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NASDAQ, INC.

FORM 10-K
(Annual Report)

Filed 02/28/18 for the Period Ending 12/31/17

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	NEW YORK, NY, 10006
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Industry	Financial & Commodity Market Operators
Sector	Financials
Fiscal Year	12/31

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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, 2017

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 number: 000-32651

Nasdaq, Inc.

(Exact name of registrant as specified in its charter)

Delaware	52-1165937
(State or Other Jurisdiction of Incorporation or Organization)	(I.R.S. Employer Identification No.)
One Liberty Plaza, New York, New York	10006
(Address of Principal Executive Offices)	(Zip Code)

Registrant's telephone number, including area code:
+1 212 401 8700

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

Title of each class	Name of each exchange on which registered
Common Stock, $.01 par value per share	**The Nasdaq Stock Market**

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 Exchange 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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☒

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	☐
Non-accelerated filer	☐ (Do not check if a smaller reporting company)	Smaller reporting company	☐
Emerging growth 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 Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of June 30, 2017, the aggregate market value of the registrant's common stock held by non-affiliates of the registrant was approximately $8.3 billion (this amount represents approximately 116.7 million shares of Nasdaq, Inc.'s common stock based on the last reported sales price of $71.49 of the common stock on The Nasdaq Stock Market on such date).

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date.

Class	Outstanding at February 21, 2018
Common Stock, $.01 par value per share	166,560,632 shares

DOCUMENTS INCORPORATED BY REFERENCE

Document	Parts Into Which Incorporated
Certain portions of the Definitive Proxy Statement for the 2018 Annual Meeting of Stockholders	Part III

Nasdaq, Inc.

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About This Form 10-K

Throughout this Form 10-K, unless otherwise specified:

- "Nasdaq," "we," "us" and "our" refer to Nasdaq, Inc.
- "Nasdaq Baltic" refers to collectively, Nasdaq Tallinn AS, Nasdaq Riga, AS, and AB Nasdaq Vilnius.
- "Nasdaq BX" refers to the cash equity exchange operated by Nasdaq BX, Inc.
- "Nasdaq BX Options" refers to the options exchange operated by Nasdaq BX, Inc.
- "Nasdaq Clearing" refers to the clearing operations conducted by Nasdaq Clearing AB.
- "Nasdaq GEMX" refers to the options exchange operated by Nasdaq GEMX, LLC.
- "Nasdaq ISE" refers to the options exchange operated by Nasdaq ISE, LLC.
- "Nasdaq MRX" refers to the options exchange operated by Nasdaq MRX, LLC.
- "Nasdaq Nordic" refers to collectively, Nasdaq Clearing AB, Nasdaq Stockholm AB, Nasdaq Copenhagen A/S, Nasdaq Helsinki Ltd, and Nasdaq Iceland hf.
- "Nasdaq PHLX" refers to the options exchange operated by Nasdaq PHLX LLC.
- "Nasdaq PSX" refers to the cash equity exchange operated by Nasdaq PHLX LLC.
- "The Nasdaq Options Market" refers to the options exchange operated by The Nasdaq Stock Market LLC.
- "The Nasdaq Stock Market" refers to the cash equity exchange operated by The Nasdaq Stock Market LLC.

* * * * * *

Nasdaq also provides as a tool for the reader the following list of abbreviations and acronyms that are used throughout this Annual Report on Form 10-K.

401(k) Plan: Voluntary Defined Contribution Savings Plan

2016 Credit Facility: $400 million senior unsecured term loan facility which matures on November 25, 2019

2017 Credit Facility: $1 billion senior unsecured revolving credit facility which matures on April 25, 2022

2019 Notes: $500 million aggregate principal amount of senior unsecured floating rate notes due March 22, 2019 with an interest rate equal to the three-month U.S. dollar LIBOR plus 0.39%

2020 Notes: $600 million aggregate principal amount of 5.55% senior unsecured notes due January 15, 2020

2021 Notes: €600 million aggregate principal amount of 3.875% senior unsecured notes due June 7, 2021

2023 Notes: €600 million aggregate principal amount of 1.75% senior unsecured notes due May 19, 2023

2024 Notes: $500 million aggregate principal amount of 4.25% senior unsecured notes due June 1, 2024

2026 Notes: $500 million aggregate principal amount of 3.85% senior unsecured notes due June 30, 2026

ASU: Accounting Standards Update

ATS: Alternative Trading System

BWise: BWise Beheer B.V. and its subsidiaries

CCP: Central Counterparty

CFTC: U.S. Commodity Futures Trading Commission

DEA: Designated Examining Authority

DWA: Dorsey, Wright & Associates, LLC

EMIR: European Market Infrastructure Regulation

Equity Plan: Nasdaq Equity Incentive Plan

eSpeed: Certain assets and certain liabilities of the eSpeed business that were acquired or assumed from BGC Partners, Inc. and certain of its affiliates

ESPP: Nasdaq Employee Stock Purchase Plan

ETF: Exchange Traded Fund

ETP: Exchange Traded Product

eVestment: eVestment, Inc. and its subsidiaries

Exchange Act: Securities Exchange Act of 1934, as amended

FASB: Financial Accounting Standards Board

FICC: Fixed Income and Commodities Trading and Clearing

FINRA: Financial Industry Regulatory Authority

IPO: Initial Public Offering

ISE: U.S. Exchange Holdings, Inc. and its subsidiaries

LIBOR: London Interbank Offered Rate

MiFID II: Update to the Markets in Financial Instruments Directive

MiFIR: Markets in Financial Instruments Regulation

MTF: Multilateral Trading Facility

NFX: Nasdaq Futures, Inc.

NPM: The Nasdaq Private Market, LLC

NSCC: National Securities Clearing Corporation

OCC: The Options Clearing Corporation

OTC: Over-the-Counter

Proxy Statement: Nasdaq's Definitive Proxy Statement for the 2018 Annual Meeting of Stockholders

PSU: Performance Share Unit

Regulation NMS: Regulation National Market System

Regulation SCI: Regulation Systems Compliance and Integrity

SEC: U.S. Securities and Exchange Commission

SecondMarket: SecondMarket Solutions, Inc.

SERP: Supplemental Executive Retirement Plan

SFSA: Swedish Financial Supervisory Authority

SMARTS: SMARTS Group Holdings Pty

S&P: Standard & Poor's

S&P 500: S&P 500 Stock Index

SRO: Self-regulatory Organization

SSMA: Swedish Securities Markets Act 2007:528

TSR: Total Shareholder Return

U.S. GAAP: U.S. Generally Accepted Accounting Principles

UTP: Unlisted Trading Privileges

UTP Plan: Joint SRO Plan Governing the Collection, Consolidation, and Dissemination of Quotation and Transaction Information for Nasdaq-Listed Securities Traded on Exchanges on a UTP Basis

VAT: Value Added Tax

VSOE: Vendor Specific Objective Evidence of Fair Value

* * * * *

The following is a non-exclusive list of registered trademarks, registered service marks, or trademarks or service marks of Nasdaq or its subsidiaries, in the United States and/or other countries or jurisdictions:

@TRADE®, ACES®, AT TRADE®, AT-TRADE®, AGGREGATION, TRANSPARENCY, CONTROL®, AUTO WORKUP®, AXE®, BOARDVANTAGE, BWISE®, BWISE BUSINESS IN CONTROL®, BWISE RAPID DEPLOYMENT SOLUTION®, BX VENTURE MARKET®, CANADIAN DIVIDEND ACHIEVERS®, CCBN®, CCN®, CCN NEWSNET DESIGN, CCNMATTHEWS®, CLICK XT®, CONDICO®, CYBER SECURITY®, D.A.L.I®, DEFENSE OF INTERNATIONAL MARKETS AND EXCHANGES SYMPOSIUM®, DIMES®, DIRECTORS DESK®, DIRECTORSDESK®, DIVIDEND ACHIEVERS®, DORSEY WRIGHT®, DREAM IT. DO IT.®, DWA®, DWA MATRIX®, EQQQ, E (design), E-SPEED®, ESPEED®, ESPEEDOMETER®, EXACTEQUITY®, EXIGO, FINQLOUD®, FINQLOUD REGULATORY RECORDS RETENTION® FIRST NORTH®, FONDSBØRSEN®, FTEN®, GENIUM®, GIDS®, GLOBE NEWSWIRE®, GO! POWERED BY MARKETWIRE®, HACK®, IGNITE YOUR AMBITION®, INET®, INTERNATIONAL SECURITIES EXCHANGE®, INVESTOR WORLD®, IPOWORLD®, ISE, ISE BIG DATA®, ISE FX OPTIONS®, ISE GEMINI®, ISE MOBILE PAYMENTS®, ISEE SELECT®, ISSUERWORLD®, ITCH®, KFXAKTIEINDEX®, LONGITUDE®, MARKET INTELLIGENCE DESK®, MARKET LINQUIDITY, MARKET MECHANICS®, MARKETSITE®, MARKETWIRE®, MARKETWIRE BEYOND WORDS®, MARKETWIRE RESONATE®, MARKETWIRE GO! ®, MARKETWIRED RESONATE®, MARKETWIRED®, MW®, MW MARKET WIRED®, MW MARKETWIRED THE POWER OF INFLUENCE®, MY CCBN®, MYMEDIAINFO®, NAREX®, NASDAQ®, NASDAQ 100 INDEX®, NASDAQ - FINANCIAL®, NASDAQ BIOTECHNOLOGY INDEX®, NASDAQ CANADA®, NASDAQ CANADA COMPOSITE INDEX®, NASDAQ CANADA INDEX®, NASDAQ CAPITAL MARKET®, NASDAQ COMPOSITE®, NASDAQ COMPOSITE INDEX®, NASDAQ COMPUTER INDEX®, NASDAQ DIVIDEND ACHIEVERS®, NASDAQ DUBAI®, NASDAQ DUBAI ACADEMY®, NASDAQ EUROPE®, NASDAQ EUROPE COMPOSITE INDEX®, NASDAQ FINANCIAL-100 INDEX®, NASDAQ FUTURES®, NASDAQ FX®, NASDAQ GLOBAL MARKET®, NASDAQ GLOBAL SELECT MARKET®, NASDAQ INDUSTRIAL INDEX®, NASDAQ INTERACT®, NASDAQ INTERNET INDEX®, NASDAQ IQ FUND®, NASDAQ IR INSIGHT®, NASDAQ JAPAN®, NASDAQ MARKET ANALYTIX®, NASDAQ MARKET CENTER®, NASDAQ MARKET FORCES®, NASDAQ MARKET VELOCITY®, NASDAQ MARKETSITE®, NASDAQ MAX®, NASDAQ MAX MARKET ANALYTIX®, NASDAQ OMX®, NASDAQ OMX GREEN ECONOMY

INDEX®, NASDAQ OMX NORDIC®, NASDAQ PRIVATE MARKET®, NASDAQ Q-50 INDEX®, NASDAQ TELECOMMUNICATIONS INDEX®, NASDAQ TOTALVIEW®, NASDAQ TRADER®, NASDAQ TRANSPORTATION INDEX®, NASDAQ US ALL MARKET®, NASDAQ WORKSTATION®, NASDAQ WORKSTATION II®, NASDAQ WORLD®, NASDAQ-100®, NASDAQ-100 EUROPEAN FUND®, NASDAQ-100 EUROPEAN TRACKER®, NASDAQ-100 EUROPEAN TRACKER FUND®, NASDAQ-100 INDEX®, NASDAQ-100 INDEX EUROPEAN TRACKER FUND®, NASDAQ-100 INDEX TRACKING STOCK®, NDX®, NEWS RELEASE EXPRESS®, NFX®, NLX®, NOIS®, NORDIX®, NPM®, OMX®, OMX COPENHAGEN 20®, OMX HELSINKI 25®, OMX STIBOR FUTURE®, OMX STOCKHOLM 30®, OMX TECHNOLOGY®, OMXC25®, OMXH25®, OMXS30®, OMXS3FUT®, ON THE WIRE®, OTW®, PHILADELPHIA STOCK EXCHANGE®, PHLX®, PHLX XL®, PIXL®, PRECISE TRADE®, PRF®, Q THE NEXT GREAT THING®, QQQ®, QTARGET®, QVIEW®, R3®, RISKWAY®, RISKWRAPPER®, RISKXPOSURE®, RX®, S.A.X.E.S®, SECONDMARKET®, SIGNALXPRESS SX®, SMARTS®, SMARTSONLINE®, STINA®, STRUCTURED LIQUIDITY PROGRAM®, THE NASDAQ STOCK MARKET®, THE STOCK MARKET FOR THE NEXT 100 YEARS®, TOTAL EQUITY SOLUTION®, TRADEGUARD®, TX®, ULL®, ULTRA LOW LATENCY®, ULTRAFEED®, VX PROXY®, WIZER®, XDE®, XO DORSEY WRIGHT & ASSOCIATES®, YLIALLE®, ÖVERUNDER®

To the extent a name, logo or design does not appear on the above list, such lack of appearance does not constitute a waiver of any intellectual property rights that Nasdaq has established in its product or service names or logos, or in product configurations or designs, all of which rights are expressly reserved.

FINRA® and TRADE REPORTING FACILITY® are registered trademarks of FINRA.

All other trademarks and service marks used herein are the property of their respective owners.

* * * * * *

This Annual Report on Form 10-K includes market share and industry data that we obtained from industry publications and surveys, reports of governmental agencies and internal company surveys. Industry publications and surveys generally state that the information they contain has been obtained from sources believed to be reliable, but we cannot assure you that this information is accurate or complete. We have not independently verified any of the data from third-party sources nor have we ascertained the underlying economic assumptions relied upon therein. Statements as to our market position are based on the most currently available market data. For market comparison purposes, The Nasdaq Stock Market data in this Annual Report on Form 10-K for IPOs is based on data generated internally by us, which includes best efforts underwritings; therefore, the data may not be comparable to other publicly-available IPO data. Data in this Annual Report on Form 10-K for new listings of equity securities on The Nasdaq Stock Market is based on data generated internally by us, which includes best efforts underwritings, issuers that switched from other listing venues, closed-end funds and ETPs. Data in this Annual Report on Form 10-K for IPOs and new listings of equity securities on the Nasdaq Nordic and Nasdaq Baltic exchanges also is based on data generated internally by us. IPOs and new listings data is presented as of period end. While we are not aware of any misstatements regarding industry data presented herein, our estimates involve risks and uncertainties and are subject to change based on various factors, including those discussed in “Item 1A. Risk Factors” in this Annual Report on Form 10-K.

* * * * * *

Nasdaq intends to use its website, ir.nasdaq.com, as a means for disclosing material non-public information and for complying with SEC Regulation FD and other disclosure obligations. These disclosures will be included on Nasdaq’s website under “Investor Relations.”

Forward-Looking Statements

The SEC encourages companies to disclose forward-looking information so that investors can better understand a company's future prospects and make informed investment decisions. This Annual Report on Form 10-K contains these types of statements. Words such as "may," "will," "could," "should," "anticipates," "envisions," "estimates," "expects," "projects," "intends," "plans," "believes" and words or terms of similar substance used in connection with any discussion of future expectations as to industry and regulatory developments or business initiatives and strategies, future operating results or financial performance, and other future developments identify forward-looking statements. These include, among others, statements relating to:

- *our strategy, growth forecasts and 2018 outlook;*
- *the integration of acquired businesses, including accounting decisions relating thereto;*
- *the scope, nature or impact of acquisitions, divestitures, investments, joint ventures or other transactional activities;*
- *the effective dates for, and expected benefits of, ongoing initiatives, including transactional activities and other strategic, restructuring, technology, de-leveraging and capital return initiatives;*
- *our products, order backlog and services;*
- *the impact of pricing changes;*
- *tax matters;*
- *the cost and availability of liquidity and capital; and*
- *any litigation, or any regulatory or government investigation or action, to which we are or could become a party.*

Forward-looking statements involve risks and uncertainties. Factors that could cause actual results to differ materially from those contemplated by the forward-looking statements include, among others, the following:

- *our operating results may be lower than expected;*
- *our ability to successfully integrate acquired businesses or divest sold businesses or assets, including the fact that any integration may be more difficult, time consuming or costly than expected, and we may be unable to realize synergies from business combinations, acquisitions, divestitures or other transactional activities;*
- *loss of significant trading and clearing volumes or values, fees, market share, listed companies, data products customers or other customers;*
- *our ability to keep up with rapid technological advances and adequately address cybersecurity risks;*
- *economic, political and market conditions and fluctuations, including interest rate and foreign currency risk, inherent in U.S. and international operations;*
- *the performance and reliability of our technology and technology of third parties;*
- *any significant error in our operational processes;*
- *our ability to continue to generate cash and manage our indebtedness; and*
- *adverse changes that may occur in the litigation or regulatory areas, or in the securities markets generally.*

Most of these factors are difficult to predict accurately and are generally beyond our control. You should consider the uncertainty and any risk related to forward-looking statements that we make. These risk factors are discussed under the caption "Item 1A. Risk Factors, " in this Annual Report on Form 10-K. You are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date of this report. You should carefully read this entire Annual Report on Form 10-K, including "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations," and the consolidated financial statements and the related notes. Except as required by the federal securities laws, we undertake no obligation to update any forward-looking statement, release publicly any revisions to any forward-looking statements or report the occurrence of unanticipated events. For any forward-looking statements contained in any document, we claim the protection of the safe harbor for forward-looking statements contained in the Private Securities Litigation Reform Act of 1995.

PART I

Item 1. Business

Overview

Nasdaq, Inc. is a leading provider of trading, clearing, marketplace technology, regulatory, securities listing, information and public and private company services. Our global offerings are diverse and include trading and clearing across multiple asset classes, trade management services, data products, financial indexes, capital formation solutions, corporate solutions, and market technology products and services. Our technology powers markets across the globe, supporting equity derivative trading, clearing and settlement, cash equity trading, fixed income trading, trading surveillance and many other functions.

History

Nasdaq was founded in 1971 as a wholly-owned subsidiary of FINRA. Beginning in 2000, FINRA restructured and broadened ownership in Nasdaq by selling shares to FINRA members, investment companies and issuers listed on The Nasdaq Stock Market. In connection with this restructuring, FINRA fully divested its ownership of Nasdaq in 2006, and The Nasdaq Stock Market became fully operational as an independent registered national securities exchange in 2007. In 2006, Nasdaq also reorganized its operations into a holding company structure.

In February 2008, Nasdaq and OMX AB combined their businesses. This transformational combination resulted in the expansion of our business from a U.S.-based exchange operator to a global exchange company offering technology that powers our own exchanges and markets as well as many other marketplaces around the world. In connection with this acquisition, we changed our corporate name to The NASDAQ OMX Group, Inc. We operated under this name until we rebranded our business as Nasdaq, Inc. in 2015.

Since 2008, in addition to growing organically, we have executed multiple acquisitions that have expanded our operations globally and increasingly diversified our product and service offerings. Our most recent significant acquisitions include ISE in 2016 and eVestment in 2017.

2017 Strategic Review

In 2017, Nasdaq completed a review of its strategy for long-term growth. We examined key macroeconomic, regulatory and technology trends, consulted with our clients about short- and long-term trends in their businesses and assessed the competitive landscape. We identified the following key trends that we believe will shape our future opportunities.

Key Trends

- *Marketplace Economy* . As technology evolves, market trends suggest that commerce will increasingly be transacted electronically. Auctions and mechanisms that allow two-sided price negotiations and require high-quality market oversight will be prevalent. This is already true today across many asset classes inside and outside the financial markets. In addition, financial institutions are seeking to digitize many processes to gain efficiencies.
- *Data Explosion* . We have seen, and expect to continue to see, a proliferation of data from many new and non-traditional sources that impact our clients' interactions with the capital markets. We expect that our clients will seek new analytical capabilities, including machine intelligence, to transform raw data into market insights. This, in turn, is expected to trigger opportunities for those who create data or harness its power.
- *Evolution of Investment Management* . New competitive dynamics among all types of asset managers are increasing their need to differentiate in order to compete for assets. Alternative investment and financing options are becoming more accessible. We expect this evolution to translate to greater technology needs, increasing utilization of quantitative data and analytics to facilitate more advanced investing styles and a growing demand for compliance and surveillance solutions.
- *Banks Embrace Change as They Evolve* . Before the credit crisis, global banks relied heavily on their own proprietary technology. Since then, these institutions have begun to embrace alternative operational constructs, including technology or outsourcing partnerships, especially in market and regulatory technology.

Our Vision, Mission and Strategy

As a result of the strategic review, we restated our vision, mission and strategy, with the full review and approval of our board of directors. Our vision, mission and strategy embrace our strengths to focus on our clients and their evolving needs.

- **Our Vision** : Reimagining markets to realize the potential of tomorrow.
- **Our Mission** : We bring together ingenuity, integrity and insights to deliver markets that accelerate economic progress and empower people to achieve their greatest ambitions.
- **Our Strategy** : Under our renewed strategic direction, we plan to maximize the resources, people and capital allocated to our biggest growth opportunities, particularly in our Market Technology and Information Services businesses. We also commit to sustaining the special marketplace platform businesses that are core to Nasdaq, and to reduce capital and resources in areas that are not as strategic to our clients and do not have significant growth potential within Nasdaq.
  - *Increasing Investment in Businesses Where We See the Highest Growth Opportunity* . We intend to increase investment in areas that we believe solve our clients' biggest challenges and generate growth for our stockholders. These businesses include: our Market Technology segment, including our regulatory technology businesses; the data analytics business

within our Information Services segment; and NPM, within our Corporate Services segment.

We have already begun this effort through our 2017 acquisitions of eVestment and Sybenetix, which are part of our Information Services and Market Technology segments, respectively. We also are investing further in the Market Technology segment through the Nasdaq Financial Framework, the expansion of our SMARTS products and customers and our efforts to commercialize disruptive technologies, including blockchain, machine intelligence and the cloud.

- *Maintaining Investment in our Core* . We intend to maintain investments in our core businesses, notably our foundational trading and listings businesses and related market data business.
- *Optimizing Slower Growth Businesses* . We intend to review areas that are not critical to our core. In these areas, we expect to target resiliency and efficiency versus growth, and thus free up resources to redirect toward greater opportunities.

We recently entered into a definitive agreement to sell the public relations (Public Relations Solutions) and webcasting and webhosting (Digital Media Services) products and services within our Corporate Solutions business to West Corporation. The closing of this transaction, which is subject to regulatory approvals and customary closing conditions, is projected to occur in the second quarter of 2018.

Any additional future cash flow resulting from the implementation of the Tax Cuts and Jobs Act enacted in December 2017 will be considered when evaluating our capital allocation priorities described above.

Products and Services

We manage, operate and provide our products and services in four business segments: Market Services, Corporate Services, Information Services and Market Technology.

See Note 1, “Organization and Nature of Operations,” and Note 20, “Business Segments,” to the consolidated financial statements for additional financial information about our reportable segments and geographic data.

Market Services

Our Market Services segment includes our Equity Derivative Trading and Clearing, Cash Equity Trading, FICC and Trade Management Services businesses.

Equity Derivative Trading and Clearing

We operate six electronic options exchanges in the U.S.: Nasdaq PHLX, The Nasdaq Options Market, Nasdaq BX Options, Nasdaq ISE, Nasdaq GEMX and Nasdaq MRX. These exchanges facilitate the trading of equity options, ETF options, index options and foreign currency options. Together, our combined market share represented the largest share of the U.S. market for multiply-listed options on equities and ETFs. Our options trading platforms provide trading opportunities to both retail investors, algorithmic trading firms and market makers, who tend to prefer electronic trading, and institutional investors, who typically pursue more complex trading strategies and often trade on the floor.

In Europe, Nasdaq offers trading in derivatives, such as stock options and futures, index options and futures and fixed-income options and futures. Nasdaq Clearing offers clearing services for fixed-income options and futures, stock options and futures, index options and futures, and interest rate swaps by serving as the CCP. Nasdaq Clearing also operates a clearing service for the resale and repurchase agreement market.

Cash Equity Trading

In the U.S., we operate three cash equity exchanges: The Nasdaq Stock Market, Nasdaq BX and Nasdaq PSX. The Nasdaq Stock Market is the largest single venue of liquidity for trading U.S.-listed cash equities.

Our U.S. cash equity exchanges offer trading of both Nasdaq-listed and non-Nasdaq-listed securities. Market participants include market makers, broker-dealers, ATSs and registered securities exchanges. In addition, we operate three markets for the trading of Canadian-listed securities.

In Europe, Nasdaq operates exchanges in Stockholm (Sweden), Copenhagen (Denmark), Helsinki (Finland), and Reykjavik (Iceland). We also operate exchanges in Tallinn (Estonia), Riga (Latvia) and Vilnius (Lithuania).

Collectively, the Nasdaq Nordic and Nasdaq Baltic exchanges offer trading in cash equities, depository receipts, warrants, convertibles, rights, fund units and ETFs. Our platform allows the exchanges to share the same trading system, which enables efficient cross-border trading and settlement, cross membership and a single source for Nordic data products. Settlement and registration of cash equity trading takes place in Sweden, Finland, Denmark and Iceland via the local central securities depositories. In addition, Nasdaq owns two central securities depositories that provide services in the Baltic countries and Iceland.

FICC

Our FICC business includes the Nasdaq Fixed Income business, NFX and Nasdaq Commodities.

The U.S. portion of Nasdaq Fixed Income includes an electronic platform for trading U.S. Treasuries. The electronic trading platform provides real-time institutional trading of benchmark U.S. Treasury securities. Through this business, we provide trading access to the U.S. Treasury securities market with an array of trading instruments to meet various investment goals across the fixed income spectrum.

The European portion of Nasdaq Fixed Income provides a wide range of products and services, such as listing, trading, and clearing, for fixed income products in Sweden, Denmark, Finland and Iceland. Nasdaq Stockholm is the largest bond listing venue in the Nordics, with more than 8,000 listed retail and institutional bonds. In addition, Nasdaq Nordic facilitates

the trading and clearing of Nordic fixed income derivatives in a unique market structure. Buyers and sellers agree to trades in fixed income derivatives through bilateral negotiations and then report those trades to Nasdaq Clearing for CCP clearing. Nasdaq Clearing acts as the counterparty to both the buyer and seller.

Nasdaq Commodities is the brand name for Nasdaq's worldwide suite of commodity-related products and services. Nasdaq Commodities' offerings include oil, power, natural gas and carbon emission markets, tanker and dry cargo freight, seafood derivatives, iron ore, electricity certificates and clearing services. These products are listed on two of Nasdaq's derivatives exchanges.

Nasdaq Oslo ASA, which is authorized by the Norwegian Ministry of Finance and supervised by the Norwegian Financial Supervisory Authority, is the commodity derivatives exchange for European products and freight. All trades with Nasdaq Oslo ASA are subject to clearing with Nasdaq Clearing, which is a CCP authorized under EMIR by the SFSA to conduct clearing operations.

We also operate NFX, which is a U.S. based designated contract market authorized by the CFTC. NFX currently lists cash-settled energy derivatives based on key energy benchmarks including oil, natural gas and U.S. power. All trades with NFX are subject to clearing with OCC.

Trade Management Services

We provide market participants with a wide variety of alternatives for connecting to and accessing our markets for a fee. Shifting connectivity from proprietary networks to third-party networks has significantly reduced technology and network costs and increased our systems' scalability while maintaining performance and reliability.

Our marketplaces may be accessed via a number of different protocols used for quoting, order entry, trade reporting, DROP functionality and connectivity to various data feeds. We also offer the Nasdaq Workstation, a browser-based, front-end interface that allows market participants to view data and enter orders, quotes and trade reports. In addition, we offer a variety of add-on compliance tools to help firms comply with regulatory requirements.

We provide co-location services to market participants, whereby firms may lease cabinet space and power to house their own equipment and servers within our data centers. These participants are charged monthly fees for cabinet space, connectivity and support. Additionally, we offer a number of wireless connectivity routes between select data centers using millimeter wave and microwave technology. We also earn revenues from annual and monthly exchange membership and registration fees.

Our broker services operations offer technology and customized securities administration solutions to financial participants in the Nordic market. Broker services provides services through a registered securities company that is regulated by the SFSA. Services primarily consist of flexible back-office systems, which allow customers to entirely or partly outsource their company's back-office functions.

We offer customer and account registration, business registration, clearing and settlement, corporate action handling for reconciliations and reporting to authorities. Available services also include direct settlement with the Nordic central securities depositories, real-time updating and communication via the Society for Worldwide Interbank Financial Telecommunication (SWIFT) to deposit banks.

Corporate Services

Corporate Solutions

Our Corporate Solutions business serves corporate clients, including companies listed on our exchanges and private companies. We help organizations manage the two-way flow of information with their key constituents, including their board members and investors, and with clients and the public through our suite of advanced technology, analytics, and consultative services.

We currently provide Corporate Solutions products and services in the following key areas:

- *Investor Relations* . We offer investor relations content, analytics, advisory services and communications tools, including investor relations webcasting, press release services, and websites. Our solutions, including our Nasdaq IR Insight platform, allow investor relations officers to manage their investor relations programs using a variety of tools and information to understand their investor base, manage meetings and read research, consensus estimates and news while meeting corporate governance and disclosure requirements.
- *Board & Leadership.* We offer secure collaboration platforms for boards of directors or any team collaborating on confidential documents and initiatives. Our solutions protect sensitive data and facilitate productive collaboration, so board members and teams can work faster and more effectively.
- *Public Relations Solutions.* We offer solutions to help clients identify, reach, monitor and measure their public relations program. We provide traditional and social media contacts databases, backed by our internal research analysts. Our press release distribution network allows clients to reach global audiences cost-effectively. Our suite of technology solutions and expert analysts help clients monitor key news media for their brand, reputation, products, as well as industry competitors, and measure the success of their communications programs.
- *Digital Media Services.* We offer a platform and services which enable our customers to produce webcasts for a wide range of applications, including investor relations, public relations, marketing and internal communications. We also provide webhosting services.

In connection with our strategic direction and the decision to reorient the company, we have entered into a definitive

agreement to sell the public relations (Public Relations Solutions) and webcasting and webhosting (Digital Media Services) products and services within our Corporate Solutions business to West Corporation. The closing of this transaction, which is subject to regulatory approvals and customary closing conditions, is projected to occur in the second quarter of 2018.

Listing Services

We operate a variety of listing platforms around the world to provide multiple global capital raising solutions for private and public companies. Companies listed on our markets represent a diverse array of industries including, among others, health care, consumer products, telecommunication services, information technology, financial services, industrials and energy. Our main listing markets are The Nasdaq Stock Market and the Nasdaq Nordic and Nasdaq Baltic exchanges.

Companies seeking to list securities on The Nasdaq Stock Market must meet minimum listing requirements, including specified financial and corporate governance criteria. Once listed, companies must meet continued listing standards. The Nasdaq Stock Market currently has three listing tiers: The Nasdaq Global Select Market, The Nasdaq Global Market and The Nasdaq Capital Market. All three market tiers maintain rigorous listing and corporate governance standards (both initial and ongoing).

As of December 31, 2017, a total of 2,949 companies listed securities on The Nasdaq Stock Market, with 1,413 listings on The Nasdaq Global Select Market, 819 on The Nasdaq Global Market and 717 on The Nasdaq Capital Market.

We aggressively pursue new listings from companies, including those undergoing IPOs as well as companies seeking to switch from alternative exchanges. In 2017, The Nasdaq Stock Market attracted 268 new listings, including 136 IPOs, 63% of U.S. IPOs in 2017. The new listings were comprised of the following:

Switches from the New York Stock Exchange LLC, or NYSE, and NYSE American LLC, or NYSE American	11
IPOs	136
Upgrades from OTC	43
ETPs and Other Listings	78
Total	268

The 11 NYSE- or NYSE American-listed companies that switched to The Nasdaq Stock Market, represented approximately $217.8 billion in market capitalization. Notable switches included PepsiCo, Inc., Principal Financial Group, Inc., and Workday, Inc.

We also offer listings on the exchanges that comprise Nasdaq Nordic and Nasdaq Baltic. For smaller companies and growth companies, we offer access to the financial markets through the Nasdaq First North alternative marketplaces. As of December 31, 2017, a total of 984 companies listed securities on our Nordic and Baltic exchanges and Nasdaq First North.

Our European listing customers include companies, funds and governments. Customers issue securities in the form of cash equities, depository receipts, warrants, ETPs, convertibles, rights, options, bonds or fixed-income related products. In 2017, a total of 108 new companies listed on our Nordic and Baltic exchanges and Nasdaq First North. In addition, 10 companies upgraded their listings from Nasdaq First North to the Nordic and Baltic exchanges.

Our Listing Services business also includes NPM, which provides liquidity solutions for private companies. NPM's platform helps employees, investors, companies, funds and institutions execute transactions, whether for private companies, private investment funds, or other private asset classes. In addition, NPM now offers Alternatives, which addresses the challenges of liquidity in alternative investments funds.

Information Services

Our Information Services segment includes our Data Products and our Index Licensing and Services businesses.

Data Products

Our Data Products business sells and distributes historical and real-time quote and trade information to the sell-side, the buy-side, retail online brokers, proprietary trading shops, other venues, internet portals and data distributors. Our data products enhance transparency of market activity within our exchanges and provide critical information to professional and non-professional investors globally.

We collect, process and create information and earn revenues as a distributor of our own, as well as select, third-party content. We provide varying levels of quote and trade information to our customers who in turn provide subscriptions for this information. Our systems enable distributors to gain access to our market depth, index values, mutual fund valuation, order imbalances, market sentiment and other analytical data.

We distribute this proprietary market information to both market participants and non-participants through a number of proprietary products, including Nasdaq TotalView, our flagship market depth quote product. TotalView shows subscribers quotes, orders and total anonymous interest at every displayed price level in The Nasdaq Stock Market for Nasdaq-listed securities and critical data for the opening, closing, halt and IPO crosses. We also offer TotalView products for our Nasdaq BX, Nasdaq PSX, Nasdaq Fixed Income and other Nordic markets.

We operate several other proprietary services and data products to provide market information, including Nasdaq Basic, a low cost alternative to the industry Level 1 feed, Ultrafeed, a normalized high speed, and consolidated data feed offering. We also provide a plethora of other data, including data relating to our 6 U.S. options exchanges, Nordic and U.S. futures, Nordic commodities, U.S. Treasuries, global indexes and global mutual funds.

Our Data Products business also includes revenues from U.S. tape plans. The plan administrators sell quotation and last sale information for all transactions in Nasdaq-listed securities, whether traded on The Nasdaq Stock Market or other exchanges, to market participants and to data distributors, who

then provide the information to subscribers. After deducting costs, the plan administrators distribute the tape revenues to the respective plan participants based on a formula required by Regulation NMS that takes into account both trading and quoting activity.

The Nasdaq Nordic and Nasdaq Baltic exchanges, as well as Nasdaq Commodities, also offer data products and services. These data products and services provide critical market transparency to professional and non-professional investors who participate in European marketplaces and, at the same time, give investors greater insight into these markets.

Much like the U.S. products, European data products and services are based on trading information from the Nasdaq Nordic and Nasdaq Baltic exchanges, as well as Nasdaq Commodities, for the following classes of assets: cash equities, bonds, derivatives and commodities. We provide varying levels of quote and trade information to market participants and to data distributors, who in turn provide subscriptions for this information. Significant European data products include Nordic Equity TotalView, Nordic Derivative TotalView, and Nordic Fixed Income TotalView, Level 2, Analytics and Fixings.

We also provide index data products based on Nasdaq indexes. Index data products include our Global Index Data Service, which delivers real-time index values throughout the trading day, and Global Index Watch/Global Index File Delivery Service, which delivers weightings and components data, corporate actions and a breadth of additional data.

In 2017, Nasdaq acquired eVestment, a leading content and analytics provider used by asset managers, investment consultants and asset owners to help facilitate institutional investment decisions. eVestment provides a flexible suite of cloud-based solutions to help the institutional investing community identify and capitalize on global investment trends and select and monitor investment managers. eVestment's products also enable asset managers to market their funds worldwide.

Index Licensing and Services

Our Index Licensing and Services business is a leading index provider that develops and licenses Nasdaq branded indexes, associated derivatives and financial products. We also provide custom calculation services for third-party clients. License fees for our trademark licenses vary by product based on a percentage of underlying assets, dollar value of a product issuance, number of products or number of contracts traded. We also license cash-settled options, futures and options on futures on our indexes.

As of December 31, 2017, we had 324 ETPs licensed to Nasdaq's indexes which had $167 billion of assets under management. Our flagship index, the Nasdaq-100 Index, includes the top 100 non-financial securities listed on The Nasdaq Stock Market.

We also operate the Nasdaq Global Index Family, which includes more than 40,000 indexes. The family consists of global securities broken down by market segment, region, country, size and sector. The Nasdaq Global Index Family covers 45 countries and approximately 9,000 securities.

DWA, a market leader in data analytics, passive indexing and smart beta strategies, provides model-based strategies and analysis to support the financial advisor community, and strengthens Nasdaq's position as a leading smart beta index provider in the U.S. As of December 31, 2017, there are $70 billion in assets under management in ETPs that track Nasdaq smart beta indexes.

Market Technology

Powering more than 90 marketplaces in 50 countries, our Market Technology business is a leading global technology solutions provider and partner to exchanges, clearing organizations, central securities depositories, regulators, banks, brokers and corporate businesses. Our Market Technology business is the sales channel for our complete global offering to other marketplaces. Our marketplace solutions can handle a wide array of assets, including cash equities, equity derivatives, currencies, various interest-bearing securities, commodities and energy products.

During 2017, we continued to invest in the Nasdaq Financial Framework, which is our market technology modular architecture that will provide next generation capital market capabilities, including the integration of blockchain technology across the issuance and settlement of securities, as well as cloud-enabled trading and clearing.

Nasdaq's market technology is utilized by, among others, ASX Limited, Bolsa de Valores de Colombia, Borsa İstanbul A.Ş., Borse Dubai Limited, Bursa Malaysia Berhad, Egyptian Exchange, Hong Kong Exchanges and Clearing Limited, Japan Exchange Group, Inc., NEX Group plc, SBI Japannext Co., Ltd., Singapore Exchange Ltd., SIX Swiss Exchange Ltd and Tokyo Commodity Exchange, Inc.

A central part of many projects is facility management and systems integration. Through our integration services, we can assume responsibility for projects involving migration to a new system and the establishment of entirely new marketplaces. We also offer operation and support for the applications, systems platforms, networks and other components included in a turn-key information technology solution, as well as advisory services.

Our Risk & Surveillance solutions include: SMARTS, which is a managed service designed for brokers and other market participants to assist them in complying with market rules, regulations and internal market surveillance policies; and TradeGuard, which is a suite of products that offer a real-time, multi-tiered risk solution that integrates pre-, at- and on-trade risk management, including margining. In 2017, we acquired Sybenetix, a leading surveillance provider that combines behavioral analytics and cognitive computing with financial markets expertise. We expect the addition of Sybenetix to our Risk & Surveillance suite of solutions to allow us to bring

deeper technology savviness and expertise to buy-side compliance officers across the global capital markets.

Finally, through BWise, we offer enterprise governance, risk management and compliance software and services to help companies track, measure and manage key organizational risks.

Technology

Technology plays a key role in ensuring the growth, reliability and regulation of financial markets. We have established a technology risk program to consider the resiliency of critical systems, including risks associated with cybersecurity. This program is focused on (i) identifying areas for improvement in systems and (ii) implementing changes and upgrades to technology and processes to minimize future risk. We have continued our focus on improving the security of our technology with an emphasis on employee awareness through training, targeted phishing campaigns, and new tool deployment for our securities operations team. See "Item 1A. Risk Factors," in this Annual Report on Form 10-K for further discussion.

Core Technology. The Nasdaq Financial Framework is Nasdaq's approach to delivering end-to-end solutions for market infrastructure operators, buy-side firms, sell-side firms and other non-financial markets. The framework consists of a single operational core platform that ties together Nasdaq's portfolio of functionality across the trade lifecycle, in an open framework whereby exchanges, clearinghouses, CSDs and other entities can easily integrate Nasdaq's business applications with each other, as well as other third-party solutions. In addition to being able to integrate a broad range of business functions, the Nasdaq Financial Framework enables end users to leverage recent technology developments, such as blockchain and machine learning.

Data Centers. Nasdaq utilizes data center facilities in key global regions to support our markets, technology services, disaster recovery capabilities and operations centers. In 2017, we continued to migrate systems to our facility in Chicago, as well as added and consolidated locations as a result of acquisitions and product enhancements.

Technology Initiatives . During 2017, our blockchain initiative began moving from technology validation to commercialization. Blockchain capabilities are now incorporated in the Nasdaq Financial Framework, and a number of applications leveraging blockchain (e.g., for voting, issuance and settlement) are available. Market Technology also entered into certain client agreements for blockchain-based solutions, including with the SIX Swiss Exchange Ltd, NYIAX, Inc. and Strate (Pty) Ltd, the South African CSD.

Competition

Market Services

We face intense competition in North America and Europe in businesses that comprise our Market Services segment. We seek to provide market participants with greater functionality, trading system stability, speed of execution, high levels of customer service, and efficient pricing. In both North America and Europe, our competitors include other exchange operators, operators of non-exchange (less-heavily regulated) trading systems and banks and brokerages that operate their own internal trading pools and platforms.

Registered exchanges that compete with our options markets in the U.S. include exchanges operated by: Cboe Global Markets, Inc., or CBOE; Miami International Holdings, Inc., or Miami; and Intercontinental Exchange, Inc., or ICE. Registered exchanges competing with our cash equities markets in the U.S. include exchanges operated by CBOE and ICE. In addition to competition from these exchanges in equities, we face competition from ATSs and other less-heavily regulated broker-owned systems, some of which are also known as "dark pools," and from other types of OTC trading.

Registered exchanges that compete with our cash equities markets in Europe include exchanges operated by: CBOE; Euronext N.V.; Deutsche Börse A.G.; and London Stock Exchange Group plc, or LSE. We also intensely compete with MTFs, such as that operated by Turquoise Global Holdings Limited. Our competitors in the trading and clearing of options and futures on European equities include: the Eurex Group companies, or Eurex; ICE Futures Europe; and the MTF operated by Turquoise Global Holdings Limited. In addition to competition from these exchanges and MTFs in equities, we face competition from other broker-owned systems, some of which are also known as Systematic Internalizers, and from other types of OTC trading. Competition among exchanges for trading European equity derivatives tends to occur where there is competition in the trading of the underlying equities. In addition to exchange-based competition, we face competition from OTC derivative markets.

The implementation of MiFID II and MiFIR over the next several years is expected to lead to further competitive pressure on our European trading business. MTFs are already attracting a significant share of electronically matched volume. With the regulatory environment likely to become more favorable to alternative trading venues, we expect such venues to compete aggressively for the trading of equity securities listed on our Nordic exchanges. Electronic trading systems pursuing block business will also remain active in Europe. We also expect trading on Systematic Internalizers to increase markedly as volume migrates from other types of trading venues. In responding to current and potential competition, we constantly review our pricing and product offerings.

Registered exchanges that compete with our cash equities markets in Canada include: Aequitas NEO Exchange; Canadian Securities Exchange; Toronto Stock Exchange, or TSX; TSX Venture Exchange; and TSX Alpha Exchange. We also compete with ATSs, such as the Omega ATS. Competition is intense, and we also face competition from markets in the U.S.

Our FICC business also operates in an intensely competitive environment. Our trading platform for benchmark U.S. treasuries faces competition from both long-established competitors, such as Brokertec, and newly emerging electronic and voice brokerages, and the operating environment remains extremely challenging. Our European fixed income products

and services are subject to relentless competitive pressure from OTC dealers as well as exchanges. Our suite of commodity-related products and services is in many cases designed to challenge the more established players.

Our Trade Management Services business competes with other exchange operators, extranet providers, and data center providers.

Corporate Services

In our Corporate Solutions business, competition is varied and can be fragmented. For our Investor Relations services business, there are many regional competitors and relatively few global providers. Other exchange operators are partnering with firms that have capabilities in this area and seeking to acquire relevant assets in order to provide investor relations services to customers alongside listing services. The competitive landscape for our Board & Leadership business varies by customer sector and geography. Most participants offer software-as-a-service solutions that are supported by a data center strategy. Some firms offer specialized services that focus on a single niche sector. The larger players often offer additional services. Customers frequently seek single-source providers that are able to address a broad range of needs within a single platform. The competitive landscape for our Public Relations Solutions business includes large providers of traditional wire services, full-service providers, which offer wire distribution along with audience targeting, monitoring and analytics services, and a large number of regional and niche providers. In our Digital Media Services business, competition is fragmented and includes firms that address enterprise buyers, offering them either managed or self-service capabilities.

Our Listing Services business in both the U.S. and Europe provides a means of facilitating capital formation through public capital markets. There are competing ways of raising capital, and we seek to demonstrate the benefits of listing shares on an exchange. Our primary competitor for larger company stock share listings in the U.S. is NYSE. The Nasdaq Stock Market also competes with NYSE American for listing of shares of smaller companies. Bats BZX Exchange, Inc. competes for ETP listings. The Nasdaq Stock Market competes with local and international markets located outside the U.S. for listings of equity securities of both U.S. and non-U.S. companies that choose to list (or dual-list) outside of their home country. For example, The Nasdaq Stock Market competes for listings with exchanges in Europe and Asia, such as LSE and The Stock Exchange of Hong Kong Limited.

The Listings Services business in Europe is characterized by a large number of exchanges competing for new or secondary listings. Each country has one or more national exchanges, which are often the first choice of companies in each respective country. For those considering an alternative, competing European exchanges that frequently attract many listings from outside their respective home countries include LSE, Euronext N.V. and Deutsche Börse A.G. In addition to the larger exchanges, companies seeking capital or liquidity from public capital markets are able to raise capital without a regulated market listing and can consider trading their shares on smaller markets and quoting facilities.

Information Services

Our Data Products business in the U.S. includes both proprietary and consolidated data products. Proprietary data products are made up exclusively of data derived from each exchange's systems. Consolidated data products are distributed by SEC-mandated consolidators (one for Nasdaq-listed stocks and another for NYSE and other-listed stocks) that share the revenue among the exchanges that contribute data. In Europe, all data products are proprietary as there is no official data consolidator. Competition in the data business is intense and is influenced by rapidly changing technology and the creation of new product and service offerings.

The sale of our proprietary data products in both the U.S. and Europe is under competitive threat from alternative exchanges and trading venues that offer similar products. Our data business competes with other exchanges and third party vendors to provide information to market participants. Examples of our competitors in proprietary data products are ICE, CBOE, TSX, S&P Global Inc. and Dow Jones & Company.

The consolidated data business is under competitive pressure from other securities exchanges that trade Nasdaq-listed securities. In addition, The Nasdaq Stock Market similarly competes for the tape fees from the sale of information on securities listed on other markets.

Our Index Licensing and Services business faces competition from providers of various competing financial indexes. For example, there are a number of indexes that aim to track the technology sector and thereby compete with the Nasdaq-100 Index and the Nasdaq Composite Index. We face competition from investment banks, dedicated index providers, markets and other product developers.

