, respectively. Subject to certain exceptions, the Corporation has the right to defer payment of interest on the subordinated debentures at any time or from time to time for a period not exceeding 20 consecutive quarterly periods provided that no extension period may extend beyond the stated maturity date. If interest is deferred on the subordinated debentures, distributions on the Series A and B securities will also be deferred and the Corporation will not be permitted, subject to certain exceptions, to pay or declare any cash distributions with respect to the Corporation's capital stock or debt securities that rank the same as or junior to the subordinated debentures, until all past due distributions are paid. The subordinated debentures are unsecured and subordinated to substantially all of the Corporation's existing indebtedness.

The Corporation has the right to redeem the Series A and Series B subordinated debentures, in whole or in part, at a price equal to the principal amount plus accrued and unpaid interest. The following table summarizes the book values of the outstanding subordinated debentures as of December 31, 2019 and 2018.

TABLE 98: SUBORDINATED DEBENTURES

(In Millions)	DECEMBER 31,	
	2019	2018
NTC Capital I Subordinated Debentures due January 15, 2027	\$ 154.3	\$ 154.2
NTC Capital II Subordinated Debentures due April 15, 2027	123.4	123.4
Total Subordinated Debentures	\$ 277.7	\$ 277.6

Note 15 – 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, 2019, the following shares of preferred stock were outstanding: 16,000 shares of Series C Non-Cumulative Perpetual Preferred Stock (the "Series C Preferred Stock"), 5,000 shares of Series D Non-Cumulative Perpetual Preferred Stock (the "Series D Preferred Stock"), and 16,000 shares of Series E Non-Cumulative Perpetual Preferred Stock (the "Series E Preferred Stock"). Further information with respect to each of these series is as follows.

Series C Preferred Stock. As of December 31, 2019, the Corporation had issued and outstanding 16 million depositary shares, each representing 1/1,000th ownership interest in a share of Series C Preferred Stock, issued in August 2014. Equity related to Series C Preferred Stock as of December 31, 2019 and 2018 totaled \$388.5 million. Series C Preferred Stock had no par value and had a liquidation preference of \$25,000 (equivalent to \$25 per depositary share).

Dividends on the Series C Preferred Stock, which were not mandatory, accrued and were 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 5.85%. On October 22, 2019, the Corporation declared a cash dividend of \$365.625 per share of Series C Preferred Stock payable on January 1, 2020, to stockholders of record as of December 15, 2019.

The Series C Preferred Stock had no maturity date and was redeemable at the Corporation's option in whole, or in part, on any dividend payment date on or after October 1, 2019. On January 2, 2020, the proceeds from the Series E Preferred Stock issuance described below were used to fund the redemption of all outstanding shares of the Corporation's Series C Preferred Stock.

Series D Preferred Stock. As of December 31, 2019, 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, 2019 and 2018 was \$493.5 million. Shares of the Series D Preferred Stock have no par value and a liquidation preference of \$100,000 (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 LIBOR 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. On November 5, 2019, the Corporation issued and sold 16 million depositary shares, each representing 1/1,000th ownership interest in a share of Series E Preferred Stock. Shares of the Series E Preferred Stock have no par value and a liquidation preference of \$25,000 (equivalent to \$25 per depositary share). The aggregate proceeds from the public offering of the depositary shares, net of underwriting discounts, commissions and offering expenses, were \$391.4 million. As noted above, on January 2, 2020, the proceeds from the Series E Preferred Stock issuance were used to fund the redemption of all outstanding shares of the Corporation's Series C Preferred Stock.

Dividends on the Series E Preferred Stock, which are not mandatory, will accrue and be 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, commencing on April 1, 2020, at a rate per annum equal to 4.70%.

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 July 2018. 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.

Under the Corporation's 2019 capital plan, which was reviewed without objection by the Federal Reserve, the Corporation may repurchase up to \$828.5 million of common stock after December 31, 2019 through June 30, 2020.

The average price paid per share for common stock repurchased in 2019, 2018, and 2017 was \$93.40, \$102.69, and \$90.25, respectively.

An analysis of changes in the number of shares of common stock outstanding follows:

TABLE 99: SHARES OF COMMON STOCK

	2019	2018	2017
Balance at January 1	219,012,050	226,126,674	228,605,485
Incentive Plan and Awards	1,688,931	1,310,778	1,320,129
Stock Options Exercised	786,931	575,662	1,997,362
Treasury Stock Purchased	(11,778,866)	(9,001,064)	(5,796,302)
Balance at December 31	209,709,046	219,012,050	226,126,674

Note 16 – Accumulated Other Comprehensive Income (Loss)

The following tables summarize the components of accumulated other comprehensive income (loss) (AOCI) at December 31, 2019, 2018, and 2017, and changes during the years then ended.

TABLE 100: SUMMARY OF CHANGES IN ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)

(In Millions)	NET UNREALIZED GAINS (LOSSES) ON DEBT SECURITIES AVAILABLE FOR SALE ⁽¹⁾	NET UNREALIZED (LOSSES) GAINS ON CASH FLOW HEDGES	NET FOREIGN CURRENCY ADJUSTMENTS	NET PENSION AND OTHER POSTRETIREMENT BENEFIT ADJUSTMENTS	TOTAL
Balance at December 31, 2016	\$ (32.4)	\$ 6.1	\$ (18.5)	\$ (325.2)	\$ (370.0)
Net Change	(42.4)	(1.6)	16.7	(17.0)	(44.3)
Balance at December 31, 2017	\$ (74.8)	\$ 4.5	\$ (1.8)	\$ (342.2)	\$ (414.3)
Reclassification of Certain Tax Effects from AOCI	(17.8)	0.9	47.5	(55.9)	(25.3)
Net Change	(22.3)	(1.4)	22.2	(12.6)	(14.1)
Balance at December 31, 2018	\$ (114.9)	\$ 4.0	\$ 67.9	\$ (410.7)	\$ (453.7)
Net Change	228.9	(7.7)	49.9	(12.1)	259.0
Balance at December 31, 2019	\$ 114.0	\$ (3.7)	\$ 117.8	\$ (422.8)	\$ (194.7)

(1) Includes net unrealized gains (losses) on debt securities transferred from available for sale to held to maturity during the years ended December 31, 2019, 2018, and 2017.

TABLE 101: DETAILS OF CHANGES IN ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,								
	2019			2018			2017		
	BEFORE TAX	TAX EFFECT	AFTER TAX	BEFORE TAX	TAX EFFECT	AFTER TAX	BEFORE TAX	TAX EFFECT	AFTER TAX
Unrealized Gains (Losses) on Debt Securities Available for Sale									
Unrealized Gains (Losses) on Debt Securities Available for Sale	\$ 306.1	\$ (78.0)	\$ 228.1	\$ (31.9)	\$ 9.2	\$ (22.7)	\$ (70.2)	\$ 26.9	\$ (43.3)
Reclassification Adjustment for Losses (Gains) Included in Net Income ⁽¹⁾	1.1	(0.3)	0.8	0.5	(0.1)	0.4	1.4	(0.5)	0.9
Net Change	\$ 307.2	\$ (78.3)	\$ 228.9	\$ (31.4)	\$ 9.1	\$ (22.3)	\$ (68.8)	\$ 26.4	\$ (42.4)
Unrealized (Losses) Gains on Cash Flow Hedges									
Foreign Exchange Contracts	\$ 14.9	\$ (3.7)	\$ 11.2	\$ 70.5	\$ (17.6)	\$ 52.9	\$ 32.5	\$ (19.5)	\$ 13.0
Interest Rate Contracts	1.5	(0.3)	1.2	(1.2)	0.3	(0.9)	1.3	(0.8)	0.5
Reclassification Adjustment for (Gains) Losses Included in Net Income ⁽²⁾	(26.7)	6.6	(20.1)	(71.1)	17.7	(53.4)	(24.5)	9.4	(15.1)
Net Change	\$ (10.3)	\$ 2.6	\$ (7.7)	\$ (1.8)	\$ 0.4	\$ (1.4)	\$ 9.3	\$ (10.9)	\$ (1.6)
Foreign Currency Adjustments									
Foreign Currency Translation Adjustments	\$ 6.4	\$ (1.6)	\$ 4.8	\$ (107.8)	\$ 1.5	\$ (106.3)	\$ 156.5	\$ (3.1)	\$ 153.4
Long-Term Intra-Entity Foreign Currency Transaction (Losses) Gains	(0.5)	0.1	(0.4)	(1.8)	0.5	(1.3)	2.0	(0.7)	1.3
Net Investment Hedge Gains (Losses)	59.7	(14.2)	45.5	173.0	(43.2)	129.8	(223.2)	85.2	(138.0)
Net Change	\$ 65.6	\$ (15.7)	\$ 49.9	\$ 63.4	\$ (41.2)	\$ 22.2	\$ (64.7)	\$ 81.4	\$ 16.7
Pension and Other Postretirement Benefit Adjustments									
Net Actuarial (Losses) Gains	\$ (36.8)	\$ 7.9	\$ (28.9)	\$ (54.9)	\$ 9.6	\$ (45.3)	\$ (58.4)	\$ 25.4	\$ (33.0)
Reclassification Adjustment for Losses (Gains) Included in Net Income ⁽³⁾									
Amortization of Net Actuarial Loss	22.4	(5.4)	17.0	\$ 36.6	\$ (3.6)	\$ 33.0	26.0	(9.9)	16.1
Amortization of Prior Service Cost	(0.2)	—	(0.2)	(0.3)	—	(0.3)	(0.1)	—	(0.1)
Net Change	\$ (14.6)	\$ 2.5	\$ (12.1)	\$ (18.6)	\$ 6.0	\$ (12.6)	\$ (32.5)	\$ 15.5	\$ (17.0)
Total Net Change	\$ 347.9	\$ (88.9)	\$ 259.0	\$ 11.6	\$ (25.7)	\$ (14.1)	\$ (156.7)	\$ 112.4	\$ (44.3)

(1) The before-tax reclassification adjustment out of AOCI related to the realized gains (losses) on debt securities available for sale is recorded as Investment Security Gains (Losses), net within the consolidated statements of income.

(2) See Note 27, "Derivative Financial Instruments" for the location of the reclassification adjustment related to cash flow hedges.

(3) The before-tax reclassification adjustment out of AOCI related to pension and other postretirement benefit adjustments is recorded in Employee Benefits expense within the consolidated statements of income.

Note 17 – Net Income per Common Share

The computations of net income per common share are presented below.

TABLE 102: NET INCOME PER COMMON SHARE

(\$ In Millions Except Per Common Share Information)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
BASIC NET INCOME PER COMMON SHARE			
Average Number of Common Shares Outstanding	214,525,547	223,148,335	228,257,664
Net Income	\$ 1,492.2	\$ 1,556.4	\$ 1,199.0
Less: Dividends on Preferred Stock	46.4	46.4	49.8
Net Income Applicable to Common Stock	1,445.8	1,510.0	1,149.2
Less: Earnings Allocated to Participating Securities	16.9	20.1	18.8
Earnings Allocated to Common Shares Outstanding	\$ 1,428.9	\$ 1,489.9	\$ 1,130.4
Basic Net Income Per Common Share	6.66	6.68	4.95
DILUTED NET INCOME PER COMMON SHARE			
Average Number of Common Shares Outstanding	214,525,547	223,148,335	228,257,664
Plus Dilutive Effect of Share-based Compensation	1,075,602	1,339,991	1,396,737
Average Common and Potential Common Shares	215,601,149	224,488,326	229,654,401
Earnings Allocated to Common and Potential Common Shares	\$ 1,428.9	\$ 1,490.0	\$ 1,130.5
Diluted Net Income Per Common Share	6.63	6.64	4.92

Note: For the years ended December 31, 2019 and, 2018 there were no common stock equivalents excluded in the computation of diluted net income per share. Common stock equivalents of 115,491 for the year ended December 31, 2017 were not included in the computation of diluted net income per common share because their inclusion would have been antidilutive.

Note 18 – 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 C&IS clients. Investment management and advisory income contains revenue received from providing asset management and related services to Wealth Management and C&IS 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 C&IS clients. Other income largely consists of revenues received from providing employee benefit, investment risk and analytic and other services to C&IS and Wealth Management clients.

Other Noninterest Income. Treasury management income represents revenues received from providing cash and liquidity management services to C&IS and Wealth Management clients. The portion of securities 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 C&IS 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 C&IS 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 of 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 103: REVENUE DISAGGREGATION

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,	
	2019	2018
Noninterest Income		
Trust, Investment and Other Servicing Fees		
Custody and Fund Administration	\$ 1,636.4	\$ 1,589.1
Investment Management and Advisory	1,930.6	1,862.6
Securities Lending	87.7	102.8
Other	197.4	199.2
Total Trust, Investment and Other Servicing Fees	\$ 3,852.1	\$ 3,753.7
Other Noninterest Income		
Foreign Exchange Trading Income	\$ 250.9	\$ 307.2
Treasury Management Fees	44.5	51.8
Security Commissions and Trading Income	103.6	98.3
Other Operating Income	145.5	127.5
Investment Security Gains (Losses), net	(1.4)	(1.0)
Total Other Noninterest Income	\$ 543.1	\$ 583.8
Total Noninterest Income	\$ 4,395.2	\$ 4,337.5

Trust, investment and other servicing fees and treasury management fees represent revenue from contracts with clients. For the year ended December 31, 2019, revenue from contracts with clients also includes \$87.1 million of the \$103.6 million total securities commissions and trading income and \$41.8 million of the \$145.5 million total other operating income. For the year ended December 31, 2018, revenue from contracts with clients also includes \$86.7 million of the \$98.3 million total securities commissions and trading income and \$44.0 million of the \$127.5 million total other operating income.

Receivables Balances. The table below represents receivables balances from contracts with clients, which are included in Other Assets in the consolidated balance sheets, at December 31, 2019 and 2018.

TABLE 104: CLIENT RECEIVABLES

(In Millions)	DECEMBER 31,	
	2019	2018
Trust Fees Receivable, net	\$ 801.9	\$ 742.5
Other	101.1	90.1
Total Client Receivables	\$ 903.0	\$ 832.6

Note 19 – Net Interest Income

The components of net interest income were as follows:

TABLE 105: NET INTEREST INCOME

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Interest Income			
Loans and Leases	\$ 1,153.4	\$ 1,098.8	\$ 919.1
Securities – Taxable	1,070.7	905.2	594.1
– Non-Taxable	3.8	7.0	9.8
Interest-Bearing Due from and Deposits with Banks ⁽¹⁾	72.4	70.0	63.8
Federal Reserve and Other Central Bank Deposits and Other	199.6	240.4	182.6
Total Interest Income	\$ 2,499.9	\$ 2,321.4	\$ 1,769.4
Interest Expense			
Deposits	\$ 488.9	\$ 384.6	\$ 182.1
Federal Funds Purchased	25.9	50.3	10.4
Securities Sold under Agreements to Repurchase	6.4	7.8	6.0
Other Borrowings	181.7	150.1	50.7
Senior Notes	72.6	53.4	46.9
Long-Term Debt	38.3	45.0	39.2
Floating Rate Capital Debt	8.2	7.5	4.9
Total Interest Expense	\$ 822.0	\$ 698.7	\$ 340.2
Net Interest Income	\$ 1,677.9	\$ 1,622.7	\$ 1,429.2

(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.

Note 20 – Other Operating Income

The components of other operating income were as follows:

TABLE 106: OTHER OPERATING INCOME

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Loan Service Fees	\$ 48.0	\$ 48.9	\$ 50.7
Banking Service Fees	45.6	46.4	48.6
Other Income	51.9	32.2	58.2
Total Other Operating Income	\$ 145.5	\$ 127.5	\$ 157.5

Other income of \$51.9 million in 2019 increased from \$32.2 million in 2018, primarily due to income related to a bank-owned life insurance program implemented during 2019, higher miscellaneous income, and the prior-year impairment of a community development equity investment previously held at cost, partially offset by a charge related to the decision made in 2019 to sell substantially all of the lease portfolio.

Note 21 – Other Operating Expense

The components of other operating expense were as follows:

TABLE 107: OTHER OPERATING EXPENSE

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Business Promotion	\$ 104.2	\$ 98.3	\$ 95.4
FDIC Insurance Premiums	9.9	27.4	34.7
Staff Related	42.8	33.6	42.8
Other Intangibles Amortization	16.6	17.4	11.4
Other Expenses	156.3	153.9	147.3
Total Other Operating Expense	\$ 329.8	\$ 330.6	\$ 331.6

Other operating expense in 2019 as compared to 2018 primarily reflects decreased FDIC insurance premiums, partially offset by higher staff-related expense and business promotion expense.

Note 22 – Income Taxes

The following table reconciles the total provision for income taxes recorded in the consolidated statements of income with the amounts computed at the statutory federal tax rate for the periods presented below.

TABLE 108: INCOME TAXES

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Federal Rate	21.0%	21.0%	35.0%
Tax at Statutory Rate	\$ 408.3	\$ 411.1	\$ 571.9
Tax Exempt Income	(11.5)	(6.9)	(9.6)
Foreign Tax Rate Differential	4.6	(7.3)	(50.0)
Excess Tax Benefit Related to Share-Based Compensation	(17.5)	(16.8)	(31.6)
State Taxes, net	55.0	66.3	40.7
Impact of Tax Cuts and Jobs Act	—	(4.8)	(53.1)
Change in Accounting Method	—	(24.4)	—
Valuation Allowance	29.5	(0.8)	0.3
Other	(16.5)	(15.0)	(33.7)
Provision for Income Taxes	\$ 451.9	\$ 401.4	\$ 434.9

Income tax expense for the twelve months ended December 31, 2019 and 2018 was \$451.9 million and \$401.4 million, representing an effective tax rate of 23.2% and 20.5%, respectively. For the twelve months ended December 31, 2019, the provision for income taxes included an increase in the U.S. taxes payable on the income of the Corporation's non-U.S. branches. This increase included a valuation allowance against deferred tax assets as management believes the foreign tax credit carryforward generated in 2019 will not be fully realized.

For the twelve months ended December 31, 2018, the provision for income taxes included income tax benefits recorded in 2018 associated with the timing of tax deductions for software development-related expenses and the implementation of the Tax Cuts and Jobs Act (TCJA) enacted in the fourth quarter of 2017, partially offset by a change in the earnings mix in tax jurisdictions in which the Corporation operates.

Additionally, the 2017 provision for income taxes included a net benefit attributable to the implementation of the TCJA of \$53.1 million and Federal and State research tax credits of \$17.6 million related to the Corporation's technology spend between 2013 and 2016, each resulting in a reduction of the effective tax rate.

The TCJA was enacted on December 22, 2017, and reduced the U.S. federal corporate tax rate from 35% to 21%. It also required companies to pay a mandatory deemed repatriation tax on earnings of foreign subsidiaries that were previously tax deferred. At December 31, 2017, Northern Trust made a reasonable estimate as to the impact of the TCJA. During 2018, Northern Trust completed the related calculations and additional analyses associated with the implementation of the TCJA, resulting in a number of adjustments to the 2018 tax provision as follows:

TABLE 109: IMPACT OF TAX CUTS AND JOBS ACT

(In Millions)	2018	2017
Federal Taxes on Mandatory Deemed Repatriation	\$ (16.8)	\$ 150.0
Impact Related to Federal Deferred Taxes	12.7	(210.0)
Other Adjustments	(0.7)	6.9
Provision (Benefit) for Income Taxes	\$ (4.8)	\$ (53.1)

Adjustments in the above table included a 2018 tax benefit of \$16.8 million resulting from an adjustment to the Corporation's 2017 income tax provision for mandatory deemed repatriation with respect to the pre-2018 earnings of its non-U.S. subsidiaries, offset by a \$12.7 million net provision recorded in 2018 associated with the repricing of deferred taxes.

For tax years beginning after December 31, 2017, the TCJA introduces new provisions for U.S. taxation of certain Global Intangible Low-Taxed Income (GILTI). Northern Trust has made the policy election to record any current year tax expense associated with GILTI in the period in which it is incurred.

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 2012.

Included in Other Liabilities within the consolidated balance sheets at December 31, 2019 and 2018 were \$25.3 million and \$21.9 million of unrecognized tax benefits, respectively. If recognized, 2019 and 2018 net income would have increased by \$22.7 million and \$19.8 million, respectively, resulting in a decrease of those years' effective income tax rates. A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows:

TABLE 110: UNRECOGNIZED TAX BENEFITS

(In Millions)	2019	2018	2017
Balance at January 1	\$ 21.9	\$ 27.7	\$ 17.2
Additions for Tax Positions Taken in the Current Year	0.9	0.5	9.9
Additions for Tax Positions Taken in Prior Years	4.0	1.7	6.2
Reductions for Tax Positions Taken in Prior Years	(1.5)	(7.8)	(5.4)
Reductions Resulting from Expiration of Statutes	—	(0.2)	(0.2)
Balance at December 31	\$ 25.3	\$ 21.9	\$ 27.7

Unrecognized tax benefits had net increases of \$3.4 million, resulting in a remaining balance of \$25.3 million at December 31, 2019, compared to net decreases of \$5.8 million resulting in a remaining balance of \$21.9 million at December 31, 2018. 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 benefit for interest and penalties of \$1.3 million, net of tax, was included in the provision for income taxes for the year ended December 31, 2019. This compares to a provision for interest and penalties of \$0.3 million, net of tax, and \$0.1 million, net of tax, for the year ended December 31, 2018 and 2017, respectively. As of December 31, 2019 and 2018, the liability for the potential payment of interest and penalties totaled \$8.4 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 111: PROVISION FOR INCOME TAXES

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Current Tax Provision:			
Federal	\$ 216.4	\$ 132.8	\$ 347.3
State	50.7	95.4	38.3
Non-U.S.	150.5	162.7	125.4
Total	417.6	390.9	511.0
Deferred Tax Provision:			
Federal	\$ 16.5	\$ 33.8	\$ (96.4)
State	16.5	(13.8)	24.6
Non-U.S.	1.3	(9.5)	(4.3)
Total	34.3	10.5	(76.1)
Provision for Income Taxes	\$ 451.9	\$ 401.4	\$ 434.9

In addition to the amounts shown above, tax charges and benefits have been recorded directly to stockholders' equity for the following:

TABLE 112: TAX CHARGES AND BENEFITS RECORDED DIRECTLY TO STOCKHOLDERS' EQUITY

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Tax Effect of Other Comprehensive Income	88.9	25.7	(112.4)

Deferred taxes result from temporary differences between the amounts reported in the consolidated financial statements and the tax bases of assets and liabilities. Deferred tax assets and liabilities have been computed as follows:

TABLE 113: NET DEFERRED TAX LIABILITIES

(In Millions)	DECEMBER 31,	
	2019	2018
Deferred Tax Liabilities:		
Lease Financing	\$ 36.9	\$ 43.3
Software Development	249.4	193.2
Accumulated Depreciation	99.8	129.5
Compensation and Benefits	8.3	10.9
State Taxes, net	66.4	58.9
Other Liabilities	206.7	114.5
Gross Deferred Tax Liabilities	667.5	550.3
Deferred Tax Assets:		
Allowance for Credit Losses	26.1	29.0
Other Assets	147.0	120.6
Gross Deferred Tax Assets	173.1	149.6
Valuation Reserve	(29.8)	(0.3)
Deferred Tax Assets, net of Valuation Reserve	143.3	149.3
Net Deferred Tax Liabilities	\$ 524.2	\$ 401.0

Northern Trust had various state net operating loss carryforwards as of December 31, 2019 and 2018. The income tax benefits associated with these loss carryforwards were approximately \$1.0 million as of December 31, 2019 and \$0.3 million

as of December 31, 2018. A valuation allowance related to the loss carryforwards of \$0.3 million was recorded at December 31, 2019 and 2018, as management believes the net operating losses will not be fully realized.