Market Technology

The traditional model, where each exchange or exchange-related business developed its own technology internally, sometimes aided by consultants, has changed, as many operators have recognized the cost-savings made possible by buying technology from third parties. As a result, two types of competitors have emerged in our Market Technology segment: exchange operators and technology providers unaffiliated with exchanges. These organizations make available a range of off-the-shelf technology, including trading, clearing, market surveillance, settlement, depository and information dissemination, and offer customization and operation expertise.

There is a wide range of providers that compete with us in surveillance, as well as governance, risk and compliance solutions. In surveillance, standardization of products and budget pressures drive customers to focus on pricing. In governance, risk and compliance, our products must compete with solutions that are often part of larger suites, such as those related to information technology management or general business management.

Market conditions in this segment are evolving rapidly, which makes continuous investment and innovation a necessity.

Intellectual Property

We believe that our intellectual property assets are important for maintaining the competitive differentiation of our products, systems, software and services, enhancing our ability to access technology of third parties and maximizing our return on research and development investments.

To support our business objectives and benefit from our investments in research and development, we actively create and maintain a wide array of intellectual property assets, including patents and patent applications related to our innovations, products and services; trademarks related to our brands, products and services; copyrights in software and creative content; trade secrets; and through other intellectual property rights, licenses of various kinds and contractual provisions. We enter into confidentiality and invention assignment agreements with our employees and contractors, and utilize non-disclosure agreements with third parties with whom we conduct business in order to secure and protect our proprietary rights and to limit access to, and disclosure of, our proprietary information.

We own, or have licensed, rights to trade names, trademarks, domain names and service marks that we use in conjunction with our operations and services. We have registered many of our most important trademarks in the U.S. and in foreign countries. For example, our primary "Nasdaq" mark is a registered trademark that we actively seek to protect in the U.S. and in over 50 other countries worldwide.

Over time, we have accumulated a robust portfolio of issued patents in the U.S. and in many other jurisdictions across the world. We currently hold rights to patents relating to certain aspects of our products, systems, software and services, but we primarily rely on the innovative skills, technical competence and marketing abilities of our personnel. No single patent is in itself core to the operations of Nasdaq or any of its principal business areas.

Corporate Venture Practice

In 2017, Nasdaq established a corporate venture practice to invest primarily in financial technology companies. Nasdaq envisions that investments made through the venture practice will further our organic research and development efforts, and accelerate our path to commercial viability, in the same way previous investments have supported our blockchain and machine intelligence initiatives. Nasdaq expects that the capital invested will be modest and will not have a material impact on our consolidated financial statements or existing capital return or deployment priorities.

Regulation

We are subject to extensive regulation in the U.S., Canada and Europe.

U.S. Regulation

U.S. federal securities laws establish a system of cooperative regulation of securities markets, market participants and listed companies. SROs conduct the day-to-day administration and regulation of the nation's securities markets under the close supervision of, and subject to extensive regulation, oversight and enforcement by, the SEC. SROs, such as national securities exchanges, are registered with the SEC.

This regulatory framework applies to our U.S. business in the following ways:

- regulation of our registered national securities exchanges; and
- regulation of our U.S. broker-dealer subsidiaries.

The rules and regulations that apply to our business are focused primarily on safeguarding the integrity of the securities markets and of market participants and investors generally. Accordingly, our board of directors, officers, and employees must give due regard to the preservation of the independence of the self-regulatory function of each of our SROs and to their obligations to investors and the general public, and may not take any actions that would interfere with the effectuation of decisions by the boards of directors of any of our SROs relating to their regulatory functions, or that would interfere with the ability of any of our SROs to carry out their responsibilities under the Exchange Act. Although the rules and regulations that apply to our business are not focused on the protection of our stockholders, we believe that regulation improves the quality of exchanges and, therefore, our company. U.S. federal securities laws and the rules that govern our operations are subject to frequent change.

National Securities Exchanges. SROs in the securities industry are an essential component of the regulatory scheme of the Exchange Act for providing fair and orderly markets and protecting investors. The Exchange Act and the rules thereunder, as well as each SRO's own rules, impose on the SROs many regulatory and operational responsibilities, including the day-to-day responsibilities for market and broker-dealer oversight. Before it may permit the registration of a national securities exchange as an SRO, the SEC must determine, among other things, that the exchange has a set of rules that is consistent with the requirements of the Exchange Act. Moreover, an SRO is responsible for enforcing compliance by its members, and persons associated with its members, with the provisions of the Exchange Act, the rules and regulations thereunder, and the rules of the SRO, including rules and regulations governing the business conduct of its members.

Nasdaq currently operates three cash equity and six options markets in the U.S. We operate The Nasdaq Stock Market and The Nasdaq Options Market pursuant to The Nasdaq Stock Market's SRO license; Nasdaq BX and Nasdaq BX Options pursuant to Nasdaq BX's SRO license; Nasdaq PSX and Nasdaq PHLX pursuant to Nasdaq PHLX's SRO license; and Nasdaq ISE, Nasdaq GEMX and Nasdaq MRX, each under their own SRO license. As SROs, each entity has separate rules pertaining

to its broker-dealer members and listed companies. Broker-dealers that choose to become members of our exchanges are subject to the rules of those exchanges.

All of our U.S. national securities exchanges are subject to SEC oversight, as prescribed by the Exchange Act, including periodic and special examinations by the SEC. Our exchanges also are potentially subject to regulatory or legal action by the SEC or other interested parties at any time in connection with alleged regulatory violations. We also are subject to Section 17 of the Exchange Act, which imposes record-keeping requirements, including the requirement to make records available to the SEC for examination. We have been subject to a number of routine reviews and inspections by the SEC or external auditors in the ordinary course, and we have been and may in the future be subject to SEC enforcement proceedings. To the extent such actions or reviews and inspections result in regulatory or other changes, we may be required to modify the manner in which we conduct our business, which may adversely affect our business.

Section 19 of the Exchange Act provides that our exchanges must submit to the SEC proposed changes to any of the SROs' rules, practices and procedures, including revisions to provisions of our certificate of incorporation and by-laws that constitute SRO rules. The SEC will typically publish such proposed changes for public comment, following which the SEC may approve or disapprove the proposal, as it deems appropriate. SEC approval requires a finding by the SEC that the proposal is consistent with the requirements of the Exchange Act and the rules and regulations thereunder. Pursuant to the requirements of the Exchange Act, our exchanges must file with the SEC, among other things, all proposals to change their pricing structure.

Pursuant to regulatory services agreements between FINRA and our SROs, FINRA provides certain regulatory services to our markets, including the regulation of trading activity and surveillance and investigative functions. Nevertheless, we have a direct regulatory role in conducting certain real-time market monitoring, certain equity surveillance not involving cross-market activity, most options surveillance, most rulemaking and some membership functions through our MarketWatch department. We refer suspicious trading behavior discovered by our regulatory staff to FINRA for further investigation. Our SROs retain ultimate regulatory responsibility for all regulatory activities performed under regulatory agreements by FINRA, and for fulfilling all regulatory obligations for which FINRA does not have responsibility under the regulatory services agreements.

In addition to its other SRO responsibilities, The Nasdaq Stock Market, as a listing market, also is responsible for overseeing each listed company's compliance with The Nasdaq Stock Market's financial and corporate governance standards. Our listing qualifications department evaluates applications submitted by issuers interested in listing their securities on The Nasdaq Stock Market to determine whether the quantitative and qualitative listing standards have been satisfied. Once securities are listed, the listing qualifications department monitors each issuer's on-going compliance with The Nasdaq Stock Market's continued listing standards.

Broker-dealer regulation. Nasdaq's broker-dealer subsidiaries are subject to regulation by the SEC, the SROs and the various state securities regulators. Nasdaq Execution Services, LLC, or Nasdaq Execution Services, currently operates as our routing broker for sending orders from Nasdaq's U.S. cash equity and options exchanges to other venues for execution. Execution Access LLC, or Execution Access, operates as the broker-dealer for our fixed income business, including Nasdaq Fixed Income's registered ATS for U.S. Treasury securities. NPM Securities, LLC operates an ATS involving primary and secondary transactions in unregistered securities (i.e., securities not listed on a registered securities exchange and not registered under Section 12 of the Exchange Act), including acting as the buyer's and seller's agent to facilitate private placement and mutual funds' (including closed-end and interval funds') transactions on the ATS. SMTX, LLC, or SMTX, also operates as a broker-dealer for NPM and acts as intermediary in connection with private non-capital raising transactions. Finally, Nasdaq Capital Markets Advisory LLC, or Nasdaq Capital Markets Advisory, acts as a third-party advisor to privately-held or publicly-traded companies during IPOs and various other offerings.

Nasdaq Execution Services is registered as a broker-dealer with the SEC and in all 50 states, the District of Columbia and Puerto Rico. It is also a member of FINRA and most of the registered national securities exchanges in the U.S.

Execution Access is registered as a broker-dealer with the SEC and in 22 states and the U.S. Virgin Islands based on business requirements. Additionally, Execution Access is a FINRA member organization. Execution Access operates an SEC registered ATS, which is part of Nasdaq Fixed Income, to trade in U.S. Treasury securities. Execution Access is an introducing broker for trades matched on this ATS. The trades, once matched, are submitted to our fully disclosed clearing broker for clearance and settlement.

NPM Securities is registered as a broker-dealer with the SEC and in all 50 states, the District of Columbia, Puerto Rico and the U.S. Virgin Islands. Additionally, NPM Securities is a FINRA member organization. NPM Securities does not hold funds or securities. Funds may be delivered by the buyer to the issuer directly or wired into an escrow account, depending on the requirements of the offering. The issuer or its transfer agent (or other corporate recordkeeper) will provide the buyer with a stock certificate in either physical or book entry form.

SMTX is registered as a broker-dealer with the SEC and in 50 states and the District of Columbia based on business requirements. Additionally, SMTX is a FINRA member organization. NPM provides the technological tools and website hosting on a platform that issuers may use for administrative purposes, document execution, handling and storage, and to facilitate communications with participants of tender offers and merger and acquisition transactions. SMTX's role in these transactions is to act as depository agent to receive and promptly transmit tenders of securities and transaction

closing funds, and a paying agent to wire funds to participants at the closing.

Nasdaq Capital Markets Advisory is registered as a broker-dealer with the SEC and the State of New York based on business requirements. Additionally, Nasdaq Capital Markets Advisory is a FINRA member organization. Nasdaq Capital Markets Advisory acts as a third-party advisor to privately-held or publicly-traded companies during their initial public offerings, follow-on equity offerings, at-the-market equity offerings, private placement offerings and Regulation A equity offerings. Nasdaq Capital Markets Advisory's role is limited to providing a company, or an investment bank on behalf of a company, with reports, profiles and other pertinent advisory information. Nasdaq Capital Markets Advisory does not act as an underwriter, syndicate group member or placement agent for any company, select underwriters or syndicate group members, hold funds or securities, accept investor indications of interest, solicit investors or decide which investors receive securities on behalf of a company.

The SEC, FINRA and the exchanges adopt rules and examine broker-dealers and require strict compliance with their rules and regulations. The SEC, SROs and state securities commissions may conduct administrative proceedings which can result in censures, fines, the issuance of cease-and-desist orders or the suspension or expulsion of a broker-dealer, its officers or employees. The SEC and state regulators may also institute proceedings against broker-dealers seeking an injunction or other sanction. The SEC and SRO rules cover many aspects of a broker-dealer's business, including capital structure and withdrawals, sales methods, trade practices among broker-dealers, use and safekeeping of customers' funds and securities, record-keeping, the financing of customers' purchases, broker-dealer and employee registration and the conduct of directors, officers and employees. All broker-dealers have an SRO that is assigned by the SEC as the broker-dealer's DEA. The DEA is responsible for examining a broker-dealer for compliance with the SEC's financial responsibility rules. FINRA is the current DEA for Nasdaq Execution Services, Execution Access, NPM Securities, SMTX and Nasdaq Capital Markets Advisory.

As registered broker-dealers, Nasdaq Execution Services, Execution Access, NPM Securities, SMTX and Nasdaq Capital Markets Advisory are subject to regulatory requirements intended to ensure their general financial soundness and liquidity, which require that they comply with certain minimum capital requirements. The SEC and FINRA impose rules that require notification when net capital falls below certain predefined criteria, dictate the ratio of debt to equity in the regulatory capital composition of a broker-dealer and constrain the ability of a broker-dealer to expand its business under certain circumstances. Additionally, the SEC's Uniform Net Capital Rule and FINRA rules impose certain requirements that may have the effect of prohibiting a broker-dealer from distributing or withdrawing capital and requiring prior notice to the SEC and FINRA for certain withdrawals of capital.

As of December 31, 2017, Nasdaq Execution Services, Execution Access, NPM Securities, SMTX and Nasdaq Capital Markets Advisory were in compliance with all of the applicable capital requirements.

Regulatory contractual relationships with FINRA . Our SROs have signed a series of regulatory service agreements covering the services FINRA provides to the respective SROs. Under these agreements, FINRA personnel act as our agents in performing the regulatory functions outlined above, and FINRA bills us a fee for these services. These agreements have enabled us to reduce our headcount while ensuring that the markets for which we are responsible are properly regulated. However, our SROs retain ultimate regulatory responsibility for all regulatory activities performed under these agreements by FINRA.

Exchange Act Rule 17d-2 permits SROs to enter into agreements, commonly called Rule 17d-2 agreements, approved by the SEC with respect to enforcement of common rules relating to common members. Our SROs have entered into several such agreements under which FINRA assumes regulatory responsibility for specifics covered by the agreement, including:

- agreements with FINRA covering the enforcement of common rules, the majority of which relate to the regulation of our SROs and their members;
- joint industry agreements with FINRA covering responsibility for enforcement of insider trading rules;
- joint industry agreement with FINRA covering enforcement of rules related to cash equity sales practices and certain other non-market related rules; and
- joint industry agreement covering enforcement of rules related to options sales practices.

Regulation NMS and Options Intermarket Linkage Plan. We are subject to Regulation NMS for our cash equity markets, and our options markets have joined the Options Intermarket Linkage Plan. These are designed to facilitate the routing of orders among exchanges to create a national market system as mandated by the Exchange Act. One of the principal purposes of a national market system is to assure that brokers may execute investors' orders at the best market price. Both Regulation NMS and the Options Intermarket Linkage Plan require that exchanges avoid trade-throughs, locking or crossing of markets and provide market participants with electronic access to the best prices among the markets for the applicable cash equity or options order.

In addition, Regulation NMS requires that every national securities exchange on which an NMS stock is traded and every national securities association act jointly pursuant to one or more national market system plans to disseminate consolidated information, including a national best bid and national best offer, on quotations for transactions in NMS stocks, and that such plan or plans provide for the dissemination of all consolidated information for an individual NMS stock through a single plan processor.

The UTP Plan was filed with and approved by the SEC as a national market system plan in accordance with the Exchange Act and Regulation NMS to provide for the collection,

consolidation and dissemination of such information for Nasdaq-listed securities. The Nasdaq Stock Market serves as the processor for the UTP Plan pursuant to a contract that was extended for a five-year term beginning in October 2015. The Nasdaq Stock Market also serves as the administrator for the UTP Plan. As the processor, The Nasdaq Stock Market performs and discharges regulatory functions and responsibilities that are necessary for the members of the UTP Plan to discharge the regulatory functions related to the operation of a national market system that have been delegated to them under the Exchange Act and Regulation NMS. To fulfill its obligations as the processor, The Nasdaq Stock Market has designed, implemented, maintained, and operated a data processing and communications system, hardware, and software and communications infrastructure to provide processing for the UTP Plan. As the administrator, The Nasdaq Stock Market manages the distribution of market data, the collection of the resulting market data revenue, and the dissemination of that revenue to plan members.

Regulation SCI. Regulation SCI is a set of rules designed to strengthen the technology infrastructure of the U.S. securities markets. Regulation SCI applies to national securities exchanges, operators of certain ATSs, market data information providers and clearing agencies, subjecting these entities to extensive new compliance obligations, with the goals of reducing the occurrence of technical issues that disrupt the securities markets and improving recovery time when disruptions occur. We implemented an inter-disciplinary program to ensure compliance with Regulation SCI. New Regulation SCI policies and procedures were created, internal policies and procedures were updated, and an information technology governance program was rolled out to ensure compliance.

Regulation of Registered Investment Advisor Subsidiary. Our subsidiary DWA is an investment advisor registered with the SEC under the Investment Advisors Act of 1940. In this capacity, DWA is subject to oversight and inspections by the SEC. Among other things, registered investment advisors like DWA must comply with certain disclosure obligations, advertising and fee restrictions and requirements relating to client suitability and custody of funds and securities. Registered investment advisors are also subject to anti-fraud provisions under both federal and state law.

CFTC Regulation. We also operate NFX, a designated contract market under the Commodity Exchange Act that is subject to regulatory oversight by the CFTC, an independent agency with the mandate to regulate commodity futures and options markets in the U.S. The National Futures Association provides regulatory services to NFX pursuant to a regulatory services agreement.

As a designated contract market, NFX is required to comply on an ongoing basis with 23 Core Principles set forth in Section 5(d) of the Commodity Exchange Act and with Part 38 of the CFTC's regulations. NFX is also subject to the requirements of Part 40 of the CFTC's regulations with respect to the adoption of new rules or rule amendments and the listing of new products. NFX is subject to CFTC rule enforcement reviews conducted by the CFTC's Division of Market Oversight. Rule enforcement reviews may examine a designated contract market's audit trail, trade practice surveillance, disciplinary and dispute resolution programs for compliance with the relevant Core Principles.

The Dodd-Frank Wall Street Reform and Consumer Protection Act also has resulted in increased CFTC regulation of our use of certain regulated derivatives products, as well as the operations of some of our subsidiaries outside the U.S. and their customers.

Canadian Regulation

Regulation of Nasdaq Canada and its three markets is performed by the Canadian Securities Administrators, an umbrella organization of Canada's provincial and territorial securities regulators. Operating in Ontario, Nasdaq Canada's lead regulator is the Ontario Securities Commission. As an approved ATS, Nasdaq Canada is subject to the Marketplace Rules (National Instrument 21-101 and National Instrument 23-101), which include requirements for fair access, transparency of operations, systems and confidentiality of trading information. As an ATS, Nasdaq Canada is also a member of the Investment Industry Regulatory Organization of Canada and must comply with its dealer member rules. In December 2017, Nasdaq Canada received approval from the Ontario Securities Commission to become recognized as an exchange under the Securities Act of Ontario effective on March 1, 2018.

European Regulation

Regulation of our markets in the European Union and European Economic Area focuses on issues relating to financial services, listing and trading of securities, clearing and market abuse. In mid-2012, EMIR, a regulation relating to CCP services and OTC derivatives transactions, was adopted. As a consequence of EMIR, Nasdaq Clearing, like other European CCPs, applied to reauthorize its CCP operations. Nasdaq Clearing was the first European CCP to be authorized as EMIR-compliant when the SFSA approved its application as a CCP under EMIR in 2014.

In July 2016, the European Union's Market Abuse Regulation, which is intended to prevent market abuse, entered into force. MiFID II and MiFIR entered into force in January 2018 and primarily affect our European trading businesses. Many of the provisions of MiFID II and MiFIR are implemented through technical standards drafted by the European Securities and Markets Authority and approved by the European Commission. In addition, in 2016, the European Union adopted legislation on governance and control of the production and use of benchmark indexes. The Benchmark Regulation applies in the European Union from early 2018. However, due to transitional clauses in the Benchmark Regulation, Nasdaq as a benchmark provider, does not need to be in compliance with the Benchmark Regulation until January 1, 2020. As the regulatory environment continues to change and related opportunities arise, we intend to continue product development and ensure that the exchanges and clearinghouses that comprise Nasdaq

Nordic and Nasdaq Baltic maintain favorable liquidity and offer efficient trading.

The entities that operate trading venues in the Nordic and Baltic countries are each subject to local regulations. In Sweden, general supervision of the Nasdaq Stockholm exchange is carried out by the SFSA, while Nasdaq Clearing's role as CCP in the clearing of derivatives is overseen by the SFSA and the Swedish central bank (Riksbanken). Additionally, as a function of the Swedish two-tier supervisory model, certain surveillance in relation to the exchange market is carried out by us, acting through our surveillance division.

Nasdaq Stockholm's exchange activities are regulated primarily by the SSMA, which implements MiFID II into Swedish law and which sets up basic requirements regarding the board of the exchange and its share capital, and which also outlines the conditions on which exchange licenses are issued. The SSMA also provides that any changes to the exchange's articles of association following initial registration must be approved by the SFSA. Nasdaq Clearing holds the license as a CCP under EMIR.

With respect to ongoing operations, the SSMA requires exchanges to conduct their activities in an honest, fair and professional manner, and in such a way as to maintain public confidence in the securities markets. When operating a regulated market, an exchange must apply the principles of free access (i.e., that each person which meets the requirements established by law and by the exchange may participate in trading), neutrality (i.e., that the exchange's rules for the regulated market are applied in a consistent manner to all those who participate in trading) and transparency (i.e., that the participants must be given speedy, simultaneous and correct information concerning trading and that the general public must be given the opportunity to access this information). Additionally, the exchange operator must identify and manage the risks that may arise in its operations, use secure technical systems and identify and handle the conflicts of interest that may arise between the exchange or its owners' interests and the interest in safeguarding effective risk management and secure technical systems. Similar requirements are set up by EMIR in relation to clearing operations.

The SSMA also contains the framework for both the SFSA's supervisory work in relation to exchanges and clearinghouses and the surveillance to be carried out by the exchanges themselves. The latter includes the requirement that an exchange should have "an independent surveillance function with sufficient resources and powers to meet the exchange's obligations." That requires the exchange to, among other things, supervise trading and price information, compliance with laws, regulations and good market practice, participant compliance with trading participation rules, financial instrument compliance with relevant listing rules and the extent to which issuers meet their obligation to submit regular financial information to relevant authorities.

The regulatory environment in the other Nordic and Baltic countries in which a Nasdaq entity has a trading venue is broadly similar to the regulatory environment in Sweden. Since 2005, there has been cooperation between the SFSA and the main supervisory authorities in Iceland, Denmark and Finland, which looks to safeguard effective and comprehensive supervision of the exchanges comprising Nasdaq Nordic and the systems operated by it, and to ensure a common supervisory approach.

Confidence in capital markets is paramount for trading to function properly. Nasdaq Nordic carries out market surveillance through an independent unit that is separate from the business operations. The surveillance work is organized into two functions: one for the listing of instruments and surveillance of companies (issuer surveillance) and one for surveillance of trading (trading surveillance). The real-time trading surveillance for the Finnish, Icelandic, Danish and Swedish markets has been centralized to Stockholm. In addition, there are special personnel who carry out surveillance activities at each of the three Baltic exchanges. In Finland and Sweden, decisions to list new companies are made by independent listing committees and in the other countries the decision is made by the respective president of the exchanges.

If there is suspicion that a listed company or member has acted in breach of exchange regulations, the matter is dealt with by the respective surveillance department. Serious breaches are considered by the respective disciplinary committee in Denmark, Finland, Iceland and Sweden. Suspected insider trading is reported to the appropriate authorities in the respective country.

Employees

As of December 31, 2017, Nasdaq had 4,734 employees.

Nasdaq Website and Availability of SEC Filings

We file periodic reports, proxy statements and other information with the SEC. The public may read and copy any materials we file with the SEC at the SEC's Public Reference Room at 100 F Street, NE, Washington, DC 20549. The public may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC maintains an internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC (such as us). The address of that site is http://www.sec.gov.

Our website is www.business.nasdaq.com. Information on our website is not a part of this Form 10-K. We make available free of charge on our website, or provide a link to, our Forms 10-K, Forms 10-Q and Forms 8-K and any amendments to these documents, that are filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. To access these filings, go to Nasdaq's website and click on "Investor Relations," then under "Financials" click on "SEC Filings."

Item 1A. Risk Factors.

The risks and uncertainties described below are not the only ones facing us. Additional risks and uncertainties not presently known to us or that we currently believe to be immaterial may also adversely affect our business. If any of the following risks actually occur, our business, financial condition, or operating results could be adversely affected.

Economic conditions and market factors, which are beyond our control, may adversely affect our business and financial condition.

Our business performance is impacted by a number of factors, including general economic conditions in both the U.S. and Europe, market volatility, changes in investment patterns and priorities, and other factors that are generally beyond our control. To the extent that global or national economic conditions weaken, our business is likely to be negatively impacted. Adverse market conditions could reduce customer demand for our services and the ability of our customers, lenders and other counterparties to meet their obligations to us. Poor economic conditions may result in a decline in trading volumes or values, deterioration of the economic welfare of our listed companies and a reduction in the demand for our products, including our data, index, corporate solutions and market technology products. Trading volumes and values are driven primarily by general market conditions and declines in trading volumes or values may affect our market share and impact our pricing. In addition, our Market Services businesses receive revenues from a relatively small number of customers concentrated in the financial industry, so any event that impacts one or more customers or the financial industry in general could impact our revenues.

The number of listings on our markets is primarily influenced by factors such as investor demand, the global economy, available sources of financing, and tax and regulatory policies. Adverse conditions may jeopardize the ability of our listed companies to comply with the continued listing requirements of our exchanges.

Information Services revenues also may be significantly affected by global economic conditions. Professional subscriptions to our data products are at risk if staff reductions occur in financial services companies, which could result in significant reductions in our professional user revenue. In addition, adverse market conditions may cause reductions in the number of non-professional investors with investments in the market and in ETP assets under management tracking Nasdaq indexes.

Finally, there may be less demand for our Corporate Solutions or Market Technology products if global economic conditions are weak. Our customers historically cut back on purchases of new services and technology when growth rates decline, thereby reducing our opportunities to sell new products and services or upgrade existing products and services.

A reduction in trading volumes or values, market share of trading, the number of our listed companies, or demand for Information Services, Corporate Solutions or Market Technology products due to economic conditions or other market factors could adversely affect our business, financial condition and operating results.

Our industry is highly competitive.

We face intense competition from other exchanges and markets for market share of trading activity and listings. In addition, our Data Products, Index Licensing and Services, Corporate Solutions and Market Technology businesses face significant competition from other market participants. This competition includes both product and price competition. Increased competition may result in a decline in our share of trading activity, listings and demand for the products we offer, thereby adversely affecting our operating results.

The liberalization and globalization of world markets has resulted in greater mobility of capital, greater international participation in local markets and more competition. As a result, both in the U.S. and in other countries, the competition among exchanges and other execution venues has become more intense. Marketplaces in both Europe and the U.S. have also merged to achieve greater economies of scale and scope.

Regulatory changes also have facilitated the entry of new participants in the European Union that compete with our European markets. The regulatory environment, both in the U.S. and in Europe, is structured to maintain this environment of intense competition. In addition, a high proportion of business in the securities markets is becoming concentrated in a smaller number of institutions and our revenue may therefore become concentrated in a smaller number of customers.

We also compete globally with other regulated exchanges and markets, ATSs, MTFs and other traditional and non-traditional execution venues. Some of these competitors also are our customers. Competitors may develop market trading platforms that are more competitive than ours. Competitors may enter into strategic partnerships, mergers or acquisitions that could make their trading, listings, clearing, data or technology businesses more competitive than ours.

If we are unable to compete successfully in this environment, our business, financial condition and operating results will be adversely affected.

Price competition has affected and could continue to affect our business.

We face intense price competition in all areas of our business. In particular, the trading industry is characterized by intense price competition. We have in the past lowered prices, and in the U.S., increased rebates for trade executions to attempt to gain or maintain market share. These strategies have not always been successful and have at times hurt operating performance. Additionally, we have also been, and may once again be, required to adjust pricing to respond to actions by competitors, which could adversely impact operating results. We are also subject to potential price competition from new competitors and from new and existing competitors. We also compete with

respect to the pricing of data products and with respect to products for pre-trade book data and for post-trade last sale data. In the future, our competitors may offer rebates for quotes and trades on their systems. In addition, pricing in our Corporate Services, Index Licensing and Services and Market Technology businesses is subject to competitive pressures. If we are unable to compete successfully in respect to the pricing of our services and products, our business, financial condition and operating results may be adversely affected.

System limitations or failures could harm our business.

Our businesses depend on the integrity and performance of the technology, computer and communications systems supporting them. If our systems cannot expand to cope with increased demand or otherwise fail to perform, we could experience unanticipated disruptions in service, slower response times and delays in the introduction of new products and services. These consequences could result in service outages, lower trading volumes or values, financial losses, decreased customer satisfaction and regulatory sanctions. Our markets and the markets that rely on our technology have experienced systems failures and delays in the past and could experience future systems failures and delays.

Although we currently maintain and expect to maintain multiple computer facilities that are designed to provide redundancy and back-up to reduce the risk of system disruptions and have facilities in place that are expected to maintain service during a system disruption, such systems and facilities may prove inadequate. If trading volumes increase unexpectedly or other unanticipated events occur, we may need to expand and upgrade our technology, transaction processing systems and network infrastructure. We do not know whether we will be able to accurately project the rate, timing or cost of any volume increases, or expand and upgrade our systems and infrastructure to accommodate any increases in a timely manner.

While we have programs in place to identify and minimize our exposure to vulnerabilities and work in collaboration with the technology industry to share corrective measures with our business partners, we cannot guarantee that such events will not occur in the future. Any system issue that causes an interruption in services, decreases the responsiveness of our services or otherwise affects our services could impair our reputation, damage our brand name and negatively impact our business, financial condition and operating results.

We must continue to introduce new products, initiatives and enhancements to maintain our competitive position.

We intend to launch new products and initiatives and continue to explore and pursue opportunities to strengthen our business and grow our company. We may spend substantial time and money developing new products and initiatives. If these products and initiatives are not successful, we may not be able to offset their costs, which could have an adverse effect on our business, financial condition and operating results.

In our technology operations, we have invested substantial amounts in the development of system platforms, the rollout of our platforms and the adoption of new technologies, such as blockchain, machine intelligence and the cloud. Although investments are carefully planned, there can be no assurance that the demand for such platforms or technologies will justify the related investments. If we fail to generate adequate revenue from planned system platforms or the adoption of new technologies, or if we fail to do so within the envisioned timeframe, it could have an adverse effect on our results of operations and financial condition. In addition, clients may delay purchases in anticipation of new products or enhancements.

A decline in trading and clearing volumes or values or market share will decrease our trading and clearing revenues.

Trading and clearing volumes and values are directly affected by economic, political and market conditions, broad trends in business and finance, unforeseen market closures or other disruptions in trading, the level and volatility of interest rates, inflation, changes in price levels of securities and the overall level of investor confidence. In recent years, trading and clearing volumes and values across our markets have fluctuated significantly depending on market conditions and other factors beyond our control. Current initiatives being considered by regulators and governments could have a material adverse effect on overall trading and clearing volumes or values. Because a significant percentage of our revenues is tied directly to the volume or value of securities traded and cleared on our markets, it is likely that a general decline in trading and clearing volumes or values would lower revenues and may adversely affect our operating results if we are unable to offset falling volumes or values through pricing changes. Declines in trading and clearing volumes or values may also impact our market share or pricing structures and adversely affect our business and financial condition.

If our total market share in securities decreases relative to our competitors, our venues may be viewed as less attractive sources of liquidity. If our exchanges are perceived to be less liquid, then our business, financial condition and operating results could be adversely affected.

Since some of our exchanges offer clearing services in addition to trading services, a decline in market share of trading could lead to a decline in clearing revenues. Declines in market share also could result in issuers viewing the value of a listing on our exchanges as less attractive, thereby adversely affecting our listing business. Finally, declines in market share of Nasdaq-listed securities could lower The Nasdaq Stock Market's share of tape pool revenues under the consolidated data plans, thereby reducing the revenues of our Data Products business.

Our role in the global marketplace may place us at greater risk for a cyberattack.

Our systems and operations are vulnerable to damage or interruption from security breaches. Some of these threats include attacks from foreign governments, hacktivists, insiders and criminal organizations. Foreign governments may seek to obtain a foothold in U.S. critical infrastructure, hacktivists may

seek to deploy denial of service attacks to bring attention to their cause, insiders may pose a risk by human error or malicious activity and criminal organizations may seek to profit from stolen data. Computer viruses and worms also continue to be a threat with ransomware increasingly being used by criminals to extort money. Given our position in the global securities industry, we may be more likely than other companies to be a direct target, or an indirect casualty, of such events.

While we continue to employ resources to monitor our systems and protect our infrastructure, these measures may prove insufficient depending upon the attack or threat posed. Any system issue, whether as a result of an intentional breach, collateral damage from a new virus or a non-malicious act, could damage our reputation and cause us to lose customers, experience lower trading volumes or values, incur significant liabilities or otherwise have a negative impact on our business, financial condition and operating results. Any system breach may go undetected for an extended period of time. We also could incur significant expense in addressing any of these problems and in addressing related data security and privacy concerns.

The success of our business depends on our ability to keep up with rapid technological and other competitive changes affecting our industry. Specifically, we must complete development of, successfully implement and maintain platforms that have the functionality, performance, capacity, reliability and speed required by our business and our regulators, as well as by our customers.

The markets in which we compete are characterized by rapidly changing technology, evolving industry and regulatory standards, frequent enhancements to existing products and services, the adoption of new services and products and changing customer demands. We may not be able to keep up with rapid technological and other competitive changes affecting our industry. For example, we must continue to enhance our platforms to remain competitive as well as to address our regulatory responsibilities, and our business will be negatively affected if our platforms or the technology solutions we sell to our customers fail to function as expected. If we are unable to develop our platforms to include other products and markets, or if our platforms do not have the required functionality, performance, capacity, reliability and speed required by our business and our regulators, as well as by our customers, we may not be able to compete successfully. Further, our failure to anticipate or respond adequately to changes in technology and customer preferences or any significant delays in product development efforts, could have a material adverse effect on our business, financial condition and operating results.

We may not be able to successfully integrate acquired businesses, which may result in an inability to realize the anticipated benefits of our acquisitions.

We must rationalize, coordinate and integrate the operations of our acquired businesses, including eVestment and Sybenetix. This process involves complex technological, operational and personnel-related challenges, which are time-consuming and expensive and may disrupt our business. The difficulties, costs and delays that could be encountered may include:

- difficulties, costs or complications in combining the companies' operations, including technology platforms, which could lead to us not achieving the synergies we anticipate or customers not renewing their contracts with us as we migrate platforms;
- incompatibility of systems and operating methods;
- reliance on, or provision of, transition services;
- inability to use capital assets efficiently to develop the business of the combined company;
- difficulties of complying with government-imposed regulations in the U.S. and abroad, which may be conflicting;
- resolving possible inconsistencies in standards, controls, procedures and policies, business cultures and compensation structures;
- the diversion of management's attention from ongoing business concerns and other strategic opportunities;
- difficulties in operating businesses we have not operated before;
- difficulties of integrating multiple acquired businesses simultaneously;
- the retention of key employees and management;
- the implementation of disclosure controls, internal controls and financial reporting systems at non-U.S. subsidiaries to enable us to comply with U.S. GAAP and U.S. securities laws and regulations, including the Sarbanes Oxley Act of 2002, required as a result of our status as a reporting company under the Exchange Act;
- the coordination of geographically separate organizations;
- the coordination and consolidation of ongoing and future research and development efforts;
- possible tax costs or inefficiencies associated with integrating the operations of a combined company;
- pre-tax restructuring and revenue investment costs;
- the retention of strategic partners and attracting new strategic partners; and
- negative impacts on employee morale and performance as a result of job changes and reassignments.

For these reasons, we may not achieve the anticipated financial and strategic benefits from our acquisitions and initiatives. Any actual cost savings and synergies may be lower than we expect and may take a longer time to achieve than we anticipate, and we may fail to realize the anticipated benefits of acquisitions.

We will need to invest in our operations to maintain and grow our business and to integrate acquisitions, and we may need additional funds, which may not be readily available.

We depend on the availability of adequate capital to maintain and develop our business. Although we believe that we can meet our current capital requirements from internally generated funds, cash on hand and borrowings under our revolving credit facility and commercial paper program, if the capital and credit markets experience volatility, access to capital or credit may not be available on terms acceptable to us or at all. Limited access to capital or credit in the future could have an impact on our ability to refinance debt, maintain our credit rating, meet our regulatory capital requirements, engage in strategic initiatives, make acquisitions or strategic investments in other companies, pay dividends, repurchase our stock or react to changing economic and business conditions. If we are unable to fund our capital or credit requirements, it could have an adverse effect on our business, financial condition and operating results.

In addition to our debt obligations, we will need to continue to invest in our operations for the foreseeable future to integrate acquired businesses and to fund new initiatives. If we do not achieve the expected operating results, we will need to reallocate our cash resources. This may include borrowing additional funds to service debt payments, which may impair our ability to make investments in our business or to integrate acquired businesses.

Should we need to raise funds through issuing additional equity, our equity holders will suffer dilution. Should we need to raise funds through incurring additional debt, we may become subject to covenants even more restrictive than those contained in our credit facilities, the indentures governing our notes and our other debt instruments. Furthermore, if adverse economic conditions occur, we could experience decreased revenues from our operations which could affect our ability to satisfy financial and other restrictive covenants to which we are subject under our existing indebtedness.

We operate in a highly regulated industry and may be subject to censures, fines and enforcement proceedings if we fail to comply with regulatory obligations that can be ambiguous and can change unexpectedly.

We operate in a highly regulated industry and are subject to extensive regulation in the U.S., Europe and Canada. The securities trading industry is subject to significant regulatory oversight and could be subject to increased governmental and public scrutiny in the future that can change in response to global conditions and events.

Our ability to comply with complex and changing regulation is largely dependent on our establishment and maintenance of compliance, audit and reporting systems that can quickly adapt and respond, as well as our ability to attract and retain qualified compliance and other risk management personnel. While we have policies and procedures to identify, monitor and manage our risks and regulatory obligations, we cannot assure you that our policies and procedures will always be effective or that we will always be successful in monitoring or evaluating the risks to which we are or may be exposed.

Our regulated markets are subject to audits, investigations, administrative proceedings and enforcement actions relating to compliance with applicable rules and regulations. Regulators have broad powers to impose fines, penalties or censure, issue cease-and-desist orders, prohibit operations, revoke licenses or registrations and impose other sanctions on our exchanges, broker-dealers and markets for violations of applicable requirements.

For example, during 2016, the SFSA and the other Nordic financial supervisory authorities conducted investigations of cybersecurity processes at our Nordic exchanges and clearinghouse. In December 2016, we were issued a $6 million fine by the SFSA as a result of findings in connection with its investigation. The SFSA's conclusions related to governance issues rather than systems and platform security. We have appealed the SFSA's decision, including the amount of the fine. The court has not yet reached a decision on our appeal.

In the future, we could be subject to SEC or other regulatory investigations or enforcement proceedings that could result in substantial sanctions, including revocation of our operating licenses. Any such investigations or proceedings, whether successful or unsuccessful, could result in substantial costs, the diversion of resources, including management time, and potential harm to our reputation, which could have a material adverse effect on our business, results of operations or financial condition. In addition, our exchanges could be required to modify or restructure their regulatory functions in response to any changes in the regulatory environment, or they may be required to rely on third parties to perform regulatory and oversight functions, each of which may require us to incur substantial expenses and may harm our reputation if our regulatory services are deemed inadequate.

The regulatory framework under which we operate and new regulatory requirements or new interpretations of existing regulatory requirements could require substantial time and resources for compliance, which could make it difficult and costly for us to operate our business.

Under current U.S. federal securities laws, changes in the rules and operations of our securities markets, including our pricing structure, must be reviewed and in many cases explicitly approved by the SEC. The SEC may approve, disapprove, or recommend changes to proposals that we submit. In addition, the SEC may delay either the approval process or the initiation of the public comment process. In addition, favorable SEC rulings and interpretations can be challenged in and reversed by federal courts of appeals, reducing or eliminating the value of such prior interpretations. Any delay in approving changes, or the altering of any proposed change, could have an adverse effect on our business, financial condition and operating results.

We must compete not only with ATSs that are not subject to the same SEC approval process but also with other exchanges that may have lower regulation and surveillance costs than us. There is a risk that trading will shift to exchanges that charge lower

fees because, among other reasons, they spend significantly less on regulation.

In 2016, the SEC approved a plan to establish a market-wide consolidated audit trail (CAT) to improve regulators' ability to monitor trading activity. In addition to increased regulatory obligations, implementation of a consolidated audit trail could result in significant additional expenditures, including to implement any new technology to meet any plan's requirements.

In addition, our registered broker-dealer subsidiaries are subject to regulation by the SEC, FINRA and other SROs. These subsidiaries are subject to regulatory requirements intended to ensure their general financial soundness and liquidity, which require that they comply with certain minimum capital requirements. The SEC and FINRA impose rules that require notification when a broker-dealer's net capital falls below certain predefined criteria, dictate the ratio of debt to equity in the regulatory capital composition of a broker-dealer and constrain the ability of a broker-dealer to expand its business under certain circumstances. Additionally, the SEC's Uniform Net Capital Rule and FINRA rules impose certain requirements that may have the effect of prohibiting a broker-dealer from distributing or withdrawing capital and requiring prior notice to the SEC and FINRA for certain withdrawals of capital. Any failure to comply with these broker-dealer regulations could have a material adverse effect on the operation of our business, financial condition and operating results.

Our non-U.S. business is subject to regulatory oversight in all the countries in which we operate regulated businesses, such as exchanges, clearinghouses or central securities depositories. In these countries, we have received authorization from the relevant authorities to conduct our regulated business activities. The authorities may revoke this authorization if we do not suitably carry out our regulated business activities. The authorities are also entitled to request that we adopt measures in order to ensure that we continue to fulfill the authorities' requirements.

Furthermore, certain of our customers operate in a highly regulated industry. Regulatory authorities could impose regulatory changes that could impact the ability of our customers to use our exchanges. The loss of a significant number of customers or a reduction in trading activity on any of our exchanges as a result of such changes could have a material adverse effect on our business, financial condition and operating results.

Regulatory changes and changes in market structure could have a material adverse effect on our business.

Regulatory changes adopted by the SEC or other regulators of our markets, and regulatory changes that our markets may adopt in fulfillment of their regulatory obligations, could materially affect our business operations. In recent years, there has been increased regulatory and governmental focus on issues affecting the securities markets, including market structure and technological oversight. The SEC, FINRA and the national securities exchanges have introduced several initiatives to ensure the oversight, integrity and resilience of markets.

Industry responses to the MiFID II and MiFIR rules or other applicable rules could affect our operations in Europe. Changes to the rules themselves could also affect our operations in Europe. In addition, actions on any of the specific regulatory issues currently under review in the U.S. and Europe could have a material impact on our business.

While we support regulatory efforts to review and improve the structure, resilience and integrity of the markets, the adoption of these proposed regulatory changes and future reforms could impose significant costs and obligations on the operation of our exchanges and processor systems and have other impacts on our business.

Regulatory changes or future court rulings may have an adverse impact on our revenue from proprietary data products.

Regulatory and legal developments could reduce the amount of revenue that we earn from our proprietary data products. In the U.S., we generally are required to file with the SEC to establish or modify the fees that we charge for our data products. In recent years, certain industry groups have objected to the ability of exchanges to charge for certain data products. We have defeated two challenges in federal appeals court and an additional challenge at the administrative level within the SEC. The decision defeating the challenge was reaffirmed at the administrative level in early 2018. However, the industry challengers have sought additional review of that administrative decision by the full SEC. That SEC review remains pending and, when resolved, it may be appealed to a federal court of appeals. If the results of the full SEC review and any subsequent appeal are detrimental to our U.S. exchanges' ability to charge for data products, there could be a negative impact on our revenues. We cannot predict whether, or in what form, any regulatory changes will be implemented, or their potential impact on our business. A determination by the SEC, for example, to link data fees to marginal costs, to take a more active role in the data rate-setting process, or to reduce the current levels of data fees could have an adverse effect on our Data Products revenues.

In Canada, all new marketplace fees and changes to existing fees, including trading and data fees, must be filed with and approved by the Ontario Securities Commission. In 2016, the Canadian Securities Administrators approved amendments adopting a Data Fees Methodology that restricts the total amount of fees that can be charged by all marketplaces to a reference level that is not yet defined. When a reference is established, all marketplaces will be subject to annual reviews of their market data fees tying market data revenues to market share.

Our European exchanges currently offer data products to customers on a non-discriminatory and reasonable commercial basis. The new MiFID II/MiFIR rules entail that the price for regulated data such as pre- and post-trade data shall be based

on cost plus a reasonable margin. However, what constitutes "reasonable margin" is not clearly defined. There is a risk that a different interpretation of this term may influence the fees for European data products adversely. In addition, any future actions by the European Commission or European court decisions could affect our ability to offer data products in the same manner as today, thereby causing an adverse effect on our Data Products revenues.

Technology issues relating to our role as exclusive processor for Nasdaq-listed stocks could affect our business.

In 2013, we experienced an outage in the exclusive processor system we maintain and operate on behalf of all exchanges that trade Nasdaq-listed stocks that resulted in a market-wide trading halt lasting approximately three hours. Following this system outage, the SEC and others evaluated all infrastructure that is critical to the national market system, including the processor systems. Nasdaq, as technology provider to the UTP Operating Committee, proposed, received approval for, and implemented measures to enhance the resiliency of the existing processor system. Additionally, the UTP Operating Committee approved Nasdaq's proposal to transfer the processor technology from its current enhanced platform to Nasdaq's INET platform. The migration, which was completed in late 2016, further enhanced the resiliency of the processor systems. If, despite these improvement measures, future outages occur or the processor systems fail to function properly while we are operating the systems, it could have an adverse effect on our business, reputation, financial condition or operating results.

Our operational processes are subject to the risk of error, which may result in financial loss or reputational damage.

We have instituted extensive controls to reduce the risk of error inherent in our operations; however, such risk cannot completely be eliminated.

Our businesses are highly dependent on our ability to process and report, on a daily basis, a large number of transactions across numerous and diverse markets. Some of our operations require complex processes, and the introduction of new products or services or changes in processes or reporting due to regulatory requirements may result in an increased risk of errors for a period after implementation.

Data, other content or information that we distribute may contain errors or be delayed, causing reputational harm. Use of our products and services as part of the investment process creates the risk that clients, or the parties whose assets are managed by our clients, may pursue claims against us in the event of such delay or error. Even with a favorable outcome, significant litigation against us might unduly burden management, personnel, financial and other resources.

In addition, the sophisticated software we sell to our customers may contain undetected errors or vulnerabilities, some of which may be discovered only after delivery. These errors may result in negative customer experiences that could damage our reputation, thereby causing loss of customers, loss of revenues and liability for damages, thereby adversely affecting our business and financial results.

Laws and regulations regarding the handling of personal data and information may affect our services or result in increased costs, legal claims or fines against us.

Our business relies on the processing of data in many jurisdictions and the movement of data across national borders. Legal and contractual requirements relating to the collection, storage, handling, use, disclosure, transfer and security of personal data continue to evolve; regulatory scrutiny in this area is increasing around the world. Significant uncertainty exists as privacy and data protection laws may be interpreted and applied differently across jurisdictions and may create inconsistent or conflicting requirements.