The Corporation generated a foreign tax credit carryforward during the twelve months ended December 31, 2019. A valuation allowance related to the credit carryforward of \$29.5 million was recorded at December 31, 2019, as management believes that the foreign tax credit carryforward will not be fully realized.

Note 23 – 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 in the consolidated balance sheets. Total assets in the “Rabbi” Trust related to the nonqualified pension plan at December 31, 2019 and 2018 amounted to \$128.8 million and \$129.9 million, respectively. Contributions of \$3.0 million and \$21.9 million were made to the “Rabbi” Trust in 2019 and 2018, 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 2019, 2018, and 2017. Prior service costs are being amortized on a straight-line basis over 11 years for the U.S. Qualified Plan and 10 years for the U.S. Non-Qualified Plan.

TABLE 114: EMPLOYEE BENEFIT PLAN STATUS

(\$ In Millions)	U.S. QUALIFIED PLAN		NON-U.S. PENSION PLANS		U.S. NON-QUALIFIED PLAN	
	2019	2018	2019	2018	2019	2018
Accumulated Benefit Obligation	\$ 1,181.9	\$ 980.6	\$ 204.7	\$ 178.4	\$ 131.5	\$ 120.9
Projected Benefit Obligation	1,323.4	1,092.0	211.1	183.5	149.2	135.6
Plan Assets at Fair Value	1,601.2	1,380.1	190.1	166.7	—	—
Funded Status at December 31	\$ 277.8	\$ 288.1	\$ (21.0)	\$ (16.8)	\$ (149.2)	\$ (135.6)
Weighted-Average Assumptions:						
Discount Rates	3.37%	4.47%	1.40%	2.16%	3.37%	4.47%
Rate of Increase in Compensation Level	4.97	4.39	1.50	1.75	4.97	4.39
Expected Long-Term Rate of Return on Assets	5.25	6.00	1.72	2.39	N/A	N/A

TABLE 115: AMOUNTS INCLUDED IN ACCUMULATED OTHER COMPREHENSIVE INCOME

(In Millions)	U.S. QUALIFIED PLAN		NON-U.S. PENSION PLANS		U.S. NON-QUALIFIED PLAN	
	2019	2018	2019	2018	2019	2018
Net Actuarial Loss	\$ 426.7	\$ 435.4	\$ 46.5	\$ 41.2	\$ 82.5	\$ 65.8
Prior Service (Benefit) Cost	(1.0)	(1.4)	3.0	3.6	0.2	0.4
Gross Amount in Accumulated Other Comprehensive Income	425.7	434.0	49.5	44.8	82.7	66.2
Income Tax Effect	105.7	108.5	6.2	6.0	20.4	16.4
Net Amount in Accumulated Other Comprehensive Income	\$ 320.0	\$ 325.5	\$ 43.3	\$ 38.8	\$ 62.3	\$ 49.8

TABLE 116: NET PERIODIC PENSION EXPENSE

(\$ In Millions)	U.S. QUALIFIED PLAN			NON-U.S. PENSION PLANS			U.S. NON-QUALIFIED PLAN		
	2019	2018	2017	2019	2018	2017	2019	2018	2017
Service Cost	\$ 41.6	\$ 41.4	\$ 38.3	\$ 2.0	\$ 1.7	\$ 0.4	\$ 4.1	\$ 4.3	\$ 3.7
Interest Cost	47.2	44.3	45.9	3.9	4.0	4.0	5.8	5.3	5.2
Expected Return on Plan Assets	(86.9)	(88.2)	(93.8)	(4.4)	(4.4)	(4.5)	—	N/A	N/A
Settlement Expense	—	—	—	—	0.5	1.1	—	—	—
Amortization:									
Net Actuarial Loss	17.2	28.2	19.0	0.6	0.9	1.3	5.6	7.4	5.7
Prior Service (Benefit) Cost	(0.4)	(0.4)	(0.4)	0.3	0.2	0.1	0.2	0.2	0.2
Net Periodic Pension Expense	\$ 18.7	\$ 25.3	\$ 9.0	\$ 2.4	\$ 2.9	\$ 2.4	\$ 15.7	\$ 17.2	\$ 14.8
Weighted-Average Assumptions:									
Discount Rates	4.47%	3.79%	4.46%	2.16%	2.08%	2.33%	4.47%	3.79%	4.46%
Rate of Increase in Compensation Level	4.39	4.39	4.39	1.75	1.75	1.75	4.39	4.39	4.39
Expected Long-Term Rate of Return on Assets	6.00	6.00	6.75	2.39	2.61	3.13	N/A	N/A	N/A

The components of net periodic pension expense are included in the line item “Employee Benefits” expense in the consolidated statements of income.

TABLE 117: CHANGE IN PROJECTED BENEFIT OBLIGATION

(In Millions)	U.S. QUALIFIED PLAN		NON-U.S. PENSION PLANS		U.S. NON-QUALIFIED PLAN	
	2019	2018	2019	2018	2019	2018
Beginning Balance	\$ 1,092.0	\$ 1,209.9	\$ 183.5	\$ 198.3	\$ 135.6	\$ 144.5
Service Cost	41.6	41.4	2.0	1.7	4.1	4.3
Interest Cost	47.2	44.3	3.9	4.0	5.8	5.3
Employee Contributions	—	—	0.6	0.4	—	—
Plan Amendment	—	—	(0.4)	1.3	—	—
Actuarial Loss (Gain)	213.3	(112.4)	20.9	(9.3)	22.0	(9.7)
Settlement	—	—	—	(2.7)	—	—
Benefits Paid	(70.7)	(91.2)	(3.6)	(1.1)	(18.3)	(8.8)
Foreign Exchange Rate Changes	—	—	4.2	(9.1)	—	—
Ending Balance	\$ 1,323.4	\$ 1,092.0	\$ 211.1	\$ 183.5	\$ 149.2	\$ 135.6

Actuarial losses of \$256.2 million in 2019 were primarily caused by decreases in discount rates. Actuarial gains of \$131.4 million in 2018 were primarily caused by increases in discount rates.

TABLE 118: ESTIMATED FUTURE BENEFIT PAYMENTS

(In Millions)	U.S. QUALIFIED PLAN	NON-U.S. PENSION PLANS	U.S. NON-QUALIFIED PLAN
2020	\$ 81.0	\$ 3.9	\$ 15.0
2021	82.9	4.2	16.7
2022	84.3	4.2	18.4
2023	91.1	4.6	20.3
2024	89.6	4.9	16.2
2025-2029	469.7	29.9	60.8

TABLE 119: CHANGE IN PLAN ASSETS

(In Millions)	U.S. QUALIFIED PLAN		NON-U.S. PENSION PLANS	
	2019	2018	2019	2018
Fair Value of Assets at Beginning of Period	\$ 1,380.1	\$ 1,506.4	\$ 166.7	\$ 178.7
Actual Return on Assets	291.8	(85.1)	18.6	(2.3)
Employer Contributions	—	50.0	3.1	2.6
Employee Contributions	—	—	0.6	0.4
Settlement	—	—	—	(2.7)
Benefits Paid	(70.7)	(91.2)	(3.6)	(1.1)
Foreign Exchange Rate Changes	—	—	4.7	(8.9)
Fair Value of Assets at End of Period	\$ 1,601.2	\$ 1,380.1	\$ 190.1	\$ 166.7

The minimum required and maximum remaining deductible contributions for the U.S. Qualified Plan in 2020 are estimated to be zero and \$275.0 million, respectively.

During 2017, the investment strategy employed for Northern Trust's U.S. Qualified Plan was changed to utilize 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 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.

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.

The target allocation of the U.S. Qualified Plan assets since February 2019 is 45% U.S. long credit bonds, 10% U.S. long government bonds, 10% custom completion, 8% U.S. equities, 5% international developed equity, 3% emerging markets equity, 3% private real estate, 4% high yield bonds, 3% global listed infrastructure, 4% emerging market debt, 2% private equity, and 3% hedge funds.

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 U.S. and non-U.S. stocks and divided by investment style and market capitalization. Fixed income securities held include U.S. treasury securities 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 2% of the total limited partnership 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.

Though not a primary strategy for meeting the U.S. Qualified Plan's objectives, derivatives may be used from time to time, 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 five derivatives held by the U.S. Qualified Plan at December 31, 2019. There were four derivatives held by the U.S. Qualified Plan at December 31, 2018.

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 relative 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 relative 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 investments are comprised of a mutual fund 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 U.S. government obligations and collective trust funds. 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 NAV.

Level 3 – Valuation techniques in which one or more significant inputs are unobservable in the marketplace. The U.S. Qualified Plan's Level 3 assets are comprised of private equity and hedge funds, 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 U.S. Qualified Plan's Level 3 assets are also comprised of 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.

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, particularly as applied to Level 3 assets, 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, 2019 and 2018.

TABLE 120: FAIR VALUE OF U.S. QUALIFIED PLAN ASSETS

(In Millions)	DECEMBER 31, 2019			
	LEVEL 1	LEVEL 2	LEVEL 3	TOTAL
Domestic Common Stock	\$ 12.3	\$ —	\$ —	\$ 12.3
Domestic Corporate Bonds	—	254.6	—	254.6
Foreign Corporate Bonds	—	45.0	—	45.0
U.S. Government Obligations	—	168.3	—	168.3
Non-U.S. Government Obligations	—	18.8	—	18.8
Domestic Municipal and Provincial Bonds	—	23.1	—	23.1
Foreign Municipal and Provincial Bonds	—	0.3	—	0.3
Collective Trust Funds	—	866.6	—	866.6
Mutual Funds	112.8	—	—	112.8
Northern Trust Private Equity Funds	—	—	20.3	20.3
Northern Trust Hedge Funds	—	—	30.2	30.2
Real Estate Funds	—	—	46.3	46.3
Cash and Other	2.6	—	—	2.6
Total Assets at Fair Value	\$ 127.7	\$ 1,376.7	\$ 96.8	\$ 1,601.2

(In Millions)	DECEMBER 31, 2018			
	LEVEL 1	LEVEL 2	LEVEL 3	TOTAL
Domestic Common Stock	\$ 27.7	\$ —	\$ —	\$ 27.7
Domestic Corporate Bonds	—	227.6	—	227.6
Foreign Corporate Bonds	—	34.2	—	34.2
U.S. Government Obligations	—	155.5	—	155.5
Non-U.S. Government Obligations	—	15.1	—	15.1
Domestic Municipal and Provincial Bonds	—	22.7	—	22.7
Foreign Municipal and Provincial Bonds	—	2.0	—	2.0
Collective Trust Funds	—	745.8	—	745.8
Mutual Funds	92.4	—	—	92.4
Exchange Traded Fund	0.1	—	—	0.1
Northern Trust Private Equity Funds	—	—	25.5	25.5
Northern Trust Hedge Funds	—	—	29.2	29.2
Cash and Other	2.3	—	—	2.3
Total Assets at Fair Value	\$ 122.5	\$ 1,202.9	\$ 54.7	\$ 1,380.1

The following table presents the changes in Level 3 assets for the years ended December 31, 2019 and 2018.

TABLE 121: CHANGE IN U.S. QUALIFIED PLAN LEVEL 3 ASSETS

(In Millions)	PRIVATE EQUITY FUNDS		HEDGE FUNDS		REAL ESTATE FUNDS	
	2019	2018	2019	2018	2019	2018
Fair Value at January 1	\$ 25.5	\$ 29.3	\$ 29.2	\$ 44.6	\$ —	\$ —
Actual Return on Plan Assets ⁽¹⁾	(2.8)	(1.5)	1.2	(2.7)	0.2	—
Realized Gain	7.4	8.7	—	2.4	—	—
Purchases	0.1	0.3	—	—	46.1	—
Sales	(9.9)	(11.3)	(0.2)	(15.1)	—	—
Fair Value at December 31	\$ 20.3	\$ 25.5	\$ 30.2	\$ 29.2	\$ 46.3	\$ —

(1) The return on plan assets represents the change in the unrealized gain (loss) on assets still held at December 31.

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, 2019 measurement date was set at 5.25%.

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.

The following tables set forth the postretirement health care plan status and amounts included in AOCI at December 31, 2019 and 2018, the net periodic postretirement benefit cost of the plan for 2019 and 2018, and the change in the accumulated postretirement benefit obligation during 2019 and 2018.

TABLE 122: POSTRETIREMENT HEALTH CARE PLAN STATUS

(In Millions)	DECEMBER 31,	
	2019	2018
Accumulated Postretirement Benefit Obligation at Measurement Date:		
Retirees and Dependents	\$ 25.2	\$ 23.5
Actives Eligible for Benefits	3.6	4.6
Net Postretirement Benefit Obligation	\$ 28.8	\$ 28.1

TABLE 123: AMOUNTS INCLUDED IN ACCUMULATED OTHER COMPREHENSIVE INCOME

(In Millions)	DECEMBER 31,	
	2019	2018
Net Actuarial (Gain) Loss	\$ (5.4)	\$ (6.5)
Prior Service Cost	—	—
Gross Amount in Accumulated Other Comprehensive Income	(5.4)	(6.5)
Income Tax Effect	(1.4)	(2.2)
Net Amount in Accumulated Other Comprehensive Income	\$ (4.0)	\$ (4.3)

TABLE 124: NET PERIODIC POSTRETIREMENT EXPENSE (BENEFIT)

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Service Cost	\$ —	\$ —	\$ 0.1
Interest Cost	1.2	1.3	1.4
Expected Return on Plan Assets	—	—	—
Amortization			
Net Gain	(1.1)	—	—
Prior Service Benefit	—	—	—
Net Periodic Postretirement Expense	\$ 0.1	\$ 1.3	\$ 1.5

TABLE 125: CHANGE IN ACCUMULATED POSTRETIREMENT BENEFIT OBLIGATION

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
		2019	2018
Beginning Balance	\$	28.1	\$ 34.4
Service Cost		—	—
Interest Cost		1.2	1.3
Actuarial Loss (Gain)		0.2	(6.7)
Net Claims Paid		(0.7)	(0.9)
Ending Balance	\$	28.8	\$ 28.1

Northern Trust uses the aggregate Pri-2012 mortality table with a 2012 base year and proposed future improvements under scale MP-2019, as released by the Society of Actuaries in October 2019. These assumptions were updated at December 31, 2019 from the aggregate table RP-2014 and improvement scale MP-2018.

TABLE 126: ESTIMATED FUTURE BENEFIT PAYMENTS

(In Millions)	TOTAL POSTRETIREMENT MEDICAL BENEFITS
2020	\$ 2.5
2021	2.4
2022	2.3
2023	2.2
2024	2.1
2025-2029	9.6

The weighted average discount rate used in determining the accumulated postretirement benefit obligation was 3.37% at December 31, 2019, and 4.47% at December 31, 2018. For measurement purposes, a 6.25% annual increase in the cost of pre-age 65 medical benefits and post-age 65 medical benefits were assumed for 2019. For drug claims, an 8.25% annual increase in cost was assumed for 2019. These rates are both assumed to gradually decrease until they reach 4.50% in 2027. The health care cost trend rate assumption has an effect on the amounts reported.

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 and totaled \$57.6 million in 2019, \$54.4 million in 2018, and \$53.4 million in 2017.

Note 24 – 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 127: TOTAL COMPENSATION EXPENSE FOR SHARE-BASED PAYMENT ARRANGEMENTS TO EMPLOYEES

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,			
		2019	2018	2017
Restricted Stock Unit Awards	\$	81.4	\$ 96.3	\$ 87.3
Stock Options		1.4	2.6	9.0
Performance Stock Units		25.1	32.0	31.7
Total Share-Based Compensation Expense	\$	107.9	\$ 130.9	\$ 128.0
Tax Benefits Recognized	\$	26.7	\$ 32.5	\$ 48.7

As of December 31, 2019, there was \$77.7 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 two years.

The Northern Trust Corporation 2017 Long-Term Incentive Plan (2017 Plan) is administered by the Compensation and Benefits 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. For all applicable periods, stock option grants continue to vest in accordance with the original terms of the award if the employee meets applicable age and service requirements upon separation from service.

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, 2019, shares available for future grant under the 2017 Plan, including shares forfeited under the 2012 Plan and 2002 Plan, totaled 18,234,658.

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 year 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, 2019 and 2018. The weighted-average assumptions used for options granted during the year ended December 31, 2017 are as follows:

TABLE 128: WEIGHTED-AVERAGE ASSUMPTIONS USED FOR OPTIONS GRANTED

	2017
Expected Term (in Years)	6.9
Dividend Yield	1.81%
Expected Volatility	23.2
Risk-Free Interest Rate	2.11

The expected term of options represents the period of time options granted are expected to be outstanding based primarily on the historical exercise behavior attributable to previous option grants. Dividend yield represents the estimated yield from dividends paid on the Corporation's common stock over the expected term of the options. Expected volatility is determined based on a combination of the historical volatility of Northern Trust's stock price and the implied volatility of traded options on Northern Trust stock. The risk-free interest rate is based on the U.S. Treasury yield curve at the time of grant for a period equal to the expected term of the options granted.

The following table provides information about stock options granted, vested, and exercised in the years ended December 31, 2019, 2018, and 2017.

TABLE 129: STOCK OPTIONS GRANTED, VESTED, AND EXERCISED

(In Millions, Except Per Share Information)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Weighted Average Grant-Date Per Share Fair Value of Stock Options Granted	\$ —	\$ —	19.18
Grant-Date Fair Value of Stock Options Vested	6.6	8.1	7.3
Stock Options Exercised			
Intrinsic Value as of Exercise Date	35.4	28.5	74.7
Cash Received	44.0	32.6	108.0
Tax Deduction Benefits Realized	35.2	27.7	73.1

The following is a summary of changes in nonvested stock options for the year ended December 31, 2019.

TABLE 130: CHANGES IN NONVESTED STOCK OPTIONS

NONVESTED OPTIONS	SHARES	WEIGHTED-AVERAGE GRANT-DATE FAIR VALUE PER SHARE
Nonvested at December 31, 2018	757,738	\$ 17.36
Granted	—	—
Vested	(372,799)	17.26
Forfeited or Cancelled	—	—
Nonvested at December 31, 2019	384,939	\$ 17.45

A summary of the status of stock options at December 31, 2019, and changes during the year then ended, are presented in the table below.

TABLE 131: 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, 2018	2,481,061	\$ 61.90		
Granted	—	—		
Exercised	(786,931)	55.91		
Forfeited, Expired or Cancelled	2,806	53.10		
Options Outstanding, December 31, 2019	1,696,936	\$ 64.77	4.1	\$ 70.4
Options Exercisable, December 31, 2019	1,311,997	\$ 61.42	3.8	\$ 58.5

Restricted Stock Unit Awards. Restricted stock unit awards may be granted to participants which entitle 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 2019 predominately vest at a rate equal to 25% each year for four years on the anniversary of the first day of the month following the month in which the grant date falls. Restricted stock unit grants totaled 855,112, 815,314, and 863,308, with weighted average grant-date fair values of \$91.89, \$103.74, and \$88.19 per share, for the years ended December 31, 2019, 2018, and 2017, respectively. The total fair value of restricted stock units vested during the years ended December 31, 2019, 2018, and 2017, was \$89.3 million, \$66.4 million, and \$88.7 million, respectively.

A summary of the status of outstanding restricted stock unit awards at December 31, 2019, and changes during the year then ended, is presented in the following table.

TABLE 132: OUTSTANDING RESTRICTED STOCK UNIT AWARDS

(\$ In Millions)	NUMBER	AGGREGATE INTRINSIC VALUE
Restricted Stock Unit Awards Outstanding, December 31, 2018	3,121,842	\$ 261.0
Granted	855,112	
Distributed	(1,271,190)	
Forfeited	(61,002)	
Restricted Stock Unit Awards Outstanding, December 31, 2019	2,644,762	\$ 281.0
Units Convertible, December 31, 2019	23,435	\$ 2.5

The following is a summary of nonvested restricted stock unit awards at December 31, 2019, and changes during the year then ended.

TABLE 133: 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, 2018	2,977,120	\$ 79.92	1.9
Granted	855,112	91.89	
Vested	(1,147,020)	72.17	
Forfeited	(61,002)	77.64	
Nonvested at December 31, 2019	2,624,210	\$ 87.26	1.7

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 at the end of a three-year performance period, subject to the attainment of specified performance targets that are a function of return on equity. For performance stock units outstanding as of December 31, 2019, and granted in 2017, 2018, or 2019, the number of such units that may vest ranges from 0% to 150% of the original award granted based on the attainment of the applicable 3-year average annual return on equity target. Distribution of the shares is then made after vesting.

Performance stock unit grants totaled 213,044, 242,232, and 231,269 for the years ended December 31, 2019, 2018, and 2017, respectively, with weighted average grant-date fair values of \$93.00, \$104.72, and \$69.80. Performance stock units outstanding at target level performance totaled 667,741, 797,531, and 817,432 at December 31, 2019, 2018, and 2017, respectively. Performance stock units had aggregate intrinsic values of \$70.9 million, \$66.7 million, and \$81.7 million, and weighted average remaining vesting terms of 1.0 year, 1.0 year, and 1.1 years, at December 31, 2019, 2018, and 2017, respectively.

Non-employee Director Stock Awards. Stock units with total values of \$1.3 million (14,232 units), \$1.2 million (11,363 units), and \$1.2 million (13,354 units) were granted to non-employee directors in 2019, 2018, and 2017, 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 \$1.4 million, \$1.3 million, and \$1.3 million in 2019, 2018, and 2017, 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 25 – 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 \$326.1 million in 2019, \$326.5 million in 2018, and \$289.8 million in 2017.

Note 26 – Contingent Liabilities

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, 2019, 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. The Public Prosecutor's Office of France has appealed the appellate court's decision to the Cour de Cassation, the highest court in France. 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. On June 28, 2018, and September 27, 2019, Visa deposited an additional \$600 million and \$300 million, respectively, 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, 2019 and 2018.

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 obligations of states and political subdivisions, asset-backed securities, commercial paper, dollar placements, and securities issued by the Government National Mortgage Association.

As a result of its participation in cash, securities, and foreign exchange clearing and settlement organizations, the Bank could be responsible for a pro rata share of certain credit-related losses arising out of the clearing activities. The method in which such losses would be shared by the clearing members is stipulated in each clearing organization's membership agreement. Credit exposure related to these agreements varies from day to day, primarily as a result of fluctuations in the volume of transactions cleared through the organizations. At December 31, 2019 and 2018, we have not recorded any material liabilities under these arrangements. Controls related to these clearing transactions are closely monitored by management to protect the assets of Northern Trust and its clients.

Note 27 – 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 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, 2019 and 2018.