The European Union General Data Protection Regulation, or GDPR, which becomes effective in May 2018, extends the scope of the European Union data protection law and requires companies to meet new requirements regarding the handling of personal data. In addition to directly applying to certain Nasdaq business activities, we expect that this regulation may impact many of our customers, which may affect their requirements and decisions related to services that we offer. Although we have a program underway to address GDPR requirements, our efforts to comply with GDPR and other privacy and data protection laws may entail substantial expenses, may divert resources from other initiatives and projects, and could impact the services that we offer. Furthermore, enforcement actions and investigations by regulatory authorities related to data security incidents and privacy violations continue to increase. The enactment of more restrictive laws, rules or regulations or future enforcement actions or investigations could impact us through increased costs or restrictions on our business, and noncompliance could result in regulatory penalties and significant legal liability.

Stagnation or decline in the listings market could have an adverse effect on our revenues.

The market for listings is dependent on the prosperity of companies and the availability of risk capital. A stagnation or decline in the number of new listings on The Nasdaq Stock Market and the Nasdaq Nordic and Nasdaq Baltic exchanges will impact our revenues. Through December 31, 2017, we recognized revenue from new listings on The Nasdaq Stock Market on a straight-line basis over an estimated six-year service period. As of January 1, 2018, we adopted ASU 2014-09; see "Recent Accounting Pronouncements," of Note 2 "Summary of Significant Accounting Policies," for further discussion. Both before and after the adoption of this new accounting standard, a stagnant market for listings could cause a decrease in revenues for future years. Furthermore, a prolonged decrease in the number of listings could negatively impact the growth of our transactions revenues. Our Corporate Solutions business is also impacted by declines in the listings market or increases in acquisitions activity as there will be fewer publicly-traded customers that need our products.

Any reduction in our credit rating could increase the cost of our funding from the capital markets.

Our long-term debt is currently rated investment grade by two of the major rating agencies. These rating agencies regularly evaluate us, and their ratings of our long-term debt and commercial paper are based on a number of factors, including our financial strength and corporate development activity, as well as factors not entirely within our control, including conditions affecting our industry generally. There can be no assurance that we will maintain our current ratings. Our failure to maintain those ratings could reduce or eliminate our ability to issue commercial paper and adversely affect the cost and other terms upon which we are able to obtain funding and increase our cost of capital. A reduction in credit ratings would also result in increases in the cost of our commercial paper and other outstanding debt as the interest rate on the outstanding amounts under our credit facilities and most tranches of our senior notes fluctuates based on our credit ratings.

Damage to our reputation or brand name could have a material adverse effect on our businesses.

One of our competitive strengths is our strong reputation and brand name. Various issues may give rise to reputational risk, including issues relating to:

- our ability to maintain the security of our data and systems;
- the quality and reliability of our technology platforms and systems;
- the ability to fulfill our regulatory obligations;
- the ability to execute our business plan, key initiatives or new business ventures and the ability to keep up with changing customer demand;
- the representation of our business in the media;
- the accuracy of our financial statements and other financial and statistical information;
- the accuracy of our financial guidance or other information provided to our investors;
- the quality of our corporate governance structure;
- the quality of our products, including the reliability of our transaction-based, Corporate Solutions and Market Technology products, the accuracy of the quote and trade information provided by our Data Products business and the accuracy of calculations used by our Index Licensing and Services business for indexes and unit investment trusts;
- the quality of our disclosure controls or internal controls over financial reporting, including any failures in supervision;
- extreme price volatility on our markets;
- any negative publicity surrounding our listed companies; and
- any misconduct, fraudulent activity or theft by our employees or other persons formerly or currently associated with us.

Damage to our reputation could cause some issuers not to list their securities on our exchanges, as well as reduce the trading volumes or values on our exchanges or cause us to lose customers in our Data Products, Index Licensing and Services, Corporate Solutions or Market Technology businesses. This, in turn, may have a material adverse effect on our business, financial condition and operating results.

We may be required to recognize impairments of our goodwill, intangible assets or other long-lived assets in the future.

Our business acquisitions typically result in the recording of goodwill and intangible assets, and the recorded values of those assets may become impaired in the future. As of December 31, 2017, goodwill totaled approximately $6.6 billion and intangible assets, net of accumulated amortization, totaled approximately $2.5 billion . The determination of the value of such goodwill and intangible assets requires management to make estimates and assumptions that affect our consolidated financial statements.

We assess goodwill and intangible assets, as well as other long-lived assets, including equity and cost method investments and property and equipment, for impairment on an annual basis or more frequently if indicators of impairment arise. We estimate the fair value of such assets by assessing many factors, including historical performance, capital requirements and projected cash flows. Considerable management judgment is necessary to project future cash flows and evaluate the impact of expected operating and macroeconomic changes on these cash flows. The estimates and assumptions we use are consistent with our internal planning process. However, there are inherent uncertainties in these estimates.

There was no impairment of goodwill for the years ended December 31, 2017, 2016 and 2015, and there were no indefinite-lived intangible asset impairment charges in 2017. As discussed in “Intangible Asset Impairment Charges,” of Note 6, “Goodwill and Acquired Intangible Assets,” to the consolidated financial statements, we recorded an indefinite-lived intangible asset impairment charge of $578 million in 2016 and $119 million in 2015.

We may experience future events that may result in asset impairments. Future disruptions to our business, prolonged economic weakness or significant declines in operating results at any of our reporting units or businesses, may result in impairment charges to goodwill, intangible assets or other long-lived assets. A significant impairment charge in the future could have a material adverse effect on our operating results.

For additional discussion of our goodwill, indefinite-lived intangible assets and other long-lived assets, including related impairment, see “Goodwill and Related Impairment,” “Indefinite-Lived Intangible Assets and Related Impairment,” and “Other Long-Lived Assets and Related Impairment,” of “Critical Accounting Policies and Estimates,” of Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” and “Goodwill and Indefinite-Lived Intangible Assets,” and “Valuation of Other

Long-Lived Assets," of Note 2, "Summary of Significant Accounting Policies," and Note 6, "Goodwill and Acquired Intangible Assets," to the consolidated financial statements.

We may experience fluctuations in our operating results, which may adversely affect the market price of our common stock.

Our industry is risky and unpredictable and is directly affected by many national and international factors beyond our control, including:

- economic, political and geopolitical market conditions;
- natural disasters, terrorism, war or other catastrophes;
- broad trends in finance and technology;
- changes in price levels and volatility in the stock markets;
- the level and volatility of interest rates;
- changes in government monetary or tax policy;
- the perceived attractiveness of the U.S. or European capital markets; and
- inflation.

Any one of these factors could have a material adverse effect on our business, financial condition and operating results by causing a substantial decline in the financial services markets and reducing trading volumes or values.

Additionally, since borrowings under our credit facilities bear interest at variable rates, any increase in interest rates on debt that we have not fixed using interest rate hedges will increase our interest expense, reduce our cash flow or increase the cost of future borrowings or refinancings. Other than variable rate debt, we believe our business has relatively large fixed costs and low variable costs, which magnifies the impact of revenue fluctuations on our operating results. As a result, a decline in our revenue may lead to a relatively larger impact on operating results. A substantial portion of our operating expenses is related to personnel costs, regulation and corporate overhead, none of which can be adjusted quickly and some of which cannot be adjusted at all. Our operating expense levels are based on our expectations for future revenue. If actual revenue is below management's expectations, or if our expenses increase before revenues do, both revenues less transaction-based expenses and operating results would be materially and adversely affected. Because of these factors, it is possible that our operating results or other operating metrics may fail to meet the expectations of stock market analysts and investors. If this happens, the market price of our common stock may be adversely affected.

We are exposed to credit risk from third parties, including customers, counterparties and clearing agents.

We are exposed to credit risk from third parties, including customers, counterparties and clearing agents. These parties may default on their obligations to us due to bankruptcy, lack of liquidity, operational failure or other reasons.

We clear or stand as riskless principal to a range of equity-related and fixed-income-related derivative products, commodities and resale and repurchase agreements. We assume the counterparty risk for all transactions that are cleared through our markets and guarantee that our cleared contracts will be honored. We enforce minimum financial and operational criteria for membership eligibility, require members and investors to provide collateral, and maintain established risk policies and procedures to ensure that the counterparty risks are properly monitored and proactively managed; however, none of these measures provides absolute assurance against experiencing financial losses from defaults by our counterparties on their obligations. No guarantee can be given that the collateral provided will at all times be sufficient. Although we maintain clearing capital resources to serve as an additional layer of protection to help ensure that we are able to meet our obligations, these resources may not be sufficient.

In addition, one of our broker-dealer subsidiaries, Execution Access, has a clearing arrangement with Cantor Fitzgerald & Co., or Cantor Fitzgerald. As of December 31, 2017, we have contributed $19 million of clearing deposits to Cantor Fitzgerald in connection with this clearing arrangement. This clearing agreement will end on July 31, 2018, and will be replaced by a clearing agreement with the Industrial and Commercial Bank of China Financial Services LLC, or ICBC. Some of the trading activity in Execution Access is cleared by Cantor Fitzgerald (and similarly will be by ICBC after July 31, 2018) through the Fixed Income Clearing Corporation. Execution Access assumes the counterparty risk of clients that do not clear through the Fixed Income Clearing Corporation. Counterparty risk of clients exists for Execution Access between the trade date and settlement date of the individual transactions, which is at least one business day (or more, if specified by the U.S. Treasury issuance calendar). All of Execution Access' obligations under the clearing arrangement with Cantor Fitzgerald are guaranteed by Nasdaq. Counterparties that do not clear through the Fixed Income Clearing Corporation are subject to a credit due diligence process and may be required to post collateral, provide principal letters, or provide other forms of credit enhancement to Execution Access for the purpose of mitigating counterparty risk. Daily position trading limits are also enforced for such counterparties. Although we believe that the potential for us to be required to make payments under these arrangements is mitigated through the pledged collateral and our risk management policies, no guarantee can be provided that these arrangements will at all times be sufficient.

We also have credit risk related to transaction and subscription-based revenues that are billed to customers on a monthly or quarterly basis, in arrears.

Credit losses such as those described above could adversely affect our consolidated financial position and results of operations.

Our leverage limits our financial flexibility, increases our exposure to weakening economic conditions and may adversely affect our ability to obtain additional financing.

Our indebtedness as of December 31, 2017 was approximately $4.2 billion . We may borrow additional amounts by utilizing available liquidity under our existing credit facilities or issuing short-term, unsecured commercial paper notes through our commercial paper program.

Our leverage could:

- reduce funds available to us for operations and general corporate purposes or for capital expenditures as a result of the dedication of a substantial portion of our consolidated cash flow from operations to the payment of principal and interest on our indebtedness;
- increase our exposure to a continued downturn in general economic conditions;
- place us at a competitive disadvantage compared with our competitors with less debt;
- affect our ability to obtain additional financing in the future for refinancing indebtedness, acquisitions, working capital, capital expenditures or other purposes; and
- increase our cost of debt and reduce or eliminate our ability to issue commercial paper.

In addition, we must comply with the covenants in our credit facilities. Among other things, these covenants restrict our ability to incur additional indebtedness, grant liens on assets, dispose of assets and pay dividends (although we are permitted to pay cash dividends on our common stock). Failure to meet any of the covenant terms of our credit facilities could result in an event of default. If an event of default occurs, and we are unable to receive a waiver of default, our lenders may increase our borrowing costs, restrict our ability to obtain additional borrowings and accelerate all amounts outstanding.

We are subject to litigation risks and other liabilities.

Many aspects of our business potentially involve substantial liability risks. Although under current law we are immune from private suits arising from conduct within our regulatory authority and from acts and forbearances incident to the exercise of our regulatory authority, this immunity only covers certain of our activities in the U.S., and we could be exposed to liability under national and local laws, court decisions and rules and regulations promulgated by regulatory agencies.

Some of our other liability risks arise under the laws and regulations relating to the tax, employment, intellectual property, anti-money laundering, technology export, foreign asset controls and foreign corrupt practices areas. Liability could also result from disputes over the terms of a trade, claims that a system failure or delay cost a customer money, claims we entered into an unauthorized transaction or claims that we provided materially false or misleading statements in connection with a securities transaction. As we intend to defend any such litigation actively, significant legal expenses could be incurred. Although we carry insurance that may limit our risk of damages in some cases, we still may sustain uncovered losses or losses in excess of available insurance that would affect our financial condition and results of operations.

We have self-regulatory obligations and also operate for-profit businesses, and these two roles may create conflicts of interest.

We have obligations to regulate and monitor activities on our markets and ensure compliance with applicable law and the rules of our markets by market participants and listed companies. In the U.S., some have expressed concern about potential conflicts of interest of “for-profit” markets performing the regulatory functions of an SRO. Although our U.S. cash equity and options exchanges outsource a portion of their market regulation functions to FINRA, we do perform regulatory functions and bear regulatory responsibility related to our listed companies and our markets. Any failure by us to diligently and fairly regulate our markets or to otherwise fulfill our regulatory obligations could significantly harm our reputation, prompt SEC scrutiny and adversely affect our business and reputation.

Our Nordic and Baltic exchanges monitor trading and compliance with listing standards in accordance with the European Union’s Market Abuse Regulation and other applicable laws. The prime objective of such monitoring activities is to promote confidence in the exchanges among the general public and to ensure fair and orderly functioning markets. The monitoring functions within the Nasdaq Nordic and Nasdaq Baltic exchanges are the responsibility of the surveillance departments or other surveillance personnel. The surveillance departments or personnel are intended to strengthen the integrity of and confidence in these exchanges and to avoid conflicts of interest. Any failure to diligently and fairly regulate the Nordic and Baltic exchanges could significantly harm our reputation, prompt scrutiny from regulators and adversely affect our business and reputation.

Failure to protect our intellectual property rights, or allegations that we have infringed on the intellectual property rights of others, could harm our brand-building efforts and ability to compete effectively.

To protect our intellectual property rights, we rely on a combination of trademark laws, copyright laws, patent laws, trade secret protection, confidentiality agreements and other contractual arrangements with our affiliates, clients, strategic partners, employees and others. However, the efforts we have taken to protect our intellectual property and proprietary rights might not be sufficient, or effective, at stopping unauthorized use of those rights. We may be unable to detect the unauthorized use of, or take appropriate steps to enforce, our intellectual property rights.

We have registered, or applied to register, our trademarks in the United States and in over 50 foreign jurisdictions and have pending U.S. and foreign applications for other trademarks. We also maintain copyright protection on our branded materials

and pursue patent protection for software products, inventions and other processes developed by us. We also hold a number of patents, patent applications and licenses in the United States and other foreign jurisdictions. However, effective trademark, copyright, patent and trade secret protection might not be available or cost-effective in every country in which our services and products are offered. Moreover, changes in patent law, such as changes in the law regarding patentable subject matter, could also impact our ability to obtain patent protection for our innovations. In particular, recent amendments to the U.S. patent law may affect our ability to protect and defend our innovations. There is also a risk that the scope of protection under our patents may not be sufficient in some cases, or that existing patents may be deemed invalid or unenforceable. Failure to protect our intellectual property adequately could harm our brand and affect our ability to compete effectively. Further, defending our intellectual property rights could result in the expenditure of significant financial and managerial resources.

Third parties may assert intellectual property rights claims against us, which may be costly to defend, could require the payment of damages and could limit our ability to use certain technologies, trademarks or other intellectual property. Any intellectual property claims, with or without merit, could be expensive to litigate or settle and could divert management resources and attention. Successful challenges against us could require us to modify or discontinue our use of technology or business processes where such use is found to infringe or violate the rights of others, or require us to purchase licenses from third parties, any of which could adversely affect our business, financial condition and operating results.

We rely on third parties to perform certain functions, and our business could be adversely affected if these third parties fail to perform as expected.

We rely on third parties for regulatory, data center, data storage, data content, clearing and other services. To the extent that any of our vendors or other third-party service providers experiences difficulties, materially changes their business relationship with us or is unable for any reason to perform their obligations, our business or our reputation may be materially adversely affected.

We also rely on members of our trading community to maintain markets and add liquidity. To the extent that any of our largest members experiences difficulties, materially changes its business relationship with us or is unable for any reason to perform market making activities, our business or our reputation may be materially adversely affected.

We are a holding company that depends on cash flow from our subsidiaries to meet our obligations, and any restrictions on our subsidiaries' ability to pay dividends or make other payments to us may have a material adverse effect on our results of operations and financial condition.

As a holding company, we require dividends and other payments from our subsidiaries to meet cash requirements.

Minimum capital requirements mandated by regulatory authorities having jurisdiction over some of our regulated subsidiaries indirectly restrict the amount of dividends paid upstream.

In addition, unremitted earnings of subsidiaries outside of the U.S. are used to finance our international operations and are generally considered to be indefinitely reinvested. It is not our current intent to change this position. However, the majority of cash held outside the U.S. is available for repatriation, but under current law in certain jurisdictions, could subject us to additional income taxes, less applicable foreign tax credits.

If our subsidiaries are unable to pay dividends and make other payments to us when needed, we may be unable to satisfy our obligations, which would have a material adverse effect on our business, financial condition and operating results.

Future acquisitions, dispositions, investments, joint ventures and other transactional activities may require significant resources and/or result in significant unanticipated losses, costs or liabilities.

Over the past several years, acquisitions have been significant factors in our growth. In addition, we are in the process of divesting certain assets, and we may divest additional businesses or assets in the future. Although we cannot predict our transactional activities with complete accuracy, we believe that additional acquisitions, divestments, investments, joint ventures and other transactional activities will be important to our strategy. Such transactions may be material in size and scope. Many of the other potential purchasers of assets in our industry have greater financial resources than we have. Therefore, we cannot be sure that we will be able to complete future transactions on terms favorable to us.

We may finance future transactions by issuing additional equity and/or debt. The issuance of additional equity in connection with any such transaction could be substantially dilutive to existing shareholders. In addition, announcement or implementation of future transactions by us or others could have a material effect on the price of our common stock. The issuance of additional debt could increase our leverage substantially. We could face financial risks associated with incurring additional debt, particularly if the debt results in significant incremental leverage. Additional debt may reduce our liquidity, curtail our access to financing markets, impact our standing with credit rating agencies and increase the cash flow required for debt service. Any incremental debt incurred to finance a transaction could also place significant constraints on the operation of our business.

Furthermore, any future transactions could entail a number of additional risks, including:

- problems with effective integration of operations;
- the inability to maintain key pre-transaction business relationships;
- reliance on, or provision of, transition services;
- increased operating costs;

- the diversion of our management team from other operations;
- problems with regulatory bodies;
- risks associated with divesting employees, customers or vendors when divesting businesses or assets;
- declines in the value of investments;
- exposure to unanticipated liabilities;
- difficulties in realizing projected efficiencies, synergies and cost savings; and
- changes in our credit rating and financing costs.

Changes in tax laws, regulations or policies could have a material adverse effect on our financial results.

Like other corporations, we are subject to taxes at the federal, state and local levels, as well as in non-U.S. jurisdictions. Changes in tax laws, regulations or policies could result in us having to pay higher taxes, which would in turn reduce our net income.

In addition, some of our subsidiaries are subject to tax in the jurisdictions in which they are organized or operate. In computing our tax obligation in these jurisdictions, we take various tax positions. We cannot assure you that upon review of these positions the applicable authorities will agree with our positions. A successful challenge by a tax authority could result in additional tax imposed on our subsidiaries.

Failure to attract and retain key personnel may adversely affect our ability to conduct our business.

Our future success depends, in large part, upon our ability to attract and retain highly qualified professional personnel. Competition for key personnel in the various localities and business segments in which we operate is intense. Our ability to attract and retain key personnel, in particular senior officers, will be dependent on a number of factors, including prevailing market conditions and compensation packages offered by companies competing for the same talent. There is no guarantee that we will have the continued service of key employees who we rely upon to execute our business strategy and identify and pursue strategic opportunities and initiatives. In particular, we may have to incur costs to replace senior officers or other key employees who leave, and our ability to execute our business strategy could be impaired if we are unable to replace such persons in a timely manner.

Our non-U.S. business operates in various international markets, particularly emerging markets that are subject to greater political, economic and social uncertainties than developed countries.

Our non-U.S. business operates in various international markets, including but not limited to Northern Europe, the Baltics, the Middle East, Africa and Asia. Therefore, our non-U.S. operations are subject to the risk inherent in the international environment. Political, economic or social events or developments in one or more of our non-U.S. locations could adversely affect our operations and financial results. Some locations, such as Lithuania, India and the Philippines, may increase risk. Some of these economies may be subject to greater political, economic and social uncertainties than countries with more developed institutional structures.

Unforeseen or catastrophic events could interrupt our critical business functions. In addition, our U.S. and European businesses are heavily concentrated in particular areas and may be adversely affected by events in those areas.

We may incur losses as a result of unforeseen or catastrophic events, such as terrorist attacks, natural disasters, extreme weather, fire, power loss, telecommunications failures, human error, theft, sabotage and vandalism. Given our position in the global capital markets, we may be more likely than other companies to be a target of such activities.

In addition, our U.S. business operations are heavily concentrated on the East Coast, and our European business operations are heavily concentrated in Stockholm. Any event that affects either of those geographic areas could potentially affect our ability to operate our businesses.

We have business continuity plans for critical business functions to mitigate the risk of an interruption. However, any interruption in our critical business functions could negatively impact our financial condition and operating results.

Because we have operations in numerous countries, we are exposed to currency risk.

We have operations in the U.S., the Nordic and Baltic countries, the U.K., Australia and many other foreign countries. We therefore have significant exposure to exchange rate movements between the Euro, Swedish Krona and other foreign currencies towards the U.S. dollar. Significant inflation or disproportionate changes in foreign exchange rates with respect to one or more of these currencies could occur as a result of general economic conditions, acts of war or terrorism, changes in governmental monetary or tax policy, changes in local interest rates or other factors. These exchange rate differences will affect the translation of our non-U.S. results of operations and financial condition into U.S. dollars as part of the preparation of our consolidated financial statements and could adversely affect our financial results.

If our risk management methods are not effective, our business, reputation and financial results may be adversely affected.

We have methods to identify, assess, monitor and manage our risks, including oversight of risk management by Nasdaq's Global Risk Management Committee, which is comprised of senior executives and is responsible for regularly reviewing risks and referring significant risks to the board of directors or specific board committees. However, these methods may not be fully effective. Some of our risk management methods may depend upon subjective evaluation of information regarding markets, customers or other matters. That information may not in all cases be accurate, complete, up-to-date or properly

evaluated. If our methods are not effective or we are not successful in monitoring or evaluating the risks to which we are or may be exposed, our business, reputation, financial condition and operating results could be materially adversely affected.

Charges to earnings resulting from acquisition, integration and restructuring costs may materially adversely affect the market value of our common stock.

In accordance with U.S. GAAP, we are accounting for the completion of our acquisitions using the acquisition method of accounting. We are allocating the total estimated purchase prices to net tangible assets, amortizable intangible assets and indefinite-lived intangible assets, and based on their fair values as of the date of completion of the acquisitions, recording the excess of the purchase price over those fair values as goodwill. Our financial results, including earnings per share, could be adversely affected by a number of financial adjustments including the following:

- we may incur additional amortization expense over the estimated useful lives of certain of the intangible assets acquired in connection with acquisitions during such estimated useful lives;
- we may have additional depreciation expense as a result of recording acquired tangible assets at fair value, in accordance with U.S. GAAP, as compared to book value as recorded;
- to the extent the value of goodwill or intangible assets becomes impaired, we may be required to incur material charges relating to the impairment of those assets;
- we may incur additional costs from integrating our acquisitions. The success of our acquisitions depends, in part, on our ability to integrate these businesses into our existing operations and realize anticipated cost savings, revenue synergies and growth opportunities; and
- we may incur restructuring costs in connection with the reorganization of any of our businesses.

Decisions to declare future dividends on our common stock will be at the discretion of our board of directors based upon a review of relevant considerations. Accordingly, there can be no guarantee that we will pay future dividends to our stockholders.

Since 2013, our board of directors has declared quarterly cash dividend payments on our outstanding common stock. Future declarations of quarterly dividends and the establishment of future record and payment dates are subject to approval by Nasdaq's board of directors. The board's determination to declare dividends will depend upon our profitability and financial condition, contractual restrictions, restrictions imposed by applicable law and other factors that the board deems relevant. Based on an evaluation of these factors, the board of directors may determine not to declare future dividends at all or to declare future dividends at a reduced amount. Accordingly, there can be no guarantee that we will pay future dividends to our stockholders.

Provisions of our certificate of incorporation, by-laws, exchange rules (including provisions included to address SEC concerns) and governing law restrict the ownership and voting of our common stock. In addition, such provisions could delay or prevent a change in control of us and entrench current management.

Our organizational documents place restrictions on the voting rights of certain stockholders. The holders of our common stock are entitled to one vote per share on all matters to be voted upon by the stockholders except that no person may exercise voting rights in respect of any shares in excess of 5% of the then outstanding shares of our common stock. Any change to the 5% voting limitation would require SEC approval.

In response to the SEC's concern about a concentration of our ownership, the rules of some of our exchange subsidiaries include a prohibition on any member or any person associated with a member of the exchange from beneficially owning more than 20% of our outstanding voting interests. SEC consent would be required before any investor could obtain more than a 20% voting interest in us. The rules of some of our exchange subsidiaries also require the SEC's approval of any business ventures with exchange members, subject to exceptions.

Our organizational documents contain provisions that may be deemed to have an anti-takeover effect and may delay, deter or prevent a change of control of us, such as a tender offer or takeover proposal that might result in a premium over the market price for our common stock. Additionally, certain of these provisions make it more difficult to bring about a change in the composition of our board of directors, which could result in entrenchment of current management.

Our certificate of incorporation and by-laws:

- do not permit stockholders to act by written consent;
- require certain advance notice for director nominations and actions to be taken at annual meetings; and
- authorize the issuance of undesignated preferred stock, or "blank check" preferred stock, which could be issued by our board of directors without stockholder approval.

Section 203 of the Delaware General Corporation Law imposes restrictions on mergers and other business combinations between us and any holder of 15% or more (or, in some cases, a holder who previously held 15% or more) of our common stock. In general, Delaware law prohibits a publicly held corporation from engaging in a "business combination" with an "interested stockholder" for three years after the stockholder becomes an interested stockholder, unless the corporation's board of directors and stockholders approve the business combination in a prescribed manner.

Finally, many of the European countries where we operate regulated entities require prior governmental approval before an investor acquires 10% or greater of our common stock.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

The following is a description of our principal properties.

Location	Use	Size (approximate, in square feet)
Stockholm, Sweden	European headquarters	294,000
New York, New York	U.S. headquarters	113,000
Philadelphia, Pennsylvania	General office space	75,000
Atlanta, Georgia	General office space	68,000
New York, New York	General office space	64,000
Bengaluru, India	General office space	63,000
New York, New York	General office space	53,000
Vilnius, Lithuania	General office space	51,000
Rockville, Maryland	General office space	48,000
Manila, Philippines	General office space	36,000
London, England	General office space	31,000
Shelton, Connecticut	General office space	29,000
Sydney, Australia	General office space	29,000
Toronto, Canada	General office space	27,000
Philadelphia, Pennsylvania	General office space	26,000
New York, New York	Location of MarketSite	25,000

Outside the U.S., we also maintain leased locations in Belgium, China, Denmark, Estonia, Finland, France, Germany, Hong Kong, Iceland, Italy, Japan, Latvia, Netherlands, Norway, Singapore, South Korea, Spain, Turkey, Ukraine and the United Arab Emirates. In some countries, we maintain multiple locations.

Within the U.S., we also maintain leased locations in California, Colorado, Illinois, Massachusetts, Missouri, New Jersey, Oregon, Texas, Virginia and Washington, DC. In some states, we maintain multiple locations.

Generally, our properties are not earmarked for use by a particular segment. Instead, most of our properties are used by two or more segments. We believe the facilities we occupy are adequate for the purposes for which they are currently used and are well-maintained.

Item 3. Legal Proceedings.

See "Legal and Regulatory Matters," of Note 19, "Commitments, Contingencies and Guarantees," to the consolidated financial statements, which is incorporated herein by reference.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

Market Information

Our common stock has been listed on The Nasdaq Stock Market since February 10, 2005, under the ticker symbol "NDAQ."

The following chart lists the quarterly high and low sales prices for shares of our common stock for fiscal years 2017 and 2016. These prices are between dealers and do not include retail markups, markdowns or other fees and commissions and may not represent actual transactions.

	High	Low
Fiscal 2017		
Fourth quarter	$ 78.88	$ 71.62
Third quarter	77.25	70.36
Second quarter	70.92	65.72
First quarter	70.76	65.37
Fiscal 2016		
Fourth quarter	$ 68.94	$ 63.23
Third quarter	71.01	63.99
Second quarter	65.16	60.84
First quarter	66.09	54.73

As of February 21, 2018 , we had approximately 276 holders of record of our common stock. As of February 21, 2018 , the closing price of our common stock was $79.12.

Cash Dividends on Common Stock

The following table shows quarterly cash dividends declared per common share on our outstanding common stock:

	December 31,	
	2017	2016
First quarter	$ 0.32	$ 0.25
Second quarter	0.38	0.32
Third quarter	0.38	0.32
Fourth quarter	0.38	0.32
Total	$ 1.46	$ 1.21

See “Cash Dividends on Common Stock,” of Note 14, “Nasdaq Stockholders’ Equity,” to the consolidated financial statements for further discussion of the dividends.

Issuer Purchases of Equity Securities

Share Repurchase Program

See “Share Repurchase Program,” of Note 14, “Nasdaq Stockholders’ Equity,” to the consolidated financial statements for further discussion of our share repurchase program.

Employee Transactions

During the fiscal quarter ended December 31, 2017, we purchased shares from employees in connection with the settlement of employee tax withholding obligations arising from the vesting of restricted stock and PSUs.

* * * * * *

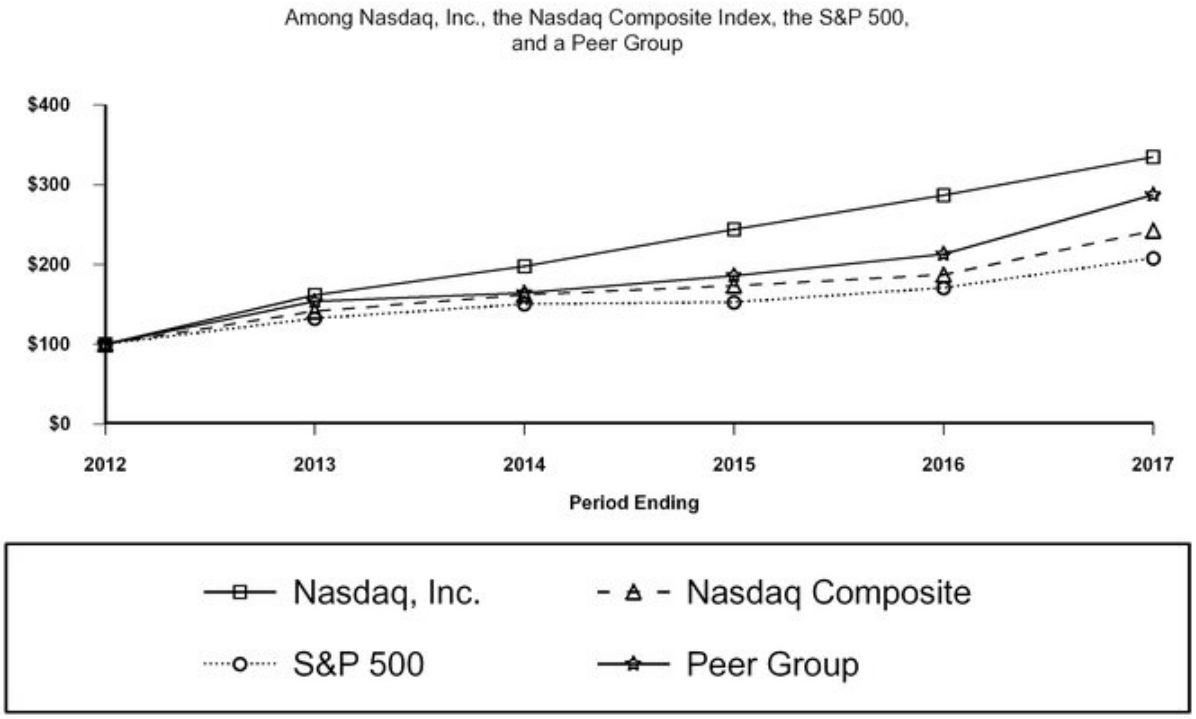
The table below represents repurchases made by or on behalf of us or any “affiliated purchaser” of our common stock during the fiscal quarter ended December 31, 2017:

Period	(a) Total Number of Shares Purchased	(b) Average Price Paid Per Share	(c) Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	(d) Maximum Dollar Value of Shares that May Yet Be Purchased Under the Plans or Programs (in millions)
October 2017				
Share repurchase program	377,516	$ 74.14	377,516	$ 227
Employee transactions	1,850	$ 74.94	N/A	N/A
November 2017				
Share repurchase program	9,732	$ 74.63	9,732	$ 226
Employee transactions	304	$ 72.40	N/A	N/A
December 2017				
Share repurchase program	1,100	$ 74.97	1,100	$ 226
Employee transactions	70,763	$ 78.69	N/A	N/A
Total Quarter Ended December 31, 2017				
Share repurchase program	388,348	$ 74.15	388,348	$ 226
Employee transactions	72,917	$ 78.57	N/A	N/A

PERFORMANCE GRAPH

The following graph compares the total return of our common stock to the Nasdaq Composite Stock Index, the S&P 500 and a selected peer group for the past five years. The peer group includes ASX Limited, CBOE, CME Group Inc., Deutsche Börse A.G., ICE, LSE, and TMX Group Limited. Information for the indices and the peer group is provided from December 31, 2012 through December 31, 2017. The figures represented below assume an initial investment of $100 in the common stock or index at the closing price on December 31, 2012 and the reinvestment of all dividends.

COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN*



*$100 invested on 12/31/12 in stock or index, including reinvestment of dividends.
Fiscal year ending December 31.

	2012	2013	2014	2015	2016	2017
Nasdaq, Inc.	$ 100.00	$ 161.79	$ 197.73	$ 244.01	$ 286.68	$ 334.72
Nasdaq Composite	100.00	141.63	162.09	173.33	187.19	242.29
S&P 500	100.00	132.39	150.51	152.59	170.84	208.14
Peer Group	100.00	153.73	164.34	185.98	212.88	287.34

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Item 6. Selected Financial Data.

The following table sets forth selected financial data on a historical basis for Nasdaq. The following information should be read in conjunction with the consolidated financial statements and notes thereto of Nasdaq included elsewhere in this Form 10-K. We completed several acquisitions during the years ended December 31, 2017, 2016, 2015 and 2013 and included the financial results of such acquisitions in our consolidated financial statements from the respective acquisition dates.

Selected Financial Data

	Year Ended December 31,				
	2017	2016	2015	2014	2013
	(in millions, except share and per share amounts)				
Statements of Income Data:					
Total revenues	$ 3,965	$ 3,705	$ 3,403	$ 3,500	$ 3,211
Transaction-based expenses	(1,537)	(1,428)	(1,313)	(1,433)	(1,316)
Revenues less transaction-based expenses	2,428	2,277	2,090	2,067	1,895
Total operating expenses	1,429	1,438	1,370	1,313	1,207
Operating income	999	839	720	754	688
Net income attributable to Nasdaq	734	108	428	414	385
Per share information:					
Basic earnings per share	$ 4.41	$ 0.65	$ 2.56	$ 2.45	$ 2.30
Diluted earnings per share	$ 4.33	$ 0.64	$ 2.50	$ 2.39	$ 2.25
Cash dividends declared per common share	$ 1.46	$ 1.21	$ 0.90	$ 0.58	$ 0.52
Weighted-average common shares outstanding for earnings per share:					
Basic	166,364,299	165,182,290	167,285,450	168,926,733	166,932,103
Diluted	169,585,031	168,800,997	171,283,271	173,018,849	171,266,146

	December 31,				
	2017	2016	2015	2014	2013
	(in millions)				
Balance Sheets Data:					
Cash and cash equivalents and financial investments	$ 612	$ 648	$ 502	$ 601	$ 587
Total assets	15,786	14,150	11,861	12,071	12,563
Total long-term liabilities	4,637	4,638	3,332	3,297	3,579
Total Nasdaq stockholders' equity	5,887	5,430	5,609	5,794	6,184

Total assets increased $1.6 billion as of December 31, 2017 compared with December 31, 2016 primarily due to an increase in default funds and margin deposits (with a corresponding increase in current liabilities), reflecting an increase in cash margin deposits pledged by members of our Nasdaq Clearing business due to an increase in clearing volume. Also contributing to the increase is an increase in goodwill and intangible assets associated with our 2017 acquisitions, partially offset by a decrease in deferred tax assets primarily due to the impact of the Tax Cuts and Jobs Act. See Note 11, “Income Taxes,” to the consolidated financial statements for further discussion. Total assets increased $2.3 billion as of December 31, 2016 compared with December 31, 2015 primarily due to an increase in default funds and margin deposits (with a corresponding increase in current liabilities) as new regulatory rules in 2016 required all collateral pledged by members of our Nasdaq Clearing business to be recorded on the balance sheet. Also contributing to the increase was an increase in goodwill and intangible assets associated with our 2016 acquisitions, partially offset by a pre-tax, non-cash intangible asset impairment charge of $578 million to write off the full value of a trade name.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

The following discussion and analysis of the financial condition and results of operations of Nasdaq should be read in conjunction with our consolidated financial statements and related notes included in this Form 10-K, as well as the discussion under "Item 1A. Risk Factors."

Business Overview

We are a leading provider of trading, clearing, marketplace technology, regulatory, securities listing, information and public and private company services. Our global offerings are diverse and include trading and clearing across multiple asset classes, trade management services, data products, financial indexes, capital formation solutions, corporate solutions, and market technology products and services. Our technology powers markets across the globe, supporting equity derivative trading, clearing and settlement, cash equity trading, fixed income trading, trading surveillance and many other functions.

For further discussion of our business, see "Item 1. Business."

Business Environment

Our non-transactional businesses provide technology to exchanges, clearing organizations and central securities depositories around the world. We also offer companies and other organizations access to innovative products, software solutions and services that increase transparency, mitigate risk, improve board efficiency and facilitate better corporate governance. In our transactional business, we serve listed companies, market participants and investors by providing derivative, commodities, cash equity, and fixed income markets, as well as clearing services, thereby facilitating economic growth and corporate entrepreneurship. In broad terms, our business performance is impacted by a number of drivers including macroeconomic events affecting the risk and return of financial assets, investor sentiment, government and private sector demands for capital, the regulatory environment for capital markets, changing technology, particularly in the financial services industry, and changes in investment patterns and priorities. Our future revenues and net income will continue to be influenced by a number of domestic and international economic trends including, among others:

- the demand by companies and other organizations for the products sold by our Corporate Solutions business, which is largely driven by the overall state of the economy and the attractiveness of our offerings;
- the challenges created by the automation of market data consumption, including competition and the quickly evolving nature of the data business;
- the outlook of our technology customers for capital market activity;
- technological advances and members' and customers' demand for speed, efficiency, and reliability;
- the acceptance of cloud-based services and advanced analytics by our customers and global regulators;
- trading volumes and values in equity derivative, cash equity and FICC, which are driven primarily by overall macroeconomic conditions;
- the number of companies seeking equity financing, which is affected by factors such as investor demand, the global economy, and availability of diverse sources of financing, as well as tax and regulatory policies;
- the demand for information about, or access to, our markets, which is dependent on the products we trade, our importance as a liquidity center, and the quality and pricing of our data and trade management services;
- the demand for licensed ETPs, enhanced analytics and other financial products based on our indexes as well as changes to the underlying assets associated with existing licensed financial products;
- continuing pressure in transaction fee pricing due to intense competition in the U.S. and Europe;
- competition related to pricing, product features and service offerings; and
- regulatory changes relating to market structure or affecting certain types of instruments, transactions, pricing structures or capital market participants.

The current consensus forecast for gross domestic product growth for the U.S. is 2.3% in 2017 and 2.5% in 2018 and the Eurozone is 2.3% in 2017 and 2.1% in 2018. U.S. growth forecasts for 2018 remained relatively consistent through the first half of 2017, but have been climbing upwards since then and are currently 0.2 percentage points higher than forecasted at the start of the year. Growth forecasts for the Eurozone in 2018 have steadily risen since an estimate of 1.5% at the start of 2017. While growth is accelerating, there are a number of significant structural and political issues continuing to impact the global economy. Consequently, sustained instability could return at any time, resulting in an increased level of market volatility, oscillating trading volumes, and a more cautious outlook by the clients of our non-trading segments. Volatility was low throughout 2017; however, in early February 2018, volatility levels have increased.

Following weakness in 2016 and early 2017, IPO activity has picked up somewhat over the past three quarters particularly in our Nordics market. Additional impacts on our business drivers include the international enactment and implementation of new legislative and regulatory initiatives, notably MiFID II in Europe, the evolution of market participants' trading and investment strategies, and the continued rapid progression and deployment of new technology in the financial services industry. The business environment that influences our financial performance in 2018 may be characterized as follows:

- rapidly evolving technology for our non-transactional businesses and their clients;

- increased demand for applications using emerging technologies and sophisticated analytics by both new entrants and industry incumbents;
- the expansion of the number of industries and emergence of new industries, seeking to use advanced market technology;
- intense competition among U.S. exchanges and dealer-owned systems for cash equity trading and strong competition between MTFs and exchanges in Europe for cash equity trading; and
- globalization of exchanges, customers and competitors extending the competitive horizon beyond national markets.

2018 Outlook

For key trends that may influence our business, see "Item 1. Business—2017 Strategic Review." Our strategy consists of leveraging our market technology and information analytics expertise across our global capital markets. The focus for both our non-transactional and transactional businesses continues to include identifying organic growth and developing adjacent opportunities to our existing businesses. In addition, our strategy includes identifying acquisitions that both complement our strengths and extend our capabilities, and offer opportunities for revenue and expense synergies and increased shareholder value.

Our non-transactional businesses seek to provide increased transparency and analytics to the investment community and to expand our market technology offerings that power trading, post-trade and surveillance. New competitors will arise from both startups and existing firms and some existing competitors will fade as continued rapid technological change dominates the competitive environment in 2018. We expect regulation to also evolve as governments and regulators respond to emerging technologies. The growth of a market place economy in financial services and beyond, the need for new analytic capabilities to process the data explosion, the evolution of the investment management industry, and our existing clients continued outsourcing of non-differentiating capabilities and processes create opportunities for our non-transactional businesses in 2018 and beyond.

During 2018, we expect changes in both the competitive and regulatory environments in our transactional businesses. In the U.S., in 2017, CBOE completed its acquisition of BATS, trading commenced on Miami's second option exchange, NYSE announced plans to begin trading Tape B and Tape C stocks on its floor and to launch a fourth equities exchange, and CBOE and CME began trading bitcoin futures. We expect intense competition among U.S. equity and options marketplaces to continue and new entrants may also become part of our competitive environment. While the willingness of new entrants to commence operations can be taken as a positive sign of good health in the trading industry, as these organizations implement their strategies, they have the potential to affect the competitive environment we face.

European regulators are currently moving forward on a number of new policies affecting the operation and infrastructure of the financial markets. The implementation of EMIR is changing the way we structure and operate the Nordic clearinghouse. MiFID II, as well as the new regulations in MiFIR, will change the way our trading business operates and will create both challenges in our existing businesses, as well as new opportunities for growth. Industry response to the implementation of MiFID II in early 2018 is still unfolding, particularly the anticipated increase in the number of Systematic Internalizer trading systems operated by large financial service firms and electronic markets. Consequently, 2018 is an uncertain environment for our European transactional businesses.

The following summarizes our 2018 outlook for each of our segments:

Market Services

Economic and political uncertainty continue to weigh on the global economy and the debate over future fiscal and monetary policy in the U.S. and Europe continues. We believe that our diversified businesses position us well to compete in an uncertain market environment. If the increased levels of market volatility seen in early February 2018 persist into the balance of 2018, then many of the asset classes within our Market Services segment and our Data Products business will continue to benefit.

NFX continues to expand its offering in its energy derivative products. We enter 2018 with plans to increase the number of clients running on the NFX platform, and we continue to identify additional products to bring to market.

We expect global markets to be influenced by significant change in 2018, driven by economic factors and regulatory initiatives in the U.S. and Europe as recently adopted regulations and legislation continue to be implemented. These changes could result in the continued fragmentation of U.S. equity derivative and cash equity markets, and trading could continue to migrate from exchanges to OTC systems, particularly in the U.S. We anticipate that trading volumes will move to new types of broker-operated systems in Europe and potentially from exchanges to broker-operated systems as the industry responds to European Union regulatory changes.

Information Services

As we look toward the future, we continue to make progress in leveraging emerging technologies to expand the ways we serve clients, with our launch of the trading and analytics product suite, Analytics Hub, which leverages machine intelligence in its logic to serve investors.

We also continue to make strides in expanding our Index Licensing and Services business, in particular in our smart beta products, which make up a strong portion of our growing total assets under management. The 2017 acquisition of eVestment added the strong network effects of a leading analytics provider to our product offerings.

The performance of our market data products offerings reflect overall market conditions as well as our ability to offer market participants superior performance and efficiency relative to our competitors' products. Our market data products also face pressure from our customers' desire to minimize their costs and from regulatory changes in the regions where we operate.

In addition, we continue to look for opportunities to expand product sales through additional geographic expansion and new opportunities such as eVestment.

Corporate Services

Overall, we made significant progress in 2017 to enhance the client experience. In 2017, we combined our two board portal platforms. In addition, we created an architectural foundation for our next generation corporate solutions products using the cloud and machine learning to offer enhanced surveillance tools.

2017 was a record year for Nordic IPOs, while the IPO market was more subdued in the U.S. Nasdaq led U.S. exchanges for IPOs for the fifth consecutive year. There was strong momentum in U.S. listing switches with the largest issuer ever to switch their exchange listing to Nasdaq in 2017. Growth in 2018 for our Corporate Services segment will depend on a continued positive economic outlook, a lower level of merger and acquisition transactions and a reasonable level of volatility.

As part of our strategic review, we identified the areas of our Corporate Solutions business that were of greatest importance to our customer base, that demonstrated significant growth opportunities, and where we could apply our technology to enhance customer value and drive future growth. We determined that our Investor Relations and Board & Leadership Services would be our area of focus and we commenced a process to evaluate strategic alternatives for the Public Relations Solutions and Digital Media Services businesses within our Corporate Solutions business and in January 2018, we announced the sale of these businesses. See "Definitive Agreement to Sell our Public Relations Solutions and Digital Media Services Businesses," of Note 21, "Subsequent Events," to the consolidated financial statements for further discussion.

Market Technology

During 2017, we continued to invest in the Nasdaq Financial Framework, which is our market technology modular architecture that will provide next generation capital market capabilities, including the integration of blockchain technology across the issuance and settlement of securities, as well as cloud-enabled trading and clearing. Based on customer interest and sales during 2017, we expect this next generation platform to contribute meaningfully to our order intake in 2018 and beyond.