TABLE 134: NOTIONAL AND FAIR VALUES OF DERIVATIVE FINANCIAL INSTRUMENTS

(In Millions)	DECEMBER 31, 2019			DECEMBER 31, 2018		
	NOTIONAL VALUE	FAIR VALUE		NOTIONAL VALUE	FAIR VALUE	
		ASSET ⁽¹⁾	LIABILITY ⁽²⁾		ASSET ⁽¹⁾	LIABILITY ⁽²⁾
Derivatives Designated as Hedging under GAAP						
Interest Rate Contracts						
Fair Value Hedges	\$ 4,538.2	\$ 20.3	\$ 20.9	\$ 4,590.4	\$ 29.8	\$ 23.3
Cash Flow Hedges	200.0	0.2	0.2	600.0	0.2	1.2
Foreign Exchange Contracts						
Cash Flow Hedges	1,661.5	8.5	11.5	2,648.2	13.8	57.8
Net Investment Hedges	2,873.8	73.7	11.9	3,475.1	292.4	14.5
Total Derivatives Designated as Hedging under GAAP	\$ 9,273.5	\$ 102.7	\$ 44.5	\$ 11,313.7	\$ 336.2	\$ 96.8
Derivatives Not Designated as Hedging under GAAP						
Non-Designated Risk Management Derivatives						
Foreign Exchange Contracts	\$ 176.5	\$ 0.9	\$ 0.7	\$ 122.2	\$ 0.5	\$ 0.2
Other Financial Derivatives ⁽³⁾	640.3	—	33.4	483.4	1.3	32.8
Total Non-Designated Risk Management Derivatives	\$ 816.8	\$ 0.9	\$ 34.1	\$ 605.6	\$ 1.8	\$ 33.0
Client-Related and Trading Derivatives						
Foreign Exchange Contracts	\$ 291,533.6	\$ 3,151.7	\$ 3,158.1	\$ 281,864.4	\$ 2,159.4	\$ 2,190.0
Interest Rate Contracts	8,976.8	132.4	76.3	7,711.2	66.1	68.6
Total Client-Related and Trading Derivatives	\$ 300,510.4	\$ 3,284.1	\$ 3,234.4	\$ 289,575.6	\$ 2,225.5	\$ 2,258.6
Total Derivatives Not Designated as Hedging under GAAP	\$ 301,327.2	\$ 3,285.0	\$ 3,268.5	\$ 290,181.2	\$ 2,227.3	\$ 2,291.6
Total Gross Derivatives	\$ 310,600.7	\$ 3,387.7	\$ 3,313.0	\$ 301,494.9	\$ 2,563.5	\$ 2,388.4
Less: Netting ⁽⁴⁾		2,338.0	1,618.4		1,357.1	1,796.3
Total Derivative Financial Instruments		\$ 1,049.7	\$ 1,694.6		\$ 1,206.4	\$ 592.1

(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 28, "Offsetting of Assets and Liabilities."

Notional amounts of derivative financial instruments do not represent credit risk, and are not recorded in 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 (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, 2019, 2018, and 2017 as a result of the discontinuance of forecasted transactions that were no longer probable of occurring. It is estimated that net losses of \$2.9 million and net gains of \$2.7 million will be reclassified into net income within the next twelve months.

relating to cash flow hedges of foreign-currency-denominated transactions and cash flow hedges of foreign-currency-denominated debt securities, respectively. It is estimated that a net loss of \$0.1 million will be reclassified into net income upon the receipt of interest payments on earning assets within the next twelve months relating to cash flow hedges of available for sale debt securities. As of December 31, 2019, 23 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. There was no ineffectiveness recognized in earnings for cash flow hedges during the year ended December 31, 2017.

The following table provides fair value and cash flow hedge derivative gains and losses recognized in income during the years ended December 31, 2019, 2018 and 2017.

TABLE 135: LOCATION AND AMOUNT OF FAIR VALUE AND CASH FLOW HEDGE DERIVATIVE GAINS AND LOSSES RECORDED IN INCOME

(in Millions) For the Year Ended December 31,	INTEREST INCOME			INTEREST EXPENSE			OTHER OPERATING INCOME			OTHER OPERATING EXPENSE		
	2019	2018	2017	2019	2018	2017	2019	2018	2017	2019	2018	2017
Total amounts on the consolidated statements of income	\$2,499.9	\$2,321.4	\$1,769.4	\$ 822.0	\$ 698.7	\$ 340.2	\$ 145.5	\$ 127.5	\$ 157.5	\$ 329.8	\$ 330.6	\$ 331.6
Gains (Losses) on fair value hedges recognized on												
Interest Rate Contracts												
Recognized on derivatives	(95.9)	13.9	8.8	99.4	(9.5)	(24.3)	—	—	—	—	—	—
Recognized on hedged items	95.9	(13.9)	(8.8)	(99.4)	9.5	24.3	—	—	—	—	—	—
Amounts related to interest settlements on derivatives	21.2	17.8	(9.6)	5.2	7.9	27.7	—	—	—	—	—	—
Total gains (losses) recognized on fair value hedges	\$ 21.2	\$ 17.8	\$ (9.6)	\$ 5.2	\$ 7.9	\$ 27.7	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Gains (Losses) on cash flow hedges recognized on												
Foreign Exchange Contracts												
Net gains (losses) reclassified from AOCI to net income	26.4	67.4	19.3	—	—	—	0.8	3.9	5.0	—	—	(0.1)
Interest Rate Contracts												
Net gains (losses) reclassified from AOCI to net income	(0.5)	(0.2)	0.3	—	—	—	—	—	—	—	—	—
Total gains (losses) reclassified from AOCI to net income on cash flow hedges	\$ 25.9	\$ 67.2	\$ 19.6	\$ —	\$ —	\$ —	\$ 0.8	\$ 3.9	\$ 5.0	\$ —	\$ —	\$ (0.1)

The following table provides the impact of fair value hedge accounting on the carrying value of the designated hedged items as of December 31, 2019 and 2018.

TABLE 136: HEDGED ITEMS IN FAIR VALUE HEDGES

(In Millions)	DECEMBER 31, 2019		DECEMBER 31, 2018	
	CARRYING VALUE OF THE HEDGED ITEMS	CUMULATIVE HEDGE ACCOUNTING BASIS ADJUSTMENT ⁽¹⁾	CARRYING VALUE OF THE HEDGED ITEMS	CUMULATIVE HEDGE ACCOUNTING BASIS ADJUSTMENT ⁽²⁾
Available for Sale Debt Securities ⁽³⁾	\$ 2,981.0	\$ 3.3	\$ 3,831.6	\$ 99.4
Senior Notes and Long-Term Subordinated Debt	1,748.5	126.9	1,248.8	29.3
Total	\$ 4,729.5	\$ 130.2	\$ 5,080.4	\$ 128.7

(1) The cumulative hedge accounting basis adjustment includes \$1.5 million related to discontinued hedging relationships of available for sale debt securities as of December 31, 2019. 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, 2019.

(2) There are no amounts related to discontinued hedging relationships as of December 31, 2018.

(3) 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 \$59.7 million and \$173.0 million were recognized in AOCI related to foreign exchange contracts for the years ended December 31, 2019 and 2018, respectively. There was no ineffectiveness recognized in earnings for net investment hedges during the year ended December 31, 2017.

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 in the consolidated statements of income for the years ended December 31, 2019, 2018, and 2017 for derivative instruments not designated as hedges under GAAP.

TABLE 137: 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		
		2019	2018	2017
Non-designated risk management derivatives				
Foreign Exchange Contracts	Other Operating Income	\$ (1.6)	\$ (4.1)	\$ 8.2
Other Financial Derivatives ⁽¹⁾	Other Operating Income	(20.0)	(19.2)	(13.3)
Gains (Losses) from non-designated risk management derivatives		\$ (21.6)	\$ (23.3)	\$ (5.1)
Client-related and trading derivatives				
Foreign Exchange Contracts	Foreign Exchange Trading Income	250.9	307.2	209.9
Interest Rate Contracts	Security Commissions and Trading Income	12.9	7.7	10.7
Gains (Losses) from client-related and trading derivatives		\$ 263.8	\$ 314.9	\$ 220.6
Total gains (losses) from derivatives not designated as hedging under GAAP		\$ 242.2	\$ 291.6	\$ 215.5

(1) This line includes swaps related to the sale of certain Visa Class B common shares and total return swap contracts.

Note 28 – 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, 2019 and 2018.

TABLE 138: OFFSETTING OF DERIVATIVE ASSETS AND SECURITIES PURCHASED UNDER AGREEMENTS TO RESELL

December 31, 2019

(In Millions)	GROSS RECOGNIZED ASSETS	GROSS AMOUNTS OFFSET IN THE BALANCE SHEET ⁽²⁾	NET AMOUNTS PRESENTED IN THE BALANCE SHEET	GROSS AMOUNTS NOT OFFSET IN THE BALANCE SHEET	NET AMOUNT ⁽⁴⁾
Derivative Assets ⁽¹⁾					
Foreign Exchange Contracts Over the Counter (OTC)	\$ 2,691.1	\$ 2,334.1	\$ 357.0	\$ 16.5	\$ 340.5
Interest Rate Swaps OTC	151.9	3.9	148.0	—	148.0
Interest Rate Swaps Exchange Cleared	1.0	—	1.0	—	1.0
Total Derivatives Subject to a Master Netting Arrangement	2,844.0	2,338.0	506.0	16.5	489.5
Total Derivatives Not Subject to a Master Netting Arrangement	543.7	—	543.7	0.3	543.4
Total Derivatives	3,387.7	2,338.0	1,049.7	16.8	1,032.9
Securities Purchased under Agreements to Resell ⁽³⁾	\$ 707.8	\$ —	\$ 707.8	\$ 707.8	\$ —

December 31, 2018

(In Millions)	GROSS RECOGNIZED ASSETS	GROSS AMOUNTS OFFSET IN THE BALANCE SHEET ⁽²⁾	NET AMOUNTS PRESENTED IN THE BALANCE SHEET	GROSS AMOUNTS NOT OFFSET IN THE BALANCE SHEET	NET AMOUNT ⁽⁴⁾
Derivative Assets ⁽¹⁾					
Foreign Exchange Contracts OTC	\$ 1,902.3	\$ 1,308.8	\$ 593.5	\$ 12.7	\$ 580.8
Interest Rate Swaps OTC	71.6	22.6	49.0	—	49.0
Interest Rate Swaps Exchange Cleared	24.5	24.4	0.1	—	0.1
Other Financial Derivative	1.3	1.3	—	—	—
Total Derivatives Subject to a Master Netting Arrangement	1,999.7	1,357.1	642.6	12.7	629.9
Total Derivatives Not Subject to a Master Netting Arrangement	563.8	—	563.8	2.7	561.1
Total Derivatives	2,563.5	1,357.1	1,206.4	15.4	1,191.0
Securities Purchased under Agreements to Resell ⁽³⁾	\$ 1,031.2	\$ —	\$ 1,031.2	\$ 1,031.2	\$ —

(1) Derivative assets are reported in Other Assets in the consolidated balance sheets. Other Assets (excluding derivative assets) totaled \$7.4 billion and \$4.6 billion as of December 31, 2019 and 2018, respectively.

(2) Including cash collateral received from counterparties.

(3) Securities purchased under agreements to resell are reported in federal funds sold and securities purchased under agreements to resell in the consolidated balance sheets. Federal funds sold totaled \$5.0 million and \$134.0 million as of December 31, 2019 and 2018, respectively.

(4) Northern Trust did not possess any cash collateral that was not offset in the consolidated balance sheets that could have been used to offset the net amounts presented in the consolidated balance sheets as of December 31, 2019 and 2018.

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, 2019 and 2018.