In addition, during 2017, we enhanced our SMARTS product and acquired deeper surveillance and behavioral capabilities through Sybenetix. Our service delivery model continues to evolve as we move from deployed software to a Platform-as-a-Service approach as cloud capabilities and market acceptance mature.

Summary

We believe that our future will continue to be determined by our ability to satisfy our customer's evolving needs and to allocate resources in strategic areas which will yield attractive returns.

Consistent with our long-term strategy, we expect to leverage our technology strengths to offer new products that expand and strengthen our relationships with existing and new customers.

We believe that our continued focus on meeting our cost, revenue and technology objectives will enable us to benefit from any improving economic conditions in the future. We will continue to look for opportunities to further expand our business with enhanced product offerings and/or acquisitions that are complementary to our existing businesses.

Business Segments

We manage, operate and provide our products and services in four business segments: Market Services, Corporate Services, Information Services and Market Technology. See Note 1, "Organization and Nature of Operations," and Note 20, "Business Segments," to the consolidated financial statements for further discussion of our reportable segments, as well as how management allocates resources, assesses performance and manages these businesses as four separate segments.

Sources of Revenues and Transaction-Based Expenses

See "Revenue Recognition and Transaction-Based Expenses," of Note 2, "Summary of Significant Accounting Policies," to the consolidated financial statements for further discussion of our sources of revenues and transaction-based expenses.

Nasdaq's Operating Results

Key Drivers

The following table includes key drivers for our Market Services, Corporate Services, Information Services and Market Technology segments. In evaluating the performance of our business, our senior management closely evaluates these key drivers.

	Year Ended December 31,		
	2017	2016	2015
Market Services			
Equity Derivative Trading and Clearing			
U.S. equity options			
Total industry average daily volume (in millions)	14.7	14.4	14.8
Nasdaq PHLX matched market share	17.3%	16.0%	16.7%
The Nasdaq Options Market matched market share	9.2%	7.8%	7.7%
Nasdaq BX Options matched market share	0.7%	0.8%	0.8%
Nasdaq ISE Options matched market share [1]	9.1%	5.8%	—%
Nasdaq GEMX Options matched market share [1]	5.2%	1.1%	—%
Nasdaq MRX Options matched market share [1]	0.1%	0.1%	—%
Total matched market share executed on Nasdaq's exchanges	41.6%	31.6%	25.2%
Nasdaq Nordic and Nasdaq Baltic options and futures			
Total average daily volume of options and futures contracts [2]	330,218	376,730	380,725
Cash Equity Trading			
Total U.S.-listed securities			
Total industry average daily share volume (in billions)	6.53	7.35	6.91
Matched share volume (in billions)	295.9	321.6	327.7
The Nasdaq Stock Market matched market share	14.2%	14.0%	15.8%
Nasdaq BX matched market share	3.1%	2.4%	2.0%
Nasdaq PSX matched market share	0.8%	1.0%	1.0%
Total matched market share executed on Nasdaq's exchanges	18.1%	17.4%	18.8%
Market share reported to the FINRA/Nasdaq Trade Reporting Facility	34.5%	33.1%	31.8%
Total market share [3]	52.6%	50.5%	50.6%
Nasdaq Nordic and Nasdaq Baltic securities			
Average daily number of equity trades executed on Nasdaq's exchanges	552,104	472,428	438,864
Total average daily value of shares traded (in billions)	$ 5.3	$ 5.1	$ 5.1
Total market share executed on Nasdaq's exchanges	67.5%	62.5%	68.0%
FICC			
Fixed Income			
U.S. fixed income notional trading volume (in billions)	$ 17,800	$ 21,504	$ 29,234
Total average daily volume of Nasdaq Nordic and Nasdaq Baltic fixed income contracts	115,185	89,252	108,708
Commodities			
Power contracts cleared (TWh) [4]	1,199	1,658	1,496
Corporate Services			
Initial public offerings			
The Nasdaq Stock Market	136	91	143
Exchanges that comprise Nasdaq Nordic and Nasdaq Baltic	88	62	78
Total new listings			
The Nasdaq Stock Market [5]	268	283	274
Exchanges that comprise Nasdaq Nordic and Nasdaq Baltic [6]	108	88	91
Number of listed companies			
The Nasdaq Stock Market [7]	2,949	2,897	2,859
Exchanges that comprise Nasdaq Nordic and Nasdaq Baltic [8]	984	900	852
Information Services			

Number of licensed ETPs	324	298	222
ETP assets under management tracking Nasdaq indexes (in billions)	$ 167	$ 124	$ 114
Market Technology			
Order intake (in millions) [9]	$ 292	$ 276	$ 271
Total order value (in millions) [10]	$ 847	$ 777	$ 788

(1) For the year ended December 31, 2016, Nasdaq ISE, Nasdaq GEMX and Nasdaq MRX matched market share represents trading volume which commenced on June 30, 2016.
(2) Includes Finnish option contracts traded on Eurex.
(3) Includes transactions executed on The Nasdaq Stock Market's, Nasdaq BX's and Nasdaq PSX's systems plus trades reported through the FINRA/Nasdaq Trade Reporting Facility.
(4) Transactions executed on Nasdaq Commodities or OTC and reported for clearing to Nasdaq Commodities measured by Terawatt hours (TWh).
(5) New listings include IPOs, including those completed on a best efforts basis, issuers that switched from other listing venues, closed-end funds and separately listed ETPs.
(6) New listings include IPOs and represent companies listed on the Nasdaq Nordic and Nasdaq Baltic exchanges and companies on the alternative markets of Nasdaq First North.
(7) Number of total listings on The Nasdaq Stock Market at period end, including 373 ETPs as of December 31, 2017 and 328 as of December 31, 2016 .
(8) Represents companies listed on the Nasdaq Nordic and Nasdaq Baltic exchanges and companies on the alternative markets of Nasdaq First North at period end.
(9) Total contract value of orders signed during the period.
(10) Represents total contract value of signed orders that are yet to be recognized as revenue. Market technology deferred revenue, as discussed in Note 9, "Deferred Revenue," to the consolidated financial statements, represents consideration received that is yet to be recognized as revenue for these signed orders.

* * * * * *

Financial Summary

The following table summarizes our financial performance for the year ended December 31, 2017 when compared with the same period in 2016 and for the year ended December 31, 2016 when compared with the same period in 2015. The comparability of our results of operations between reported periods is impacted by the acquisitions of: eVestment in October 2017, Nasdaq Canada and Marketwired in February 2016, Boardvantage in May 2016, ISE in June 2016 and DWA in January 2015. See Note 4, "Acquisitions," to the consolidated financial statements for further discussion of the above acquisitions. For a detailed discussion of our results of operations, see "Segment Operating Results" below.

	Year Ended December 31,			Percentage Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
	(in millions, except per share amounts)				
Revenues less transaction-based expenses	$ 2,428	$ 2,277	$ 2,090	6.6 %	8.9 %
Operating expenses	1,429	1,438	1,370	(0.6)%	5.0 %
Operating income	999	839	720	19.1 %	16.5 %
Interest expense	(143)	(135)	(111)	5.9 %	21.6 %
Asset impairment charge	—	(578)	—	(100.0)%	N/M
Income before income taxes	880	136	630	547.1 %	(78.4)%
Income tax provision	146	28	203	421.4 %	(86.2)%
Net income attributable to Nasdaq	$ 734	$ 108	$ 428	579.6 %	(74.8)%
Diluted earnings per share	$ 4.33	$ 0.64	$ 2.50	576.6 %	(74.4)%
Cash dividends declared per common share	$ 1.46	$ 1.21	$ 0.90	20.7 %	34.4 %

N/M Not meaningful.

In countries with currencies other than the U.S. dollar, revenues and expenses are translated using monthly average exchange rates. Impacts on our revenues less transaction-based expenses and operating income associated with fluctuations in foreign currency are discussed in more detail under "Item 7A. Quantitative and Qualitative Disclosures about Market Risk."

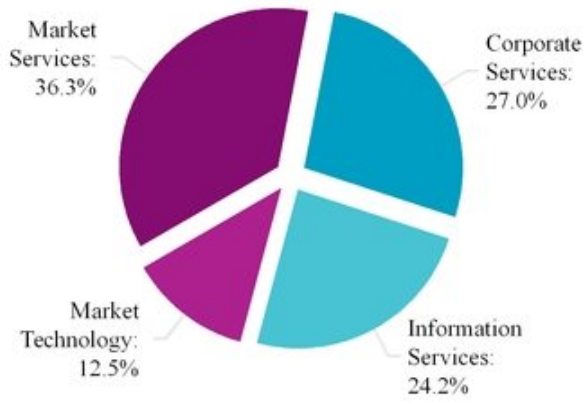
Segment Operating Results

The following table shows our revenues by segment, transaction-based expenses for our Market Services segment and total revenues less transaction-based expenses:

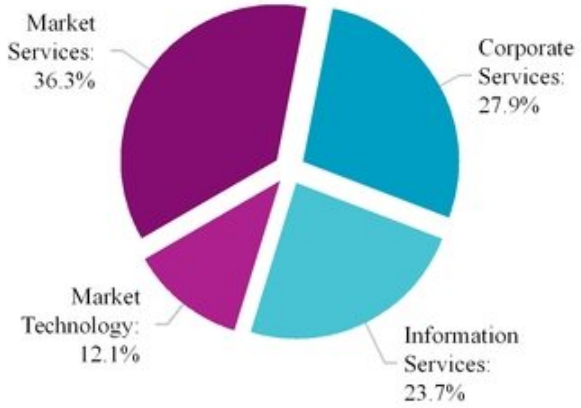
	Year Ended December 31,			Percentage Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
	(in millions)				
Market Services	$ 2,418	$ 2,255	$ 2,084	7.2%	8.2%
Transaction-based expenses	(1,537)	(1,428)	(1,313)	7.6%	8.8%
Market Services revenues less transaction-based expenses	881	827	771	6.5%	7.3%
Corporate Services	656	635	562	3.3%	13.0%
Information Services	588	540	512	8.9%	5.5%
Market Technology	303	275	245	10.2%	12.2%
Total revenues less transaction-based expenses	$ 2,428	$ 2,277	$ 2,090	6.6%	8.9%

The following charts show our Market Services, Corporate Services, Information Services and Market Technology segments as a percentage of our total revenues less transaction-based expenses of $2,428 million in 2017, $2,277 million in 2016 and $2,090 million in 2015:

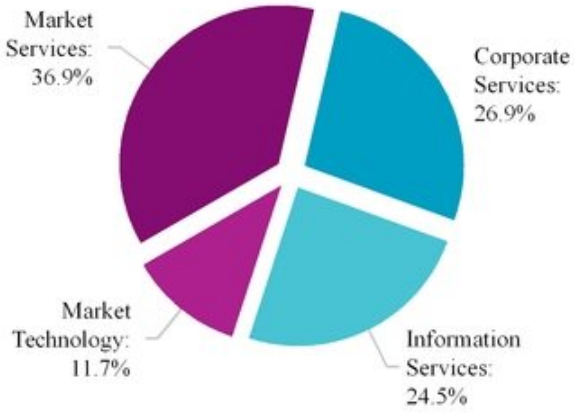
2017 Percentage of Revenues Less Transaction-based Expenses by Segment



2016 Percentage of Revenues Less Transaction-based Expenses by Segment



2015 Percentage of Revenues Less Transaction-based Expenses by Segment



MARKET SERVICES

The following table shows total revenues, transaction-based expenses, and total revenues less transaction-based expenses from our Market Services segment:

	Year Ended December 31,			Percentage Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
	(in millions)				
Market Services Revenues:					
Equity Derivative Trading and Clearing Revenues [1]	$ 752	$ 541	$ 432	39.0 %	25.2 %
Transaction-based expenses:					
Transaction rebates	(450)	(288)	(223)	56.3 %	29.1 %
Brokerage, clearance and exchange fees [1]	(43)	(25)	(21)	72.0 %	19.0 %
Equity derivative trading and clearing revenues less transaction-based expenses	**259**	**228**	**188**	**13.6 %**	**21.3 %**
Cash Equity Trading Revenues [2]	1,279	1,349	1,315	(5.2)%	2.6 %
Transaction-based expenses:					
Transaction rebates	(692)	(785)	(756)	(11.8)%	3.8 %
Brokerage, clearance and exchange fees [2]	(334)	(309)	(306)	8.1 %	1.0 %
Cash equity trading revenues less transaction-based expenses	**253**	**255**	**253**	**(0.8)%**	**0.8 %**
FICC Revenues	96	99	98	(3.0)%	1.0 %
Transaction-based expenses:					
Transaction rebates	(16)	(19)	(4)	(15.8)%	375.0 %
Brokerage, clearance and exchange fees	(2)	(2)	(3)	— %	(33.3)%
FICC revenues less transaction-based expenses	**78**	**78**	**91**	**— %**	**(14.3)%**
Trade Management Services Revenues	**291**	**266**	**239**	**9.4 %**	**11.3 %**
Total Market Services revenues less transaction-based expenses	**$ 881**	**$ 827**	**$ 771**	**6.5 %**	**7.3 %**

(1) Includes Section 31 fees of $40 million in 2017, $24 million in 2016 and $19 million in 2015. Section 31 fees are recorded as equity derivative trading and clearing revenues with a corresponding amount recorded in transaction-based expenses.

(2) Includes Section 31 fees of $319 million in 2017, $290 million in 2016 and $282 million in 2015. Section 31 fees are recorded as cash equity trading revenues with a corresponding amount recorded in transaction-based expenses.

Equity Derivative Trading and Clearing Revenues

Equity derivative trading and clearing revenues and equity derivative trading and clearing revenues less transaction-based expenses increased in both 2017 compared with 2016 and 2016 compared with 2015.

The increases in 2017 were primarily due to the inclusion of a full year of revenues from our acquisition of ISE compared with six months in 2016, higher U.S. industry trading volumes and an increase in our overall U.S. matched market share. Further impacting the increase in equity derivative trading revenues was higher Section 31 pass-through fee revenue.

The increases in 2016 were primarily due to:

- the inclusion of revenues from our acquisition of ISE, partially offset by;
- lower U.S. industry trading volumes; and
- lower market share at Nasdaq PHLX.

Section 31 fees are recorded as equity derivative trading and clearing revenues with a corresponding amount recorded as transaction-based expenses. In the U.S., we are assessed these fees from the SEC and pass them through to our customers in the form of incremental fees. Pass-through fees can increase or decrease due to rate changes by the SEC, our percentage of the overall industry volumes processed on our systems, and differences in actual dollar value of shares traded. Since the amount recorded in revenues is equal to the amount recorded as transaction-based expenses, there is no impact on our revenues less transaction-based expenses. The increase in 2017 compared with 2016 is primarily due to the inclusion of a full year of Section 31 fees from our acquisition of ISE compared with six months in 2016. The increase in 2016 compared with 2015 is primarily due to the inclusion of six months of Section 31 fees from our acquisition of ISE.

Transaction rebates, in which we credit a portion of the per share execution charge to the market participant, increased in both

2017 compared with 2016 and 2016 compared to 2015. The increase in 2017 was primarily due to the inclusion of a full year of rebates associated with our acquisition of ISE compared with six months in 2016, increases in rebate capture, higher U.S. industry trading volumes, and an increase in our overall U.S. matched market share. The increase in 2016 was primarily due to the inclusion of six months of rebates associated with our acquisition of ISE, partially offset by lower U.S. industry trading volumes and lower market share at Nasdaq PHLX.

Brokerage, clearance and exchange fees increased in both 2017 compared with 2016 and 2016 compared with 2015. The increase in both 2017 and 2016 was primarily due to higher Section 31 pass-through fees associated with our acquisition of ISE, as discussed above.

Cash Equity Trading Revenues

Cash equity trading revenues and cash equity trading revenues less transaction-based expenses decreased in 2017 compared with 2016 and increased in 2016 compared with 2015.

The decreases in 2017 were primarily due to:

- lower U.S. industry trading volumes, partially offset by;
- higher European industry trading volumes; and
- an increase in our overall U.S. matched market share and European market share executed on Nasdaq's exchanges.

The decrease in cash equity trading revenues in 2017 was also partially offset by an increase in Section 31 pass-through fee revenue.

The increases in 2016 were primarily due to:

- the inclusion of revenues associated with our acquisition of Nasdaq Canada; and
- higher U.S. and European industry trading volumes, partially offset by a;
- decrease in our overall U.S. and European matched market share executed on Nasdaq’s exchanges.

The increase in cash equity trading revenues less transaction-based expenses in 2016 was also unfavorably impacted by a decrease in the U.S. average net capture rate.

Similar to equity derivative trading and clearing, in the U.S. we record Section 31 fees as cash equity trading revenues with a corresponding amount recorded as transaction-based expenses. We are assessed these fees from the SEC and pass them through to our customers in the form of incremental fees. Since the amount recorded as revenues is equal to the amount recorded as transaction-based expenses, there is no impact on our revenues less transaction-based expenses. The increases in Section 31 fees in 2017 compared with 2016 and 2016 compared with 2015 were primarily due to higher dollar value traded on Nasdaq’s exchanges and higher SEC fee rates.

Transaction rebates decreased in 2017 compared with 2016 and increased in 2016 compared with 2015. For The Nasdaq Stock Market, Nasdaq PSX and Nasdaq Canada, we credit a portion of the per share execution charge to the market participant that provides the liquidity, and for Nasdaq BX, we credit a portion of the per share execution charge to the market participant that takes the liquidity.

The decrease in 2017 was primarily due to:

- lower U.S. industry trading volumes, partially offset by;
- an increase in our overall U.S. matched market share executed on Nasdaq’s exchanges.

The increase in 2016 was primarily due to:

- higher U.S. industry trading volumes; and
- the inclusion of rebates associated with our acquisition of Nasdaq Canada, partially offset by a;
- decrease in our overall U.S. matched market share executed on Nasdaq’s exchanges.

Brokerage, clearance and exchange fees increased in both 2017 compared with 2016 and 2016 when compared with 2015. The increase in 2017 was primarily due to higher Section 31 pass-through fees, as discussed above, partially offset by a decline in routing fees. The increase in 2016 was primarily due to an increase in Section 31 pass-through fees.

FICC Revenues

FICC revenues decreased in 2017 compared with the same period in 2016 primarily due to volume declines in European commodities products and U.S. fixed income products, partially offset by higher volumes and pricing changes at NFX. FICC revenues less transaction-based expenses were flat in 2017 compared with 2016 as declines in European commodities products and U.S. fixed income products were offset by higher volumes and pricing changes at NFX.

FICC revenues increased slightly in 2016 compared with 2015 and FICC revenues less transaction-based expenses decreased in 2016 compared with 2015. The decrease in FICC revenues less transaction-based expenses in 2016 was primarily due to the impact of NFX trading incentives and a decline in U.S. fixed income revenues, partially offset by higher commodities revenues.

Trade Management Services Revenues

Trade management services revenues increased in both 2017 compared with 2016 and 2016 compared with 2015. The increase in 2017 was primarily due to an increase in customer demand for third party connectivity, co-location, and test facilities and the inclusion of a full year of revenues from our acquisition of ISE compared with six months in 2016. The increase in 2016 was primarily due to an increase in customer demand for network connectivity and the inclusion of six months of revenues from our acquisition of ISE.

CORPORATE SERVICES

The following table shows revenues from our Corporate Services segment:

	Year Ended December 31,			Percentage Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
	(in millions)				
Corporate Services:					
Corporate Solutions	$ 386	$ 363	$ 298	6.3 %	21.8%
Listing Services	270	272	264	(0.7)%	3.0%
Total Corporate Services	$ 656	$ 635	$ 562	3.3 %	13.0%

Corporate Solutions Revenues

Corporate solutions revenues increased in both 2017 compared with 2016 and 2016 compared with 2015. The increase was primarily due to the inclusion of revenues associated with the acquisitions of Boardvantage and Marketwired. See "Acquisition of Boardvantage," and "Acquisition of Marketwired," of Note 4, "Acquisitions," to the consolidated financial statements for further discussion of the Boardvantage and Marketwired acquisitions.

Listing Services Revenues

Listing services revenues decreased in 2017 compared with 2016 and increased in 2016 compared with 2015. The decrease in 2017 was primarily due to a decrease in U.S. listing of additional share fees as a result of our all-inclusive annual listing fee program, partially offset by an increase in European listing services revenues due to new company listings. The increase in 2016 was primarily due to an increase in European revenues due to new company listings.

INFORMATION SERVICES

The following table shows revenues from our Information Services segment:

	Year Ended December 31,			Percentage Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
	(in millions)				
Information Services:					
Data Products	$ 454	$ 427	$ 399	6.3%	7.0%
Index Licensing and Services	134	113	113	18.6%	—%
Total Information Services	$ 588	$ 540	$ 512	8.9%	5.5%

Data Products Revenues

Data products revenues increased in both 2017 compared with 2016 and 2016 compared with 2015. The increase in 2017 was primarily due to growth in proprietary data products revenues and the inclusion of revenues associated with the acquisition of eVestment. The increase in 2016 was primarily due to growth in proprietary data products revenues, the inclusion of revenues associated with the acquisitions of ISE and Nasdaq Canada, and higher index data products revenues.

Index Licensing and Services Revenues

Index licensing and services revenues increased in 2017 compared with 2016 and was flat in 2016 compared with 2015. The increase in 2017 was primarily due to higher assets under management in ETPs linked to Nasdaq indexes. Index licensing and services revenues were flat in 2016 as an increase in revenues associated with the acquisition of ISE was offset by a decrease in average fees on ETPs tracking to Nasdaq indexes and a decrease in the value of underlying assets associated with non-ETP Nasdaq-licensed products.

MARKET TECHNOLOGY

The following table shows revenues from our Market Technology segment:

	Year Ended December 31,			Percentage Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
	(in millions)				
Market Technology	$ 303	$ 275	$ 245	10.2%	12.2%

Market Technology Revenues

Market technology revenues increased in both 2017 compared with 2016 and 2016 compared with 2015. The increase in 2017 was primarily due to higher change request revenues and an increase in revenues from software as a service. The increase in 2016 was primarily due to an increase in revenues from software, licensing and support as well as surveillance products.

Total Order Value

Total order value, which represents the total contract value of orders signed that are yet to be recognized as revenues, was $847 million as of December 31, 2017 and $777 million as of December 31, 2016 . As of December 31, 2017 , market technology deferred revenue of $173 million represents consideration received that is yet to be recognized as revenue for these signed orders. See Note 9, "Deferred Revenue," to the consolidated financial statements for further discussion. The recognition and timing of these revenues depend on many factors, including those that are not within our control. As such, the following table of market technology revenues to be recognized in the future represents our best estimate:

	Total Order Value
	(in millions)
Fiscal year ended:	
2018	$ 263
2019	204
2020	137
2021	102
2022	62
2023 and thereafter	79
Total	$ 847

On January 1, 2018, we adopted ASU 2014-09, "Revenue from Contracts with Customers." As a result, a portion of revenues that were previously deferred were recognized either in prior period revenues, through restatement, or as an adjustment to retained earnings upon adoption of the new standard. See "Recent Accounting Pronouncements," of Note 2, "Summary of Significant Accounting Policies," for further discussion and the impact to the deferred revenue balance.

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Expenses

Operating Expenses

The following table shows our operating expenses:

	Year Ended December 31,			Percentage Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
	(in millions)				
Compensation and benefits	$ 675	$ 664	$ 590	1.7 %	12.5 %
Professional and contract services	156	153	148	2.0 %	3.4 %
Computer operations and data communications	125	111	107	12.6 %	3.7 %
Occupancy	95	86	85	10.5 %	1.2 %
General, administrative and other	82	72	65	13.9 %	10.8 %
Marketing and advertising	31	30	28	3.3 %	7.1 %
Depreciation and amortization	188	170	138	10.6 %	23.2 %
Regulatory	33	35	27	(5.7)%	29.6 %
Merger and strategic initiatives	44	76	10	(42.1)%	660.0 %
Restructuring charges	—	41	172	(100.0)%	(76.2)%
Total operating expenses	$ 1,429	$ 1,438	$ 1,370	(0.6)%	5.0 %

The increase in compensation and benefits expense in 2017 was primarily due to overall higher compensation costs resulting from our 2017 and 2016 acquisitions and an unfavorable impact from foreign exchange of $2 million, partially offset by lower compensation expense reflecting lower performance incentives. Also impacting the change in compensation expense in 2017 was accelerated expense recorded in 2016 due to the retirement of the company's former CEO for equity awards previously granted. The increase in 2016 was primarily due to overall higher compensation costs resulting from our 2016 acquisitions and accelerated expense due to the retirement of the company's former CEO discussed above. Partially offsetting the 2016 increases was lower compensation expense reflecting lower performance incentives and a favorable impact from foreign exchange of $3 million.

Headcount increased to 4,734 employees as of December 31, 2017 from 4,325 as of December 31, 2016 primarily due to our acquisition of eVestment.

The increase in professional and contract services expense in 2017 was primarily associated with our 2017 and 2016 acquisitions and the increase in 2016 was primarily associated with our 2016 acquisitions.

The increase in computer operations and data communications expense in 2017 and 2016 was primarily due to higher hardware and license costs. The increase in 2017 was associated with our 2017 and 2016 acquisitions and the increase in 2016 was primarily associated with our 2016 acquisitions.

The increase in occupancy expense in 2017 and 2016 primarily reflects additional facility and rent costs. The increase in 2017 was associated with our 2017 and 2016 acquisitions and the increase in 2016 was associated with our 2016 acquisitions. The increase in 2016 is partially offset by lower facility and rent costs as a result of our restructuring activities.

The increase in general, administrative and other expense in 2017 was primarily due to a pre-tax charge of $10 million which primarily included a make-whole redemption price premium paid on the early extinguishment of our $370 million aggregate principal amount of 5.25% senior unsecured notes, or the 2018 Notes, and lower regulatory fine collections. The increase in 2016 is primarily associated with our 2016 acquisitions.

Marketing and advertising expense increased in both 2017 and 2016 primarily due to an increase in advertising spend.

The increase in depreciation and amortization expense in 2017 and 2016 was primarily due to additional amortization expense associated with acquired intangible assets. The increase in 2017 was associated with our 2017 and 2016 acquisitions and the increase in 2016 was primarily associated with our 2016 acquisitions. The increase in 2016 was also due to additional amortization expense associated with software assets placed in service.

The decrease in regulatory expense in 2017 was primarily due to costs incurred in 2016 related to the investigations of cybersecurity processes at our Nordic exchanges and clearinghouse, which are discussed below, partially offset by a rate increase for regulatory services and trade surveillance. The

increase in 2016 was due to investigations of cybersecurity processes at our Nordic exchanges and clearinghouse. In December 2016, we were issued a $6 million fine by the SFSA as a result of findings in connection with its investigation. The SFSA's conclusions related to governance issues rather than systems and platform security. We have appealed the SFSA's decision, including the amount of the fine. The court has not yet reached a decision on our appeal.

Merger and strategic initiatives expense for 2017 was primarily related to our acquisitions of eVestment and ISE as well as costs associated with our review of strategic alternatives for our Public Relations Solutions and Digital Media Services businesses within our Corporate Solutions business. Merger and strategic initiatives expense for 2016 was primarily related to our acquisitions of ISE, Boardvantage, and Marketwired. Merger and strategic initiatives expense for 2015 was primarily related to certain strategic initiatives and our acquisition of DWA.

See Note 3, "Restructuring Charges," to the consolidated financial statements for a discussion of our restructuring charges recorded during 2016 and 2015.

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Non-operating Income and Expenses

The following table shows our non-operating income and expenses:

	Year Ended December 31,			Percentage Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
	(in millions)				
Interest income	$ 7	$ 5	$ 4	40.0 %	25.0 %
Interest expense	(143)	(135)	(111)	5.9 %	21.6 %
Net interest expense	(136)	(130)	(107)	4.6 %	21.5 %
Asset impairment charge	—	(578)	—	(100.0)%	N/M
Other investment income	2	3	—	(33.3)%	N/M
Net income from unconsolidated investees	15	2	17	650.0 %	(88.2)%
Total non-operating expenses	$ (119)	$ (703)	$ (90)	(83.1)%	681.1 %

N/M Not meaningful.

Interest Income

Interest income increased in both 2017 and 2016 primarily due to an increase in interest rates.

Interest Expense

The following table shows our interest expense:

	Year Ended December 31,			Percentage Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
	(in millions)				
Interest expense on debt	$ 135	$ 129	$ 106	4.7%	21.7%
Accretion of debt issuance costs and debt discount	6	5	4	20.0%	25.0%
Other bank and investment-related fees	2	1	1	100.0%	—%
Interest expense	$ 143	$ 135	$ 111	5.9%	21.6%

Interest expense increased in 2017 and 2016 primarily due to debt issuances related to our acquisitions, partially offset by refinancing to lower cost debt. The increase in 2017 was primarily associated with our 2017 and 2016 acquisitions and the increase in 2016 was primarily associated with our 2016 acquisitions.

See Note 10, "Debt Obligations," to the consolidated financial statements for further discussion.

Asset Impairment Charge

The asset impairment charge in 2016 relates to a pre-tax, non-cash intangible asset impairment charge related to the full write-off of the eSpeed trade name due to a continued decline in the operating performance of the eSpeed business during 2016 and a rebranding of our Fixed Income business under a single brand called Nasdaq Fixed Income.

See "Intangible Asset Impairment Charges," of Note 6, "Goodwill and Acquired Intangible Assets," to the consolidated financial statements for further discussion of the intangible asset impairment charge in 2016.

Net Income from Unconsolidated Investees

Net income from unconsolidated investees in 2017 and 2015 primarily relates to income recognized from our equity method investment in OCC. Net income from unconsolidated investees in 2016 includes income recognized from our equity method investments in OCC and EuroCCP N.V. , partially offset by the write-off of an equity method investment. See "Equity Method Investments," of Note 7, "Investments," to the consolidated financial statements for further discussion of our equity method investments.

Tax Matters

The Tax Cuts and Jobs Act was enacted on December 22, 2017 and is effective January 1, 2018. The new legislation contains several key provisions, including a reduction of the U.S. corporate income tax rate from 35% to 21%. We are required to remeasure all our U.S. deferred tax assets and liabilities as of December 22, 2017 and record the impact of such remeasurement in our 2017 financial statements. For the year ended December 31, 2017, we recorded a decrease to tax expense of $87 million , substantially all of which reflects the estimated impact associated with the remeasurement of our net U.S. deferred tax liability at the lower U.S. federal corporate income tax rate. The Tax Cuts and Jobs Act also imposes a transition tax on unremitted aggregate accumulated earnings of non-U.S. subsidiaries, which did not impact us.

The following table shows our income tax provision and effective tax rate:

	Year Ended December 31,			Percentage Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
	($ in millions)				
Income tax provision	$ 146	$ 28	$ 203	421.4%	(86.2)%
Effective tax rate	16.6%	20.6%	32.2%		

The lower effective tax rate in 2017 when compared to 2016 is primarily due to a decrease to tax expense associated with the remeasurement of our net U.S. deferred tax liability as a result of enactment of the Tax Cuts and Jobs Act. The decrease in the effective tax rate in 2017 is also due to the recognition of excess tax benefits associated with the vesting of employee share-based compensation arrangements. The lower effective tax rate in 2016 when compared to 2015 is primarily due to a shift in the geographic mix of earnings, largely driven by the write-off of the eSpeed trade name, partially offset by an unfavorable ruling from the Finnish Supreme Administrative Court.

The effective tax rate may also vary from period to period depending on, among other factors, the geographic and business mix of earnings and losses. These same and other factors, including history of pre-tax earnings and losses, are taken into account in assessing the ability to realize deferred tax assets.

For further discussion of our tax matters, see "Tax Matters," and "Recent Accounting Pronouncements," of Note 2, "Summary of Significant Accounting Policies," and Note 11, "Income Taxes," to the consolidated financial statements.

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Non-GAAP Financial Measures

In addition to disclosing results determined in accordance with U.S. GAAP, we also have provided non-GAAP net income attributable to Nasdaq and non-GAAP diluted earnings per share. Management uses this non-GAAP information internally, along with U.S. GAAP information, in evaluating our performance and in making financial and operational decisions. We believe our presentation of these measures provides investors with greater transparency and supplemental data relating to our financial condition and results of operations. In addition, we believe the presentation of these measures is useful to investors for period-to-period comparisons of results as the items described below do not reflect ongoing operating performance.

These measures are not in accordance with, or an alternative to, U.S. GAAP, and may be different from non-GAAP measures used by other companies. Investors should not rely on any single financial measure when evaluating our business. We recommend investors review the U.S. GAAP financial measures included in this Annual Report on Form 10-K, including our consolidated financial statements and the notes thereto. When viewed in conjunction with our U.S. GAAP results and the accompanying reconciliation, we believe these non-GAAP measures provide greater transparency and a more complete understanding of factors affecting our business than U.S. GAAP measures alone.

We understand that analysts and investors regularly rely on non-GAAP financial measures, such as non-GAAP net income attributable to Nasdaq and non-GAAP diluted earnings per share, to assess operating performance. We use non-GAAP net income attributable to Nasdaq and non-GAAP diluted earnings per share because they highlight trends more clearly in our business that may not otherwise be apparent when relying solely on U.S. GAAP financial measures, since these measures eliminate from our results specific financial items that have less bearing on our ongoing operating performance. Non-GAAP net

income attributable to Nasdaq for the periods presented below is calculated by adjusting for the following items:

Amortization expense of acquired intangible assets: We amortize intangible assets acquired in connection with various acquisitions. Intangible asset amortization expense can vary from period to period due to episodic acquisitions completed, rather than from our ongoing business operations. As such, if intangible asset amortization is included in performance measures, it is more difficult to assess the day-to-day operating performance of the businesses, the relative operating performance of the businesses between periods, and the earnings power of Nasdaq. Performance measures excluding intangible asset amortization therefore provide investors with a more useful representation of our businesses' ongoing activity in each period.

Merger and strategic initiatives expense: We have pursued various strategic initiatives and completed a number of acquisitions in recent years which have resulted in expenses which would not have otherwise been incurred. These expenses generally include integration costs, as well as legal, due diligence and other third party transaction costs. The frequency and the amount of such expenses vary significantly based on the size, timing and complexity of the transaction. Accordingly, we exclude these costs for purposes of calculating non-GAAP measures which provide a more meaningful analysis of Nasdaq's ongoing operating performance or comparison in Nasdaq's performance between periods.

Restructuring charges: Restructuring charges are associated with our 2015 restructuring plan to improve performance, cut costs and reduce spending and were primarily related to (i) severance and other termination benefits, (ii) asset impairment charges, and (iii) other charges. We exclude these restructuring costs because these costs do not reflect future operating expenses and do not contribute to a meaningful evaluation of Nasdaq's ongoing operating performance or comparison of Nasdaq's performance between periods.

Asset impairment charge: Intangible assets that have indefinite lives are reviewed for impairment at least annually, or when indicators of impairment are present. In December *2* 016, we recorded a pre-tax, non-cash intangible asset impairment charge of $578 million related to the full write-off of the eSpeed trade name. The impairment charge was the result of a decline in operating performance and the rebranding of our Fixed Income business. We exclude asset impairment charges because they do not reflect future operating expenses and do not contribute to a meaningful evaluation of Nasdaq's ongoing operating performance or comparison of Nasdaq's performance between periods.

Other significant items: We have excluded certain other charges or gains, including certain tax items, that are the result of other non-comparable events to measure operating performance. We believe the exclusion of such amounts allows management and investors to better understand the ongoing financial results of Nasdaq. For 2017 , other significant items primarily include a make-whole redemption price premium paid on the early extinguishment of our 2018 Notes, a sublease loss reserve charge recorded on space we currently occupy due to excess capacity, and wind down costs associated with an equity method investment that was previously written off. For 2016, other significant items primarily include accelerated expense for equity awards previously granted due to the retirement of the company's former CEO, a regulatory fine received by our Nordic exchanges and clearinghouse, the release of a sublease loss reserve due to the early exit of a facility, and the impact of the write-off of an equity method investment, partially offset by a gain resulting from the sale of a percentage of a separate equity method investment. For 2015, other significant items include income from our equity investment in OCC where we were not able to determine what our share of OCC's income was for the year ended December 31, 2014 until the first quarter of 2015, when financial statements were made available to us. As a result, we recorded other income in the first quarter of 2015 relating to our share of OCC's income for the year ended December 31, 2014. For 2015, other significant adjustments also included the reversal of a VAT refund.

Significant tax items: The adjustment to the income tax provision includes the tax impact of each non-GAAP adjustment in addition to the following items:

- The recognition of previously unrecognized tax benefits of $12 million associated with positions taken in prior years for the year ended December 31, 2017.
- We recorded a $27 million tax expense for the year ended December 31, 2016, due to an unfavorable tax ruling received during the second quarter of 2016, the impact of which is related to prior periods.
- The impact of newly enacted U.S. tax legislation is related to the Tax Cuts and Jobs Act which was enacted on December 22, 2017. For the year ended December 31, 2017, we recorded a decrease to tax expense of $87 million, which reflects the estimated impact associated with the enactment of this act. The decrease in tax expense primarily relates to the remeasurement of our net U.S. deferred tax liability at the lower U.S. federal corporate income tax rate. The estimate may be refined in the future as new information becomes available.
- Excess tax benefits related to employee share-based compensation of $40 million for the year ended December 31, 2017 was recorded as a result of the adoption of new accounting guidance on January 1, 2017. This guidance requires all income tax effects of share-based awards to be recognized as income tax expense or benefit in the income statement when the awards vest or are settled on a prospective basis, as opposed to stockholders' equity where it was previously recorded, and will be a recurring item going forward. This item is subject to volatility and will vary based on the timing of the vesting of employee share-based compensation arrangements and fluctuation in our stock price.

The following table represents reconciliations between U.S. GAAP net income attributable to Nasdaq and diluted earnings per share and non-GAAP net income attributable to Nasdaq and diluted earnings per share:

	Year Ended December 31, 2017		Year Ended December 31, 2016		Year Ended December 31, 2015	
	Net Income	Diluted Earnings Per Share	Net Income	Diluted Earnings Per Share	Net Income	Diluted Earnings Per Share
	(in millions, except share and per share amounts)					
U.S. GAAP net income attributable to Nasdaq and diluted earnings per share	$ 734	$ 4.33	$ 108	$ 0.64	$ 428	$ 2.50
Non-GAAP adjustments:						
Amortization expense of acquired intangible assets	92	0.54	82	0.49	62	0.36
Merger and strategic initiatives	44	0.26	76	0.45	10	0.06
Extinguishment of debt	10	0.06	—	—	—	—
Restructuring charges	—	—	41	0.24	172	1.00
Asset impairment charge	—	—	578	3.42	—	—
Executive compensation	—	—	12	0.07	—	—
Regulatory matter	1	0.01	6	0.04	—	—
Income from OCC equity investment	—	—	—	—	(13)	(0.08)
Reversal VAT refund	—	—	—	—	12	0.07
Sublease loss reserve	2	0.01	(1)	(0.01)	—	—
Other	2	0.01	6	0.04	—	—
Adjustment to the income tax provision to reflect non-GAAP adjustments and other tax items	(70)	(0.41)	(287)	(1.70)	(90)	(0.52)
Impact of newly enacted U.S. tax legislation	(87)	(0.51)	—	—	—	—
Excess tax benefits related to employee share-based compensation	(40)	(0.24)	—	—	—	—
Total non-GAAP adjustments, net of tax	(46)	(0.27)	513	3.04	153	0.89
Non-GAAP net income attributable to Nasdaq and diluted earnings per share	$ 688	$ 4.06	$ 621	$ 3.68	$ 581	$ 3.39
Weighted-average common shares outstanding for diluted earnings per share		169,585,031		168,800,997		171,283,271

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Liquidity and Capital Resources

Historically, we have funded our operating activities and met our commitments through cash generated by operations, augmented by the periodic issuance of our common stock and debt. See Note 10, “Debt Obligations,” to the consolidated financial statements for further discussion. Currently, our cost and availability of funding remain healthy.

As part of the purchase price consideration of a prior acquisition, Nasdaq has contingent future obligations to issue 992,247 shares of Nasdaq common stock annually which approximated certain tax benefits associated with the transaction of $484 million. Such contingent future issuances of Nasdaq common stock will be paid ratably through 2027 if Nasdaq’s total gross revenues equal or exceed $25 million in each such year. The contingent future issuances of Nasdaq common stock are subject to anti-dilution protections and acceleration upon certain events.

In April 2017, we entered into the 2017 Credit Facility which replaced our existing 2014 credit facility. We also entered into a commercial paper program which enables us to borrow efficiently at reasonable short-term interest rates and is supported by our 2017 Credit Facility. See “Commercial Paper Program,” “2017 Credit Facility,” and “2014 Credit Facility,” of Note 10, “Debt Obligations,” to the consolidated financial statements for further discussion.

As of December 31, 2017 , the balance of $110 million outstanding on the 2017 Credit Facility reflects the outstanding

amount, less unamortized debt issuance costs of $5 million . Of the $885 million that is available for borrowing, $480 million provides liquidity support for the principal amount outstanding under the commercial paper program as of December 31, 2017 and $1 million has been utilized for a letter of credit. As of December 31, 2017 , the total remaining amount available under the 2017 Credit Facility was $404 million .

In May 2017, we used a combination of cash on hand and net proceeds from the sale of commercial paper to redeem all of our 2018 Notes. In addition, in June 2017, we used net proceeds from the sale of commercial paper to repay $300 million of the amount outstanding on the 2016 Credit Facility. As of December 31, 2017 , the outstanding balance of $100 million on the 2016 Credit Facility reflects the aggregate principal amount, less the unamortized debt issuance costs. See “Early Extinguishment of 2018 Notes,” and “2016 Credit Facility,” of Note 10, “Debt Obligations,” to the consolidated financial statements for further discussion.

In September 2017, we announced an agreement to acquire eVestment and issued the 2019 Notes. Since the proposed acquisition of eVestment was not immediately expected to close, $276 million of the net proceeds from the 2019 Notes was used to partially pay down our outstanding commercial paper balance and the remainder of the net proceeds was held in cash and used in October 2017 to partially fund our acquisition of eVestment. See “Acquisition of eVestment,” of Note 4, “Acquisitions,” for further discussion.

In May 2016, Nasdaq issued the 2023 Notes and in June 2016, Nasdaq issued the 2026 Notes. We used the majority of the net proceeds from the 2023 Notes of $664 million and the 2026 Notes of $495 million to fund the acquisition of ISE and related expenses. See “3.85% Senior Unsecured Notes,” and “1.75% Senior Unsecured Notes,” of Note 10, “Debt Obligations,” and “Acquisition of ISE,” of Note 4, “Acquisitions,” to the consolidated financial statements for further discussion.

In the near term, we expect that our operations and the availability under our revolving credit commitment and commercial paper program will provide sufficient cash to fund our operating expenses, capital expenditures, debt repayments, any share repurchases, and any dividends.

Various assets and liabilities, including cash and cash equivalents, receivables, accounts payable and accrued expenses, and commercial paper can fluctuate from month to month. Working capital (calculated as current assets less current liabilities) was $ 267 million as of December 31, 2017 , compared with $ 478 million as of December 31, 2016 , a decrease of $ 211 million . Current asset balance changes increased working capital by $969 million, with increases in default funds and margin deposits, assets held for sale, other current assets and restricted cash, partially offset by decreases in cash and cash equivalents, financial investments, at fair value, and receivables, net. Current liability balance changes decreased working capital by $1,180 million, due to increases in default funds and margin deposits, short-term debt, liabilities held for sale, deferred revenue, Section 31 fees payable to the SEC, and accounts payable and accrued expenses, partially offset by decreases in other current liabilities and accrued personnel costs. Principal factors that could affect the availability of our internally-generated funds include:

- deterioration of our revenues in any of our business segments;
- changes in regulatory and working capital requirements; and
- an increase in our expenses.

Principal factors that could affect our ability to obtain cash from external sources include:

- operating covenants contained in our credit facilities that limit our total borrowing capacity;
- increases in interest rates under our credit facilities;
- credit rating downgrades, which could limit our access to additional debt;
- a decrease in the market price of our common stock; and
- volatility or disruption in the public debt and equity markets.

The following sections discuss the effects of changes in our financial assets, debt obligations, clearing and broker-dealer net capital requirements, and cash flows on our liquidity and capital resources.

Financial Assets

The following table summarizes our financial assets:

	December 31, 2017	December 31, 2016
	(in millions)	
Cash and cash equivalents	$ 377	$ 403
Restricted cash	22	15
Financial investments, at fair value	235	245
Total financial assets	$ 634	$ 663

Cash and Cash Equivalents and Restricted Cash

Cash and cash equivalents includes all non-restricted cash in banks and highly liquid investments with original maturities of 90 days or less at the time of purchase. The balance retained in cash and cash equivalents is a function of anticipated or possible short-term cash needs, prevailing interest rates, our investment policy, and alternative investment choices. As of December 31, 2017 , our cash and cash equivalents of $377 million were primarily invested in bank deposits, money market funds and commercial paper. In the long-term, we may use both internally generated funds and external sources to satisfy our debt obligations and other long-term liabilities. Cash and cash equivalents as of December 31, 2017 decreased $26 million from December 31, 2016 , primarily due to:

- cash paid for acquisitions, net of cash and cash equivalents acquired;
- repayments of long-term debt;

- cash dividends paid on our common stock;
- repurchases of our common stock; and
- purchases of property and equipment, partially offset by;
- net cash provided by operating activities;
- net proceeds received from the issuance of the 2019 Notes;
- net proceeds received from commercial paper, net; and
- proceeds received from utilization of credit commitment, net of debt issuance costs.

See "Cash Flow Analysis" below for further discussion.

As of December 31, 2017 and December 31, 2016, restricted cash is restricted from withdrawal due to a contractual or regulatory requirement or is not available for general use. Restricted cash was $22 million as of December 31, 2017 and $15 million as of December 31, 2016, an increase of $7 million . The increase relates to an increase in regulatory capital required. Restricted cash is classified as restricted cash in the Consolidated Balance Sheets.

Repatriation of Cash

Our cash and cash equivalents held outside of the U.S. in various foreign subsidiaries totaled $138 million as of December 31, 2017 and $102 million as of December 31, 2016. The remaining balance held in the U.S. totaled $239 million as of December 31, 2017 and $301 million as of December 31, 2016.

Unremitted earnings of subsidiaries outside of the U.S. are used to finance our international operations and are generally considered to be indefinitely reinvested. It is not our current intent to change this position. However, the majority of cash held outside the U.S. is available for repatriation, but under current law in certain jurisdictions, could subject us to additional income taxes, less applicable foreign tax credits.

Share Repurchase Program

See "Share Repurchase Program," of Note 14, "Nasdaq Stockholders' Equity," to the consolidated financial statements for further discussion of our share repurchase program.

Cash Dividends on Common Stock

The following table shows quarterly cash dividends paid per common share on our outstanding common stock:

	2017	2016
First quarter	$ 0.32	$ 0.25
Second quarter	0.38	0.32
Third quarter	0.38	0.32
Fourth quarter	0.38	0.32
Total	$ 1.46	$ 1.21

See "Cash Dividends on Common Stock," of Note 14, "Nasdaq Stockholders' Equity," to the consolidated financial statements for further discussion of the dividends.