TABLE 139: OFFSETTING OF DERIVATIVE LIABILITIES AND SECURITIES SOLD UNDER AGREEMENTS TO REPURCHASE

December 31, 2019						
(In Millions)	GROSS RECOGNIZED LIABILITIES	GROSS AMOUNTS OFFSET IN THE BALANCE SHEET ⁽²⁾	NET AMOUNTS PRESENTED IN THE BALANCE SHEET	GROSS AMOUNTS NOT OFFSET IN THE BALANCE SHEET	NET AMOUNT ⁽³⁾	
Derivative Liabilities ⁽¹⁾						
Foreign Exchange Contracts OTC	\$ 2,181.6	\$ 1,548.6	\$ 633.0	\$ 0.1	\$ 632.9	
Interest Rate Swaps OTC	96.7	57.3	39.4	—	39.4	
Interest Rate Swaps Exchange Cleared	0.7	—	0.7	—	0.7	
Other Financial Derivatives	33.4	12.5	20.9	—	20.9	
Total Derivatives Subject to a Master Netting Arrangement	2,312.4	1,618.4	694.0	0.1	693.9	
Total Derivatives Not Subject to a Master Netting Arrangement	1,000.6	—	1,000.6	—	1,000.6	
Total Derivatives	3,313.0	1,618.4	1,694.6	0.1	1,694.5	
Securities Sold under Agreements to Repurchase	\$ 489.7	\$ —	\$ 489.7	\$ 489.7	\$ —	
December 31, 2018						
(In Millions)	GROSS RECOGNIZED LIABILITIES	GROSS AMOUNTS OFFSET IN THE BALANCE SHEET ⁽²⁾	NET AMOUNTS PRESENTED IN THE BALANCE SHEET	GROSS AMOUNTS NOT OFFSET IN THE BALANCE SHEET	NET AMOUNT ⁽³⁾	
Derivative Liabilities ⁽¹⁾						
Foreign Exchange Contracts OTC	\$ 1,821.0	\$ 1,751.7	\$ 69.3	\$ —	\$ 69.3	
Interest Rate Swaps OTC	68.8	19.0	49.8	—	49.8	
Interest Rate Swaps Exchange Cleared	24.4	24.4	—	—	—	
Other Financial Derivatives	32.8	1.2	31.6	—	31.6	
Total Derivatives Subject to a Master Netting Arrangement	1,947.0	1,796.3	150.7	—	150.7	
Total Derivatives Not Subject to a Master Netting Arrangement	441.4	—	441.4	—	441.4	
Total Derivatives	2,388.4	1,796.3	592.1	—	592.1	
Securities Sold under Agreements to Repurchase	\$ 168.3	\$ —	\$ 168.3	\$ 168.3	\$ —	

(1) Derivative liabilities are reported in Other Liabilities in the consolidated balance sheets. Other Liabilities (excluding derivative liabilities) totaled \$3.1 billion and \$2.5 billion as of December 31, 2019 and 2018, respectively.

(2) Including cash collateral deposited with counterparties.

(3) Northern Trust did not place any cash collateral with counterparties that was not offset in the consolidated balance sheets that could have been used to offset the net amounts presented in the consolidated balance sheets as of December 31, 2019 and 2018.

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. However, Northern Trust's repurchase agreements and reverse repurchase agreements 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 \$196.3 million and \$2.0 million, respectively, as of December 31, 2019, and \$27.6 million and \$91.5 million, respectively, as of December 31, 2018, 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 \$766.2 million and \$324.1 million at December 31, 2019 and 2018, respectively. Cash collateral amounts deposited with derivative counterparties on those dates included \$327.1 million and \$316.5 million, respectively, posted against these liabilities, resulting in a net maximum amount of termination payments that could have been required at December 31, 2019 and 2018 of \$439.1 million and \$7.6 million, respectively. Accelerated settlement of these liabilities would not have a material effect on the consolidated financial position or liquidity of Northern Trust.

Note 29 – 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 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. Commitments and letters of credit consist of the following:

Legally Binding 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.

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.

Custody 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, 2019 and 2018 subject to indemnification was \$138.1 billion and \$128.9 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, 2019, or 2018 related to these indemnifications.

The following table provides details of Northern Trust's off-balance sheet financial instruments as of December 31, 2019 and 2018.

TABLE 140: SUMMARY OF OFF-BALANCE SHEET FINANCIAL INSTRUMENTS

(In Millions)	DECEMBER 31,	
	2019	2018
Legally Binding Commitments to Extend Credit ⁽¹⁾	\$ 24,406.2	\$ 25,023.0
Standby Letters of Credit and Financial Guarantees ⁽²⁾⁽³⁾	2,416.7	2,486.2
Commercial Letters of Credit	32.3	32.3
Custody Securities Lent with Indemnification	138,085.9	128,904.8

(1) These amounts exclude \$243.6 million and \$242.3 million of commitments participated to others at December 31, 2019 and 2018, respectively.

(2) These amounts include \$44.5 million and \$72.3 million of standby letters of credit secured by cash deposits or participated to others as of December 31, 2019 and 2018, respectively.

(3) At December 31, 2019, \$1.4 billion of the standby letters of credit will expire within one year or less and \$845.9 million in one to five years.

Note 30 – Variable Interest Entities

Variable Interest Entities (VIEs) are defined within GAAP as entities which either have a total equity investment that is insufficient to permit the entity to finance its activities without additional subordinated financial support or whose equity investors lack the characteristics of a controlling financial interest. Investors that finance a VIE through debt or equity interests, or other counterparties that provide other forms of support, such as guarantees, subordinated fee arrangements, or certain types of derivative contracts, 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 and a variable interest that could potentially be significant to the entity is deemed to be the VIE's primary beneficiary and is required to consolidate the VIE.

Leveraged Leases. In leveraged leasing transactions, Northern Trust acts as lessor of the underlying asset subject to the lease and typically funds 20-30% of the asset's cost via an equity ownership in a trust with the remaining 70-80% provided by third party non-recourse debt holders. In such transactions, the trusts, which are VIEs, are created to provide the lessee use of the property with substantially all of the rights and obligations of ownership. The lessee's maintenance and operation of the leased property has a direct effect on the fair value of the underlying property, and the lessee also has the ability to increase the benefits it can receive and limit the losses it can suffer by the manner in which it uses the property. As a result, Northern Trust has determined that it is not the primary beneficiary of the leveraged lease trust VIEs given it lacks the power to direct the activities that most significantly impact the economic performance of the leveraged lease trust VIEs.

Northern Trust's maximum exposure to loss as a result of its involvement with leveraged lease trust VIEs is limited to the carrying amounts of its leveraged lease investments. As of December 31, 2019 and 2018, the carrying amounts of these investments, which are included in loans and leases in the consolidated balance sheets, were \$42.6 million and \$56.8 million, respectively. Northern Trust's funding requirements relative to the leveraged lease trust VIEs are limited to its invested capital. Northern Trust has no other liquidity arrangements or obligations to purchase assets of the leveraged lease trust VIEs that would expose Northern Trust to a loss.

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, 2019 and 2018, the carrying amounts of these investments in community development projects that generate tax credits, included in Other Assets

in the consolidated balance sheets, totaled \$749.3 million and \$602.4 million, respectively, of which \$700.3 million and \$549.8 million are VIEs as of December 31, 2019 and 2018, respectively. As of December 31, 2019 and 2018, liabilities related to unfunded commitments on investments in tax credit community development projects, included in Other Liabilities in the consolidated balance sheets, totaled \$376.2 million and \$321.0 million, respectively, of which \$354.3 million and \$279.5 million related to undrawn commitments on VIEs as of December 31, 2019 and 2018, 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 \$67.4 million and \$63.0 million, respectively, as of December 31, 2019 and 2018.

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.

Periodically, Northern Trust makes seed capital investments to certain funds. As of December 31, 2019, Northern Trust had \$112.0 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, 2018, Northern Trust had \$29.2 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.

Note 31 – Pledged and Restricted Assets

Certain of Northern Trust's subsidiaries, as required or permitted by law, pledge assets to secure public and trust deposits, repurchase agreements and Federal Home Loan Bank borrowings, as well as for other purposes, including support for securities settlement, primarily related to client activities, for potential Federal Reserve Bank discount window borrowings, and for derivative contracts.

The following table presents Northern Trust's pledged assets.

TABLE 141: TYPE OF PLEDGED ASSETS

(In Billions)	FOR THE YEAR ENDED DECEMBER 31,	
	2019	2018
Securities		
Obligations of States and Political Subdivisions	\$ 1.0	\$ 0.6
Government Sponsored Agency and Other Securities	33.4	30.9
Loans	7.7	8.1
Total Pledged Assets	\$ 42.1	\$ 39.6

Collateral required for these purposes totaled \$8.5 billion and \$9.3 billion at December 31, 2019 and 2018, respectively. The following table presents the available for sale debt securities pledged as collateral that are included in pledged assets.

TABLE 142: FAIR VALUE OF AVAILABLE FOR SALE DEBT SECURITIES INCLUDED IN PLEDGED ASSETS

(In Millions)	SECURITIES SOLD UNDER AGREEMENTS TO REPURCHASE		DERIVATIVE CONTRACTS	
	DECEMBER 31, 2019	DECEMBER 31, 2018	DECEMBER 31, 2019	DECEMBER 31, 2018
Debt Securities				
Available for Sale	\$ 487.1	\$ 151.5	\$ 14.4	\$ 29.0

The secured parties to these transactions have the right to repledge or sell the securities as it relates to \$487.2 million and \$151.5 million of the pledged collateral as of December 31, 2019 and 2018, respectively.

Northern Trust accepts financial assets as collateral that it is and is not permitted to repledge or sell. The collateral is generally obtained under certain repurchase agreements and derivative contracts. The following table presents the fair value of securities accepted as collateral. There was no repledged or sold collateral at December 31, 2019 or 2018.

TABLE 143: ACCEPTED COLLATERAL

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,	
	2019	2018
Collateral that may be repledged or sold		
Repurchase agreements	\$ 707.8	\$ 426.2
Derivative contracts	16.8	15.4
Collateral that may not be repledged or sold		
Repurchase agreements	—	605.0

Deposits maintained to meet Federal Reserve Bank reserve requirements averaged \$1.5 billion in 2019 as compared to \$1.7 billion in 2018.

Note 32 – 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 Wall Street Reform and Consumer Protection Act and Basel III impose additional restrictions on the ability of banking institutions to pay dividends (e.g., the Corporation must include proposed dividends in the capital plan that it submits to the Federal Reserve Board and such dividends may only be declared if the Federal Reserve Board does not object to the Corporation’s capital plan).

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 33 – Reporting Segments and Related Information

Segment Information. Northern Trust is organized around its two client-focused reporting segments: C&IS and Wealth Management. Asset management and related services are provided to C&IS 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 C&IS 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. 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.

Effective January 1, 2019, Northern Trust implemented several enhancements to its FTP methodology, including the allocation of contingent liquidity charges to C&IS and Wealth Management client instruments and products. These methodology enhancements affect the results of each reporting segment. Due to the lack of historical information, segment results for periods ended prior to January 1, 2019 have not been revised to reflect the methodology enhancements.

Also effective January 1, 2019, all revenues, expenses and average assets are allocated to C&IS 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.

For reporting periods ended prior to January 1, 2019, income and expense associated with the wholesale funding activities and investment portfolios of the Corporation and the Bank, as well as certain corporate-based expense, executive-level compensation and nonrecurring items, were not allocated to C&IS and Wealth Management, and were reported in Treasury and Other.

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 tables reflect the earnings contribution and average assets of Northern Trust's reporting segments for the years ended December 31, 2019, 2018, and 2017.

TABLE 144: CORPORATE AND INSTITUTIONAL SERVICES RESULTS OF OPERATIONS

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Noninterest Income			
Trust, Investment and Other Servicing Fees	\$ 2,211.5	\$ 2,173.1	\$ 1,984.6
Foreign Exchange Trading Income	232.2	233.4	197.9
Other Noninterest Income	178.2	183.0	176.1
Total Noninterest Income	2,621.9	2,589.5	2,358.6
Net Interest Income ⁽¹⁾	918.7	992.2	733.8
Revenue ⁽¹⁾	3,540.6	3,581.7	3,092.4
Provision for Credit Losses	1.9	1.9	3.4
Noninterest Expense	2,605.5	2,421.4	2,194.5
Income before Income Taxes ⁽¹⁾	933.2	1,158.4	894.5
Provision for Income Taxes ⁽¹⁾	219.4	255.3	279.5
Net Income	\$ 713.8	\$ 903.1	\$ 615.0
Percentage of Consolidated Net Income	48%	58%	51%
Average Assets	\$ 87,557.1	\$ 82,996.5	\$ 80,105.6

(1) Stated on an FTE basis.