Financial Investments, at Fair Value

Our financial investments, at fair value totaled $235 million as of December 31, 2017 and $245 million as of December 31, 2016 and are primarily comprised of trading securities, mainly highly rated European government debt securities. Of these securities, $160 million as of December 31, 2017 and $172 million as of December 31, 2016 are assets utilized to meet regulatory capital requirements, primarily for our clearing operations at Nasdaq Clearing. See Note 7, "Investments," to the consolidated financial statements for further discussion of our trading investment securities.

Debt Obligations

The following table summarizes our debt obligations by contractual maturity:

	Maturity Date	December 31, 2017	December 31, 2016
		(in millions)	
Short-term debt - commercial paper	Weighted-average maturity of 22 days	$ 480	$ —
Long-term debt:			
5.25% senior unsecured notes	Repaid May 2017	—	369
Senior unsecured floating rate notes	March 2019	498	—
$400 million senior unsecured term loan facility	November 2019	100	399
5.55% senior unsecured notes	January 2020	599	598
3.875% senior unsecured notes	June 2021	716	625
$1 billion revolving credit commitment	April 2022	110	—
1.75% senior unsecured notes	May 2023	712	622
4.25% senior unsecured notes	June 2024	496	495
3.85% senior unsecured notes	June 2026	496	495
Total long-term debt		3,727	3,603
Total debt obligations		$ 4,207	$ 3,603

In addition to the $1 billion revolving credit commitment and $400 million term loan facility, we also have other credit facilities related to our Nasdaq Clearing operations in order to provide further liquidity. Other credit facilities, which are available in multiple currencies, totaled $187 million as of December 31, 2017 and $170 million as of December 31, 2016 , in available liquidity, none of which was utilized.

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As of December 31, 2017 , we were in compliance with the covenants of all of our debt obligations.

See Note 10, “Debt Obligations,” to the consolidated financial statements for further discussion of our debt obligations.

Clearing and Broker-Dealer Net Capital Requirements

Clearing Operations Regulatory Capital Requirements

We are required to maintain minimum levels of regulatory capital for the clearing operations of Nasdaq Clearing. The level of regulatory capital required to be maintained is dependent upon many factors, including market conditions and creditworthiness of the counterparty. As of December 31, 2017 , our required regulatory capital of $160 million is primarily comprised of highly rated European government debt securities that are included in financial investments, at fair value in the Consolidated Balance Sheets.

Broker-Dealer Net Capital Requirements

Our broker-dealer subsidiaries, Nasdaq Execution Services, Execution Access, NPM Securities, SMTX, and Nasdaq Capital Markets Advisory are subject to regulatory requirements intended to ensure their general financial soundness and liquidity. These requirements obligate these subsidiaries to comply with minimum net capital requirements. The following table summarizes the net capital requirements for our broker-dealer subsidiaries as of December 31, 2017 :

Broker-Dealer Subsidiaries	Total Net Capital	Required Minimum Net Capital	Excess Capital
	(in millions)		
Nasdaq Execution Services	$ 7.3	$ 0.3	$ 7.0
Execution Access	47.7	0.4	47.3
NPM Securities	0.2	—	0.2
SMTX	1.5	0.3	1.2
Nasdaq Capital Markets Advisory	0.5	0.3	0.2

Other Capital Requirements

Nasdaq Execution Services

Nasdaq Execution Services also is required to maintain a $2 million minimum level of net capital under our clearing arrangement with OCC.

Nasdaq Canada

As a member of the Investment Industry Regulatory Organization of Canada, Nasdaq Canada must comply with its dealer member rules which are intended to ensure general financial soundness and liquidity. Under these rules, Nasdaq Canada is required to comply with minimum net capital requirements. As of December 31, 2017 , Nasdaq Canada was required to maintain minimum net capital of $0.2 million and

had total net capital of approximately $7.8 million, or $7.6 million in excess of the minimum amount required.

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Cash Flow Analysis

The following table summarizes the changes in cash flows:

	Year Ended December 31,			Percentage Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
	(in millions)				
Net cash provided by (used in):					
Operating activities	$ 909	$ 776	$ 727	17.1 %	6.7 %
Investing activities	(890)	(1,657)	(435)	(46.3)%	280.9 %
Financing activities	(53)	948	(400)	(105.6)%	(337.0)%
Effect of exchange rate changes on cash and cash equivalents and restricted cash	15	(6)	(11)	(350.0)%	(45.5)%
Net increase (decrease) in cash and cash equivalents and restricted cash	(19)	61	(119)	(131.1)%	(151.3)%
Cash and cash equivalents and restricted cash at beginning of period	418	357	476	17.1 %	(25.0)%
Cash and cash equivalents and restricted cash at end of period	$ 399	$ 418	$ 357	(4.5)%	17.1 %

Net Cash Provided by Operating Activities

Net cash provided by operating activities increased $133 million in 2017 compared with 2016 and increased $49 million in 2016 compared with 2015. The increase in 2017 was primarily due to higher net income, mainly due to the inclusion of a full year of cash flows from our 2016 acquisitions, partially offset by higher compensation payments driven by our 2016 acquisitions. The increase in 2016 was primarily due to additional cash flows from our 2016 acquisitions, partially offset by an increase in cash payments related to merger and strategic initiatives expense associated with our 2016 acquisitions.

Net Cash Used in Investing Activities

Net cash used in investing activities decreased $767 million in 2017 compared with 2016 and increased $1,222 million in 2016 compared with 2015. The decrease in 2017 was primarily due to cash paid for our 2016 acquisitions, net of cash and cash equivalents acquired of $1,460 million partially offset by cash paid for our 2017 acquisitions, net of cash and cash equivalents acquired of $776 million .

Net Cash (Used in) Provided by Financing Activities

Net cash used in financing activities for the year ended December 31, 2017 primarily consisted of repayment of long-term debt of $708 million, $ 243 million related to cash dividends paid on our common stock, and $ 203 million related to the repurchase of our common stock, partially offset by net proceeds of $ 498 million from the issuance of the 2019 Notes and commercial paper, net of $ 480 million , and proceeds received from the utilization of our credit commitment of $150 million.

Net cash provided by financing activities for the year ended December 31, 2016 primarily consisted of net proceeds of $2,456 million, of which $1,159 million related to the issuances of our 2023 Notes and 2026 Notes to fund our acquisition of ISE, $399 million related to net proceeds from our 2016 Credit Facility and $898 million related to proceeds from utilization of the revolving credit commitment under our 2014 credit facility to partially fund our acquisitions of Boardvantage, Marketwired and Nasdaq Canada, and other general corporate purposes. These proceeds were partially offset by the repayment of $1,156 million on the revolving credit commitment under our 2014 credit facility. We also used $200 million of cash to pay cash dividends on our common stock and $100 million of cash to repurchase our common stock.

See Note 4, “Acquisitions,” to the consolidated financial statements for further discussion of our acquisitions.

See Note 10, Debt Obligations,” to the consolidated financial statements for further discussion of our debt obligations.

See “Share Repurchase Program,” and “Cash Dividends on Common Stock,” of Note 14, “Nasdaq Stockholders’ Equity,” to the consolidated financial statements for further discussion of our share repurchase program and cash dividends paid on our common stock.

Contractual Obligations and Contingent Commitments

Nasdaq has contractual obligations to make future payments under debt obligations by contract maturity, minimum rental commitments under non-cancelable operating leases, net and other obligations. The following table shows these contractual obligations as of December 31, 2017 :

	Payments Due by Period				
Contractual Obligations	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years
			(in millions)		
Debt obligations by contract maturity [1]	$ 4,844	$ 612	$ 1,324	$ 1,076	$ 1,832
Minimum rental commitments under non-cancelable operating leases, net [2]	439	87	140	102	110
Other obligations [3]	18	14	4	—	—
Total	$ 5,301	$ 713	$ 1,468	$ 1,178	$ 1,942

(1) Our debt obligations include both principal and interest obligations. As of December 31, 2017 , an interest rate of 3.09% was used to compute the amount of the contractual obligations for interest on the 2017 Credit Facility, 3.25% was used to compute the amount of the contractual obligations for interest on the 2016 Credit Facility, and 2.15% was used to compute the amount of the contractual obligations for interest on the 2019 Notes. All other debt obligations were primarily calculated on a 360-day basis at the contractual fixed rate multiplied by the aggregate principal amount as of December 31, 2017 . See Note 10, "Debt Obligations," to the consolidated financial statements for further discussion.

(2) We lease some of our office space under non-cancelable operating leases with third parties and sublease office space to third parties. Some of our leases contain renewal options and escalation clauses based on increases in property taxes and building operating costs.

(3) Other obligations primarily consist of potential future escrow agreement payments related to prior acquisitions.

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No n-Cash Contingent Consideration

As part of the purchase price consideration of a prior acquisition, we have agreed to future annual issuances of 992,247 shares of Nasdaq common stock which approximated certain tax benefits associated with the transaction. Such contingent future issuances of Nasdaq common stock will be paid ratably through 2027 if Nasdaq's total gross revenues equal or exceed $25 million in each such year. The contingent future issuances of Nasdaq common stock are subject to anti-dilution protections and acceleration upon certain events.

Off-Balance Sheet Arrangements

For discussion of off-balance sheet arrangements see:

- Note 17, "Clearing Operations," to the consolidated financial statements for further discussion of our non-cash default fund contributions and margin deposits received for clearing operations; and
- Note 19, "Commitments, Contingencies and Guarantees," to the consolidated financial statements for further discussion of:
  - Guarantees issued and credit facilities available;
  - Lease commitments;
  - Other guarantees;
  - Non-cash contingent consideration;
  - Escrow agreements;
  - Routing brokerage activities;
  - Legal and regulatory matters; and
  - Tax audits.

Quantitative and Qualitative Disclosures About Market Risk

Market risk represents the potential for losses that may result from changes in the market value of a financial instrument due to changes in market conditions. As a result of our operating, investing and financing activities, we are exposed to market risks such as interest rate risk and foreign currency exchange rate risk. We are also exposed to credit risk as a result of our normal business activities.

We have implemented policies and procedures to measure, manage, monitor and report risk exposures, which are reviewed regularly by management and the board of directors. We identify risk exposures and monitor and manage such risks on a daily basis.

We perform sensitivity analyses to determine the effects of market risk exposures. We may use derivative instruments solely to hedge financial risks related to our financial positions or risks that are incurred during the normal course of business. We do not use derivative instruments for speculative purposes.

Interest Rate Risk

We are subject to the risk of fluctuating interest rates in the normal course of business. Our exposure to market risk for changes in interest rates relates primarily to our financial investments and debt obligations which are discussed below.

Financial Investments

As of December 31, 2017 , our investment portfolio was primarily comprised of trading securities, mainly highly rated European government debt securities, which pay a fixed rate of interest. These securities are subject to interest rate risk and will decrease in value if market interest rates increase. If market interest rates were to increase immediately and uniformly by 100 basis points from levels as of December 31, 2017 , the fair value of this portfolio would have declined by $5 million .

Debt Obligations

As of December 31, 2017 , substantially all of our debt obligations are fixed-rate obligations. While changes in interest rates will have no impact on the interest we pay on fixed-rate obligations, we are exposed to changes in interest rates as a result of the issuance of our 2019 Notes, borrowings under our 2017 Credit Facility and 2016 Credit Facility, and amounts outstanding from the sale of commercial paper under our commercial paper program, all of which have variable interest rates. As of December 31, 2017 , we had principal amounts outstanding of $500 million on the 2019 Notes, $115 million under the 2017 Credit Facility, $100 million under the 2016 Credit Facility and $480 million of commercial paper. A hypothetical 100 basis points increase in interest rates on our outstanding 2019 Notes, the 2017 Credit Facility, the 2016 Credit Facility and our outstanding commercial paper would increase interest expense by approximately $12 million based on borrowings as of December 31, 2017 .

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Foreign Currency Exchange Rate Risk

As a leading global exchange group, we are subject to foreign currency transaction risk. Our primary exposure to foreign currency denominated revenues less transaction-based expenses and operating income for years ended December 31, 2017 and 2016 is presented in the following table:

	Euro	Swedish Krona	Other Foreign Currencies	U.S. Dollar	Total
	(in millions, except currency rate)				
Year Ended December 31, 2017					
Average foreign currency rate to the U.S. dollar	1.1273	0.1170	#	N/A	N/A
Percentage of revenues less transaction-based expenses	9.7%	8.8%	6.0 %	75.5%	100.0%
Percentage of operating income	15.4%	3.2%	(4.9)%	86.3%	100.0%
Impact of a 10% adverse currency fluctuation on revenues less transaction-based expenses	$ (24)	$ (21)	$ (14)	$ —	$ (59)
Impact of a 10% adverse currency fluctuation on operating income	$ (15)	$ (3)	$ (5)	$ —	$ (23)

	Euro	Swedish Krona	Other Foreign Currencies	U.S. Dollar	Total
	(in millions, except currency rate)				
Year Ended December 31, 2016					
Average foreign currency rate to the U.S. dollar	1.1064	0.1168	#	N/A	N/A
Percentage of revenues less transaction-based expenses	10.0%	8.5%	5.9 %	75.6%	100.0%
Percentage of operating income	18.3%	1.0%	(5.9)%	86.6%	100.0%
Impact of a 10% adverse currency fluctuation on revenues less transaction-based expenses	$ (23)	$ (19)	$ (14)	$ —	$ (56)
Impact of a 10% adverse currency fluctuation on operating income	$ (15)	$ (1)	$ (5)	$ —	$ (21)

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Represents multiple foreign currency rates.
N/A Not applicable.

Our investments in foreign subsidiaries are exposed to volatility in currency exchange rates through translation of the foreign subsidiaries' net assets or equity to U.S. dollars. Substantially all of our foreign subsidiaries operate in functional currencies other than the U.S. dollar. Fluctuations in currency exchange rates may create volatility in our results of operations as we are required to translate the balance sheets and operational results of these foreign currency denominated subsidiaries into U.S. dollars for consolidated reporting. The translation of foreign subsidiaries' non-U.S. dollar balance sheets into U.S. dollars for consolidated reporting results in a cumulative translation adjustment which is recorded in accumulated other

comprehensive loss within stockholders' equity in the Consolidated Balance Sheets.

Our primary exposure to net assets in foreign currencies as of December 31, 2017 is presented in the following table:

	Net Assets	Impact of a 10% Adverse Currency Fluctuation
	(in millions)	
Swedish Krona [1]	$ 3,541	$ (354)
Norwegian Krone	200	(20)
Canadian Dollar	193	(19)
British Pound	202	(20)
Euro	144	(14)
Australian Dollar	104	(10)

[1] Includes goodwill of $2,662 million and intangible assets, net of $638 million .

Credit Risk

Credit risk is the potential loss due to the default or deterioration in credit quality of customers or counterparties. We are exposed to credit risk from third parties, including customers, counterparties and clearing agents. These parties may default on their obligations to us due to bankruptcy, lack of liquidity, operational failure or other reasons. We limit our exposure to credit risk by rigorously evaluating the counterparties with which we make investments and execute agreements. The financial investment portfolio objective is to invest in securities to preserve principal while maximizing yields, without significantly increasing risk. Credit risk associated with investments is minimized substantially by ensuring that these financial assets are placed with governments which have investment grade ratings, well-capitalized financial institutions and other creditworthy counterparties.

Our subsidiary, Nasdaq Execution Services, may be exposed to credit risk, due to the default of trading counterparties, in connection with the routing services it provides for our trading customers. System trades in cash equities routed to other market centers for members of our cash equity exchanges are routed by Nasdaq Execution Services for clearing to the NSCC. In this function, Nasdaq Execution Services is to be neutral by the end of the trading day, but may be exposed to intraday risk if a trade extends beyond the trading day and into the next day, thereby leaving Nasdaq Execution Services susceptible to counterparty risk in the period between accepting the trade and routing it to the clearinghouse. In this interim period, Nasdaq Execution Services is not novating like a clearing broker but instead is subject to the short-term risk of counterparty failure before the clearinghouse enters the transaction. Once the clearinghouse officially accepts the trade for novation, Nasdaq Execution Services is legally removed from trade execution risk. However, Nasdaq has membership obligations to NSCC independent of Nasdaq Execution Services' arrangements.

Pursuant to the rules of the NSCC and Nasdaq Execution Services' clearing agreement, Nasdaq Execution Services is liable for any losses incurred due to a counterparty or a clearing agent's failure to satisfy its contractual obligations, either by making payment or delivering securities. Adverse movements in the prices of securities that are subject to these transactions can increase our credit risk. However, we believe that the risk of material loss is limited, as Nasdaq Execution Services' customers are not permitted to trade on margin and NSCC rules limit counterparty risk on self-cleared transactions by establishing credit limits and capital deposit requirements for all brokers that clear with NSCC. Historically, Nasdaq Execution Services has never incurred a liability due to a customer's failure to satisfy its contractual obligations as counterparty to a system trade. Credit difficulties or insolvency, or the perceived possibility of credit difficulties or insolvency, of one or more larger or visible market participants could also result in market-wide credit difficulties or other market disruptions.

Execution Access is an introducing broker which operates the trading platform for our Nasdaq Fixed Income business to trade in U.S. Treasury securities. Execution Access has a clearing arrangement with Cantor Fitzgerald. As of December 31, 2017 , we have contributed $19 million of clearing deposits to Cantor Fitzgerald in connection with this clearing arrangement. These deposits are recorded in other current assets in our Consolidated Balance Sheets. This clearing agreement will end on July 31, 2018, and will be replaced by a clearing agreement with ICBC. Some of the trading activity in Execution Access is cleared by Cantor Fitzgerald (and similarly will be by ICBC after July 31, 2018) through the Fixed Income Clearing Corporation. Execution Access assumes the counterparty risk of clients that do not clear through the Fixed Income Clearing Corporation. Counterparty risk of clients exists for Execution Access between the trade date and settlement date of the individual transactions, which is at least one business day (or more, if specified by the U.S. Treasury issuance calendar). All of Execution Access' obligations under the clearing arrangement with Cantor Fitzgerald are guaranteed by Nasdaq. Counterparties that do not clear through the Fixed Income Clearing Corporation are subject to a credit due diligence process and may be required to post collateral, provide principal letters, or provide other forms of credit enhancement to Execution Access for the purpose of mitigating counterparty risk.

We are exposed to credit risk through our clearing operations with Nasdaq Clearing. See Note 17, "Clearing Operations," to the consolidated financial statements for further discussion.

We also have credit risk related to transaction and subscription-based revenues that are billed to customers on a monthly or quarterly basis, in arrears. Our potential exposure to credit losses on these transactions is represented by the receivable balances in our Consolidated Balance Sheets. On an ongoing basis, we review and evaluate changes in the status of our counterparties' creditworthiness. Credit losses such as those described above could adversely affect our consolidated financial position and results of operations.

Critical Accounting Policies and Estimates

The preparation of financial statements and related disclosures in conformity with U.S. GAAP requires management to make judgments, assumptions, and estimates that affect the amounts reported in the consolidated financial statements and accompanying notes. Note 2, "Summary of Significant Accounting Policies," to the consolidated financial statements describes the significant accounting policies and methods used in the preparation of the consolidated financial statements. The accounting policies described below are significantly affected by critical accounting estimates. Such accounting policies require significant judgments, assumptions, and estimates used in the preparation of the consolidated financial statements, and actual results could differ materially from the amounts reported based on these policies .

Revenue Recognition

Corporate Services Revenues

Listing Services Revenues

Listing services revenues primarily include annual renewal fees, initial listing fees, and listing of additional shares fees. Annual renewal fees do not require any judgments or assumptions by management as these amounts are recognized ratably over the following 12-month period. However, listing of additional shares fees and initial listing fees are recognized on a straight-line basis over estimated service periods, which are four and six years, respectively, based on our historical listing experience and projected future listing duration. Unamortized balances are recorded as deferred revenue in the Consolidated Balance Sheets.

Revenue recognition for our Listing Services business was impacted due to the adoption of ASU 2014-09, "Revenue from Contracts with Customers." See "Recent Accounting Pronouncements," of Note 2, "Summary of Significant Accounting Policies," to the consolidated financial statements for further discussion.

Goodwill and Related Impairment

Goodwill represents the excess of purchase price over the value assigned to the net assets, including identifiable intangible assets, of a business acquired. Goodwill is allocated to our reporting units based on the assignment of the fair values of each reporting unit of the acquired company. We test goodwill for impairment at the reporting unit level annually, or in interim periods if certain events occur indicating that the carrying amount may be impaired, such as changes in the business climate, poor indicators of operating performance or the sale or disposition of a significant portion of a reporting unit. For purposes of performing our goodwill impairment test, our five reporting units are the Market Services segment, the two businesses comprising the Corporate Services segment: Corporate Solutions and Listing Services, the Information Services segment, and the Market Technology segment. We test for impairment during the fourth quarter of our fiscal year using an October 1 measurement date. When testing goodwill for impairment, we have the option of first performing a qualitative assessment to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount as the basis to determine if it is necessary to perform a quantitative goodwill impairment test. In performing a qualitative assessment, we consider the extent to which unfavorable events or circumstances identified, such as changes in economic conditions, industry and market conditions or company specific events, could affect the comparison of the reporting unit's fair value with its carrying amount. If we choose not to complete a qualitative assessment for a given reporting unit, or if the initial assessment indicates that it is more likely than not that the carrying amount of a reporting unit exceeds its estimated fair value, a quantitative test is required.

When assessing goodwill for impairment, our decision to perform a qualitative impairment assessment for a reporting unit in a given year is influenced by a number of factors, including but not limited to, the size of the reporting unit's goodwill, the significance of the excess of the reporting unit's estimated fair value over its carrying amount at the last quantitative assessment date, and the amount of time in between quantitative fair value assessments.

The quantitative goodwill impairment test consists of two steps performed at the reporting unit level.

- The first step compares the estimated fair value of each reporting unit to its corresponding carrying amount, including goodwill. The fair value of each reporting unit is estimated using a combination of discounted cash flow valuation, which incorporates assumptions regarding future growth rates, terminal values, and discount rates, as well as guideline public company valuations, incorporating relevant trading multiples of comparable companies and other factors. The estimates and assumptions used consider historical performance and are consistent with the assumptions used in determining future profit plans for each reporting unit, which are approved by our board of directors. If the reporting unit's estimated fair value exceeds its estimated carrying amount, goodwill is not impaired.
- If the first step results in the carrying amount exceeding the fair value of the reporting unit, then a second step must be completed in order to determine the amount of goodwill impairment that should be recorded, if any. In the second step, the implied fair value of the reporting unit's goodwill is determined by allocating the reporting unit's fair value to all of its assets and liabilities other than goodwill in a manner similar to a purchase price allocation. The implied fair value of the goodwill that results from the application of this second step is then compared to the carrying amount of the goodwill and an impairment charge is recorded for any difference.

The following table presents the balances of goodwill for our reportable segments at the time of our 2017 annual impairment test:

	October 1, 2017
	(in millions)
Market Services	$ 3,560
Corporate Services	491
Information Services	1,915
Market Technology	188
	$ 6,154

In 2017, we performed a quantitative test for our annual impairment test for goodwill as several years had elapsed since the date of certain of our quantitative valuations. The last quantitative tests were in 2013 for the Listing Services, Information Services and Market Technology reporting units and in 2015 for the Market Services reporting unit. We also performed a quantitative goodwill impairment test on the remaining businesses in our Corporate Solutions reporting unit since our Public Relations Solutions and Digital Media Services businesses have been classified as held for sale. See Note 5, "Assets and Liabilities Held for Sale," to the consolidated financial statements for further discussion.

We performed step one of the quantitative goodwill impairment test for all reporting units and determined that fair value substantially exceeded carrying value for each of our reporting units. As a result, no goodwill impairment was recorded in 2017. No goodwill impairment was recorded in 2016 and 2015.

Although we believe our estimates of fair value are reasonable, the determination of certain valuation inputs is subject to management's judgment. Changes in these inputs could materially affect the results of our impairment review. If our forecasts of cash flows or other key inputs are negatively revised in the future, the estimated fair value of each reporting unit would be adversely impacted, potentially leading to an impairment in the future that could materially affect our operating results.

Subsequent to our annual impairment test, no indications of impairment were identified.

Indefinite-Lived Intangible Assets and Related Impairment

Intangible assets deemed to have indefinite useful lives, primarily exchange and clearing registrations, are not amortized but instead are tested for impairment at least annually and more frequently whenever events or changes in circumstances indicate that the fair value of the asset may be less than its carrying amount. Similar to goodwill impairment testing, we test for impairment of indefinite-lived intangible assets during the fourth quarter of our fiscal year using an October 1 measurement date and may first perform a qualitative assessment, considering similar factors as discussed above in the goodwill impairment discussion, to determine if it is more likely than not that the fair value of the indefinite-lived intangible asset is less than its carrying amount. If we elect to perform or are required to perform a quantitative assessment, the test consists of a comparison of the fair value of the indefinite-lived intangible asset to its carrying amount as of the impairment testing date. If the carrying amount of the indefinite-lived intangible asset exceeds its fair value, an impairment charge is recorded for the difference. The fair value of indefinite-lived intangible assets is primarily determined on the basis of estimated discounted value, using the Greenfield Approach for exchange and clearing registrations and licenses and the relief from royalty approach or excess earnings approach for trade names, both of which incorporate assumptions regarding future revenue projections and discount rates. During our annual indefinite-lived intangible asset impairment test during the fourth quarter of 2017, we performed a quantitative test as several years had elapsed since the date of our previous quantitative valuations.

There were no indefinite-lived intangible asset impairment charges in 2017. Subsequent to our annual indefinite-lived impairment test, no indications of impairment were identified.

As discussed in "Intangible Asset Impairment Charges," of Note 6, "Goodwill and Acquired Intangible Assets," to the consolidated financial statements, we recorded the following pre-tax, non-cash indefinite-lived asset impairment charges during 2016 and 2015:

- December 2016: $578 million to write off the full value of the eSpeed trade name; and
- March 2015: $119 million to write off the full value of the OMX trade name. In connection with our global rebranding initiative, we decided to change our company name from The NASDAQ OMX Group, Inc. to Nasdaq, Inc., which became effective in the third quarter of 2015. In connection with this action, we decided to discontinue the use of the OMX trade name.

These charges did not impact the company's consolidated cash flows, liquidity, or capital resources. The write off of the eSpeed trade name is recorded in asset impairment charge in the Consolidated Statements of Income for 2016 and the write off of the OMX trade name is recorded in restructuring charges in the Consolidated Statements of Income for 2015.

There were no other impairments of indefinite-lived intangible assets for the years ended December 31, 2016 and 2015.

Other Long-Lived Assets and Related Impairment

We review our other long-lived assets, such as finite-lived intangible assets, equity and cost method investments, as well as property and equipment for potential impairment when there is evidence that events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. The carrying amount of an asset is not recoverable if it exceeds the sum of the undiscounted cash flows expected to result from the use and eventual disposition of the asset. We evaluate our equity and cost method investments for other-than-temporary declines in value by considering a variety of factors such as the earnings capacity of the investment and the fair value of the investment compared to its carrying amount. In addition, for investments where the market value is readily determinable, we

consider the underlying stock price as an additional factor. Any required impairment loss is measured as the amount by which the carrying amount of the asset exceeds its fair value and is recorded as a reduction in the carrying amount of the related asset and a charge to operating results.

We recorded pre-tax, non-cash property and equipment asset impairment charges of $9 million for the year ended December 31, 2017, $8 million for 2016 and $18 million for 2015. See Note 8, "Property and Equipment, net," to the consolidated financial statements for further discussion. The impairment charge in 2017 is included in merger and strategic initiatives expense in the Consolidated Statements of Income and the 2016 and 2015 impairment charges are included in restructuring charges in the Consolidated Statements of Income during the respective period.

There were no other impairments of property and equipment recorded in 2017, 2016 or 2015.

In December 31, 2016, we recorded a pre-tax, non-cash impairment charge of $7 million to write off the full value of an equity method investment. See "Equity Method Investments," of Note 7, "Investments," to the consolidated financial statements for further discussion. No other impairments of equity method investments were recorded in 2017, 2016 or 2015.

Income Taxes

Estimates and judgments are required in the calculation of certain tax liabilities and in the determination of the recoverability of certain deferred tax assets, which arise from net operating loss carryforwards, tax credit carryforwards and temporary differences between the tax and financial statement recognition of revenue and expense. Our deferred tax assets are reduced by a valuation allowance if it is more likely than not that some portion or all of the recorded deferred tax assets will not be realized in future periods. Management is required to determine whether a tax position is more likely than not to be sustained upon examination, including resolution of any related appeals or litigation processes, based on the technical merits of the position. Once it is determined that a position meets the recognition thresholds, the position is measured to determine the amount of benefit to be recognized in the consolidated financial statements. Interest and/or penalties related to income tax matters are recognized in income tax expense.

In assessing the need for a valuation allowance, we consider all available evidence including past operating results, the existence of cumulative losses in the most recent fiscal years, estimates of future taxable income and the feasibility of tax planning strategies. In the event that we change our determination as to the amount of deferred tax assets that can be realized, we will adjust our valuation allowance with a corresponding impact to the provision for income taxes in the period in which such determination is made.

In addition, the calculation of our tax liabilities involves uncertainties in the application of tax regulations in the U.S. and other tax jurisdictions. We recognize potential liabilities for anticipated tax audit issues in such jurisdictions based on our estimate of whether, and the extent to which, additional taxes and interest may be due. While we believe that our tax liabilities reflect the probable outcome of identified tax uncertainties, it is reasonably possible that the ultimate resolution of any tax matter may be greater or less than the amount accrued. If events occur and the payment of these amounts ultimately proves unnecessary, the reversal of the liabilities would result in tax benefits being recognized in the period when we determine the liabilities are no longer necessary. If our estimate of tax liabilities proves to be less than the ultimate assessment, a further charge to expense would result.

The Tax Cuts and Jobs Act was enacted on December 22, 2017. We are required to recognize the effect of the tax law changes in the period of enactment, such as remeasuring our U.S. deferred tax assets and liabilities, reassessing the net realizability of deferred tax assets and liabilities, and determining the applicability of the one-time mandatory transition tax on accumulated foreign earnings. SEC Staff Accounting Bulletin No. 118, "Income Tax Accounting Implications of the Tax Cuts and Jobs Act," or SAB 118, has provided guidance which allows us to record provisional amounts during a measurement period not to extend beyond one year of the enactment date. As of December 31, 2017, we have recorded a provisional estimate of the effects of the new legislation. We will continue to analyze the Tax Cuts and Jobs Act and related accounting guidance and interpretations in order to finalize any impacts within the measurement period.

Recent Accounting Pronouncements

See "Recent Accounting Pronouncements," of Note 2, "Summary of Significant Accounting Policies," to the consolidated financial statements for further discussion of recently adopted and recently issued accounting pronouncements that are applicable to Nasdaq.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

Information about quantitative and qualitative disclosures about market risk is incorporated herein by reference from "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations—Quantitative and Qualitative Disclosures About Market Risk."

Item 8. Financial Statements and Supplementary Data.

Nasdaq's consolidated financial statements, including Consolidated Balance Sheets as of December 31, 2017 and 2016, Consolidated Statements of Income for the years ended December 31, 2017 , 2016 and 2015, Consolidated Statements of Comprehensive Income (Loss) for the years ended December 31, 2017 , 2016 and 2015, Consolidated Statements of Changes in Equity for the years ended December 31, 2017 , 2016 and 2015, Consolidated Statements of Cash Flows for the years ended December 31, 2017 , 2016 and 2015 and notes to our consolidated financial statements, together with a report thereon of Ernst & Young LLP, dated February 28, 2018 , are attached hereto as pages F-1 through F-52 and incorporated by reference herein.

Summarized Quarterly Financial Data (Unaudited)

	1st Qtr 2017	2nd Qtr 2017	3rd Qtr 2017	4th Qtr 2017
	(in millions, except per share amounts)			
Total revenues	$ 971	$ 1,000	$ 969	$ 1,024
Transaction-based expenses	(388)	(398)	(362)	(389)
Revenues less transaction-based expenses	583	602	607	635
Total operating expenses	335	358	343	392
Operating income	248	244	264	243
Net income attributable to Nasdaq	$ 169	$ 147	$ 171	$ 246
Basic earnings per share	$ 1.02	$ 0.89	$ 1.03	$ 1.47
Diluted earnings per share	$ 0.99	$ 0.87	$ 1.01	$ 1.45
Cash dividends declared per common share	$ 0.32	$ 0.38	$ 0.38	$ 0.38

	1st Qtr 2016	2nd Qtr 2016	3rd Qtr 2016	4th Qtr 2016
	(in millions, except per share amounts)			
Total revenues	$ 905	$ 897	$ 929	$ 973
Transaction-based expenses	(371)	(338)	(344)	(374)
Revenues less transaction-based expenses	534	559	585	599
Total operating expenses	315	385	352	386
Operating income	219	174	233	213
Net income (loss) attributable to Nasdaq	$ 132	$ 70	$ 131	$ (224)
Basic earnings (loss) per share	$ 0.80	$ 0.42	$ 0.79	$ (1.35)
Diluted earnings (loss) per share	$ 0.78	$ 0.42	$ 0.77	$ (1.35)
Cash dividends declared per common share	$ 0.57	$ —	$ 0.32	$ 0.32

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

(a) ***Disclosure controls and procedures.*** Nasdaq's management, with the participation of Nasdaq's President and Chief Executive Officer, and Executive Vice President, Corporate Strategy and Chief Financial Officer, has evaluated the effectiveness of Nasdaq's disclosure controls and procedures (as defined in Rule 13a-15(e) and Rule 15d-15(e) under the Exchange Act) as of the end of the period covered by this report. Based upon that evaluation, Nasdaq's President and Chief Executive Officer and Executive Vice President, Corporate Strategy and Chief Financial Officer, have concluded that, as of the end of such period, Nasdaq's disclosure controls and procedures are effective.

(b). ***Internal control over financial reporting*** . In October 2017, we acquired eVestment. Management has considered this transaction material to the results of operations, cash flows and financial position from the date of the acquisition through December 31, 2017, and believes that the internal controls and procedures of this acquisition have a material effect on internal control over financial reporting. We are currently in the process of incorporating the internal controls and procedures of eVestment into the internal control over financial reporting for our assessment of and report on internal control over financial reporting for December 31, 2018. However, in accordance with SEC guidance, management has elected to exclude eVestment from its December 31, 2017 assessment of and report on internal control over financial reporting. We are currently in the process of incorporating the internal controls and procedures of eVestment into the internal control over financial reporting for our assessment of and report on internal control over financial reporting for December 31, 2018. There have been no other changes in Nasdaq's internal control over financial reporting (as defined in Rule 13a-15(f) and Rule 15d-15(f) under the Exchange Act) that occurred during the quarter ended December 31, 2017 that have materially affected, or are reasonably likely to materially affect, Nasdaq's internal control over financial reporting.

Management's Report on Internal Control Over Financial Reporting

Management is responsible for the preparation and integrity of the consolidated financial statements appearing in the reports that we file with the SEC. The consolidated financial statements were prepared in conformity with U.S. generally accepted accounting principles and include amounts based on management's estimates and judgments.

Management is also responsible for establishing and maintaining adequate internal control over Nasdaq's financial reporting. Although there are inherent limitations in the effectiveness of any system of internal control over financial reporting, we maintain a system of internal control that is designed to provide reasonable assurance as to the fair and reliable preparation and presentation of the consolidated financial statements, as well as to safeguard assets from unauthorized use or disposition that could have a material effect on the financial statements.

Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) (2013 framework). This evaluation included review of the documentation of controls, evaluation of the design effectiveness of controls, testing of the operating effectiveness of controls and a conclusion on this evaluation. Based on its assessment, our management believes that, as of December 31, 2017, our internal control over financial reporting is effective.

Management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include, in accordance with SEC guidance, the internal controls of eVestment, Inc. and its subsidiaries which are included in the 2017 consolidated financial statements and in 2017 reflect total assets constituting 6% of consolidated total assets, which includes 9% of goodwill and intangible assets, net and 0.3% of the total revenues less transaction-based expenses, of consolidated results.

Ernst & Young LLP, an independent registered public accounting firm, has issued an attestation report on Nasdaq's internal control over financial reporting, which is included herein.

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of Nasdaq, Inc.

Opinion on Internal Control over Financial Reporting
We have audited Nasdaq, Inc.'s internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Nasdaq, Inc. (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on the COSO criteria.

As indicated in the accompanying Management's Report on Internal Control Over Financial Reporting, management's assessment of and the conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of eVestment Inc. and its subsidiaries which is included in the 2017 consolidated financial statements of the Company and constituted 6% of consolidated total assets as of December 31, 2017, which include 9% of goodwill and intangible assets, net and 0.3% of the total revenues less transaction-based expenses for the year then ended. Our audit of internal control over financial reporting of the Company also did not include an evaluation of eVestment Inc. and its subsidiaries.

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 Company as of December 31, 2017 and 2016, and the related consolidated statements of income, comprehensive income (loss), changes in equity and cash flows for each of the three years in the period ended December 31, 2017, and the related notes and our report dated February 28, 2018 expressed an unqualified opinion thereon.

Basis for Opinion
The Company'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 Company'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 Company 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 included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting
A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ *Ernst & Young LLP*

New York, New York
February 28, 2018

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

Information about Nasdaq's directors, as required by Item 401 of Regulation S-K, is incorporated by reference from the discussion under the caption "Board of Directors—Proposal I: Election of Directors" in Nasdaq's Proxy Statement. Information about Nasdaq's executive officers, as required by Item 401 of Regulation S-K, is incorporated by reference from the discussion under the caption "Other Items—Executive Officers" in the Proxy Statement. Information about Section 16 reports, as required by Item 405 of Regulation S-K, is incorporated by reference from the discussion under the caption "Section 16(a) Beneficial Ownership Reporting Compliance" in the Proxy Statement. Information about Nasdaq's code of ethics, as required by Item 406 of Regulation S-K, is incorporated by reference from the discussion under the caption "Other Items—Corporate Governance" in the Proxy Statement. Information about Nasdaq's nomination procedures, audit committee and audit committee financial experts, as required by Items 407(c)(3), 407(d)(4) and 407(d)(5) of Regulation S-K, is incorporated by reference from the discussions under the headings "Board of Directors—Proposal I: Election of Directors" and "Board of Directors—Board Committees" in the Proxy Statement.

Item 11. Executive Compensation.

Information about Nasdaq's director and executive compensation, as required by Items 402, 407(e)(4) and 407(e)(5) of Regulation S-K, is incorporated by reference from the discussions under the headings "Board of Directors—Director Compensation" and "Named Executive Officer Compensation" in the Proxy Statement.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

Information about security ownership of certain beneficial owners and management, as required by Item 403 of Regulation S-K, is incorporated by reference from the discussion under the heading "Other Items—Security Ownership of Certain Beneficial Owners and Management" in the Proxy Statement.

Equity Compensation Plan Information

Nasdaq's Equity Plan provides for the issuance of our equity securities to our officers and other employees, directors and consultants. In addition, most employees of Nasdaq and its subsidiaries are eligible to participate in the ESPP, at 85.0% of the fair market value of our common stock on the price calculation date. The Equity Plan and the ESPP have been approved previously by our stockholders. The following table sets forth information regarding outstanding options and shares reserved for future issuance under all of Nasdaq's compensation plans as of December 31, 2017 .

Plan Category	Number of shares to be issued upon exercise of outstanding options, warrants and rights(a) [1]	Weighted-average exercise price of outstanding options, warrants and rights(b)	Number of shares remaining available for future issuance under equity compensation plans (excluding shares reflected in column(a))(c)
Equity compensation plans approved by stockholders	571,380	$ 43.84	7,891,426 [2]
Equity compensation plans not approved by stockholders	—	$ —	—
Total	571,380	$ 43.84	7,891,426 [2]

(1) The amounts in this column include only the number of shares to be issued upon exercise of outstanding options, warrants and rights. As of December 31, 2017, we also had 3,331,462 shares to be issued upon vesting of outstanding restricted stock and PSUs.

(2) This amount includes 5,801,663 shares of common stock that may be awarded pursuant to the Equity Plan and 2,089,763 shares of common stock that may be issued pursuant to the ESPP.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

Information about certain relationships and related transactions, as required by Item 404 of Regulation S-K, is incorporated herein by reference from the discussion under the heading "Other Items—Certain Relationships and Related Transactions" in the Proxy Statement. Information about director independence, as required by Item 407(a) of Regulation S-K, is incorporated herein by reference from the discussion under the heading "Board of Directors—Proposal I: Election of Directors" in the Proxy Statement.

Item 14. Principal Accountant Fees and Services.

Information about principal accountant fees and services, as required by Item 9(e) of Schedule 14A, is incorporated herein by reference from the discussion under the heading “Audit Committee Matters—Annual Evaluation and 2018 Selection of Independent Auditors” in the Proxy Statement.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a)(1) Financial Statements

See “Index to Consolidated Financial Statements.”

(a)(2) Financial Statement Schedules

All schedules are omitted because they are not applicable or the required information is included in the consolidated financial statements or notes.

(a)(3) Exhibits

Exhibit Index

Exhibit Number	
2.1	Purchase Agreement, dated as of April 1, 2013, among Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.), BGC Partners, Inc., BGC Holdings, L.P., BGC Partners, L.P., and, solely for purposes of certain sections thereof, Cantor Fitzgerald, L.P. (incorporated herein by reference to Exhibit 2.1 to the Quarterly Report on Form 10-Q for the quarter ended June 30, 2013 filed on August 8, 2013).
2.2	Stock Purchase Agreement, dated as of March 9, 2016, by and among Deutsche Börse AG and Eurex Frankfurt AG and Nasdaq, Inc. (incorporated herein by reference to the Current Report on Form 8-K filed on March 15, 2016).
2.3	Agreement and Plan of Merger, dated as of September 4, 2017, by and among eVestment, Inc., Nasdaq, Inc., Echo Holding Company and Insight Venture Partners, LLC (solely in its capacity as representative for eVestment's securityholders) (incorporated herein by reference to Exhibit 2.1 to the Current Report on Form 8-K filed on September 8, 2017).†
3.1	Amended and Restated Certificate of Incorporation of Nasdaq (incorporated herein by reference to Exhibit 3.1 to the Current Report on Form 8-K filed on January 28, 2014).
3.1.1	Certificate of Elimination of Nasdaq's Series A Convertible Preferred Stock (incorporated herein by reference to Exhibit 3.1.1 to the Current Report on Form 8-K filed on January 28, 2014).
3.1.2	Certificate of Amendment of Nasdaq's Amended and Restated Certificate of Incorporation (incorporated herein by reference to Exhibit 3.1 to the Current Report on Form 8-K filed on November 19, 2014).
3.1.3	Certificate of Amendment of Nasdaq's Amended and Restated Certificate of Incorporation (incorporated herein by reference to Exhibit 3.1 to the Current Report on Form 8-K filed on September 8, 2015).
3.2	Nasdaq's By-Laws (incorporated herein by reference to Exhibit 3.2 to the Current Report on Form 8-K filed on November 21, 2016).
4.1	Form of Common Stock certificate (incorporated herein by reference to Exhibit 4.1 to the Quarterly Report on Form 10-Q for the quarter ended September 30, 2015 filed on November 4, 2015).
4.2	Stockholders' Agreement, dated as of February 27, 2008, between Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.) and Borse Dubai Limited (incorporated herein by reference to Exhibit 10.2 to the Current Report on Form 8-K filed on March 3, 2008).
4.2.1	First Amendment to Stockholders' Agreement, dated as of February 19, 2009, between Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.) and Borse Dubai Limited (incorporated herein by reference to Exhibit 4.10.1 to the Annual Report on Form 10-K for the year ended December 31, 2008 filed on February 27, 2009).
4.3	Registration Rights Agreement, dated as of February 27, 2008, among Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.), Borse Dubai Limited and Borse Dubai Nasdaq Share Trust (incorporated herein by reference to Exhibit 10.3 to the Current Report on Form 8-K filed on March 3, 2008).
4.3.1	First Amendment to Registration Rights Agreement, dated as of February 19, 2009, among Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.), Borse Dubai Limited and Borse Dubai Nasdaq Share Trust (incorporated herein by reference to Exhibit 4.11.1 to the Annual Report on Form 10-K for the year ended December 31, 2008 filed on February 27, 2009).

4.4	Indenture, dated as of January 15, 2010, between Nasdaq (f/k/a The NASDAQ OMX Group, Inc.) and Wells Fargo Bank, National Association, as Trustee (incorporated herein by reference to Exhibit 4.1 to the Current Report on Form 8-K filed on January 19, 2010).
4.5	First Supplemental Indenture, dated as of January 15, 2010, among Nasdaq (f/k/a The NASDAQ OMX Group, Inc.) and Wells Fargo Bank, National Association, as Trustee (incorporated herein by reference to Exhibit 4.2 to the Current Report on Form 8-K filed on January 19, 2010).
4.6	Second Supplemental Indenture, dated as of December 21, 2010, among Nasdaq (f/k/a The NASDAQ OMX Group, Inc.) and Wells Fargo Bank, National Association, as Trustee (incorporated herein by reference to Exhibit 4.1 to the Current Report on Form 8-K filed on December 21, 2010).
4.7	Stockholders' Agreement, dated as of December 16, 2010, between Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.) and Investor AB (incorporated herein by reference to Exhibit 4.12 to the Annual Report on Form 10-K for the year ended December 31, 2010 filed on February 24, 2011).
4.8	Indenture, dated as of June 7, 2013, between Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.) and Wells Fargo Bank, National Association, as Trustee (incorporated herein by reference to Exhibit 4.1 to the Current Report on Form 8-K filed on June 10, 2013).
4.9	First Supplemental Indenture, dated as of June 7, 2013, among Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.), Wells Fargo Bank, National Association, as Trustee, Deutsche Bank AG, London Branch, as paying agent, and Deutsche Bank Luxembourg S.A., as registrar and transfer agent (incorporated herein by reference to Exhibit 4.2 to the Current Report on Form 8-K filed on June 10, 2013).
4.10	Second Supplemental Indenture, dated as of May 29, 2014, among Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.) and Wells Fargo Bank, National Association, as Trustee (incorporated herein by reference to Exhibit 4.1 to the Current Report on Form 8-K filed on May 30, 2014).
4.11	Third Supplemental Indenture, dated as of May 20, 2016, among Nasdaq, Inc., Wells Fargo Bank, National Association, as Trustee, and HSBC Bank USA, National Association, as paying agent and as registrar and transfer agent (incorporated herein by reference to the Current Report on Form 8-K filed on May 23, 2016).
4.12	Fourth Supplemental Indenture, dated as of June 7, 2016, among Nasdaq, Inc. and Wells Fargo Bank, National Association, as Trustee (incorporated herein by reference to the Current Report on Form 8-K filed on June 7, 2016).
4.13	Fifth Supplemental Indenture, dated as of September 22, 2017, among Nasdaq, Inc. and Wells Fargo Bank, National Association, as Trustee (incorporated herein by reference to Exhibit 4.1 to the Current Report on Form 8-K filed on September 22, 2017).
4.14	Registration Rights Agreement, dated as of June 28, 2013, by and among Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.), BGC Partners, Inc., BGC Holdings, L.P. and BGC Partners, L.P. (incorporated herein by reference to Exhibit 10.1 to the Current Report on Form 8-K filed on July 1, 2013).
10.1	Amended and Restated Board Compensation Policy, effective on May 10, 2017 (incorporated herein by reference to Exhibit 10.4 to the Quarterly Report on Form 10-Q for the quarter ended June 30, 2017 filed on August 2, 2017).*
10.2	Nasdaq Executive Corporate Incentive Plan, effective as of January 1, 2015 (incorporated herein by reference to Exhibit 10.1 to the Current Report on Form 8-K filed on May 11, 2015).*
10.3	Form of Nasdaq Non-Qualified Stock Option Award Certificate (incorporated herein by reference to Exhibit 10.3 to the Annual Report on Form 10-K for the year ended December 31, 2010 filed on February 24, 2011).*

10.4	Form of Nasdaq Restricted Stock Unit Award Certificate (employees) (incorporated herein by reference to Exhibit 10.5 to the Quarterly Report on Form 10-Q for the quarter ended June 30, 2017 filed on August 2, 2017).*
10.5	Form of Nasdaq Restricted Stock Unit Award Certificate (directors) (incorporated herein by reference to Exhibit 10.6 to the Quarterly Report on Form 10-Q for the quarter ended June 30, 2017 filed on August 2, 2017).*
10.6	Form of Nasdaq One-Year Performance Share Unit Agreement (incorporated herein by reference to Exhibit 10.7 to the Quarterly Report on Form 10-Q for the quarter ended June 30, 2017 filed on August 2, 2017).*
10.7	Form of Nasdaq Three-Year Performance Share Unit Agreement (incorporated herein by reference to Exhibit 10.8 to the Quarterly Report on Form 10-Q for the quarter ended June 30, 2017 filed on August 2, 2017).*
10.8	Form of Nasdaq Continuing Obligations Agreement (incorporated herein by reference to Exhibit 10.1 to the Quarterly Report on Form 10-Q for the quarter ended March 31, 2017 filed on May 10, 2017).*
10.9	Amended and Restated Supplemental Executive Retirement Plan, dated as of December 17, 2008 (incorporated herein by reference to Exhibit 10.6 to the Annual Report on Form 10-K for the year ended December 31, 2008 filed on February 27, 2009).*
10.9.1	Amendment No. 1 to Amended and Restated Supplemental Executive Retirement Plan, effective as of December 31, 2008 (incorporated herein by reference to Exhibit 10.6.1 to the Annual Report on Form 10-K for the year ended December 31, 2008 filed on February 27, 2009).*
10.10	Nasdaq Supplemental Employer Retirement Contribution Plan, dated as of December 17, 2008 (incorporated herein by reference to Exhibit 10.7 to the Annual Report on Form 10-K for the year ended December 31, 2008 filed on February 27, 2009).*
10.11	Employment Agreement between Nasdaq and Adena Friedman, made and entered into on November 14, 2016 and effective as of January 1, 2017 (incorporated herein by reference to Exhibit 10.10.1 to the Annual Report on Form 10-K for the year ended December 31, 2012 filed on February 21, 2013).*
10.12	Nonqualified Stock Option Award Certificate to Adena T. Friedman from Nasdaq, Inc. in connection with grant made on January 3, 2017 (incorporated herein by reference to Exhibit 10.1 to the Quarterly Report on Form 10-Q for the quarter ended September 30, 2017 filed on November 7, 2017).*
10.13	Employment Offer Letter, dated as of May 10, 2016, between Nasdaq, Inc. and Michael Ptasznik (incorporated herein by reference to Exhibit 10.2 to the Quarterly Report on Form 10-Q for the quarter ended March 31, 2017 filed on May 10, 2017).*
10.14	Employment Agreement between Nasdaq and Edward Knight, effective as of December 29, 2000 (incorporated herein by reference to Exhibit 10.14 to the Annual Report on Form 10-K for the year ended December 31, 2002 filed on March 31, 2003).*
10.14.1	First Amendment to Employment Agreement between Nasdaq and Edward Knight, effective February 1, 2002 (incorporated herein by reference to Exhibit 10.14.1 to the Annual Report on Form 10-K for the year ended December 31, 2002 filed on March 31, 2003).*
10.14.2	Second Amendment to Employment Agreement between Nasdaq and Edward Knight, effective as of December 31, 2008 (incorporated herein by reference to Exhibit 10.13.2 to the Annual Report on Form 10-K for the year ended December 31, 2008 filed on February 27, 2009).*
10.14.3	Third Amendment to Employment Agreement between Nasdaq and Edward Knight, effective as of February 22, 2012 (incorporated herein by reference to Exhibit 10.2 to the Current Report on Form 8-K filed on February 28, 2012).*

10.14.4	Fourth Amendment to Employment Agreement between Nasdaq and Edward Knight, entered into and effective as of October 24, 2016 (incorporated herein by reference to Exhibit 10.14.4 to the Annual Report on Form 10-K for the year ended December 31, 2016 filed on March 1, 2017).*
10.15	Employment Agreement between Nasdaq and Bradley J. Peterson, dated August 1, 2016 (incorporated herein by reference to Exhibit 10.1 to the Quarterly Report on Form 10-Q for the quarter ended September 30, 2016 filed on November 8, 2016).*
10.16	Nasdaq Change in Control Severance Plan for Executive Vice Presidents and Senior Vice Presidents, effective November 26, 2013 (incorporated herein by reference to Exhibit 10.1 to the Current Report on Form 8-K filed on November 29, 2013).*
10.17	Credit Agreement, dated as of April 25, 2017, among Nasdaq, Inc., the various lenders from time to time party thereto, Bank of America, N.A., as administrative agent and an issuing bank, and the other financial institutions party thereto (incorporated herein by reference to Exhibit 10.1 to the Current Report on Form 8-K filed on April 26, 2017).
10.18	Credit Agreement, dated March 17, 2016, among Nasdaq, Inc., the various lenders party thereto and Bank of America, N.A., as Administrative Agent (incorporated herein by reference to the Current Report on Form 8-K filed on March 22, 2016).
10.18.1	Amendment No. 1 to Credit Agreement, dated as of April 25, 2017, among Nasdaq, Inc., the lenders party thereto and Bank of America, N.A., as administrative agent (incorporated herein by reference to Exhibit 10.2 to the Current Report on Form 8-K filed on April 26, 2017).
10.19	Form of Commercial Paper Dealer Agreement between Nasdaq, Inc., as Issuer, and the Dealer party thereto (incorporated herein by reference to Exhibit 10.3 to the Current Report on Form 8-K filed on April 26, 2017).
11	Statement regarding computation of per share earnings (incorporated herein by reference from Note 15 to the consolidated financial statements under Part II, Item 8 of this Form 10-K).
12.1	Computation of Ratio of Earnings to Fixed Charges.
21.1	List of all subsidiaries.
23.1	Consent of Ernst & Young LLP.
24.1	Powers of Attorney.
31.1	Certification of President and Chief Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 (“Sarbanes-Oxley”).
31.2	Certification of Executive Vice President, Corporate Strategy and Chief Financial Officer pursuant to Section 302 of Sarbanes-Oxley.
32.1	Certifications Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of Sarbanes-Oxley.
101.INS	XBRL Instance Document.**
101.SCH	XBRL Taxonomy Extension Schema.
101.CAL	XBRL Taxonomy Extension Calculation Linkbase.

101.DEF	Taxonomy Extension Definition Linkbase.
101.LAB	XBRL Taxonomy Extension Label Linkbase.
101.PRE	XBRL Taxonomy Extension Presentation Linkbase.

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* Management contract or compensatory plan or arrangement.

** The following materials from the Nasdaq, Inc. Annual Report on Form 10-K for the year ended December 31, 2017, formatted in XBRL (eXtensible Business Reporting Language): (i) Consolidated Balance Sheets as of December 31, 2017 and December 31, 2016; (ii) Consolidated Statements of Income for the years ended December 31, 2017, 2016 and 2015; (iii) Consolidated Statements of Comprehensive Income (Loss) for the years ended December 31, 2017, 2016 and 2015; (iv) Consolidated Statements of Changes in Equity for the years ended December 31, 2017, 2016 and 2015; (v) Consolidated Statements of Cash Flows for the years ended December 31, 2017, 2016 and 2015; and (vi) notes to consolidated financial statements.

† Schedules have been omitted pursuant to Item 601(b)(2) of Regulation S-K. Nasdaq hereby undertakes to furnish supplementally copies of any of the omitted schedules upon request by the SEC.

(b) Exhibits:

See Item 15(a)(3) above.

(c) Financial Statement Schedules:

All schedules are omitted because they are not applicable or the required information is included in the consolidated financial statements or notes.

Item 16. Form 10-K Summary.

None.

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SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized, on February 28, 2018 .

Nasdaq, Inc.

By: /s/ Adena T. Friedman
Name: **Adena T. Friedman**
Title: **President and Chief Executive Officer**

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities indicated as of February 28, 2018 .

Name	Title
/s/ Adena T. Friedman **Adena T. Friedman**	President and Chief Executive Officer and Director (Principal Executive Officer)
/s/ Michael Ptasznik **Michael Ptasznik**	Executive Vice President, Corporate Strategy and Chief Financial Officer (Principal Financial Officer)
/s/ Ann M. Dennison **Ann M. Dennison**	Senior Vice President and Controller (Principal Accounting Officer)
* **Michael R. Splinter**	Chairman of the Board
* **Melissa M. Arnoldi**	Director
* **Charlene T. Begley**	Director
* **Steven D. Black**	Director
* **Essa Kazim**	Director
* **Thomas A. Kloet**	Director
* **John D. Rainey**	Director
* **Lars R. Wedenborn**	Director

* Pursuant to Power of Attorney

By: /s/ Edward S. Knight
Edward S. Knight
Attorney-in-Fact

Nasdaq, Inc.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

The following consolidated financial statements of Nasdaq, Inc. and its subsidiaries are presented herein on the page indicated:

Report of Independent Registered Public Accounting Firm	F- 2
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Consolidated Statements of Changes in Equity	F- 6
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Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of Nasdaq, Inc.

Opinion on the Financial Statements
We have audited the accompanying consolidated balance sheets of Nasdaq, Inc. (the Company) as of December 31, 2017 and 2016, and the related consolidated statements of income, comprehensive income (loss), changes in equity and cash flows for each of the three years in the period ended December 31, 2017 and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2017, 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 Company's internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework), and our report dated February 28, 2018 expressed an unqualified opinion thereon.

Basis for Opinion
These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's 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 Company 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 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 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 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 financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ *Ernst & Young LLP*

We have served as the Company's auditor since 1986.

New York, New York
February 28, 2018

Nasdaq, Inc.
Consolidated Balance Sheets
(in millions, except share and par value amounts)

	December 31, 2017	December 31, 2016
Assets		
Current assets:		
Cash and cash equivalents	$ 377	$ 403
Restricted cash	22	15
Financial investments, at fair value	235	245
Receivables, net	423	429
Default funds and margin deposits	3,988	3,301
Other current assets	187	167
Assets held for sale	297	—
Total current assets	5,529	4,560
Property and equipment, net	400	362
Deferred tax assets	391	717
Goodwill	6,586	6,027
Intangible assets, net	2,468	2,094
Other non-current assets	412	390
Total assets	$ 15,786	$ 14,150
Liabilities		
Current liabilities:		
Accounts payable and accrued expenses	$ 177	$ 175
Section 31 fees payable to SEC	128	108
Accrued personnel costs	170	207
Deferred revenue	189	162
Other current liabilities	85	129
Default funds and margin deposits	3,988	3,301
Short-term debt	480	—
Liabilities held for sale	45	—
Total current liabilities	5,262	4,082
Long-term debt	3,727	3,603
Deferred tax liabilities	602	720
Non-current deferred revenue	146	171
Other non-current liabilities	162	144
Total liabilities	9,899	8,720
Commitments and contingencies		
Equity		
Nasdaq stockholders' equity:		
Common stock, $0.01 par value, 300,000,000 shares authorized, shares issued: 172,373,432 at December 31, 2017 and 170,501,186 at December 31, 2016; shares outstanding: 167,441,030 at December 31, 2017 and 166,579,468 at December 31, 2016	2	2
Additional paid-in capital	3,024	3,104
Common stock in treasury, at cost: 4,932,402 shares at December 31, 2017 and 3,921,718 shares at December 31, 2016	(247)	(176)
Accumulated other comprehensive loss	(862)	(979)
Retained earnings	3,970	3,479
Total Nasdaq stockholders' equity	5,887	5,430
Total liabilities and equity	$ 15,786	$ 14,150

See accompanying notes to consolidated financial statements.

Nasdaq, Inc.
Consolidated Statements of Income
(in millions, except per share amounts)

	Year Ended December 31,		
	2017	2016	2015
Revenues:			
Market Services	$ 2,418	$ 2,255	$ 2,084
Corporate Services	656	635	562
Information Services	588	540	512
Market Technology	303	275	245
Total revenues	3,965	3,705	3,403
Transaction-based expenses:			
Transaction rebates	(1,158)	(1,092)	(983)
Brokerage, clearance and exchange fees	(379)	(336)	(330)
Revenues less transaction-based expenses	2,428	2,277	2,090
Operating expenses:			
Compensation and benefits	675	664	590
Professional and contract services	156	153	148
Computer operations and data communications	125	111	107
Occupancy	95	86	85
General, administrative and other	82	72	65
Marketing and advertising	31	30	28
Depreciation and amortization	188	170	138
Regulatory	33	35	27
Merger and strategic initiatives	44	76	10
Restructuring charges	—	41	172
Total operating expenses	1,429	1,438	1,370
Operating income	999	839	720
Interest income	7	5	4
Interest expense	(143)	(135)	(111)
Asset impairment charge	—	(578)	—
Other investment income	2	3	—
Net income from unconsolidated investees	15	2	17
Income before income taxes	880	136	630
Income tax provision	146	28	203
Net income	734	108	427
Net loss attributable to noncontrolling interests	—	—	1
Net income attributable to Nasdaq	$ 734	$ 108	$ 428
Per share information:			
Basic earnings per share	$ 4.41	$ 0.65	$ 2.56
Diluted earnings per share	$ 4.33	$ 0.64	$ 2.50
Cash dividends declared per common share	$ 1.46	$ 1.21	$ 0.90

See accompanying notes to consolidated financial statements.

Nasdaq, Inc.
Consolidated Statements of Comprehensive Income (Loss)
(in millions)

	Year Ended December 31,		
	2017	2016	2015
Net income	$ 734	$ 108	$ 427
Other comprehensive income (loss):			
Foreign currency translation gains (losses):			
Net foreign currency translation gains (losses)	214	(183)	(283)
Income tax benefit (expense)	(96)	68	100
Total	118	(115)	(183)
Employee benefit plan gains (losses):			
Employee benefit plan adjustment gains (losses)	(2)	—	2
Income tax benefit (expense)	1	—	(1)
Total	(1)	—	1
Total other comprehensive income (loss), net of tax	117	(115)	(182)
Comprehensive income (loss)	851	(7)	245
Comprehensive loss attributable to noncontrolling interests	—	—	1
Comprehensive income (loss) attributable to Nasdaq	$ 851	$ (7)	$ 246

See accompanying notes to consolidated financial statements.

Nasdaq, Inc.
Consolidated Statements of Changes in Equity
(in millions, except share amounts)

	Number of Common Shares Outstanding	Common Stock at Par Value	Additional Paid-in Capital	Common Stock In Treasury, at Cost	Accumulated Other Comprehensive Loss	Retained Earnings	Non- controlling Interests	Total
Balance at December 31, 2014	168,795,263	$ 2	$ 3,222	$ (41)	$ (682)	$ 3,292	$ 1	$ 5,794
Net income (loss)	—	—	— —	—	—	428	(1)	427
Foreign currency translation, net of tax of $100	—	—	—	—	(183)	—	—	(183)
Employee benefit plan adjustments, net of tax of $1	—	—	—	—	1	—	—	1
Cash dividends declared per common share	—	—	—	—	—	(149)	—	(149)
Share repurchase program	(7,191,685)	—	(340)	(37)	—	—	—	(377)
Share-based compensation	1,455,380	—	68	—	—	—	—	68
Stock option exercises, net	682,054	—	18	—	—	—	—	18
Other issuances of common stock, net	(408,989)	—	55	(33)	—	—	—	22
Purchase of subsidiary shares to noncontrolling interests and other adjustments	—	—	(12)	—	—	—	—	(12)
Issuance of Nasdaq common stock related to a prior acquisition	992,247	—	—	—	—	—	—	—
Balance at December 31, 2015	164,324,270	$ 2	$ 3,011	$ (111)	$ (864)	$ 3,571	$ —	$ 5,609
Net income	—	—	—	—	—	108	—	108
Foreign currency translation, net of tax of $68	—	—	—	—	(115)	—	—	(115)
Cash dividends declared per common share	—	—	—	—	—	(200)	—	(200)
Share repurchase program	(1,547,778)	—	(100)	—	—	—	—	(100)
Share-based compensation	2,361,699	—	86	—	—	—	—	86
Stock option exercises, net	1,219,820	—	41	—	—	—	—	41
Other issuances of common stock, net	(770,790)	—	66	(65)	—	—	—	1
Issuance of Nasdaq common stock related to a prior acquisition	992,247	—	—	—	—	—	—	—
Balance at December 31, 2016	166,579,468	$ 2	$ 3,104	$ (176)	$ (979)	$ 3,479	$ —	$ 5,430
Net income	—	—	—	—	—	734	—	734
Foreign currency translation, net of tax of $96	—	—	—	—	118	—	—	118
Employee benefit plan adjustments, net of tax of $1	—	—	—	—	(1)	—	—	(1)
Cash dividends declared per common share	—	—	—	—	—	(243)	—	(243)
Share repurchase program	(2,843,519)	—	(203)	—	—	—	—	(203)
Share-based compensation	2,384,821	—	70	—	—	—	—	70
Stock option exercises, net	1,102,830	—	24	—	—	—	—	24
Other issuances of common stock, net	(774,817)	—	29	(71)	—	—	—	(42)
Issuance of Nasdaq common stock related to a prior acquisition	992,247	—	—	—	—	—	—	—
Balance at December 31, 2017	167,441,030	$ 2	$ 3,024	$ (247)	$ (862)	$ 3,970	$ —	$ 5,887

See accompanying notes to consolidated financial statements.

Nasdaq, Inc.
Consolidated Statements of Cash Flows
(in millions)

	Year Ended December 31,		
	2017	2016	2015
Cash flows from operating activities:			
Net income	$ 734	$ 108	$ 427
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	188	170	138
Share-based compensation	70	86	68
Deferred income taxes	10	(136)	(14)
Non-cash restructuring charges	—	8	136
Asset impairment charge	—	578	—
Net income from unconsolidated investees	(15)	(2)	(17)
Other reconciling items included in net income	25	9	7
Net change in operating assets and liabilities, net of effects of acquisitions:			
Receivables, net	25	(24)	55
Other assets	261	(18)	(41)
Accounts payable and accrued expenses	(12)	5	(38)
Section 31 fees payable to SEC	20	5	(26)
Accrued personnel costs	(41)	27	33
Deferred revenue	(43)	(15)	(49)
Other liabilities	(61)	(25)	48
Net assets held for sale	(252)	—	—
Net cash provided by operating activities	909	776	727
Cash flows from investing activities:			
Purchases of trading securities	(366)	(443)	(346)
Proceeds from sales and redemptions of trading securities	394	392	319
Purchases of available-for-sale investment securities	(26)	(25)	(38)
Proceeds from maturities of available-for-sale investment securities	30	19	29
Capital contribution in equity method investment	—	—	(30)
Acquisition of businesses, net of cash and cash equivalents acquired	(776)	(1,460)	(226)
Purchases of property and equipment	(144)	(134)	(133)
Other investment activities	(2)	(6)	(10)
Net cash used in investing activities	(890)	(1,657)	(435)
Cash flows from financing activities:			
Proceeds from commercial paper, net	480	—	—
Repayments of long-term debt	(708)	(1,156)	(369)
Payment of debt extinguishment cost	(9)	—	—
Proceeds from utilization of credit commitment, net of debt issuance costs	150	898	506
Proceeds from issuances of senior unsecured notes, net of debt issuance costs	498	1,159	—
Proceeds from issuance of term loan facility	—	399	—
Cash paid for repurchase of common stock	(203)	(100)	(377)
Cash dividends	(243)	(200)	(149)
Proceeds received from employee stock activity	53	54	29
Payments related to employee shares withheld for taxes	(71)	(65)	(34)
Proceeds (disbursements) of customer funds	—	(38)	13
Other financing activities	—	(3)	(19)
Net cash (used in) provided by financing activities	(53)	948	(400)
Effect of exchange rate changes on cash and cash equivalents and restricted cash	15	(6)	(11)
Net increase (decrease) in cash and cash equivalents and restricted cash	(19)	61	(119)
Cash and cash equivalents and restricted cash at beginning of period	418	357	476

Cash and cash equivalents and restricted cash at end of period	$ 399	$ 418	$ 357
Supplemental Disclosure Cash Flow Information			
Cash paid for:			
Interest	$ 129	$ 119	$ 103
Income taxes, net of refund	$ 154	$ 191	$ 202

See accompanying notes to consolidated financial statements.

Nasdaq, Inc.

Notes to Consolidated Financial Statements

1. Organization and Nature of Operations

Nasdaq, Inc. is a leading provider of trading, clearing, marketplace technology, regulatory, securities listing, information and public and private company services. Our global offerings are diverse and include trading and clearing across multiple asset classes, trade management services, data products, financial indexes, capital formation solutions, corporate solutions, and market technology products and services. Our technology powers markets across the globe, supporting equity derivative trading, clearing and settlement, cash equity trading, fixed income trading, trading surveillance and many other functions.

We manage, operate and provide our products and services in four business segments: Market Services, Corporate Services, Information Services and Market Technology.

Market Services

Our Market Services segment includes our Equity Derivative Trading and Clearing, Cash Equity Trading, FICC and Trade Management Services businesses. We operate multiple exchanges and other marketplace facilities across several asset classes, including derivatives, commodities, cash equity, debt, structured products and ETPs. In addition, in some countries where we operate exchanges, we also provide broker services, clearing, settlement and central depository services. Our transaction-based platforms provide market participants with the ability to access, process, display and integrate orders and quotes. The platforms allow the routing and execution of buy and sell orders as well as the reporting of transactions, providing fee-based revenues.

In the U.S., we operate six electronic options exchanges and three cash equity exchanges. The Nasdaq Stock Market, the largest of our cash equities exchanges, is the largest single venue of liquidity for trading U.S.-listed cash equities. We also operate an electronic platform for trading of U.S. Treasuries and NFX, a U.S. based designated contract market which lists cash-settled energy derivatives based on key energy benchmarks including oil, natural gas and U.S. power. In addition, we also operate three Canadian markets for the trading of Canadian-listed securities.

In Europe, we operate exchanges in Stockholm (Sweden), Copenhagen (Denmark), Helsinki (Finland), and Reykjavik (Iceland), as well as the clearing operations of Nasdaq Clearing. We also operate exchanges in Tallinn (Estonia), Riga (Latvia) and Vilnius (Lithuania) as Nasdaq Baltic. Collectively, Nasdaq Nordic and Nasdaq Baltic offer trading in cash equities, depository receipts, warrants, convertibles, rights, fund units and ETFs, as well as trading and clearing of derivatives and clearing of resale and repurchase agreements.

Nasdaq Commodities is the brand name for Nasdaq's worldwide suite of commodity-related products and services. Nasdaq Commodities' offerings include oil, power, natural gas and carbon emission markets, tanker and dry cargo freight, seafood derivatives, iron ore, electricity certificates and clearing services. These products are listed on two of Nasdaq's derivatives exchanges, Nasdaq Oslo ASA and NFX.

Through our Trade Management Services business, we provide market participants with a wide variety of alternatives for connecting to and accessing our markets via a number of different protocols used for quoting, order entry, trade reporting, DROP functionality and connectivity to various data feeds. We also provide co-location services to market participants, whereby firms may lease cabinet space and power to house their own equipment and servers within our data centers. Our broker services operations offer technology and customized securities administration solutions to financial participants in the Nordic market.

Corporate Services

Our Corporate Services segment includes our Corporate Solutions and Listing Services businesses.

Our Corporate Solutions business serves corporate clients, including companies listed on our exchanges and private companies. We help organizations manage the two-way flow of information with their key constituents, including their board members and investors, and with clients and the public through our suite of advanced technology, analytics, and consultative services. Our Corporate Solutions business currently offers products to serve the following key areas: investor relations, board & leadership, public relations solutions, and digital media services. As of September 30, 2017, our Public Relations Solutions and Digital Media Services businesses have been classified as held for sale. See Note 5, "Assets and Liabilities Held for Sale," for further discussion. In January 2018, we announced that we entered into a definitive agreement to sell these businesses. See "Definitive Agreement to Sell our Public Relations Solutions and Digital Media Services Businesses," of Note 21, "Subsequent Events," for further discussion.

Our Listing Services business includes our U.S. and European Listing Services businesses. We operate a variety of listing platforms around the world to provide multiple global capital raising solutions for private and public companies. Our main listing markets are The Nasdaq Stock Market and the Nasdaq Nordic and Nasdaq Baltic exchanges. Through Nasdaq First North, our Nordic and Baltic operations also offer alternative marketplaces for smaller companies and growth companies. Our Listing Services business also includes NPM, which provides liquidity solutions for private companies.

As of December 31, 2017 , there were 2,949 total listings on The Nasdaq Stock Market, including 373 ETPs. The combined market capitalization was approximately $11.6 trillion . In Europe, the Nasdaq Nordic and Nasdaq Baltic exchanges, together with Nasdaq First North, were home to 984 listed companies with a combined market capitalization of approximately $1.5 trillion .

Information Services

Our Information Services segment includes our Data Products and our Index Licensing and Services businesses. Our Data Products business sells and distributes historical and real-time quote and trade information to the sell-side, the buy-side, retail online brokers, proprietary trading shops, other venues, internet portals and data distributors. Our data products enhance transparency of market activity within our exchanges and provide critical information to professional and non-professional investors globally.

Our Index Licensing and Services business develops and licenses Nasdaq branded indexes, associated derivatives, and financial products and also provides custom calculation services for third-party clients. As of December 31, 2017 , we had 324 ETPs licensed to Nasdaq's indexes which had $167 billion of assets under management.

Market Technology

Our Market Technology segment is a leading global technology solutions provider and partner to exchanges, clearing organizations, central securities depositories, regulators, banks, brokers and corporate businesses. Our Market Technology business is the sales channel for our complete global offering to other marketplaces.

Market Technology provides technology solutions for trading, clearing, settlement, surveillance and information dissemination to markets with wide-ranging requirements, from the leading markets in the U.S., Europe and Asia to emerging markets in the Middle East, Latin America, and Africa. Our marketplace solutions can handle a wide array of assets, including cash equities, equity derivatives, currencies, various interest-bearing securities, commodities and energy products, and are currently powering more than 90 marketplaces in 50 countries. Market Technology also provides market surveillance services to broker-dealer firms worldwide, as well as enterprise governance, risk management and compliance software solutions.

2. Summary of Significant Accounting Policies

Basis of Presentation and Principles of Consolidation

The consolidated financial statements are prepared in accordance with U.S. GAAP and include the accounts of Nasdaq, its wholly-owned subsidiaries and other entities in which Nasdaq has a controlling financial interest. When we do not have a controlling interest in an entity but exercise significant influence over the entity's operating and financial policies, such investment is accounted for under the equity method of accounting. We recognize our share of earnings or losses of an equity method investee based on our ownership percentage. See "Equity Method Investments," of Note 7, "Investments," for further discussion of our equity method investments.

The accompanying consolidated financial statements reflect all adjustments which are, in the opinion of management, necessary for a fair statement of the results. These adjustments are of a normal recurring nature. All significant intercompany accounts and transactions have been eliminated in consolidation.

Certain prior year amounts have been reclassified to conform to the current year presentation.

Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts and the disclosure of contingent amounts in the consolidated financial statements and accompanying notes. Actual results could differ from those estimates.

Foreign Currency

Foreign denominated assets and liabilities are remeasured into the functional currency at exchange rates in effect at the balance sheet date and recorded through the income statement. Gains or losses resulting from foreign currency transactions are remeasured using the rates on the dates on which those elements are recognized during the period, and are included in general, administrative and other expense in the Consolidated Statements of Income.

Translation gains or losses resulting from translating our subsidiaries' financial statements from the local functional currency to the reporting currency, net of tax, are included in accumulated other comprehensive loss within stockholders' equity in the Consolidated Balance Sheets. Assets and liabilities are translated at the balance sheet date while revenues and expenses are translated at the date the transaction occurs or at an applicable average rate.

Deferred taxes are not recorded on cumulative translation adjustments where we expect earnings of a foreign subsidiary to be indefinitely reinvested. The income tax effect of currency translation adjustments related to foreign subsidiaries that are not considered indefinitely reinvested is recorded as a component of deferred taxes with an offset to accumulated other comprehensive loss within stockholders' equity in the Consolidated Balance Sheets.

Cash and Cash Equivalents

Cash and cash equivalents include all non-restricted cash in banks and highly liquid investments with original maturities of 90 days or less at the time of purchase. Such equivalent investments included in cash and cash equivalents in the Consolidated Balance Sheets were $183 million as of December 31, 2017 and $251 million as of December 31, 2016 . Cash equivalents are carried at cost plus accrued interest, which approximates fair value due to the short maturities of these investments.

Restricted Cash

Current restricted cash, which was $22 million as of December 31, 2017 and $15 million as of December 31, 2016 , is restricted from withdrawal due to a contractual or regulatory

requirement or not available for general use and is classified as restricted cash in the Consolidated Balance Sheets. As of December 31, 2017 and 2016 , current restricted cash primarily includes restricted cash held for our trading and clearing businesses.

Financial Investments

Financial investments, at fair value are primarily comprised of trading securities, mainly highly rated European government debt securities. Trading securities are bought principally to meet regulatory capital requirements for Nasdaq Clearing's operations and are generally sold in the near term. Changes in fair value of trading securities are included in dividend and investment income. Financial investments that are classified as available-for-sale investment securities are carried at fair value with unrealized gains and losses, net of tax, reported in accumulated other comprehensive loss within stockholders' equity in the Consolidated Balance Sheets. Realized gains and losses on these securities are included in earnings upon disposition of the securities using the specific identification method. In addition, realized losses are recognized when management determines that a decline in value is other than temporary, which requires judgment regarding the amount and timing of recovery. For financial investments that are classified as available-for-sale securities, we also consider the extent to which cost exceeds fair value, the duration of that difference, management's judgment about the issuer's current and prospective financial condition, as well as our intent and ability to hold the security until recovery of the unrealized losses.

Fair value of both trading and available-for-sale investment securities is generally obtained from third party pricing sources. When available, quoted market prices are used to determine fair value. If quoted market prices are not available, fair values are estimated using pricing models with observable market inputs. The inputs to the valuation models vary by the type of security being priced but are typically benchmark yields, reported trades, broker-dealer quotes, and prices of similar assets. Pricing models generally do not entail material subjectivity because the methodologies employed use inputs observed from active markets. See "Fair Value Measurements," below for further discussion of fair value measures.

Receivables, net

Our receivables are concentrated with our member firms, market data distributors, listed companies, corporate solutions and market technology customers. Receivables are shown net of a reserve for uncollectible accounts. The reserve for bad debts is maintained at a level that management believes to be sufficient to absorb estimated losses in the accounts receivable portfolio. The reserve is increased by the provision for bad debts which is charged against operating results and decreased by the amount of charge-offs, net of recoveries. The provision for bad debts is included in general, administrative and other expense in the Consolidated Statements of Income. The amount charged against operating results is based on several factors including, but not limited to, a continuous assessment of the collectability of each account, the length of time a receivable is past due and our historical experience with the particular customer. In circumstances where a specific customer's inability to meet its financial obligations is known (i.e., bankruptcy filings), we record a specific provision for bad debts against amounts due to reduce the receivable to the amount we reasonably believe will be collected. Due to changing economic, business and market conditions, we review the reserve for bad debts monthly and make changes to the reserve through the provision for bad debts as appropriate. If circumstances change (i.e., higher than expected defaults or an unexpected material adverse change in a major customer's ability to pay), our estimates of recoverability could be reduced by a material amount. The total reserve netted against receivables in the Consolidated Balance Sheets was $9 million as of December 31, 2017 , $13 million as of December 31, 2016 and $14 million as of December 31, 2015 . The changes in the balance between periods was immaterial.

Default Funds and Margin Deposits

Nasdaq Clearing members' cash contributions are included in default funds and margin deposits in the Consolidated Balance Sheets as both a current asset and a current liability. These balances may fluctuate over time due to changes in the amount of deposits required and whether members choose to provide cash or non-cash contributions. Non-cash contributions include highly rated government debt securities that must meet specific criteria approved by Nasdaq Clearing. Non-cash contributions are pledged assets that are not recorded in the Consolidated Balance Sheets as Nasdaq Clearing does not take legal ownership of these assets and the risks and rewards remain with the clearing members.

Derivative Financial Instruments and Hedging Activities

Non-Designated Derivatives

We use derivatives as economic hedges that are not designed as accounting hedges or do not qualify for hedge accounting treatment. For such derivative financial instruments, changes in fair value are reported in current period earnings.

We use foreign exchange forward contracts to manage foreign currency exposure of intercompany loans. These contracts are not designated as hedges for financial reporting purposes. The change in fair value of these contracts is recognized in general, administrative and other expense in the Consolidated Statements of Income and offsets the foreign currency impact recognized on the intercompany loans.

As of December 31, 2017 and 2016 , the fair value amounts of our derivative instruments were immaterial.

Net Investment Hedges

Net assets of our foreign subsidiaries are exposed to volatility in foreign currency exchange rates. We may utilize net investment hedges to offset the translation adjustment arising from re-measuring our investment in foreign subsidiaries.

Our 2021 and 2023 Notes have been designated as a hedge of our net investment in certain foreign subsidiaries to mitigate

the foreign exchange risk associated with certain investments in these subsidiaries. Any increase or decrease related to the remeasurement of the 2021 and 2023 Notes into U.S. dollars is recorded within accumulated other comprehensive loss in the Consolidated Balance Sheets. See "3.875% Senior Unsecured Notes," and "1.75% Senior Unsecured Notes," of Note 10, "Debt Obligations," for further discussion.

Property and Equipment, net

Property and equipment, including leasehold improvements, are carried at cost less accumulated depreciation and amortization. Depreciation and amortization are recognized using the straight-line method over the estimated useful lives of the related assets, which range from 10 to 40 years for buildings and improvements, 2 to 5 years for data processing equipment, and 5 to 10 years for furniture and equipment.

We develop systems solutions for both internal and external use. Certain costs incurred in connection with developing or obtaining internal use software are capitalized. In addition, certain costs of computer software to be sold, leased, or otherwise marketed as a separate product or as part of a product or process are capitalized beginning when a product's technological feasibility has been established and ending when a product is available for general release. Technological feasibility is established upon completion of a detailed program design or, in its absence, completion. Prior to reaching technological feasibility, all costs are charged to expense. Unamortized capitalized costs are included in data processing equipment and software, within property and equipment, net in the Consolidated Balance Sheets. Capitalized software costs are amortized on a straight-line basis over the estimated useful lives of the software, generally 3 to 5 years. Amortization of these costs is included in depreciation and amortization expense in the Consolidated Statements of Income.

Leasehold improvements are amortized using the straight-line method over the shorter of their estimated useful lives or the remaining term of the related lease.

See Note 8, "Property and Equipment, net," for further discussion.

Goodwill and Indefinite-Lived Intangible Assets

Goodwill represents the excess of purchase price over the value assigned to the net assets, including identifiable intangible assets, of a business acquired. Goodwill is assessed for impairment annually in the fourth quarter of our fiscal year using an October 1 measurement date, or more frequently if conditions exist that indicate that the asset may be impaired, such as changes in the business climate, poor indicators of operating performance or the sale or disposition of a significant portion of a reporting unit. When testing goodwill for impairment, we have the option of first performing a qualitative assessment to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount as the basis to determine if it is necessary to perform a quantitative goodwill impairment test. In performing a qualitative assessment, we consider the extent to which unfavorable events or circumstances identified, such as changes in economic conditions, industry and market conditions or company specific events, could affect the comparison of the reporting unit's fair value with its carrying amount. If we choose not to complete a qualitative assessment for a given reporting unit, or if the initial assessment indicates that it is more likely than not that the carrying amount of a reporting unit exceeds its estimated fair value, a quantitative test is required.

When assessing goodwill for impairment, our decision to perform a qualitative impairment assessment for a reporting unit in a given year is influenced by a number of factors, including but not limited to, the size of the reporting unit's goodwill, the significance of the excess of the reporting unit's estimated fair value over its carrying amount at the last quantitative assessment date, and the amount of time in between quantitative fair value assessments.

The quantitative goodwill test consists of two steps:

- The first step compares the fair value of each reporting unit with its carrying amount, including goodwill. If the reporting unit's fair value exceeds its carrying amount, goodwill is not impaired.
- If the fair value of a reporting unit is less than its carrying amount, the second step of the goodwill test is performed to measure the amount of impairment, if any. An impairment is equal to the excess of the carrying amount of goodwill over its fair value.

We also evaluate indefinite-lived intangible assets for impairment annually in the fourth quarter of our fiscal year using an October 1 measurement date, or more frequently whenever events or changes in circumstances indicate that the fair value of the asset may be less than its carrying amount. Such evaluation includes determining the fair value of the asset and comparing the fair value of the asset with its carrying amount . If the fair value of the indefinite-lived intangible asset is less than its carrying amount , an impairment charge is recognized in an amount equal to the difference.

For indefinite-lived intangible assets impairment testing, we also have the option to first perform a qualitative assessment to determine whether it is more likely than not that the fair value of an indefinite-lived intangible asset is less than the carrying amount. If, after assessing the totality of events or circumstances, we determine that it is more likely than not that the fair value of an indefinite-lived intangible asset is less than its carrying amount, then we must perform additional testing of the asset. Otherwise, we conclude that no impairment is indicated and further testing is not performed.

There was no impairment of goodwill for the years ended December 31, 2017 , 2016 and 2015 and there were no indefinite-lived intangible asset impairment charges in 2017. As discussed in "Intangible Asset Impairment Charges," of Note 6, "Goodwill and Acquired Intangible Assets," we recorded pre-tax, non-cash indefinite-lived intangible asset impairment charges of $578 million in 2016 and $119 million in 2015. There was no other impairment of indefinite-lived intangible assets for the years ended December 31, 2016 and

2015. Disruptions to our business and events, such as economic weakness or unexpected significant declines in the operating results of any of our reporting units or businesses, may result in goodwill or indefinite-lived intangible asset impairment charges in the future.

Valuation of Other Long-Lived Assets

We review our other long-lived assets, such as finite-lived intangible assets and property and equipment, for potential impairment when there is evidence that events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. The carrying amount of an asset is not recoverable if it exceeds the sum of the undiscounted cash flows expected to result from the use and eventual disposition of the asset. Any required impairment loss is measured as the amount by which the carrying amount of the asset exceeds its fair value and is recorded as a reduction in the carrying amount of the related asset and a charge to operating results. See Note 8, "Property and Equipment, net," for further discussion of property and equipment asset impairment charges recorded in 2017, 2016 and 2015.

Equity Method Investments

In general, the equity method of accounting is used when we own 20% to 50% of the outstanding voting stock of a company and when we are able to exercise significant influence over the operating and financial policies of a company. We have certain investments in which we have determined that we have significant influence and as such account for the investments under the equity method of accounting. We record our pro-rata share of earnings or losses each period and record any dividends as a reduction in the investment balance. We evaluate our equity method investments for other-than-temporary declines in value by considering a variety of factors such as the earnings capacity of the investment and the fair value of the investment compared to its carrying amount. In addition, for investments where the market value is readily determinable, we consider the underlying stock price. If the estimated fair value of the investment is less than the carrying amount and management considers the decline in value to be other than temporary, the excess of the carrying amount over the estimated fair value is recognized in the financial statements as an impairment. See "Equity Method Investments," of Note 7, "Investments," for further discussion of an other-than-temporary charge recorded in 2016 on an equity method investment.

Cost Method Investments

In general, the cost method of accounting is used when we own less than 20% of the outstanding voting stock of a company which does not have a readily determinable fair value and when we are not able to exercise significant influence over the operating and financial policies of a company. Under the cost method of accounting, investments are carried at cost and are adjusted only for other-than-temporary declines in fair value, certain distributions, and additional investments. We evaluate our cost method investments for other-than-temporary declines in value by considering a variety of factors such as the earnings capacity of the investment.

Revenue Recognition and Transaction-Based Expenses

Market Services Revenues

Market services revenues include equity derivative trading and clearing revenues, cash equity trading revenues, FICC revenues, and trade management services revenues.

Equity Derivative Trading and Clearing and Cash Equity Trading Revenues

Equity Derivative Trading and Clearing Revenues

In our equity derivative markets, we earn trading and clearing revenues which are variable. In the U.S., trading revenues are based on traded volumes, and recognized when executed. The principal types of equity derivative contracts traded are equity options, ETF options, index options and foreign currency options. In the U.S., we record execution revenues from transactions on a gross basis as revenues and record related expenses as transaction-based expenses, as we have certain risk associated with trade execution. See "Equity Derivative Trading and Clearing and Cash Equity Trading Transaction-Based Expenses" below for further discussion.

In Europe, equity derivative trading and clearing revenues are based on the volume and value of traded and cleared contracts, and recognized when executed or when contracts are cleared. The principal types of equity derivative contracts traded and cleared are stock options and futures and index options and futures.

Cash Equity Trading Revenues

U.S. cash equity trading revenues are variable, based on individual customer share volumes, and recognized as transactions occur. We charge transaction fees for executing cash equity trades in Nasdaq-listed and other listed securities on our U.S. cash equity exchanges, as well as on orders that are routed to and executed on other market venues for execution. Similar to U.S. equity derivative trading and clearing, we record cash equity trading revenues from transactions on a gross basis as revenues and record related expenses as transaction-based expenses, as we have certain risk associated with trade execution. For further discussion see "Equity Derivative Trading and Clearing and Cash Equity Trading Transaction-Based Expenses" below.

In our European cash equity markets, we charge transaction fees for executing trades on the exchanges that comprise Nasdaq Nordic and Nasdaq Baltic. These transaction fees are charged per executed order and as per value traded.

Equity Derivative Trading and Clearing and Cash Equity Trading Transaction-Based Expenses

For U.S. equity derivative trading, we credit a portion of the per share execution charge to the market participant that provides the liquidity. For U.S. cash equity trading, for Nasdaq and Nasdaq PSX, we credit a portion of the per share execution charge to the market participant that provides the liquidity and for Nasdaq BX, we credit a portion of the per share execution charge to the market participant that takes the liquidity. We

record these credits as transaction rebates that are included in transaction-based expense in the Consolidated Statements of Income. These transaction rebates are paid on a monthly basis and the amounts due are included in accounts payable and accrued expenses in the Consolidated Balance Sheets.

In the U.S., we pay Section 31 fees to the SEC for supervision and regulation of securities markets. We pass these costs along to our customers through our equity derivative trading and clearing fees and our cash equity trading fees. We collect the fees as a pass-through charge from organizations executing eligible trades on our options exchanges and our cash equity platforms and we recognize these amounts in transaction-based expenses when incurred. Section 31 fees received are included in cash and cash equivalents in the Consolidated Balance Sheets at the time of receipt and, as required by law, the amount due to the SEC is remitted semiannually and recorded as Section 31 fees payable to the SEC in the Consolidated Balance Sheets until paid. Since the amount recorded as revenues is equal to the amount recorded as transaction-based expenses, there is no impact on our revenues less transaction-based expenses. As we hold the cash received until payment to the SEC, we earn interest income on the related cash balances.

Under our Limitation of Liability Rule and procedures, we may, subject to certain caps, provide compensation for losses directly resulting from the systems' actual failure to correctly process an order, quote, message or other data into our platform. We do not record a liability for any potential claims that may be submitted under the Limitation of Liability Rule unless they meet the provisions required in accordance with U.S. GAAP. As such, losses arising as a result of the rule are accrued and charged to expense only if the loss is probable and estimable.

The exchanges that comprise Nasdaq Nordic and Nasdaq Baltic do not have any revenue sharing agreements or transaction-based expenses, such as transaction rebates and brokerage, clearance and exchange fees.

FICC Revenues

Fixed income trading revenues are primarily earned from trading of U.S. Treasury securities and other fixed income products. Customer contracts may be on a fixed or variable rate basis. Revenues from customer contracts with a fixed rate basis are recognized ratably over the contract period. Revenues from customer contracts with a variable rate basis are based upon individual customer share volume and are recognized as revenues as the transaction occurs. Commodities trading and clearing revenues are primarily earned from trading and clearing of energy, emission allowance, freight, seafood and other commodity products. Trading and clearing revenues are based on the volume and value of traded and cleared contracts, and recognized when executed or when contracts are cleared. In addition, Nasdaq Commodities members are billed an annual fee which is recognized ratably over the following 12-month period.

We also generate clearing revenues for OTC traded derivatives, interest rate swaps, and resale and repurchase agreements. These clearing revenues are based on the value and length of the contract and are recognized when cleared. In connection with our collateral management process in our Nasdaq Clearing operations, we recognize interest income on cash contributions that we manage when earned.

Trade Management Services Revenues

Access Services

We generate revenues by providing market participants with several alternatives for connecting to and accessing our markets for a fee. The type of connectivity is determined by the level of functionality a customer needs. As a result, access services revenues vary depending on the type of connection provided to customers. We provide co-location services to market participants, whereby firms may lease cabinet space and power to house their own equipment and servers within our data centers. These participants are charged monthly fees for cabinet space, connectivity and support. Additionally, we offer a number of wireless connectivity routes between select data centers using millimeter wave and microwave technology. We also earn revenues from annual and monthly exchange membership and registration fees. Revenues for providing access to our markets, co-location services and monthly exchange membership and registration fees are recognized on a monthly basis as the service is provided. Revenues from annual fees for exchange membership and registration fees are recognized ratably over the following 12-month period.

Broker Services

Our broker services operations offer technology and customized securities administration solutions to financial participants in the Nordic market. The primary services offered are flexible back-office systems, which allow customers to entirely or partly outsource their company's back-office functions. Revenues from broker services are based on a fixed basic fee for administration or licensing, maintenance and operations, and a variable portion that depends on the number of transactions completed. Broker services revenues are recognized on a continuous basis as services are rendered.

Corporate Services Revenues

Corporate services revenues include corporate solutions revenues and listing services revenues.

Corporate Solutions Revenues

Corporate solutions revenues primarily include subscription and transaction-based income from our investor relations, board & leadership, public relations solutions, and digital media services products. Subscription-based revenues earned are recognized ratably over the contract period, generally one to two years in length. As part of the subscription agreements, customers can also be charged usage fees based upon actual usage of the services provided. Revenues from usage fees and other services are recognized when earned. Revenues from transaction-based services, such as webcasting and wire distribution, are recorded as the services are provided and delivered.