TABLE 145: WEALTH MANAGEMENT RESULTS OF OPERATIONS

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Noninterest Income			
Trust, Investment and Other Servicing Fees	\$ 1,640.6	\$ 1,580.6	\$ 1,449.7
Foreign Exchange Trading Income	18.7	4.2	3.1
Other Noninterest Income	131.1	102.7	103.9
Total Noninterest Income	1,790.4	1,687.5	1,556.7
Net Interest Income ⁽¹⁾	792.0	816.5	736.2
Revenue ⁽¹⁾	2,582.4	2,504.0	2,292.9
Provision for Credit Losses	(16.4)	(16.4)	(31.4)
Noninterest Expense	1,531.6	1,460.0	1,405.3
Income before Income Taxes ⁽¹⁾	1,067.2	1,060.4	919.0
Provision for Income Taxes ⁽¹⁾	271.1	262.1	347.2
Net Income	\$ 796.1	\$ 798.3	\$ 571.8
Percentage of Consolidated Net Income	53%	51%	48%
Average Assets	\$ 29,994.3	\$ 26,163.7	\$ 26,599.9

(1) Stated on an FTE basis.

TABLE 146: TREASURY AND OTHER RESULTS OF OPERATIONS

(\$ In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Noninterest Income	\$ (17.1)	\$ 60.5	\$ 30.8
Net Interest Income ⁽¹⁾	—	(144.8)	5.0
Revenue ⁽¹⁾	(17.1)	(84.3)	35.8
Noninterest Expense	6.4	135.5	169.6
Income (Loss) before Income Taxes ⁽¹⁾	(23.5)	(219.8)	(133.8)
Provision (Benefit) for Income Taxes ⁽¹⁾	(5.8)	(74.8)	(146.0)
Net Income	\$ (17.7)	\$ (145.0)	\$ 12.2
Percentage of Consolidated Net Income	(1)%	(9)%	1%
Average Assets	\$ —	\$ 13,786.4	\$ 12,901.9

(1) Stated on an FTE basis.

TABLE 147: CONSOLIDATED FINANCIAL INFORMATION

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
Noninterest Income			
Trust, Investment and Other Servicing Fees	\$ 3,852.1	\$ 3,753.7	\$ 3,434.3
Foreign Exchange Trading Income	250.9	307.2	209.9
Other Noninterest Income	292.2	276.6	301.9
Total Noninterest Income	4,395.2	4,337.5	3,946.1
Net Interest Income⁽¹⁾	1,710.7	1,663.9	1,475.0
Revenue⁽¹⁾			
Revenue ⁽¹⁾	6,105.9	6,001.4	5,421.1
Provision for Credit Losses	(14.5)	(14.5)	(28.0)
Noninterest Expense	4,143.5	4,016.9	3,769.4
Income before Income Taxes⁽¹⁾	1,976.9	1,999.0	1,679.7
Provision for Income Taxes⁽¹⁾	484.7	442.6	480.7
Net Income	\$ 1,492.2	\$ 1,556.4	\$ 1,199.0
Average Assets	\$ 117,551.4	\$ 122,946.6	\$ 119,607.4

(1) Stated on an FTE basis. The consolidated figures include \$32.8 million, \$41.2 million, and \$45.8 million, of FTE adjustments for 2019, 2018, and 2017, respectively.

Further discussion of reporting segment results is provided within the “Reporting Segments and Related Information” section of Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations.”

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 table below summarizes Northern Trust’s performance based on the allocation process described above without regard to guarantors or the location of collateral.

TABLE 148: DISTRIBUTION OF TOTAL ASSETS AND OPERATING PERFORMANCE

(In Millions)	TOTAL ASSETS	TOTAL REVENUE ⁽¹⁾	INCOME BEFORE INCOME TAXES	NET INCOME
2019				
Non-U.S.	\$ 27,888.6	\$ 1,889.5	\$ 600.0	\$ 451.0
U.S.	108,939.8	4,183.6	1,344.1	1,041.2
Total	\$ 136,828.4	\$ 6,073.1	\$ 1,944.1	\$ 1,492.2
2018				
Non-U.S.	\$ 32,712.9	\$ 2,018.1	\$ 786.4	\$ 625.7
U.S.	99,499.6	3,942.1	1,171.4	930.7
Total	\$ 132,212.5	\$ 5,960.2	\$ 1,957.8	\$ 1,556.4
2017				
Non-U.S.	\$ 30,325.3	\$ 1,709.7	\$ 613.5	\$ 430.0
U.S.	108,265.2	3,665.6	1,020.4	769.0
Total	\$ 138,590.5	\$ 5,375.3	\$ 1,633.9	\$ 1,199.0

(1) Total revenue is comprised of net interest income and noninterest income.

Note 34 – Regulatory Capital Requirements

Northern Trust 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 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, 2019 and 2018, 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. 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, 2019 and 2018, 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, 2019, that management believes have adversely affected the capital categorization of any Northern Trust subsidiary bank.

The table below provides capital ratios for the Corporation and the Bank determined by Basel III phased in requirements.

TABLE 149: RISK-BASED AND LEVERAGE CAPITAL AMOUNTS AND RATIOS

(\$ In Millions)	DECEMBER 31, 2019				DECEMBER 31, 2018			
	STANDARDIZED APPROACH		ADVANCED APPROACH		STANDARDIZED APPROACH		ADVANCED APPROACH	
	BALANCE	RATIO	BALANCE	RATIO	BALANCE	RATIO	BALANCE	RATIO
Common Equity Tier 1 Capital								
Northern Trust Corporation	\$ 8,898.7	12.7%	\$ 8,898.7	13.2%	\$ 8,729.8	12.9%	\$ 8,729.8	13.7%
The Northern Trust Company	8,476.0	12.3	8,476.0	13.0	8,722.5	13.1	8,722.5	14.1
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	4,472.0	6.5	4,230.0	6.5	4,335.9	6.5	4,007.4	6.5
Tier 1 Capital								
Northern Trust Corporation	10,152.0	14.5	10,152.0	15.0	9,596.7	14.1	9,596.7	15.0
The Northern Trust Company	8,476.0	12.3	8,476.0	13.0	8,722.5	13.1	8,722.5	14.1
Minimum to qualify as well-capitalized:								
Northern Trust Corporation	4,205.3	6.0	4,051.6	6.0	4,070.2	6.0	3,834.9	6.0
The Northern Trust Company	5,504.0	8.0	5,206.2	8.0	5,336.4	8.0	4,932.2	8.0
Total Capital								
Northern Trust Corporation	11,456.7	16.3	11,332.3	16.8	10,942.0	16.1	10,803.8	16.9
The Northern Trust Company	9,610.4	14.0	9,486.0	14.6	9,870.7	14.8	9,732.5	15.8
Minimum to qualify as well-capitalized:								
Northern Trust Corporation	7,008.8	10.0	6,752.7	10.0	6,783.7	10.0	6,391.5	10.0
The Northern Trust Company	6,880.1	10.0	6,507.7	10.0	6,670.6	10.0	6,165.3	10.0
Tier 1 Leverage								
Northern Trust Corporation	10,152.0	8.7	10,152.0	8.7	9,596.7	8.0	9,596.7	8.0
The Northern Trust Company	8,476.0	7.3	8,476.0	7.3	8,722.5	7.3	8,722.5	7.3
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	5,835.4	5.0	5,835.4	5.0	5,998.6	5.0	5,998.6	5.0
Supplementary Leverage ⁽¹⁾								
Northern Trust Corporation	N/A	N/A	10,152.0	7.6	N/A	N/A	9,596.7	7.0
The Northern Trust Company	N/A	N/A	8,476.0	6.4	N/A	N/A	8,722.5	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	N/A	N/A	3,983.6	3.0	N/A	N/A	4,077.2	3.0

(1) Effective January 1, 2018, a minimum supplementary leverage ratio of 3 percent became applicable.

The risk-based capital guidelines that apply to the Corporation and the Bank, commonly referred to as Basel III, are based upon the 2011 capital accord of the Basel Committee. The Basel III rules are currently being phased in, and will come into full effect by January 1, 2022.

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 risk weighted assets (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.

The U.S.'s implementation of Basel III has increased the minimum capital thresholds for banking organizations and tightened the standards for what qualifies as capital. The Corporation and the Bank believe their capital strength, balance sheets and business models leave them well positioned for the continued U.S. implementation of Basel III.

Note 35 – Northern Trust Corporation (Corporation only)

Condensed financial information is presented below. Investments in wholly-owned subsidiaries are carried on the equity method of accounting.

TABLE 150: CONDENSED BALANCE SHEETS

(In Millions)	DECEMBER 31,	
	2019	2018
ASSETS		
Cash on Deposit with Subsidiary Bank	\$ 2,559.1	\$ 866.8
Advances to Wholly-Owned Subsidiaries – Banks	2,370.0	2,910.0
Investments in Wholly-Owned Subsidiaries – Banks	9,349.8	9,585.2
– Nonbank	163.0	182.9
Other Assets	1,444.7	803.1
Total Assets	\$ 15,886.6	\$ 14,348.0
LIABILITIES		
Senior Notes	\$ 2,573.0	\$ 2,011.3
Long Term Debt	1,148.1	1,112.4
Floating Rate Capital Debt	277.7	277.6
Other Liabilities	796.8	438.5
Total Liabilities	4,795.6	3,839.8
STOCKHOLDERS' EQUITY		
Preferred Stock	1,273.4	882.0
Common Stock	408.6	408.6
Additional Paid-in Capital	1,013.1	1,068.4
Retained Earnings	11,656.7	10,776.8
Accumulated Other Comprehensive Income (Loss)	(194.7)	(453.7)
Treasury Stock	(3,066.1)	(2,173.9)
Total Stockholders' Equity	11,091.0	10,508.2
Total Liabilities and Stockholders' Equity	\$ 15,886.6	\$ 14,348.0

TABLE 151: CONDENSED STATEMENTS OF INCOME

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
OPERATING INCOME			
Dividends – Bank Subsidiaries	\$ 2,024.1	\$ 1,200.9	\$ 525.0
– Nonbank Subsidiaries	0.4	—	—
Intercompany Interest and Other Charges	115.1	91.9	58.2
Interest and Other Income	20.2	(8.7)	18.1
Total Operating Income	2,159.8	1,284.1	601.3
OPERATING EXPENSES			
Interest Expense	121.6	97.3	76.5
Other Operating Expenses	28.6	17.0	25.9
Total Operating Expenses	150.2	114.3	102.4
Income before Income Taxes and Equity in Undistributed Net Income of Subsidiaries	2,009.6	1,169.8	498.9
Benefit for Income Taxes	24.3	24.6	43.7
Income before Equity in Undistributed Net Income of Subsidiaries	2,033.9	1,194.4	542.6
Equity in Undistributed Net Income of Subsidiaries – Banks	(559.9)	336.7	632.6
– Nonbank	18.2	25.3	23.8
Net Income	\$ 1,492.2	\$ 1,556.4	\$ 1,199.0
Preferred Stock Dividends	46.4	46.4	49.8
Net Income Applicable to Common Stock	\$ 1,445.8	\$ 1,510.0	\$ 1,149.2

TABLE 152: CONDENSED STATEMENTS OF CASH FLOWS

(In Millions)	FOR THE YEAR ENDED DECEMBER 31,		
	2019	2018	2017
CASH FLOWS FROM OPERATING ACTIVITIES			
Net Income	\$ 1,492.2	\$ 1,556.4	\$ 1,199.0
Adjustments to Reconcile Net Income to Net Cash Provided by Operating Activities			
Equity in Undistributed Net Income of Subsidiaries	541.7	(362.0)	(656.4)
Change in Prepaid Expenses	(400.4)	(0.6)	(0.3)
Change in Accrued Income Taxes	114.1	(141.8)	17.2
Other Operating Activities, net	141.9	125.6	55.7
Net Cash Provided by Operating Activities	1,889.5	1,177.6	615.2
CASH FLOWS FROM INVESTING ACTIVITIES			
Proceeds from Sale, Maturity and Redemption of Debt Securities – Available for Sale	—	1.0	—
Advances to Wholly-Owned Subsidiaries	540.0	(436.5)	100.0
Acquisition of a Business, Net of Cash Received	—	(31.2)	—
Other Investing Activities, net	3.7	(3.1)	1.9
Net Cash Provided by (Used in) Investing Activities	543.7	(469.8)	101.9
CASH FLOWS FROM FINANCING ACTIVITIES			
Proceeds from Senior Notes	498.0	497.9	350.0
Proceeds from Issuance of Preferred Stock - Series E	391.4	—	—
Treasury Stock Purchased	(1,100.2)	(924.3)	(523.1)
Net Proceeds from Stock Options	44.0	32.6	108.0
Cash Dividends Paid on Common Stock	(529.7)	(405.4)	(356.8)
Cash Dividends Paid on Preferred Stock	(46.4)	(46.4)	(49.8)
Other Financing Activities, net	2.0	2.1	0.1
Net Cash (Used In) Provided by Financing Activities	(740.9)	(843.5)	(471.6)
Net Change in Cash on Deposit with Subsidiary Bank	1,692.3	(135.7)	245.5
Cash on Deposit with Subsidiary Bank at Beginning of Year	866.8	1,002.5	757.0
Cash on Deposit with Subsidiary Bank at End of Year	\$ 2,559.1	\$ 866.8	\$ 1,002.5

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, 2019, 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, 2019, 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, 2019, 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, 2019, 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, 2019, 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, 2019.

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 OF NORTHERN TRUST CORPORATION:

Opinion on Internal Control Over Financial Reporting

We have audited Northern Trust Corporation's (and subsidiaries') (the Corporation) internal control over financial reporting as of December 31, 2019, 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, 2019, 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, 2019 and 2018, 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, 2019, and the related notes (collectively, the consolidated financial statements), and our report dated February 25, 2020 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.

KPMG LLP

CHICAGO, ILLINOIS
FEBRUARY 25, 2020

ITEM 9B – OTHER INFORMATION

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 2020 Annual Meeting of Stockholders: “Item 1 – Election of Directors,” “Information about the Nominees for Director,” “Security Ownership by Directors and Executive Officers – Delinquent Section 16(a) Reports,” “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 – Committee Composition.”

ITEM 11 – EXECUTIVE COMPENSATION

The information called for by this item is incorporated herein by reference to the “Compensation Discussion and Analysis,” “Compensation and Benefits Committee Report,” “Executive Compensation,” and “Director Compensation” sections of the Corporation’s definitive Proxy Statement for the 2020 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 2020 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 2020 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 2020 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, 2019 and 2018

Consolidated Statements of Income - Years Ended December 31, 2019, 2018, and 2017

Consolidated Statements of Comprehensive Income - Years Ended December 31, 2019, 2018, and 2017

Consolidated Statements of Changes in Stockholders' Equity - Years Ended December 31, 2019, 2018, and 2017

Consolidated Statements of Cash Flows - Years Ended December 31, 2019, 2018, and 2017

Notes to Consolidated Financial Statements

Report of Independent Registered Public Accounting Firm

Financial statement schedules have been omitted for the reason that they are not required or are not applicable.

The Quarterly Financial Data (Unaudited) of the Corporation included in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" is incorporated herein by reference.

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 C Non-Cumulative Perpetual Preferred Stock of Northern Trust Corporation, dated August 4, 2014 (incorporated herein by reference to Exhibit 4.1 to the Corporation's Current Report on Form 8-K filed August 4, 2014).
3.3	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).
3.4	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).
3.5	By-laws of Northern Trust Corporation, as amended February 19, 2019 (incorporated herein by reference to Exhibit 3.1 to the Corporation's Current Report on Form 8-K filed February 19, 2019).
4.1	Deposit Agreement, dated August 5, 2014, 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 4.1 to the Corporation's Current Report on Form 8-K filed August 5, 2014).
4.2	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).
4.3	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).

Exhibit Number	Description
4.4	Description of securities registered pursuant to Section 12 of the Securities Exchange Act of 1934.
4.5	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.
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).
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).
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).
10.5**	Northern Trust Corporation Deferred Compensation Plan, as amended and restated effective as of November 1, 2017 (incorporated herein by reference to Exhibit 10.5 to the Corporation's Annual Report on Form 10-K for the year ended December 31, 2017).
10.6**	Amended and Restated Northern Trust Corporation 2002 Stock Plan, effective as of January 1, 2008 (incorporated herein by reference to Exhibit 10(xiv) to the Corporation's Annual Report on Form 10-K for the fiscal year ended December 31, 2008).
(i)**	Form of 2011 Executive Stock Option Terms and Conditions (incorporated herein by reference to Exhibit 10(v) to the Corporation's Quarterly Report on Form 10-Q for the quarter ended March 31, 2011).
(ii)**	Form of 2012 Executive Stock Option Award Terms and Conditions (incorporated herein by reference to Exhibit 10.7(xix) to the Corporation's Annual Report on Form 10-K for the fiscal year ended December 31, 2011).
10.7**	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).

Exhibit Number	Description
(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 2012 Executive Stock Option Terms and Conditions (incorporated herein by reference to Exhibit 10(i) to the Corporation's Quarterly Report on Form 10-Q for the quarter ended September 30, 2012).
(v)**	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).
(vi)**	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).
(vii)**	Terms and Conditions of 2016 Equity Awards under the Northern Trust Corporation 2012 Stock Plan (incorporated herein by reference to Exhibit 10.1 to the Corporation's Quarterly Report on Form 10-Q for the quarter ended March 31, 2016).
(viii)**	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).
(ix)**	Form of 2017 Stock Unit Award Terms and Conditions, as amended (incorporated herein by reference to Exhibit 10.7(xi) to the Corporation's Annual Report on Form 10-K for the year ended December 31, 2017).
10.8**	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).
10.9**	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).
10.10**	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).
10.11**	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).
10.12**	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).
10.13**	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).
10.14**	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).
10.15**	Northern Trust Corporation 2012 Long Term Cash Incentive Plan (incorporated herein by reference to Exhibit 10(i) to the Corporation's Quarterly Report on Form 10-Q for the quarter ended March 31, 2012).
(i)**	Form of 2012 Long Term Cash Incentive Award Terms and Conditions (incorporated herein by reference to Exhibit 10.19 to the Corporation's Annual Report on Form 10-K for the fiscal year ended December 31, 2011).
(ii)**	Amendment Number One to the 2012 Long Term Cash Incentive Plan, dated as of January 20, 2015 (incorporated herein by reference to Exhibit 10.14(ii) to the Corporation's Annual Report on Form 10-K for the fiscal year ended December 31, 2014).
10.16**	Northern Trust Corporation 2017 Long Term Cash Incentive Plan (incorporated herein by reference to Exhibit 10.7 to the Corporation's Quarterly Report on Form 10-Q for the quarter ended March 31, 2017).
(i)**	Form of Cash Incentive Award Terms and Conditions, as amended (incorporated herein by reference to Exhibit 10.19(i) to the Corporation's Annual Report on Form 10-K for the year ended December 31, 2017).
10.17**	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).

Exhibit Number	Description
(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 2018 Performance Stock Unit Award Terms and Conditions (incorporated herein by reference to Exhibit 10.3 to the Corporation's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018).
(iv)**	Form of 2019 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, 2019).
(v)**	Form of 2018 Stock Unit Award Terms and Conditions (incorporated herein by reference to Exhibit 10.4 to the Corporation's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018).
(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).
10.18**	Northern Trust Corporation Executive Financial Consulting and Tax Preparation Services Plan, as amended and restated effective January 1, 2008 (which, effective October 1, 2018, was renamed the Northern Trust Corporation Wealth Planning and Tax Consulting Services Plan) (incorporated herein by reference to Exhibit 10 (xxxiii) to the Corporation's Annual Report on Form 10-K for the fiscal year ended December 31, 2007).
(i)**	First Amendment, dated and effective October 3, 2017.
(ii)**	Second Amendment, dated September 27, 2019 and effective October 1, 2018.
10.19**	Northern Trust Corporation Non-Employee Director Compensation Plan.
10.20**	Northern Partners Incentive Plan, as amended and restated on January 6, 2020.
10.21**	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).
10.22**	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).
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, 2019, 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.

/s/ Jose Luis Prado

Director

Jose Luis Prado

/s/ Thomas E. Richards

Director

Thomas E. Richards

/s/ Martin P. Slark

Director

Martin P. Slark

/s/ David H.B. Smith, Jr.

Director

David H.B. Smith, Jr.

/s/ Donald Thompson

Director

Donald Thompson

/s/ Charles A. Tribbett, III

Director

Charles A. Tribbett, III

Date: February 25, 2020

**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, 2019 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 25, 2020

/s/ Michael G. O'Grady

Michael G. O'Grady
Chief Executive Officer
(Principal Executive Officer)

**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, 2019 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 25, 2020

/s/ Jason J. Tyler

Jason J. Tyler
Chief Financial Officer
(Principal Financial Officer)

**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, 2019 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 25, 2020

/s/ Jason J. Tyler

Jason J. Tyler

Chief Financial Officer

(Principal Financial Officer)

February 25, 2020

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, as amended.

BOARD OF DIRECTORS

Michael G. O'Grady
Chairman, President and Chief Executive Officer
Northern Trust Corporation

Linda Walker Bynoe
President and Chief Executive Officer
Telemat Ltd.
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
President and Chief Executive Officer
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
Vice Chairman
Evans Food Group, Ltd.
Global food company

Thomas E. Richards
Retired President and Chief Executive Officer
CDW Corporation
Provider of integrated information technology solutions
in the United States, Canada and the United Kingdom

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
Managing Director
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, President and Chief Executive Officer

Robert P. Browne
Executive Vice President
Chief Investment Officer

Peter B. Cherecwich
President – Corporate & Institutional Services

Steven L. Fradkin
President – Wealth Management

Mark C. Gossett
Executive Vice President
Chief Risk Officer

Susan C. Levy
Executive Vice President
General Counsel and Corporate Secretary

Teresa A. Parker
Executive Vice President
Corporate & Institutional Services
(Europe, Middle East and Africa)

Thomas A. South
Executive Vice President
Chief Information Officer

Joyce M. St. Clair
Executive Vice President
Chief Human Resources Officer

Shundrawn A. Thomas
President – Asset Management

Jason J. Tyler
Executive Vice President
Chief Financial Officer

CORPORATE INFORMATION

ANNUAL MEETING

The 2020 Annual Meeting of Stockholders will be held on Tuesday, April 21, 2020, at 10:30 A.M. (Central Time) at 50 South La Salle Street, Chicago, Illinois. 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

Please direct Investor Relations inquiries to:

Mark M. Bette, Senior Vice President, at

312-444-2301 or mark_bette@ntrs.com; or

Kelly M. Lernihan, Vice President, at 312-

444-7214 or km235@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.



**NORTHERN
TRUST**



The 2019 Northern Trust Corporation Annual Report is printed on 10% recycled paper made from fiber sourced from well-managed forests and is independently certified to the Forest Stewardship Council® (FSC) standards.



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NORTHERN TRUST CORPORATION
50 SOUTH LA SALLE STREET \ CHICAGO, ILLINOIS 60603

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