Listing Services Revenues

Listing services revenues primarily include annual renewal fees, initial listing fees and listing of additional shares fees.

Annual Renewal Fees

In the U.S., annual renewal fees are charged based on the number of outstanding shares of companies listed in the U.S. at the end of the prior year and are recognized ratably over the following 12-month period. European annual renewal fees, which are received from companies listed on our Nasdaq Nordic and Nasdaq Baltic exchanges and Nasdaq First North, are directly related to the listed companies' market capitalization on a trailing 12-month basis.

Initial Listing Fees

Initial listing fees are generally based on the number of shares that a company initially lists and are recognized on a straight-line basis over estimated service periods of six years, based on our historical listing experience and projected future listing duration.

Listing of Additional Shares Fees

Listing of additional shares fees are paid by listed companies in connection with corporate actions involving the issuance of new shares to be listed, such as stock splits and sales of additional securities. These fees are recognized on a straight-line basis over estimated service periods of four years, based on our historical listing experience and projected future listing duration.

Listing of additional share fees have been phased out effective January 2018 as a result of our all-inclusive annual listing fee program for our U.S. markets. See "All-Inclusive Annual Listing Fee Program" below for further discussion.

All-Inclusive Annual Listing Fee Program

Nasdaq announced an all-inclusive annual listing fee program for companies listed in the U.S. which became effective in 2015. Under this program, listed companies pay an annual fee which includes all listing-related activities, including listing of additional shares. All listed companies are subject to the all-inclusive program effective January 2018. These revenues are recognized ratably over the following 12-month period.

Revenue recognition for our Listing Services business was impacted due to the adoption of ASU 2014-09, "Revenue from Contracts with Customers." See "Recent Accounting Pronouncements," of Note 2, "Summary of Significant Accounting Policies," for further discussion.

Information Services Revenues

Information services revenues include data products revenues and index licensing and services revenues.

Data Products Revenues

Data products revenues are earned from U.S. and European proprietary data products and index data products. In the U.S., we also earn revenues from U.S. tape plans.

We collect, process and create information from our exchanges and earn revenues as a distributor of our own data, as well as select, third-party content. We provide varying levels of quote and trade information to our customers, who in turn sell subscriptions for this information. In 2017, we expanded our offering through the acquisition of eVestment, a leading data and analytics provider to the asset management industry. We earn revenues primarily based on the number of data subscribers and distributors of our data. Data products revenues are subscription-based and are recognized on a monthly basis net of amounts due under revenue sharing arrangements with market participants.

We also generate revenues from our Nasdaq indexes that consist of Global Index Data Services, which delivers real-time index values throughout the trading day, and Global Index Watch/Global Index File Delivery Service, which delivers weightings and components data, corporate actions and a breadth of additional data. We earn revenues primarily based on the number of data subscribers and distributors of our data. These revenues, which are subscription based, are recognized on a monthly basis.

Revenues from U.S. tape plans include eligible UTP Plan revenues that are shared among UTP Plan participants and are presented on a net basis. The Nasdaq Stock Market acts as the processor and administrator for the UTP Plan. The UTP Plan administrator sells quotation and last sale information for all transactions in Nasdaq-listed securities, whether traded on The Nasdaq Stock Market or other exchanges, to market participants and to data distributors, who then provide the information to subscribers. After deducting costs, as permitted under the revenue sharing provision of the UTP Plan, the UTP Plan administrator distributes the tape revenues to the respective UTP Plan participants, including The Nasdaq Stock Market, Nasdaq BX and Nasdaq PSX, based on a formula required by Regulation NMS that takes into account both trading and quoting activity. In addition, much like Nasdaq-listed securities, all quotes and trades in NYSE- and NYSE American-listed securities are reported and disseminated in real-time, and as such, we share in the tape revenues for information on NYSE- and NYSE American-listed securities. Revenues from net U.S. tape plans are recognized on a monthly basis.

Data Products Revenue Sharing

The most significant component of data products revenues recorded on a net basis is the UTP Plan revenue sharing in the U.S. All indicators of gross versus net reporting under U.S. GAAP have been considered in analyzing the appropriate presentation of UTP Plan revenue sharing. However, the following are the primary indicators of net reporting:

- Primary Obligor: We are the administrator for the UTP Plan, in addition to being a participant in the UTP Plan. In

our unique role as administrator, we facilitate the collection and dissemination of revenues on behalf of the UTP Plan participants. As a participant, we share in the net distribution of revenues according to the plan on the same terms as all other plan participants.

- Risk of Loss/Credit Risk: Risk of loss on the revenue is shared equally among plan participants according to the UTP Plan.
- Price Latitude: The operating committee of the UTP Plan, which is comprised of representatives from each of the participants, including us solely in our capacity as a UTP Plan participant, is responsible for setting the level of fees to be paid by distributors and subscribers and taking action in accordance with the provisions of the UTP Plan, subject to SEC approval.

The exchanges that comprise Nasdaq Nordic and Nasdaq Baltic do not have any data products revenue sharing agreements.

Index Licensing and Services Revenues

We develop and license Nasdaq branded indexes, associated derivatives and financial products as part of our Global Index Family. We also provide custom calculation services for third-party clients. Revenues primarily include license fees from these branded indexes, associated derivatives and financial products in the U.S. and abroad. We primarily have two types of license agreements: transaction-based licenses and asset-based licenses. Transaction-based licenses are generally renewable long-term agreements. Customers are charged based on transaction volume or a minimum contract amount, or both. If a customer is charged based on transaction volume, we recognize revenue when the transaction occurs. If a customer is charged based on a minimum contract amount, we recognize revenue on a pro-rata basis over the licensing term. Asset-based licenses are also generally long-term agreements. Customers are charged based on a percentage of assets under management for licensed products, per the agreement, on a monthly or quarterly basis. These revenues are recognized over the term of the license agreement.

Market Technology Revenues

Market Technology provides technology solutions for trading, clearing, settlement, surveillance and information dissemination, as well as enterprise governance, risk management and compliance software solutions. Revenues primarily consist of software, license and support revenues, change request and advisory revenues, and software as a service revenues.

For most solutions, we enter into multiple-element sales arrangements to develop technology solutions, license the right to use software, and provide post-contract support and other services to our customers. In order to recognize revenues associated with each individual element of a multiple-element sales arrangement separately, we are required to establish the existence of VSOE of fair value for each element. When VSOE for individual elements of an arrangement cannot be established, revenue is generally deferred and recognized over either the final element of the arrangement or the entire term of the arrangement for which the services will be delivered.

We enter into agreements to modify the system solutions sold by Nasdaq after delivery has occurred. These revenues are recognized when earned.

In addition, we enter into revolving subscription agreements which allow customers to connect to our servers to access certain services. These revenues are recognized ratably over the subscription term.

Revenue recognition for our Market Technology business was impacted due to the adoption of ASU 2014-09, “Revenue from Contracts with Customers.” See “Recent Accounting Pronouncements,” of Note 2, “Summary of Significant Accounting Policies,” for further discussion.

Earnings Per Share

We present both basic and diluted earnings per share. Basic earnings per share is computed by dividing net income attributable to Nasdaq by the weighted-average number of common shares outstanding for the period. Diluted earnings per share is computed by dividing net income attributable to Nasdaq by the weighted-average number of common shares and common share equivalents outstanding during the period and reflects the assumed conversion of all dilutive securities, which primarily consist of employee stock options, restricted stock, and PSUs. Common share equivalents are excluded from the computation in periods for which they have an anti-dilutive effect. Stock options for which the exercise price exceeds the average market price over the period are anti-dilutive and, accordingly, are excluded from the calculation. See Note 15, “Earnings Per Share,” for further discussion.

Pension and Post-Retirement Benefits

Pension and other post-retirement benefit plan information for financial reporting purposes is developed using actuarial valuations. We assess our pension and other post-retirement benefit plan assumptions on a regular basis. In evaluating these assumptions, we consider many factors, including evaluation of the discount rate, expected rate of return on plan assets, mortality rate, healthcare cost trend rate, retirement age assumption, our historical assumptions compared with actual results and analysis of current market conditions and asset allocations. See Note 12, “Retirement Plans,” for further discussion.

Discount rates used for pension and other post-retirement benefit plan calculations are evaluated annually and modified to reflect the prevailing market rates at the measurement date of a high-quality fixed-income debt instrument portfolio that would provide the future cash flows needed to pay the benefits included in the benefit obligations as they come due. Actuarial assumptions are based upon management’s best estimates and judgment.

The expected rate of return on plan assets for our U.S. pension plans represents our long-term assessment of return expectations which may change based on significant shifts in economic and financial market conditions. The long-term rate

of return on plan assets is derived from return assumptions based on targeted allocations for various asset classes. While we consider the pension plans' recent performance and other economic growth and inflation factors, which are supported by long-term historical data, the return expectations for the targeted asset categories represent a long-term prospective return.

Share-Based Compensation

Nasdaq uses the fair value method of accounting for share-based awards. Share-based awards, or equity awards, include stock options, restricted stock, and PSUs. The fair value of stock options are estimated using the Black-Scholes option-pricing model. The fair value of restricted stock awards and PSUs, other than PSUs granted with market conditions, is determined based on the grant date closing stock price less the present value of future cash dividends. We estimate the fair value of PSUs granted with market conditions using a Monte Carlo simulation model at the date of grant.

We generally recognize compensation expense for equity awards on a straight-line basis over the requisite service period of the award, taking into account an estimated forfeiture rate.

Excess tax benefits or expense related to employee share-based payments, if any, are recognized as income tax benefit or expense in the Consolidated Statements of Income when the awards vest or are settled.

Nasdaq also has an ESPP that allows eligible employees to purchase a limited number of shares of our common stock at six-month intervals, called offering periods, at 85.0% of the lower of the fair market value on the first or the last day of each offering period. The 15.0% discount given to our employees is included in compensation and benefits expense in the Consolidated Statements of Income.

See Note 13, "Share-Based Compensation," for further discussion of our share-based compensation plans.

Leases

We expense rent from non-cancellable operating leases, net of sublease income, on a straight line basis, based on future minimum lease payments. The net costs are included in occupancy expense in the Consolidated Statements of Income. See Note 18, "Leases," for further discussion.

Fair Value Measurements

Fair value is defined as the price that would be received from selling an asset or paid to transfer a liability, or the exit price, in an orderly transaction between market participants at the measurement date. When determining the fair value measurements for assets and liabilities required or permitted to be either recorded or disclosed at fair value, we consider the principal or most advantageous market in which we would transact, and we also consider assumptions that market participants would use when pricing the asset or liability. Fair value measurement establishes a hierarchy of valuation techniques based on whether the inputs to those valuation techniques are observable or unobservable. Observable inputs reflect market data obtained from independent sources, while unobservable inputs reflect Nasdaq's market assumptions. These two types of inputs create the following fair value hierarchy:

- Level 1—Quoted prices for identical instruments in active markets.
- Level 2—Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations whose inputs are observable or whose significant value drivers are observable.
- Level 3—Instruments whose significant value drivers are unobservable.

This hierarchy requires the use of observable market data when available.

See Note 16, "Fair Value of Financial Instruments," for further discussion.

Tax Matters

We use the asset and liability method to determine income taxes on all transactions recorded in the consolidated financial statements. Deferred tax assets and liabilities are determined based on differences between the financial statement carrying amounts and the tax basis of existing assets and liabilities (i.e., temporary differences) and are measured at the enacted rates that will be in effect when these differences are realized. If necessary, a valuation allowance is established to reduce deferred tax assets to the amount that is more likely than not to be realized.

In order to recognize and measure our unrecognized tax benefits, management determines whether a tax position is more likely than not to be sustained upon examination, including resolution of any related appeals or litigation processes, based on the technical merits of the position. Once it is determined that a position meets the recognition thresholds, the position is measured to determine the amount of benefit to be recognized in the consolidated financial statements. Interest and/or penalties related to income tax matters are recognized in income tax expense.

The Tax Cuts and Jobs Act was enacted on December 22, 2017. We are required to recognize the effect of the tax law changes in the period of enactment, such as remeasuring our U.S. deferred tax assets and liabilities, reassessing the net realizability of deferred tax assets and liabilities, and determining the applicability of the one-time mandatory transition tax on accumulated foreign earnings. SAB 118 has provided guidance which allows us to record provisional amounts during a measurement period not to extend beyond one year of the enactment date. As of December 31, 2017, we have recorded a provisional estimate of the effects of the new legislation. We will continue to analyze the Tax Cuts and Jobs Act and related accounting guidance and interpretations in order to finalize any impacts within the measurement period.

See Note 11, "Income Taxes," for further discussion.

Recent Accounting Pronouncements

Accounting Standard	Description	Effective Date	Effect on the Financial Statements or Other Significant Matters
Compensation - Stock Compensation In March 2016, the FASB issued ASU 2016-09, "Improvements to Employee Share-Based Payment Accounting."	This ASU involves several aspects of the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. This guidance requires all income tax effects of awards to be recognized as income tax expense or benefit in the income statement when the awards vest or are settled, as opposed to additional paid-in-capital where it was previously recorded. This guidance impacts the calculation of our total diluted share count for the earnings per share calculation, as calculated under the treasury stock method. It also allows an employer to repurchase more of an employee's shares for tax withholding purposes without triggering liability accounting. All tax-related cash flows resulting from share-based payments are reported as operating activities on the statement of cash flows. In regards to forfeitures, a policy election is required to either estimate the number of awards that are expected to vest or account for forfeitures as they occur.	We adopted this standard on January 1, 2017 on a prospective basis for the impacts on the accounting for income taxes and the effect on earnings per share. We adopted the changes for the cash flow statement classification retrospectively.	The adoption resulted in the recognition of excess tax benefits in our provision for income taxes rather than additional paid-in capital of $40 million for the year ended December 31, 2017.
Compensation - Stock Compensation In May 2017, the FASB issued ASU 2017-09, "Scope of Modification Accounting."	This ASU clarifies when changes to the terms or conditions of a share-based payment award must be accounted for as modifications. Under the new guidance, modification accounting is required only if the fair value, the vesting conditions, or the classification of the award (as equity or liability) change as a result of the change in terms or conditions.	We adopted this standard on June 30, 2017 on a prospective basis.	Adopting this standard had no impact on our consolidated financial statements. The future impact will depend on the extent and nature of future changes to the terms of our share-based payment awards. Historically, we have not had significant changes to our share-based payment awards and therefore do not expect adoption of this guidance to have a material impact on our consolidated financial statements.
Business Combination In January 2017, the FASB issued ASU 2017-01, "Clarifying the Definition of a Business."	This ASU clarifies the definition of a business with the objective of adding guidance to assist companies with evaluating whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. The new guidance is expected to reduce the number of transactions that need to be further evaluated as businesses. Early adoption is permitted for certain types of transactions .	We adopted this standard on January 1, 2018 on a prospective basis.	None. However, this standard may impact how we account for future acquisitions.

Accounting Standard	Description	Effective Date	Effect on the Financial Statements or Other Significant Matters
Goodwill In January 2017, the FASB issued ASU 2017-04, "Simplifying the Test for Goodwill Impairment."	This ASU simplifies how an entity is required to test goodwill for impairment and removes the second step of the goodwill impairment test, which required a hypothetical purchase price allocation if the fair value of a reporting unit is less than its carrying amount. Goodwill impairment will now be measured using the difference between the carrying amount and the fair value of the reporting unit and the loss recognized should not exceed the total amount of goodwill allocated to that reporting unit. The amendments in this ASU should be applied on a prospective basis. Early adoption is permitted for interim or annual goodwill impairment tests performed on testing dates after January 1, 2017.	January 1, 2020, with early adoption as of January 1, 2017 permitted .	We do not anticipate a material impact on our consolidated financial statements at the time of adoption of this new standard as the carrying amounts of our reporting units have been less than their corresponding fair values in recent years. Therefore, the second step of the goodwill impairment test was not required. However, changes in future projections, market conditions and other factors may cause a change in the excess of fair value of our reporting units over their corresponding carrying amounts. We do not anticipate early adoption of this standard.
Financial Instruments - Credit Losses In June 2016, the FASB issued ASU 2016-13, "Measurement of Credit Losses on Financial Instruments."	This ASU changes the impairment model for certain financial instruments. The new model is a forward looking expected loss model and will apply to financial assets subject to credit losses and measured at amortized cost and certain off-balance sheet credit exposures. This includes loans, held-to-maturity debt securities, loan commitments, financial guarantees and net investments in leases, as well as trade receivables. For available-for-sale debt securities with unrealized losses, credit losses will be measured in a manner similar to today, except that the losses will be recognized as allowances rather than reductions in the amortized cost of the securities.	January 1, 2020, with early adoption permitted as of January 1, 2019.	We are currently assessing the impact that this standard will have on our consolidated financial statements. We do not anticipate early adoption of this standard.

Accounting Standard	Description	Effective Date	Effect on the Financial Statements or Other Significant Matters
Leases In February 2016, the FASB issued ASU 2016-02, "Leases."	Under this ASU, at the commencement date, lessees will be required to recognize a lease liability, which is a lessee's obligation to make lease payments arising from a lease, measured on a discounted basis; and a right-of-use asset, which is an asset that represents the lessee's right to use, or control the use of, a specified asset for the lease term. This guidance is not applicable for leases with a term of 12 months or less. Lessor accounting is largely unchanged.	January 1, 2019, with early adoption permitted.	When adopted, ASU 2016-02 will result in an increase in the assets and liabilities reflected on our consolidated balance sheets. In addition, we will be required to disclose key information about our leases. We are currently assessing the significance that this standard will have on our consolidated financial statements. We do not anticipate early adoption of this standard.
Financial Instruments - Overall In January 2016, the FASB issued ASU 2016-01, "Recognition and Measurement of Financial Assets and Financial Liabilities."	This ASU requires that most equity investments be measured at fair value, with subsequent changes in fair value recognized in net income. Under this new guidance, Nasdaq will no longer be able to recognize unrealized holding gains and losses on equity securities classified today as available-for-sale in accumulated other comprehensive income within stockholders' equity. For certain equity investments that do not have readily determinable fair values, there is a new measurement alternative where those investments are measured at cost, less any impairment, plus or minus changes resulting from observable price changes in orderly transactions for the identical or a similar investment of the same issuer. This new standard does not change the guidance for classifying and measuring investments in debt securities and loans. This new guidance also impacts financial liabilities accounted for under the fair value option and affects the presentation and disclosure requirements for financial assets and liabilities.	We adopted this standard on January 1, 2018 on a prospective basis.	Since we do not have a significant investment in financial instruments impacted by this standard at the time of adoption, there was no material impact on our consolidated financial statements. We have elected the measurement alternative for equity investments which were historically accounted for under the cost method of accounting. This could result in volatility in earnings.

Accounting Standard	Description	Effective Date	Effect on the Financial Statements or Other Significant Matters
Income Statement - Reporting Comprehensive Income In February 2018, the FASB issued ASU 2018-02, "Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income."	This ASU provides an election to reclassify tax effects that are stranded in accumulated other comprehensive income as a result of tax reform to retained earnings. An election is also available to reclassify other stranded tax effects that relate to the Tax Cuts and Jobs Act but do not directly relate to the change in the federal rate. Tax effects that are stranded in accumulated other comprehensive income for other reasons (e.g., prior changes in tax law, a change in valuation allowance) may not be reclassified. Previously, the effects of changes in tax rates and laws on deferred tax balances were required to be recorded as a component of tax expense related to continuing operations for the period in which the law was enacted, even if the assets and liabilities related to items of accumulated other comprehensive income. In other words, backward tracing of the income tax effects of items originally recognized through accumulated other comprehensive income was prohibited.	January 1, 2019, with early adoption permitted.	We are currently assessing the impact that this standard will have on our consolidated financial statements.
Revenue From Contracts With Customers In May 2014, the FASB issued ASU 2014-09, "Revenue from Contracts with Customers (Topic 606)," which supersedes the revenue recognition guidance in Accounting Standards Codification, "Revenue Recognition."	The new revenue recognition standard sets forth a five-step revenue recognition model to determine when and how revenue is recognized. The core principle of the guidance is that an entity should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration it expects to receive in exchange for those goods or services. The standard also requires more detailed disclosures. The standard provides alternative methods of initial adoption.	We adopted this standard on January 1, 2018 using the full retrospective method.	See discussion below.

Revenue From Contracts With Customers

Revenue and expense recognition for our Market Technology business and revenue recognition for our Listing Services business were impacted due to the adoption of Topic 606; however, the impact on our consolidated financial statements at the time of adoption was not material. There was no impact to revenue and expense recognition for our other businesses.

Market Technology. In our Market Technology business, we enter into contracts with customers to develop technology solutions, license the right to use software, and provide post-contract support and other services to our customers. Under accounting
policies prior to the adoption of Topic 606, we did not recognize revenue or expense until we began the final stage of the contract as we are not able to establish VSOE for individual elements of the contract. Under Topic 606, we no longer defer recognition of revenue and expense until the final stage of the contract. For each of our contracts, we have identified multiple performance obligations, allocated the transaction price to these obligations and are recognizing revenue for each of these obligations as they are satisfied. Expenses are no longer deferred, with the exception of certain commission expense, but are recognized as incurred. Since revenue and expense are recognized in earlier stages of the contract, the balance sheet accounts for deferred revenue and costs have declined upon adoption of Topic 606. Due to the complexity of certain contracts, the revenue recognition treatment under Topic 606 is dependent on contract-specific terms and may vary in some instances.

Listing Services. Under accounting policies prior to the adoption of Topic 606, amounts received for initial listing fees and listing of additional shares fees were generally deferred and revenue was recognized over estimated service periods of six and four years, respectively. Under Topic 606, we have identified the performance obligations associated with these services and are recording revenue upon satisfaction of each performance obligation. Under Topic 606, we recognize initial listing fees over a shorter period on average than the prior estimated service period. Since we recognize revenues earlier under Topic 606, the balance sheet account for deferred revenue has declined upon adoption.

The following are key items to note regarding the accounting for our Market Technology and Listing Services businesses under Topic 606:

- revenue recognition for existing and new contracts is recognized in earlier stages under the new standard;

- expense recognition for Market Technology contracts is recognized in earlier stages under the new standard;
- a portion of revenues and expenses that were previously deferred were recognized either in prior period revenues, through restatement, or as an adjustment to retained earnings upon adoption of the new standard; and
- the overall value of our contracts and the timing of cash flows from customers did not change.

The following tables present the expected effect of the adoption of Topic 606 on our Consolidated Statements of Income for the years ended December 31, 2017 and 2016:

	Year Ended December 31, 2017			Year Ended December 31, 2016		
	As Reported	Adjustment to Reflect Adoption of Topic 606	As Adjusted	As Reported	Adjustment to Reflect Adoption of Topic 606	As Adjusted
	(in millions)			(in millions)		
Revenues less transaction-based expenses:						
Market Services	$ 881	$ —	$ 881	$ 827	$ —	$ 827
Corporate Services	656	(3)	653	635	(3)	632
Information Services	588	—	588	540	—	540
Market Technology	303	(14)	289	275	2	277
Total revenues less transaction-based expenses	2,428	(17)	2,411	2,277	(1)	2,276
Total operating expenses [1]	1,429	(9)	1,420	1,438	2	1,440
Income before income taxes	880	(8)	872	136	(3)	133
Income tax provision (benefit)	146	(3)	143	28	(1)	27
Net income attributable to Nasdaq	$ 734	$ (5)	$ 729	$ 108	$ (2)	$ 106
Diluted earnings per share	$ 4.33	$ (0.03)	$ 4.30	$ 0.64	$ (0.01)	$ 0.63

[1] Adjustment to reflect the adoption of Topic 606 for the year ended December 31, 2017 and 2016 primarily pertains to our Market Technology business.

As of January 1, 2016, as the result of the adoption of Topic 606, the impact to retained earnings was immaterial. The following table presents the effect of the adoption on our Consolidated Balance Sheets as of December 31, 2017 and 2016:

	December 31, 2017			December 31, 2016		
	As Reported	Adjustment to Reflect Adoption of Topic 606	As Adjusted	As Reported	Adjustment to Reflect Adoption of Topic 606	As Adjusted
	(in millions)			(in millions)		
Assets:						
Other current assets	$ 187	$ (19)	$ 168	$ 167	$ (15)	$ 152
Other non-current assets	412	(38)	374	390	(46)	344
Deferred tax assets	391	2	393	717	(1)	716
Total assets	$ 15,786	$ (55)	$ 15,731	$ 14,150	$ (62)	$ 14,088
Liabilities:						
Deferred revenue	$ 189	$ (28)	$ 161	$ 162	$ (24)	$ 138
Non-current deferred revenue	146	(20)	126	171	(36)	135
Total liabilities	$ 9,899	$ (48)	$ 9,851	$ 8,720	$ (60)	$ 8,660
Nasdaq stockholders' equity:						
Retained earnings	$ 3,970	$ (7)	$ 3,963	$ 3,479	$ (2)	$ 3,477
Total Nasdaq stockholders' equity	5,887	(7)	5,880	5,430	(2)	5,428
Total liabilities and equity	$ 15,786	$ (55)	$ 15,731	$ 14,150	$ (62)	$ 14,088

3. Restructuring Charges

2015 Restructuring Plan

During the first quarter of 2015, we performed a comprehensive review of our processes, businesses and systems in a company-wide effort to improve performance, cut costs, and reduce spending. In June 2016, we completed our 2015 restructuring plan and recognized total net pre-tax charges of $213 million for the period March 2015 through June 2016.

The following table presents a summary of restructuring plan charges in the Consolidated Statements of Income:

	Year Ended December 31,	
	2016	2015
	(in millions)	
Rebranding of trade name	$ —	$ 119
Severance	22	25
Facilities-related	1	—
Asset impairments	8	18
Other	10	10
Total restructuring charges	$ 41	$ 172

For the year ended December 31, 2016 , we recognized restructuring charges totaling $41 million , including severance costs of $22 million related to workforce reductions of 201 positions across our organization, $8 million for asset impairments, primarily related to fixed assets and capitalized software that were retired, and $10 million of other charges. For the year ended December 31, 2015, we recorded restructuring charges totaling $172 million , including rebranding of our trade name of $119 million , severance costs of $25 million related to workforce reductions of 230 positions across our organization, $18 million for asset impairments, primarily related to fixed assets and capitalized software that were retired, and $10 million of other charges.

Restructuring Reserve

Severance

As of December 31, 2016 , an accrued severance balance of $17 million was included in other current liabilities in the Consolidated Balance Sheets and was paid during 2017.

* * * * * *

4. Acquisitions

We completed the following acquisitions in 2017, 2016 and 2015 . Financial results of each transaction are included in our Consolidated Statements of Income from the date of each acquisition.

2017 Acquisitions

	Purchase Consideration	Total Net Liabilities Acquired	Total Net Deferred Tax Liability	Acquired Intangible Assets	Goodwill
			(in millions)		
eVestment	$ 744	$ (10)	$ (104)	$ 405	$ 453

The amounts in the table above represent the preliminary allocation of purchase price as of December 31, 2017 and are subject to revision during the remainder of the measurement period, a period not to exceed 12 months from the acquisition date. Adjustments to the provisional values, which may include tax and other estimates, during the measurement period will be recorded in the reporting period in which the adjustment amounts are determined. Changes to amounts recorded as assets and liabilities may result in a corresponding adjustment to goodwill.

See “Intangible Assets” below for further discussion of intangible assets acquired in the eVestment acquisition.

Acquisition of eVestment

In October 2017, we acquired eVestment for $705 million . The aggregate cash consideration of $744 million , which is net of cash acquired of $22 million , included $39 million of estimated tax benefits associated with the transaction. We acquired net liabilities, at fair value, totaling $10 million and we recorded a net deferred tax liability of $104 million , which is net of the $39 million in estimated tax benefits associated with the transaction. The deferred tax liability recorded of $143 million relates to differences in the U.S. GAAP and tax basis of our investment in eVestment. eVestment is part of our Information Services segment.

Nasdaq used cash on hand and issuances of commercial paper to fund this acquisition.

Acquisition of Sybenetix

In September 2017, we acquired Sybenetix for an immaterial amount. Sybenetix is part of our Market Technology segment.

2016 Acquisitions

	Purchase Consideration	Total Net Assets (Liabilities) Acquired	Total Net Deferred Tax Liability	Acquired Intangible Assets	Goodwill
			(in millions)		
ISE	$ 1,070	$ 83	$ (185)	$ 623	$ 549
Boardvantage	242	28	(38)	111	141
Marketwired	111	(1)	(5)	31	86
Nasdaq Canada	116	6	(20)	76	54

The amounts in the table above represent the final allocation of purchase price for each acquisition. The allocations of the purchase price were subject to revision during the measurement period, a period not to exceed 12 months from the acquisition date. Adjustments to the provisional values, which may include tax and other estimates, during the measurement period are recorded in the reporting period in which the adjustment amounts are determined. We finalized the allocation of the purchase price for Marketwired and Nasdaq Canada in February 2017. In the second quarter of 2017, we finalized the allocation of the purchase price for Boardvantage and ISE. There were no adjustments to the provisional values during the 12-month measurement period for Nasdaq Canada and ISE. In the second quarter of 2016, we recorded a measurement period adjustment of $5 million related to our acquisition of Marketwired which is discussed below under "Acquisition of Marketwired." In the second quarter of 2017, we recorded a measurement period adjustment of $7 million related to our acquisition of Boardvantage which is discussed below under "Acquisition of Boardvantage."

See "Intangible Assets" below for further discussion of intangible assets acquired through our 2016 acquisitions.

Acquisition of ISE

In June 2016, we acquired ISE for $1,070 million . We acquired net assets, at fair value, totaling $83 million and recorded a net deferred tax liability of $185 million , comprised of a deferred tax liability of $266 million and a deferred tax asset of $81 million , related to differences in the U.S. GAAP and tax basis of our investment in ISE. ISE is part of our Market Services, Information Services and Market Technology segments.

In May 2016, we issued the 2023 Notes and in June 2016, we issued the 2026 Notes to fund this acquisition. See "1.75% Senior Unsecured Notes," and "3.85% Senior Unsecured Notes," of Note 10, "Debt Obligations," for further discussion.

Acquisition of Boardvantage

In May 2016, we acquired Boardvantage for $242 million ($197 million in cash paid plus $45 million in working capital adjustments, which primarily includes cash acquired). We acquired net assets, at fair value, totaling $28 million and recorded a net deferred tax liability of $45 million , comprised of a deferred tax liability of $46 million and a deferred tax asset of $1 million , related to differences in the U.S. GAAP and tax basis of our investment in Boardvantage. In the second quarter of 2017, we recorded a measurement period adjustment of $7 million to the estimated fair value of deferred tax assets to reflect a revised assessment following the receipt of new information. The adjustment resulted in an increase to deferred tax assets recorded and a decrease to goodwill. The adjustment did not result in an impact to our Consolidated Statements of Income. Boardvantage is part of our Corporate Solutions business within our Corporate Services segment.

Nasdaq borrowed $197 million under the revolving credit commitment of a previous credit facility to fund this acquisition.

Acquisition of Marketwired

In February 2016, we acquired Marketwired for $111 million ($109 million in cash paid plus $2 million in working capital adjustments). We acquired net liabilities, at fair value, totaling $1 million and recorded a deferred tax liability of $10 million related to differences in the U.S. GAAP and tax basis of our investment in Marketwired. In the second quarter of 2016, we recorded a measurement period adjustment of $5 million to the estimated fair value of deferred tax liabilities to reflect a revised assessment following the receipt of new information. The adjustment resulted in a decrease to both deferred tax liabilities recorded and goodwill. The adjustment did not result in an impact to our Consolidated Statements of Income. Marketwired is part of our Corporate Solutions business within our Corporate Services segment.

Nasdaq borrowed $109 million under the revolving credit commitment of a previous credit facility to fund this acquisition.

Acquisition of Nasdaq Canada

In February 2016, we acquired Nasdaq Canada for $116 million ($115 million in cash paid plus $1 million in working capital adjustments). We acquired net assets, at fair value, totaling $6 million and recorded a deferred tax liability of $20 million related to differences in the U.S. GAAP and tax basis of our investment in Nasdaq Canada. Nasdaq Canada is part of our Market Services segment and our Data Products business within our Information Services segment.

Nasdaq used cash on hand and borrowed $55 million under the revolving credit commitment of a previous credit facility to fund this acquisition.

2015 Acquisitions

	Purchase Consideration	Total Net Assets Acquired	Total Net Deferred Tax Liability	Acquired Intangible Assets	Goodwill
			(in millions)		
DWA	$ 226	$ 8	$ (34)	$ 141	$ 111

We finalized the allocation of the purchase price for DWA in January 2016. There were no adjustments to the provisional values for this acquisition during the 12-month measurement period.

See “Intangible Assets” below for further discussion of intangible assets acquired in the DWA acquisition.

Acquisition of DWA

In January 2015, we completed the acquisition of DWA for $226 million ($225 million cash paid plus $1 million in working capital adjustments). We acquired net assets, at fair value, totaling $8 million and recorded a deferred tax liability of $34 million related to differences in the U.S. GAAP and tax basis of our investment in DWA. DWA is part of our Data Products and Index Licensing and Services businesses within our Information Services segment.

Nasdaq used cash on hand and borrowed $100 million under the revolving credit commitment of a previous credit facility to fund this acquisition.

Acquisition of Full Ownership of NPM and Acquisition of SecondMarket

In October 2015, we acquired full ownership of NPM following the acquisition of the minority stake that was previously held by a third party. In addition, through NPM, we acquired SecondMarket. The additional ownership interest in NPM and SecondMarket were purchased for an immaterial amount. NPM and SecondMarket are part of our Listing Services business within our Corporate Services segment.

* * * * * *

Intangible Assets

The following table presents the details of acquired intangible assets at the date of each acquisition. All acquired intangible assets with finite lives are amortized using the straight-line method.

	2017	2016				2015
	eVestment	ISE	Boardvantage	Marketwired	Nasdaq Canada	DWA
			($ in millions)			
Intangible Assets						
Exchange registrations	$ —	$ 467	$ —	$ —	$ —	$ —
Discount rate used	—	8.6%	—	—	—	—
Estimated average useful life	—	Indefinite	—	—	—	—
Customer relationships	$ 378	$ 148	$ 103	$ 29	$ 76	$ 29
Discount rate used	9.3%	9.1%	15.5%	16.4%	10.3%	17.5%
Estimated average useful life	14 years	13 years	14 years	6 years	17 years	15 years
Trade name	$ 13	$ 8	$ 2	$ 2	$ —	$ 108
Discount rate used	9.2%	8.6%	15.0%	15.8%	—	17.0%
Estimated average useful life	8 years	Indefinite	1 year	2 years	—	Indefinite
Technology	$ 14	$ —	$ 6	$ —	$ —	$ 4
Discount rate used	9.2%	—	15.5%	—	—	17.0%
Estimated average useful life	8 years	—	5 years	—	—	5 years
Total intangible assets	**$ 405**	**$ 623**	**$ 111**	**$ 31**	**$ 76**	**$ 141**

Exchange Registrations

As part of our acquisition of ISE we acquired exchange registrations. The exchange registrations represent licenses that provide ISE with the ability to operate its options exchanges.

Nasdaq views these intangible assets as a perpetual license to operate the exchanges so long as ISE meets its regulatory requirements. Nasdaq selected a variation of the income approach called the Greenfield Approach to value the exchange

registrations. The Greenfield Approach refers to a discounted cash flow analysis that assumes the buyer is building the exchange from a start-up business to a normalized level of operations as of the acquisition date. This discounted cash flow model considers the required resources and eventual returns from the build-out of operational exchanges and the acquisition of customers, once the exchange registrations are obtained. The advantage of this approach is that it reflects the actual expectations that will arise from an investment in the registrations and it directly values the registrations. The Greenfield Approach relies on assumptions regarding projected revenues, margins, capital expenditures, depreciation, and working capital during the two year pre-trade phase, the 10 year ramp-up period, as well as the terminal period.

In developing a discount rate for the exchange registrations, we estimated a weighted-average cost of capital for the overall business and we employed this rate when discounting the cash flows. The resulting discounted cash flows were then tax-effected at the applicable statutory rate.

Customer Relationships

As part of all of our 2017, 2016 and 2015 acquisitions, we acquired customer relationships. Customer relationships represent the non-contractual and contractual relationships with customers.

Methodology

For our acquisitions of eVestment, ISE, Boardvantage, Marketwired and Nasdaq Canada, customer relationships were valued using the income approach, specifically an excess earnings method. The excess earnings method examines the economic returns contributed by the identified tangible and intangible assets of a company, and then isolates the excess return that is attributable to the intangible asset being valued.

The DWA customer relationships were valued individually for each of DWA's businesses using the income approach, specifically the with-and-without method. The with-and-without method is commonly used when the cash flows of a business can be estimated with and without the asset in place. The premise associated with this valuation technique is that the value of an asset is represented by the differences in the subject business' cash flows under scenarios where (a) the asset is present and is used in operations (with); and (b) the asset is absent and not used in operations (without). Cash flow differentials are then discounted to present value to arrive at an estimate of fair value for the asset.

We estimated that without current customer relationships, it would take approximately 3 - 6 years, depending on the business, for the customer base to grow to 100.0% of current projected revenues. We also made estimates related to compensation levels and other expenses such as sales and marketing that would be incurred as the business was ramped up through the year in which the customer base would be expected to reach the level that currently exists.

Discount rate

The discount rates used reflect the amount of risk associated with the hypothetical cash flows for the customer relationships relative to the overall business. In developing a discount rate for the customer relationships, we estimated a weighted-average cost of capital for the overall business and we employed this rate when discounting the cash flows. The resulting discounted cash flows were then tax-effected at the applicable statutory rate.

For our acquisitions of eVestment, Marketwired, Nasdaq Canada, and DWA a discounted tax amortization benefit was added to the fair value of the assets under the assumption that the customer relationships would be amortized for tax purposes over a period of 15 years .

Estimated Useful Life

We estimate the useful life based on the historical behavior of the customers and a parallel analysis of the customers using the excess earnings method.

Trade Names

As part of our acquisitions of eVestment, ISE, and DWA, we acquired trade names. These trade names are recognized in their respective industries and carry a reputation for quality. As such, the reputation and positive recognition embodied in these trade names are valuable assets to Nasdaq.

eVestment and ISE Trade Names

The eVestment and ISE trade names were valued using the income approach, specifically the relief-from-royalty method, or RFRM. The RFRM is used to es timate the cost savings that accrue to the owner of an intangible asset who would otherwise have to pay royalties or license fees on revenues earned through the use of the asset. The royalty rate is applied to the projected revenue over the expected remaining life of the intangible asset to estimate royalty savings. The net after-tax royalty savings are calculated for each year in the remaining economic life of the trade name and discounted to present value.

The discount rates used reflect the amount of risk associated with the hypothetical cash flows for each trade name relative to the overall business as discussed above in "Customer Relationships."

We have estimated the useful life of the eVestment trade name to be 8 years and the estimated useful life of the ISE trade name to be indefinite based on the number of years the name has been in service, its popularity within the industry, and our intention to continue to use it in the branding of products.

DWA Trade Name

The DWA trade name was considered the primary asset acquired in the DWA transaction. In valuing the acquired trade name, we used the income approach, specifically the excess earnings method. The excess earnings method examines the economic returns contributed by the identified tangible and intangible assets of a company, and then isolates the excess return that is attributable to the intangible asset being valued.

The discount rate used reflects the amount of risk associated with the hypothetical cash flows generated by the DWA trade name in the future. In developing a discount rate for the trade name, we estimated a weighted average cost of capital for the overall business and we employed this rate when discounting the cash flows. The resulting discounted cash flows were then tax-effected at the applicable statutory rate, and a discounted tax amortization benefit was added to the fair value of the asset under the assumption that the trade name would be amortized for tax purposes over a period of 15 years.

We estimated the useful life of the trade name to be indefinite. The useful life was based on several factors including the number of years the name has been in service, its popularity within the industry, and our intention to continue its use in the branding of products.

Technology

As part of our acquisitions of eVestment, Boardvantage, and DWA, we acquired developed technology.

Methodology

The developed technologies were valued using the income approach, specifically the RFRM as discussed above in "Trade Names."

Discount rate

The discount rates used reflect the amount of risk associated with the hypothetical cash flows for each developed technology relative to the overall business as discussed above in "Customer Relationships."

Estimated Useful Life

We have estimated the useful life of the eVestment technology to be 8 years and the estimated useful life of the Boardvantage technology and DWA technology to be 5 years.

Pro Forma Results and Acquisition-related Costs

The consolidated financial statements for the years ended December 31, 2017 , 2016 and 2015 include the financial results of the above 2017 , 2016 and 2015 acquisitions from the date of each acquisition. Pro forma financial results for acquisitions completed in 2017 , 2016 and 2015 have not been presented since these acquisitions both individually and in the aggregate were not material to our financial results.

Acquisition-related costs for the transactions described above were expensed as incurred and are included in merger and strategic initiatives expense in the Consolidated Statements of Income.

5. Assets and Liabilities Held For Sale

We classify assets and liabilities as held for sale (disposal group) when management, having the authority to approve the action, commits to a plan to sell the disposal group, the sale is probable within one year, and the disposal group is available for immediate sale in its present condition. We also consider whether an active program to locate a buyer has been initiated, whether the disposal group is marketed actively for sale at a price that is reasonable in relation to its current fair value, and whether actions required to complete the plan indicate that it is unlikely that significant changes to the plan will be made or that the plan will be withdrawn. We initially measure a disposal group that is classified as held for sale at the lower of its carrying amount or fair value less costs to sell. Any loss resulting from this measurement is recognized in the period in which the held for sale criteria are met. Conversely, gains are not recognized until the date of sale. We assess the fair value of a disposal group less costs to sell each reporting period it remains classified as held for sale and report any subsequent changes as an adjustment to the carrying amount of the disposal group, as long as the new carrying amount does not exceed the carrying amount of the disposal group at the time it was initially classified as held for sale. Assets are not depreciated or amortized while they are classified as held for sale. Upon determining that a disposal group meets the criteria to be classified as held for sale, we report the assets and liabilities of the disposal group as assets held for sale and liabilities held for sale in our Consolidated Balance Sheets.

In September 2017, we commenced a process to evaluate strategic alternatives for our Public Relations Solutions and Digital Media Services businesses within our Corporate Solutions business as part of our strategic refinement. The Corporate Solutions business is part of our Corporate Services segment. The Public Relations Solutions and Digital Media Services businesses include the following products and services:

- Nasdaq GlobeNewswire;
- Nasdaq Influencers;
- Nasdaq Media Intelligence;
- Nasdaq IR Websites and Newsrooms; and
- Nasdaq Webcasts.

As a result of the above, we determined that we met all of the criteria to classify the assets and liabilities of these businesses as held for sale as of September 30, 2017. The disposal of these businesses did not represent a strategic shift that would have a major effect on our operations and financial results and is, therefore, not classified as discontinued operations. No impairment charge was recorded for the year ended December 31, 2017 as the carrying amount of the net assets was less than the fair value less costs to sell. Fair value was determined based upon the anticipated sales price of these businesses based on current market conditions and assumptions made by management, which may differ from actual results and may result in an impairment if market conditions deteriorate. In January 2018, we announced that we entered into a definitive agreement to sell our Public Relations Solutions and Digital Media Services businesses. Based on the sales price in the agreement, no impairment charge was recorded. See "Definitive Agreement to Sell our Public Relations Solutions and Digital Media Services Businesses," of Note 21, "Subsequent Events," for further discussion.

The following table presents the carrying amounts of the major classes of assets and liabilities classified as held for sale in the Consolidated Balance Sheets:

	December 31, 2017
	(in millions)
Receivables, net	$ 27
Property and equipment, net	21
Goodwill [1]	202
Intangible assets, net	38
Other assets	9
Total assets held for sale	$ 297
Deferred tax liabilities	$ 16
Other current liabilities	29
Total liabilities held for sale	$ 45

[1] The assignment of goodwill was based on the relative fair value of the disposal group and the portion of the remaining reporting unit.

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6. Goodwill and Acquired Intangible Assets

Goodwill

The following table presents the changes in goodwill by business segment during the year ended December 31, 2017 :

	Market Services	Corporate Services	Information Services	Market Technology	Total
			(in millions)		
Balance at December 31, 2016	$ 3,390	$ 674	$ 1,806	$ 157	$ 6,027
Goodwill acquired	—	—	453	13	466
Measurement period adjustment	—	(7)	—	—	(7)
Foreign currency translation adjustment	156	25	103	18	302
Goodwill reclassified as held for sale [1]	—	(202)	—	—	(202)
Balance at December 31, 2017	$ 3,546	$ 490	$ 2,362	$ 188	$ 6,586

[1] See Note 5, “Assets and Liabilities Held for Sale,” for further discussion.

The goodwill acquired for Information Services shown above relates to our acquisition of eVestment, and the goodwill acquired for Market Technology shown above relates to our acquisition of Sybenetix. See “2017 Acquisitions,” of Note 4, “Acquisitions,” for further discussion.

In the second quarter of 2017, we recorded a measurement period adjustment of $7 million to the estimated fair value of deferred tax assets related to our acquisition of Boardvantage. See “Acquisition of Boardvantage,” of Note 4, “Acquisitions,” for further discussion of the Boardvantage acquisition. The adjustment was made to reflect a revised assessment of deferred tax assets following the receipt of new information. The adjustment resulted in an increase to deferred tax assets recorded and a decrease to goodwill and is reflected in the above table. The measurement period adjustment is included in our Consolidated Balance Sheets as of December 31, 2017 . The adjustment did not result in an impact to our Consolidated Statements of Income.

As of December 31, 2017 , the amount of goodwill that is expected to be deductible for tax purposes in future periods is $864 million .

Goodwill represents the excess of purchase price over the value assigned to the net assets, including identifiable intangible assets, of a business acquired. Goodwill is allocated to our reporting units based on the assignment of the fair values of each reporting unit of the acquired company. We test goodwill for impairment at the reporting unit level annually, or in interim periods if certain events occur indicating that the carrying amount may be impaired, such as changes in the business climate, poor indicators of operating performance or the sale or disposition of a significant portion of a reporting unit. There was no impairment of goodwill for the years ended December 31, 2017 , 2016 and 2015 ; however, events such as extended economic weakness or unexpected significant declines in operating results of a reporting unit may result in goodwill impairment charges in the future.

Acquired Intangible Assets

The following table presents details of our total acquired intangible assets, both finite- and indefinite-lived:

	December 31, 2017				December 31, 2016			
	Gross Amount	Accumulated Amortization	Net Amount	Weighted-Average Useful Life (in Years)	Gross Amount	Accumulated Amortization	Net Amount	Weighted-Average Useful Life (in Years)
	(in millions)				(in millions)			
Finite-Lived Intangible Assets								
Technology	$ 65	$ (22)	$ 43	8	$ 38	$ (24)	$ 14	5
Customer relationships	1,708	(526)	1,182	18	1,394	(464)	930	18
Other	17	(4)	13	8	7	(6)	1	6
Foreign currency translation adjustment	(111)	46	(65)		(160)	58	(102)	
Total finite-lived intangible assets	$ 1,679	$ (506)	$ 1,173		$ 1,279	$ (436)	$ 843	
Indefinite-Lived Intangible Assets								
Exchange and clearing registrations	$ 1,257	$ —	$ 1,257		$ 1,257	$ —	$ 1,257	
Trade names	129	—	129		130	—	130	
Licenses	52	—	52		52	—	52	
Foreign currency translation adjustment	(143)	—	(143)		(188)	—	(188)	
Total indefinite-lived intangible assets	$ 1,295	$ —	$ 1,295		$ 1,251	$ —	$ 1,251	
Total intangible assets	$ 2,974	$ (506)	$ 2,468		$ 2,530	$ (436)	$ 2,094	

As a result of our decision to evaluate strategic alternatives for our Public Relations Solutions and Digital Media Services businesses within our Corporate Solutions business, we reclassified certain intangibles assets to held for sale. The following table presents the gross amount, accumulated amortization and net amount of finite-lived and indefinite-lived intangible assets that have been reclassified as assets held for sale as of December 31, 2017 . See Note 5, “Assets and Liabilities Held for Sale,” for further discussion.

	Gross Amount	Accumulated Amortization	Net Amount
	(in millions)		
Finite-lived intangible assets reclassified as held for sale:			
Customer relationships	$ 54	$ (17)	$ 37
Other	2	(1)	1
Total finite-lived intangible assets held for sale	$ 56	$ (18)	$ 38

In January 2018, we announced that we entered into a definitive agreement to sell our Public Relations Solutions and Digital Media Services businesses. See “Definitive Agreement to Sell our Public Relations Solutions and Digital Media Services Businesses,” of Note 21, “Subsequent Events,” for further discussion.

Amortization expense for acquired finite-lived intangible assets was $92 million for the year ended December 31, 2017 , $82 million for the year ended December 31, 2016 , and $62 million for the year ended December 31, 2015 . Amortization expense increased in 2017 and 2016 primarily due to additional amortization expense associated with acquired intangible assets. The increase in 2017 was associated with our 2017 and 2016 acquisitions and the increase in 2016 was primarily associated with our 2016 acquisitions. These amounts are included in depreciation and amortization expense in the Consolidated Statements of Income.

The estimated future amortization expense (excluding the impact of foreign currency translation adjustments of $65 million as of December 31, 2017) of acquired finite-lived intangible assets as of December 31, 2017 is as follows:

	(in millions)
2018	$ 114
2019	99
2020	99
2021	97
2022	94
2023 and thereafter	735
Total	$ 1,238

Intangible Asset Impairment Charges

We recorded pre-tax, non-cash intangible asset impairment charges described below during 2016 and 2015.

During 2016, the eSpeed business operated in a challenging environment and, as a result, experienced a decline in operating performance. In late 2016, the management team conducted an extensive business review of the eSpeed business. Based upon this review, management changed the strategic direction of our Fixed Income business and more closely integrated the U.S. and European Fixed Income businesses under a single brand called Nasdaq Fixed Income. As part of this effort, we decided to no longer utilize the eSpeed trade name. In connection with these triggering events, following board approval in January 2017, we recorded a pre-tax, non-cash intangible asset impairment charge of $578 million to write off the full value of the eSpeed trade name as we no longer attributed any material value to the trade name. This charge is recorded in asset impairment charge in the Consolidated Statements of Income for 2016.

In 2015 , in connection with our global rebranding initiative, we decided to change our company name from The NASDAQ OMX Group, Inc. to Nasdaq, Inc., which became effective in the third quarter of 2015. In connection with this action, we decided to discontinue the use of the OMX trade name and recorded a pre-tax, non-cash impairment charge of $119 million because we no longer attributed any material value to the trade name. This charge is recorded in restructuring charges in the Consolidated Statements of Income for 2015 .

These intangible asset impairment charges did not impact the company's consolidated cash flows, liquidity, or capital resources and related primarily to our Market Services segment. However, for segment reporting purposes, these charges were allocated to corporate items based on the decision that these charges should not be used to evaluate any particular segment's operating performance.

Significant judgments and unobservable inputs categorized as Level III in the fair value hierarchy are inherent in impairment tests performed and include assumptions about the amount and timing of expected future cash flows, growth rates and the determination of appropriate discount rates. We believe that the assumptions used in our impairment tests are reasonable, but variations in any of the assumptions could result in different calculations of fair value.

7. Investments

The following table presents the details of our investments:

	December 31, 2017	December 31, 2016
	(in millions)	
Trading securities	$ 221	$ 228
Available-for-sale investment securities	14	17
Equity method investments	131	124
Cost method investments	$ 152	$ 144

Trading Securities

Trading securities, which are included in financial investments, at fair value in the Consolidated Balance Sheets, are primarily comprised of highly rated European government debt securities, of which $160 million as of December 31, 2017 and $172 million as of December 31, 2016 , are assets utilized to meet regulatory capital requirements, primarily for our clearing operations at Nasdaq Clearing.

Available-for-Sale Investment Securities

As of December 31, 2017 , available-for-sale investment securities, which are included in financial investments, at fair value in the Consolidated Balance Sheets, are primarily comprised of commercial paper. As of December 31, 2016 , available-for-sale investment securities were primarily comprised of short-term certificates of deposit and commercial paper. As of December 31, 2017 and December 31, 2016 , the cumulative unrealized gains and losses on these securities were immaterial.

Equity Method Investments

As of December 31, 2017 and December 31, 2016, our equity method investments primarily included equity interests in OCC and EuroCCP N.V.

The carrying amounts of our equity method investments are included in other non-current assets in the Consolidated Balance Sheets.

Net income recognized from our equity interest in the earnings and losses of these equity method investments was $15 million for the year ended December 31, 2017 , $2 million for the year ended December 31, 2016 and $17 million for the year ended December 31, 2015 . The change in the year ended December 31, 2017 compared with the same period in 2016 relates to our additional 20.0% ownership interest in OCC, which we acquired in connection with our acquisition of ISE in June 2016, bringing our total ownership interest in OCC to 40.0% , partially offset by $2 million of wind down costs associated with an equity method investment that was previously written off. The change in the year ended December 31, 2016 compared with the same period in 2015 is primarily due to income recognized

from our equity method investment in OCC, partially offset by the write-off of our equity method investment in The Order Machine. We were not able to determine what our share of OCC's income was for the year ended December 31, 2014 until the first quarter of 2015, when financial statements were made available to us. As a result, we recorded other income of $13 million in the first quarter of 2015 relating to our share of OCC's income for the year ended December 31, 2014.

As of December 31, 2016, the estimated fair value of our investment in The Order Machine was less than the carrying value and management considered the decline in value to be other-than-temporary. As a result, we recorded a pre-tax, non-cash impairment charge of $7 million to write off the full value of this investment. This charge is partially offset by a gain resulting from the sale of a percentage of a separate equity method investment and is recorded in net income from unconsolidated investees in the Consolidated Statements of Income for 2016. No other impairments of equity method investments were recorded in 2017, 2016 or 2015.

Capital Contribution to OCC

In March 2015, in connection with being designated systemically important by the Financial Stability Oversight Council, OCC implemented a capital plan under which the options exchanges that are OCC's stockholders made new capital contributions to OCC, committed to make further capital contributions in the future under certain specified circumstances, and received certain commitments from OCC with respect to future dividend payments and related matters. Under the OCC capital plan, OCC's existing exchange stockholders, including Nasdaq and ISE, each contributed a pro-rata share of $150 million in new equity capital. Nasdaq's and ISE's capital contributions were each $30 million . OCC's exchange stockholders also committed to provide, as may become necessary from time to time, additional replenishment capital on a pro-rata basis if certain capital thresholds are triggered. For its part, OCC adopted specific policies with respect to fees, customer refunds and stockholder dividends, which envision an annual dividend payment to its stockholders equal to the portion of OCC's after-tax income that exceeds OCC's capital requirements after payment of refunds to OCC's clearing members (with such customer refunds generally to constitute 50% of the portion of OCC's pre-tax income that exceeds OCC's capital requirements).

After the SEC staff approved the OCC capital plan and the stockholders made their capital contributions, the plan's further effectiveness was suspended under the applicable SEC rules because certain parties petitioned the full Commission to reconsider the capital plan's approval. This stay was lifted by the SEC in September 2015, allowing OCC to implement the plan and in February 2016, the SEC issued an order approving the OCC capital plan as previously implemented and dismissed the petitions challenging that plan. The petitioners filed for a stay of the SEC's order, which would have blocked OCC from paying a dividend under the OCC capital plan. The Federal Court of Appeals for the District of Columbia Circuit, or the Court of Appeals, denied the requested stay, permitting OCC to pay a dividend which Nasdaq received in February 2016.

The petitioners also appealed the SEC's order to the Court of Appeals. The Court of Appeals heard arguments on the case in March 2017 and decided the case in August 2017. The Court of Appeals remanded the case to the SEC for further examination of the record and an independent assessment by the SEC of the evidence OCC submitted. The Court directed that the SEC approval of the OCC capital plan remain in place during the SEC's examination unless the SEC determined not to preserve it. The SEC has allowed OCC to preserve the capital plan, and in September 2017, OCC disbursed an annual dividend of $5 million per ownership share. Nasdaq, as the owner of two shares, received $10 million . The SEC provided OCC and the appellants with an opportunity to submit further briefs and evidence for the administrative record. It appears from public filings that the SEC record is complete and that the matter is now under consideration by the agency. There has been no ruling at this time, and there is no deadline for the SEC to issue its ruling.

Cost Method Investments

The carrying amounts of our cost method investments are included in other non-current assets in the Consolidated Balance Sheets. As of December 31, 2017 and December 31, 2016 , our cost method investments primarily represented our 5% ownership interest in Borsa İstanbul, and our 5% ownership interest in LCH.Clearnet Group Limited.

The Borsa Istanbul shares, which were issued to us in the first quarter of 2014, are part of the consideration received under a market technology agreement. This investment has a cost basis of $75 million which is guaranteed to us via a put option negotiated as part of the market technology agreement.

8. Property and Equipment, net

The following table presents our major categories of property and equipment, net:

	Year Ended December 31,	
	2017	2016
	(in millions)	
Data processing equipment and software	$ 626	$ 665
Furniture, equipment and leasehold improvements	279	254
Total property and equipment	905	919
Less: accumulated depreciation and amortization	(505)	(557)
Total property and equipment, net	$ 400	$ 362

Depreciation and amortization expense for property and equipment was $96 million for the year ended December 31, 2017 , $88 million for the year ended December 31, 2016 and $76 million for the year ended December 31, 2015 . The increase in depreciation and amortization expense in 2017 and 2016 was primarily due to additional expense associated with assets and

software placed in service. These amounts are included in depreciation and amortization expense in the Consolidated Statements of Income.

We recorded asset impairment charges of $9 million for the year ended December 31, 2017, $8 million for the year ended December 31, 2016 and $18 million for the year ended December 31, 2015. The asset impairment charge in 2017 primarily related to the write-off of capitalized software and hardware equipment associated with our 2017 and 2016 acquisitions and is included in merger and strategic initiatives expense in the Consolidated Statements of Income. The asset impairment charges in 2016 and 2015 primarily related to fixed assets and capitalized software that were retired. The 2016 and 2015 asset impairment charges are included in restructuring charges in the Consolidated Statements of Income for the respective periods.

As of December 31, 2017 and 2016, we did not own any real estate properties.

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9. Deferred Revenue

Deferred revenue represents consideration received that is yet to be recognized as revenue. The changes in our deferred revenue during the year ended December 31, 2017 and 2016 are reflected in the following table:

	Initial Listing Revenues	Listing of Additional Shares Revenues	Annual Renewal and Other Revenues	Market Technology Revenues	Total
			(in millions)		
Balance at January 1, 2017	$ 54	$ 37	$ 57	$ 185	$ 333
Additions	18	11	569	208	806
Revenue recognized	(17)	(22)	(544)	(240)	(823)
Translation adjustment	—	—	1	20	21
Deferred revenue reclassified as held for sale [1]	—	—	(2)	—	(2)
Balance at December 31, 2017	$ 55	$ 26	$ 81	$ 173	$ 335
Balance at January 1, 2016	$ 59	$ 53	$ 28	$ 187	$ 327
Additions	13	12	606	233	864
Revenue recognized	(18)	(28)	(576)	(227)	(849)
Translation adjustment	—	—	(1)	(8)	(9)
Balance at December 31, 2016	$ 54	$ 37	$ 57	$ 185	$ 333

[1] See Note 5, “Assets and Liabilities Held for Sale,” for further discussion.

The additions and revenue recognized for initial listing revenues, listing of additional shares revenues and annual renewal and other revenues primarily reflect revenues from our Listing Services business within our Corporate Services segment.

For our market technology contracts, total revenues, as well as costs incurred, are deferred until significant customizations are completed and delivered. Once delivered, deferred revenue and the related deferred costs are recognized over the post-contract support period. For these market technology contracts, we have included the deferral of costs in other current assets and other non-current assets in the Consolidated Balance Sheets.

As of December 31, 2017 , we estimate that our deferred revenue, which is primarily corporate services and market technology revenues, will be recognized in the following years:

	Initial Listing Revenues	Listing of Additional Shares Revenues	Annual Renewal and Other Revenues	Market Technology Revenues	Total
			(in millions)		
Fiscal year ended:					
2018	$ 17	$ 13	$ 79	$ 80	$ 189
2019	15	7	2	35	59
2020	11	5	—	33	49
2021	7	1	—	15	23
2022	4	—	—	3	7
2023 and thereafter	1	—	—	7	8
	$ 55	$ 26	$ 81	$ 173	$ 335

The timing of recognition of our deferred market technology revenues is primarily dependent upon the completion of customization and any significant modifications made pursuant to existing market technology contracts. As such, as it relates

to market technology revenues, the timing represents our best estimate.

On January 1, 2018, we adopted ASU 2014-09, "Revenue from Contracts with Customers." As a result, a portion of revenues that were previously deferred were recognized either in prior period revenues, through restatement, or as an adjustment to retained earnings upon adoption of the new standard. See "Recent Accounting Pronouncements," of Note 2, "Summary of Significant Accounting Policies," for further discussion and the impact to the deferred revenue balance.

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10. Debt Obligations

The following table presents the changes in the carrying amount of our debt obligations during the year ended December 31, 2017 :

	December 31, 2016	Additions	Payments, Accretion and Other	December 31, 2017
		(in millions)		
Short-term debt - commercial paper	$ —	$ 2,514	$ (2,034)	$ 480
Long-term debt:				
5.55% senior unsecured notes due January 15, 2020	598	—	1	599
5.25% senior unsecured notes repaid on May 26, 2017	369	—	(369)	—
3.875% senior unsecured notes due June 7, 2021	625	—	91	716
4.25% senior unsecured notes due June 1, 2024	495	—	1	496
1.75% senior unsecured notes due May 19, 2023	622	—	90	712
3.85% senior unsecured notes due June 30, 2026	495	—	1	496
Senior unsecured floating rate notes due March 22, 2019	—	498	—	498
$400 million senior unsecured term loan facility due November 25, 2019 (average interest rate of 2.47% for the period January 1, 2017 through December 31, 2017)	399	—	(299)	100
$1 billion revolving credit commitment due April 25, 2022 (average interest rate of 2.66% for the period April 25, 2017 through December 31, 2017)	—	155	(45)	110
Total long-term debt	3,603	653	(529)	3,727
Total debt obligations	$ 3,603	$ 3,167	$ (2,563)	$ 4,207

Commercial Paper Program

In April 2017, we entered into a U.S. dollar commercial paper program. The commercial paper program is supported by our 2017 Credit Facility which provides liquidity support for the repayment of commercial paper issued through the commercial paper program. See "2017 Credit Facility" below for further discussion of our 2017 Credit Facility. The effective interest rate of commercial paper issuances fluctuate as short term interest rates and demand fluctuate. The fluctuation of these rates due to market conditions may impact our interest expense.

In May 2017, we used a combination of cash on hand and net proceeds from the sale of commercial paper to redeem all of our 2018 Notes. In addition, in June 2017, we used net proceeds from the sale of commercial paper to repay $300 million of the amount outstanding on the 2016 Credit Facility. See "Early Extinguishment of 2018 Notes" and "2016 Credit Facility" below for further discussion.

In connection with our agreement to acquire eVestment, we issued the 2019 Notes. Since the proposed acquisition of eVestment was not immediately expected to close, $276 million of the net proceeds from the 2019 Notes was used to partially pay down our outstanding commercial paper balance. See "Senior Unsecured Floating Rate Notes" below for further discussion of our 2019 Notes.

As of December 31, 2017 , commercial paper notes in the table above reflect the aggregate principal amount, less the unamortized discount which is being accreted through interest expense over the life of the applicable notes. The original maturities of these notes range from 12 days to 119 days and the weighted-average maturity is 22 days . The weighted-average effective interest rate is 1.70% per annum.

Senior Unsecured Notes

Our senior unsecured notes were all issued at a discount. As a result of the discount, the proceeds received from each issuance were less than the aggregate principal amount. As of December 31, 2017 , the amounts in the table above reflect the aggregate principal amount, less the unamortized debt discount and the unamortized debt issuance costs which are being accreted through interest expense over the life of the applicable

notes. Our senior unsecured notes are general unsecured obligations of ours and rank equally with all of our existing and future unsubordinated obligations and they are not guaranteed by any of our subsidiaries. The senior unsecured notes were issued under indentures that, among other things, limit our ability to consolidate, merge or sell all or substantially all of our assets, create liens, and enter into sale and leaseback transactions.

With the exception of the 2020 Notes, upon a change of control triggering event (as defined in the various note indentures), the terms require us to repurchase all or part of each holder's notes for cash equal to 101% of the aggregate principal amount purchased plus accrued and unpaid interest, if any.

5.55% Senior Unsecured Notes

In January 2010, Nasdaq issued the 2020 Notes. The 2020 Notes pay interest semiannually at a rate of 5.55% per annum until January 15, 2020 .

Early Extinguishment of 2018 Notes

In December 2010, Nasdaq issued the 2018 Notes. The 2018 Notes paid interest semiannually at a rate of 5.25% per annum.

In May 2017, we redeemed all of our 2018 Notes using a combination of cash on hand and net proceeds from the sale of commercial paper issued through the commercial paper program. See "Commercial Paper Program" above for further discussion of our commercial paper program. In connection with the early extinguishment of the 2018 Notes, we recorded a pre-tax charge of $9 million , which primarily included a make-whole redemption price premium. This charge is included in general, administrative and other expense in the Consolidated Statements of Income for the year ended December 31, 2017 .

3.875% Senior Unsecured Notes

In June 2013, Nasdaq issued the 2021 Notes. The 2021 Notes pay interest annually at a rate of 3.875% per annum until June 7, 2021 and such rate may vary with Nasdaq's debt rating up to a rate not to exceed 5.875% .

The 2021 Notes have been designated as a hedge of our net investment in certain foreign subsidiaries to mitigate the foreign exchange risk associated with certain investments in these subsidiaries. The increase in the carrying amount of $91 million noted in the "Payments, Accretion and Other" column in the table above primarily reflects the translation of the 2021 Notes into U.S. dollars and is recorded in accumulated other comprehensive loss within stockholders' equity in the Consolidated Balance Sheets as of December 31, 2017 .

4.25% Senior Unsecured Notes

In May 2014, Nasdaq issued the 2024 Notes. The 2024 Notes pay interest semiannually at a rate of 4.25% per annum until June 1, 2024 and such rate may vary with Nasdaq's debt rating up to a rate not to exceed 6.25% .

1.75% Senior Unsecured Notes

In May 2016, Nasdaq issued the 2023 Notes. We used the net proceeds from the 2023 Notes and the 2026 Notes to fund our acquisition of ISE. See "Acquisition of ISE," of Note 4, "Acquisitions," for further discussion of the ISE acquisition.

The 2023 Notes pay interest annually at a rate of 1.75% per annum until May 19, 2023 and such rate may vary with Nasdaq's debt rating up to a rate not to exceed 3.75% .

The 2023 Notes have been designated as a hedge of our net investment in certain foreign subsidiaries to mitigate the foreign exchange rate risk associated with certain investments in these subsidiaries. The increase in the carrying amount of $90 million noted in the "Payments, Accretion and Other" column in the table above reflects the translation of the 2023 Notes into U.S. dollars and is recorded in accumulated other comprehensive loss within stockholders' equity in the Consolidated Balance Sheets as of December 31, 2017 .

3.85% Senior Unsecured Notes

In June 2016, Nasdaq issued the 2026 Notes. We used the net proceeds from the 2023 Notes and the 2026 Notes to fund our acquisition of ISE. See "Acquisition of ISE," of Note 4, "Acquisitions," for further discussion of the ISE acquisition.

The 2026 Notes pay interest semiannually at a rate of 3.85% per annum until June 30, 2026 and such rate may vary with Nasdaq's debt rating up to a rate not to exceed 5.85% .

Senior Unsecured Floating Rate Notes

In September 2017, Nasdaq issued the 2019 Notes. We used the net proceeds from the 2019 Notes to partially pay down our outstanding commercial paper balance and the remainder of the net proceeds was used to partially fund our acquisition of eVestment. See "Acquisition of eVestment," of Note 4, "Acquisitions," for further discussion of the eVestment acquisition.

The 2019 Notes pay interest quarterly in arrears at a rate equal to the three-month U.S. dollar LIBOR as determined at the beginning of each quarterly period plus 0.39% per annum until March 22, 2019.

Credit Facilities

As of December 31, 2017 , the amounts in the table above reflect the aggregate principal amount, less the unamortized debt issuance costs which are being accreted through interest expense over the life of the applicable credit facility. Nasdaq is permitted to repay borrowings under our credit facilities at any time in whole or in part, without penalty.

Our credit facilities contain financial and operating covenants. Financial covenants include a minimum interest expense coverage ratio and a maximum leverage ratio. Operating covenants include, among other things, limitations on Nasdaq's ability to incur additional indebtedness, grant liens on assets, dispose of assets and pay dividends. Our credit facilities allow us to pay cash dividends on our common stock. The facilities also contain customary affirmative covenants, including access

to financial statements, notice of defaults and certain other material events, maintenance of properties and insurance, and events of default, including cross-defaults to our material indebtedness.

2017 Credit Facility

In April 2017, Nasdaq entered into the 2017 Credit Facility. The 2017 Credit Facility consists of a $1 billion five -year revolving credit facility (with sublimits for non-dollar borrowings, swingline borrowings and letters of credit), which replaced our 2014 credit facility. See “2014 Credit Facility” below for further discussion. Nasdaq intends to use funds available under the 2017 Credit Facility for general corporate purposes and to provide liquidity support for the repayment of commercial paper issued through the commercial paper program.

As of December 31, 2017 , the balance of $110 million reflects the outstanding amount under the 2017 Credit Facility, less unamortized debt issuance costs of $5 million . Of the $885 million that is available for borrowing as of December 31, 2017 , $480 million provides liquidity support for the principal amount outstanding under the commercial paper program. In addition, $1 million has been utilized for a letter of credit. As such, as of December 31, 2017 , the total remaining amount available under the 2017 Credit Facility was $404 million . See “Commercial Paper Program” above for further discussion of our commercial paper program.

Under our 2017 Credit Facility, borrowings under the revolving credit facility and swingline borrowings bear interest on the principal amount outstanding at a variable interest rate based on either the LIBOR or the base rate (as defined in the credit agreement) (or other applicable rate with respect to non-dollar borrowings), plus an applicable margin that varies with Nasdaq’s debt rating.

The 2017 Credit Facility includes an option for Nasdaq to increase the available aggregate amount by up to $500 million , subject to the consent of the lenders funding the increase and certain other conditions.

2016 Credit Facility

In March 2016, Nasdaq entered into the 2016 Credit Facility. In March 2016, loans in an aggregate principal amount of $400 million were drawn under the 2016 Credit Facility and the net proceeds were used to partially repay amounts outstanding under the revolving credit commitment of the 2014 credit facility. See “2014 Credit Facility” below for further discussion of our 2014 credit facility.

Under our 2016 Credit Facility, borrowings bear interest on the principal amount outstanding at a variable interest rate based on either the LIBOR or the base rate (or other applicable rate with respect to non-dollar borrowings), plus an applicable margin that varies with Nasdaq’s debt rating.

In June 2017, we used net proceeds from the sale of commercial paper issued through the commercial paper program to repay $300 million of the amount outstanding on the 2016 Credit Facility. The remaining amount outstanding of $100 million is due upon maturity at November 25, 2019. See “Commercial Paper Program” above for further discussion of our commercial paper program. In connection with the partial repayment of the amount outstanding on the 2016 Credit Facility, we recorded a pre-tax charge of $1 million which related to the write-off of unamortized debt issuance costs related to the $300 million payment. This charge is included in general, administrative and other expense in the Consolidated Statements of Income for the year ended December 31, 2017 .

2014 Credit Facility

In November 2014, Nasdaq entered into the 2014 credit facility. The 2014 credit facility consisted of a $750 million revolving credit commitment (with sublimits for non-dollar borrowings, swingline borrowings and letters of credit).

Loans under the 2014 credit facility had a variable interest rate based on either the LIBOR or the base rate (as defined in the credit agreement) (or other applicable rate with respect to non-dollar borrowings), plus an applicable margin that varied with Nasdaq’s debt rating.

In April 2017, Nasdaq entered into the 2017 Credit Facility which replaced the 2014 credit facility. As a result, our 2014 credit facility has been terminated. No amounts were outstanding on the 2014 credit facility during 2017. See “2017 Credit Facility” above for further discussion of our 2017 Credit Facility.

Other Credit Facilities

We also have credit facilities related to our Nasdaq Clearing operations in order to provide further liquidity. Credit facilities, which are available in multiple currencies, totaled $187 million as of December 31, 2017 and $170 million as of December 31, 2016 in available liquidity, none of which was utilized.

Debt Covenants

As of December 31, 2017 , we were in compliance with the covenants of all of our debt obligations.

11. Income Taxes

The income tax provision consists of the following amounts:

	Year Ended December 31,		
	2017	2016	2015
	(in millions)		
Current income taxes:			
Federal	$ 51	$ 37	$ 139
State	17	21	42
Foreign	68	106	36
Total current income taxes	136	164	217
Deferred income taxes:			
Federal	(14)	(97)	(18)
State	24	(35)	(1)
Foreign	—	(4)	5
Total deferred income taxes	10	(136)	(14)
Total income tax provision	$ 146	$ 28	$ 203

We have determined that undistributed earnings of certain non-U.S. subsidiaries will be reinvested for an indefinite period of time. We have both the intent and ability to indefinitely reinvest these earnings. As of December 31, 2017 , the cumulative amount of undistributed earnings in these subsidiaries is approximately $131 million . Given our intent to reinvest these earnings for an indefinite period of time, we have not accrued a deferred tax liability on these earnings. A determination of an unrecognized deferred tax liability related to these earnings is not practicable.

A reconciliation of the income tax provision, based on the U.S. federal statutory rate, to our actual income tax provision for the years ended December 31, 2017 , 2016 and 2015 is as follows:

	Year Ended December 31,		
	2017	2016	2015
Federal income tax provision at the statutory rate	35.0 %	35.0 %	35.0 %
State income tax provision, net of federal effect	2.6 %	(6.7)%	3.9 %
Change in deferred taxes due to change in law	(9.9)%	(1.2)%	0.2 %
Excess tax benefits related to employee share-based compensation	(4.0)%	— %	— %
Non-U.S. subsidiary earnings	(6.0)%	(7.3)%	(6.4)%
Tax credits and deductions	(1.0)%	(5.1)%	(0.8)%
Change in unrecognized tax benefits	(0.8)%	4.2 %	0.3 %
Other, net	0.7 %	1.7 %	— %
Actual income tax provision	16.6 %	20.6 %	32.2 %

The lower effective tax rate in 2017 when compared to 2016 is primarily due to a decrease to tax expense associated with the remeasurement of our net U.S. deferred tax liability as a result of enactment of the Tax Cuts and Jobs Act. The decrease in the effective tax rate in 2017 is also due to the recognition of excess tax benefits associated with the vesting of employee share-based compensation arrangements. See “Recent Accounting Pronouncements” of Note 2, “Summary of Significant Accounting Policies” for further discussion. The lower effective tax rate in 2016 when compared to 2015 is primarily due to a shift in the geographic mix of earnings, largely driven by the write-off of the eSpeed trade name, partially offset by an unfavorable ruling from the Finnish Supreme Administrative Court.

The effective tax rate may vary from period to period depending on, among other factors, the geographic and business mix of earnings and losses. These same and other factors, including the history of pre-tax earnings and losses, are taken into account in assessing the ability to realize deferred tax assets.

The temporary differences, which give rise to our deferred tax assets and (liabilities), consisted of the following:

	December 31,	
	2017	2016
	(in millions)	
Deferred tax assets:		
Deferred revenues	$ 25	$ 39
U.S. federal net operating loss	1	2
Foreign net operating loss	30	37
State net operating loss	4	1
Compensation and benefits	42	99
Foreign currency translation	292	528
Tax credits	7	7
Other	20	34
Gross deferred tax assets	$ 421	$ 747
Deferred tax liabilities:		
Amortization of software development costs and depreciation	$ (47)	$ (63)
Amortization of acquired intangible assets	(510)	(596)
Investments	(26)	(37)
Other	(19)	(24)
Gross deferred tax liabilities	(602)	(720)
Net deferred tax assets before valuation allowance	(181)	27
Less: valuation allowance	(30)	(30)
Net deferred tax assets (liabilities)	$ (211)	$ (3)

A valuation allowance has been established with regards to the tax benefits primarily associated with certain net operating losses, or NOLs, as it is more likely than not that these benefits will not be realized in the foreseeable future.

As of December 31, 2017 , the expiration dates for the NOLs, and credits are as follows:

Jurisdiction	Amount	Expiration Date
	(in millions)	
U.S. Federal NOL	$ 1	2033-2035
Foreign NOL	4	2018-2026
Foreign NOL	26	No expiration date
State NOL	4	2025-2036
U.S. Federal Tax credits	7	2018-2027

The following represents the domestic and foreign components of income before income tax provision:

	Year Ended December 31,		
	2017	2016	2015
	(in millions)		
Domestic	$ 556	$ (155)	$ 393
Foreign	324	291	237
Income before income tax provision	$ 880	$ 136	$ 630

We recorded income tax benefits of $40 million in 2017 , $41 million in 2016 and $34 million in 2015 , primarily related to share-based compensation. In 2017, the benefit was included in income tax expense. In 2016 and 2015, the amounts were recorded as additional paid-in-capital in the Consolidated Balance Sheets. See “Recent Accounting Pronouncements,” of Note 2, “Summary of Significant Accounting Policies,” for further discussion.

We are subject to examination by federal, state and local, and foreign tax authorities. We regularly assess the likelihood of additional assessments by each jurisdiction and have established tax reserves that we believe are adequate in relation to the potential for additional assessments. We believe that the resolution of tax matters will not have a material effect on our financial condition but may be material to our operating results for a particular period and the effective tax rate for that period.

There are $45 million as of December 31, 2017 and $48 million as of December 31, 2016 of unrecognized tax benefits that if recognized would affect our effective tax rate.

A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows:

	Year Ended December 31,	
	2017	2016
	(in millions)	
Beginning balance	$ 48	$ 40
Additions as a result of tax positions taken in prior periods	2	9
Additions as a result of tax positions taken in the current period	5	3
Reductions related to settlements with taxing authorities	—	(4)
Reductions as a result of lapses of the applicable statute of limitations	(10)	—
Ending balance	$ 45	$ 48

Our policy is to recognize interest and/or penalties related to income tax matters in income tax expense. We have accrued $9 million as of December 31, 2017 and $8 million as of December 31, 2016 for interest and penalties, net of tax effect.

Nasdaq and its eligible subsidiaries file a consolidated U.S. federal income tax return and applicable state and local income tax returns and non-U.S. income tax returns. Federal income tax returns for the years 2012 through 2015 are currently under examination by the Internal Revenue Services and we are

subject to examination by the Internal Revenue Service for 2016. Several state tax returns are currently under examination by the respective tax authorities for the years 2005 through 2015 and we are subject to examination for 2016. Non-U.S. tax returns are subject to examination by the respective tax authorities for the years 2009 through 2016. Although the results of such examinations may have an impact on our unrecognized tax benefits, we do not anticipate that such impact will be material to our consolidated financial position or results of operations. Based on the expiration of the statute of limitations in the third quarter of 2017, we recognized $8 million in previously unrecognized tax benefits associated with positions taken in prior years. In addition, we anticipate that the amount of unrecognized tax benefits as of December 31, 2017 will decrease in the next twelve months as we expect to settle certain tax audits.

The Swedish Tax Agency has disallowed certain interest expense deductions for the years 2013 - 2015. We have appealed to the Lower Administrative Court. Despite a prior negative decision from the Council for Advance Rulings and the Supreme Administrative Court's refusal to hear our appeal at that time, we continue to expect a favorable decision from the Swedish Courts. Since January 1, 2013, we have recorded tax benefits of $56 million associated with this matter. We continue to pay all assessments from the Swedish Tax Agency while this matter is pending. If the Swedish Courts agree with our position we will receive a refund of all paid assessments; if the Swedish Courts disagree with our position, we will record tax expense of $48 million or $0.28 per diluted share, which is gross of any related U.S. tax benefits and reflects the impact of foreign currency translation. We record quarterly tax benefits of $1 million to $2 million related to this matter.

The Tax Cuts and Jobs Act was enacted on December 22, 2017 and is effective January 1, 2018. The new legislation contains several key provisions, including a reduction of the U.S. corporate income tax rate from 35% to 21%. We are required to remeasure all our U.S. deferred tax assets and liabilities as of December 22, 2017 and record the impact of such remeasurement in our 2017 financial statements. For the year ended December 31, 2017, we recorded a decrease to tax expense of $87 million , substantially all of which reflects the estimated impact associated with the remeasurement of our net U.S. deferred tax liability at the lower U.S. federal corporate income tax rate. The Tax Cuts and Jobs Act also imposes a transition tax on unremitted aggregate accumulated earnings of non-U.S. subsidiaries, which did not impact us.

SAB 118 has provided guidance which allows us to record provisional amounts during a measurement period not to extend beyond one year of the enactment date. As of December 31, 2017, we have recorded a provisional estimate of the effects of the new legislation. We will continue to analyze the Tax Cuts and Jobs Act and related accounting guidance and interpretations in order to finalize any impacts within the measurement period.

12. Retirement Plans

Defined Contribution Savings Plan

We sponsor a 401(k) Plan for U.S. employees. Employees are immediately eligible to make contributions to the plan and are also eligible for an employer contribution match at an amount equal to 100.0% of the first 6.0% of eligible employee contributions. Savings plan expense included in compensation and benefits expense in the Consolidated Statements of Income was $13 million for 2017, $11 million for 2016 and $10 million for 2015.

Pension and Supplemental Executive Retirement Plans

We maintain non-contributory, defined-benefit pension plans, non-qualified SERPs for certain senior executives and other post-retirement benefit plans for eligible employees in the U.S., collectively referred to as the Nasdaq Benefit Plans. Our pension plans and SERPs are frozen. Future service and salary for all participants do not count toward an accrual of benefits under the pension plans and SERPs. Most employees outside the U.S. are covered by local retirement plans or by applicable social laws. Benefits under social laws are generally expensed in the periods in which the costs are incurred. The total expense for these plans is included in compensation and benefits expense in the Consolidated Statements of Income and was $21 million in 2017 , $23 million in 2016 and $22 million in 2015 .

Nasdaq recognizes the funded status of the Nasdaq Benefit Plans, measured as the difference between the fair value of the plan assets and the benefit obligation, in the Consolidated Balance Sheets. The funded status related to the Nasdaq Benefit Plans was underfunded by $60 million as of December 31, 2017 , $59 million as of December 31, 2016 and $64 million as of December 31, 2015 and is included in accrued personnel costs and other non-current liabilities in the Consolidated Balance Sheets. The fair value of the plan assets was $79 million as of December 31, 2017 and $74 million as of December 31, 2016 and the benefit obligation was $139 million as of December 31, 2017 and $133 million as of December 31, 2016 . The plan assets of the Nasdaq Benefit Plans are invested in securities per target allocations adopted by Nasdaq's Pension and 401(k) Committee and are primarily invested in equity and fixed income securities, which are primarily categorized as Level 2 in the fair value hierarchy.

Accumulated Other Comprehensive Loss

As of December 31, 2017 , accumulated other comprehensive loss for the Nasdaq Benefit Plans was $22 million reflecting an unrecognized net loss of $37 million , partially offset by an income tax benefit of $15 million , primarily due to our pension plans.

Estimated Future Benefit Payments

We expect to make the following benefit payments to participants in the next ten fiscal years under the Nasdaq Benefit Plans:

Fiscal Year Ended:	Pension	SERP	Post-retirement	Total
	(in millions)			
2018	$ 5	$ 2	$ —	$ 7
2019	5	7	—	12
2020	5	2	—	7
2021	5	2	—	7
2022	6	2	—	8
2023 through 2027	29	10	1	40
	$ 55	$ 25	$ 1	$ 81

13. Share-Based Compensation

We have a share-based compensation program that provides our board of directors broad discretion in creating employee equity incentives. Share-based awards granted under this program include stock options, restricted stock (consisting of restricted stock units), and PSUs. For accounting purposes, we consider PSUs to be a form of restricted stock.

Summary of Share-Based Compensation Expense

The following table shows the total share-based compensation expense resulting from equity awards and the 15.0% discount for the ESPP for the years ended December 31, 2017 , 2016 and 2015 in the Consolidated Statements of Income:

	Year Ended December 31,		
	2017	2016	2015
	(in millions)		
Share-based compensation expense before income taxes	$ 70	$ 86	$ 68
Income tax benefit	(29)	(35)	(28)
Share-based compensation expense after income taxes	$ 41	$ 51	$ 40

Common Shares Available Under Our Equity Plan

As of December 31, 2017 , we had approximately 5.8 million shares of common stock authorized for future issuance under our Equity Plan.

Restricted Stock

We grant restricted stock to most active employees. The grant date fair value of restricted stock awards is based on the closing price at the date of grant less the present value of future cash dividends. Restricted stock awards granted generally vest 25.0% on the second anniversary of the grant date, 25.0% on the third anniversary of the grant date, and 50.0% on the fourth anniversary of the grant date. We generally recognize compensation expense for restricted stock awards on a straight-line basis over the requisite service period of the award, taking into account an estimated forfeiture rate.

Summary of Restricted Stock Activity

The following table summarizes our restricted stock activity for the years ended December 31, 2017 , 2016 and 2015:

	Restricted Stock	
	Number of Awards	Weighted-Average Grant Date Fair Value
Unvested balances at December 31, 2014	3,193,230	$ 30.99
Granted	823,950	$ 49.26
Vested	(370,998)	$ 29.90
Forfeited	(302,444)	$ 34.34
Unvested balances at December 31, 2015	3,343,738	$ 35.36
Granted	724,200	$ 62.91
Vested	(1,238,980)	$ 27.91
Forfeited	(268,380)	$ 43.29
Unvested balances at December 31, 2016	2,560,578	$ 45.92
Granted	737,864	$ 67.48
Vested	(1,102,823)	$ 38.56
Forfeited	(207,119)	$ 52.29
Unvested balances at December 31, 2017	1,988,500	$ 57.34

As of December 31, 2017 , $54 million of total unrecognized compensation cost related to restricted stock is expected to be recognized over a weighted-average period of 1.8 years .

PSUs

The grant date fair value of PSUs is based on the closing price at the date of grant less the present value of future cash dividends. PSUs are based on performance measures that impact the amount of shares that each recipient will receive upon vesting. We report the target number of PSUs granted, unless we have determined that it is more likely than not, based on the actual achievement of performance measures, that an employee will receive a different amount of shares underlying the PSUs, in which case we report the amount of shares the employee is likely to receive. We have two performance-based long-term PSU programs for certain officers, a one -year performance-based program and a three -year cumulative performance-based program that focuses on TSR.

One -Year PSU Program

Under the one -year performance-based program, an employee may receive from 0.0% to 150.0% of the target amount granted, depending on the achievement of performance measures. These awards vest ratably on an annual basis over a three -year period commencing with the end of the performance period. Compensation cost is recognized over the performance period and the three -year vesting period, taking into account an estimated forfeiture rate.

During 2017, certain grants of PSUs with a one -year performance period exceeded the applicable performance

parameters. As a result, an additional 14,497 units above target were considered granted in the first quarter of 2018.

Three -Year PSU Program

Under the three -year performance-based program, each individual receives PSUs with a three -year cumulative performance period that vest at the end of the performance period. Compensation cost is recognized over the three -year vesting period. Performance will be determined by comparing Nasdaq's TSR to two peer groups, each weighted 50.0% . The first peer group consists of exchange companies, and the second peer group consists of all companies in the S&P 500. Nasdaq's relative performance ranking against each of these groups will determine the final number of shares delivered to each individual under the program. The payout under this program will be between 0.0% and 200.0% of the number of PSUs granted and will be determined by Nasdaq's overall performance against both peer groups. However, if Nasdaq's TSR is negative for the three -year performance period, regardless of TSR ranking, the payout will not exceed 100.0% of the number of PSUs granted. We estimate the fair value of PSUs granted under the three -year PSU program using the Monte Carlo simulation model, as these awards contain a market condition.

Certain grants of PSUs that were issued in 2015 with a three -year performance period exceeded the applicable performance parameters. As a result, an additional 237,876 units above target were considered granted in the first quarter of 2018.

The following weighted-average assumptions were used to determine the weighted-average fair values of the PSU awards granted under the three -year PSU program for the years ended December 31, 2017 and 2016:

	Year Ended December 31,	
	2017	2016
Weighted-average risk free interest rate [1]	1.44%	0.84%
Expected volatility [2]	19.2%	21.0%
Weighted-average grant date share price	$69.45	$66.36
Weighted-average fair value at grant date	$81.57	$93.25

(1) The risk-free interest rate for periods within the expected life of the award is based on the U.S. Treasury yield curve in effect at the time of grant.

(2) We use historic volatility for PSU awards issued under the three -year PSU program, as implied volatility data could not be obtained for all the companies in the peer groups used for relative performance measurement within the program.

In addition, the annual dividend assumption utilized in the Monte Carlo simulation model is based on Nasdaq's dividend yield at the date of grant.

Summary of PSU Activity

The following table summarizes our PSU activity for the years ended December 31, 2017 , 2016 and 2015:

	PSUs			
	One-Year Program		Three-Year Program	
	Number of Awards	Weighted-Average Grant Date Fair Value	Number of Awards	Weighted-Average Grant Date Fair Value
Unvested balances at December 31, 2014	558,040	$ 24.17	1,654,567	$ 35.57
Granted	206,199	$ 48.16	649,626	$ 49.69
Vested	(247,273)	$ 30.51	(837,109)	$ 22.50
Forfeited	(92,999)	$ 34.74	(27,366)	$ 43.49
Unvested balances at December 31, 2015	423,967	$ 41.34	1,439,718	$ 49.41
Granted	242,642	$ 58.33	761,501	$ 66.89
Vested	(242,793)	$ 39.63	(879,926)	$ 43.81
Forfeited	(45,050)	$ 47.72	(6,625)	$ 69.11
Unvested balances at December 31, 2016	378,766	$ 52.55	1,314,668	$ 63.18
Granted	197,075	$ 65.51	803,712	$ 55.57
Vested	(202,073)	$ 49.93	(1,079,925)	$ 42.83
Forfeited	(40,764)	$ 55.92	(28,497)	$ 87.86
Unvested balances at December 31, 2017	333,004	$ 61.39	1,009,958	$ 78.18

As of December 31, 2017 , $9 million of total unrecognized compensation cost related to the one -year PSU program is expected to be recognized over a weighted-average period of 1.4 years . For the three -year PSU program, $21 million of total unrecognized compensation cost is expected to be recognized over a weighted-average period of 1.4 years .

Stock Options

The fair value of stock options is estimated using the Black-Scholes option-pricing model. Each grant has a 10 -year life. In January 2017, our CEO received 268,817 performance-based non-qualified stock options which will vest annually over a three -year period, with each vesting contingent upon the achievement of annual performance parameters. On January 30, 2018, Nasdaq's management compensation committee and board of directors determined that the performance goal for 2017 was met, resulting in the settlement of the first one-third of the grant. There were no stock option awards granted during the years ended December 31, 2016 and 2015.

Summary of Stock Option Activity

A summary of stock option activity for the year ended December 31, 2017 is as follows:

	Number of Stock Options		Weighted-Average Exercise Price
Outstanding at December 31, 2014	3,316,782	$	27.56
Exercised	(682,054)		26.84
Forfeited	(8,241)		28.53
Outstanding at December 31, 2015	2,626,487	$	27.74
Exercised	(1,219,820)		34.00
Forfeited	(296)		23.31
Outstanding at December 31, 2016	1,406,371	$	22.32
Granted	268,817		66.68
Exercised	(1,102,830)		21.98
Forfeited	(978)		21.33
Outstanding at December 31, 2017	571,380	$	43.84
Exercisable at December 31, 2017	302,563	$	23.55

We received net cash proceeds of $24 million from the exercise of 1,102,830 stock options for the year ended December 31, 2017 , received net cash proceeds of $41 million from the exercise of 1,219,820 stock options for the year ended December 31, 2016 and received net cash proceeds of $18 million from the exercise of 682,054 stock options for the year ended December 31, 2015.

The following table summarizes significant ranges of outstanding and exercisable stock options as of December 31, 2017:

	Outstanding				Exercisable			
Range of Exercise Prices	Number of Stock Options	Weighted-Average Remaining Contractual Term (in years)	Weighted-Average Exercise Price	Aggregate Intrinsic Value (in millions)	Number Exercisable	Weighted-Average Remaining Contractual Term (in years)	Weighted-Average Exercise Price	Aggregate Intrinsic Value (in millions)
$17.36 - $19.99	94,265	2.14	$ 19.73	$ 5	94,265	2.14	$ 19.73	$ 5
$20.00 - $25.75	206,980	2.39	25.20	11	206,980	2.39	25.20	11
$25.76 - $66.68	270,135	8.84	66.53	3	1,318	0.48	36.40	—
Total	571,380	5.40	$ 43.84	$ 19	302,563	2.30	$ 23.55	$ 16

The aggregate intrinsic value in the above table represents the total pre-tax intrinsic value (i.e., the difference between our closing stock price on December 29, 2017 of $76.83 and the exercise price, times the number of shares) based on stock options with an exercise price less than Nasdaq's closing price of $76.83 as of December 29, 2017, which would have been received by the option holders had the option holders exercised their stock options on that date. This amount can change based on the fair market value of our common stock. The total number of in-the-money stock options exercisable as of December 31, 2017 was 0.3 million and the weighted-average exercise price was $23.55 . As of December 31, 2016 , 1.4 million outstanding stock options were exercisable and the weighted-average exercise price was $22.32 .

The total pre-tax intrinsic value of stock options exercised was $54 million during 2017, $40 million during 2016 and $17 million during 2015.

ESPP

We have an ESPP under which approximately 2.1 million shares of our common stock have been reserved for future issuance as of December 31, 2017 . Under our ESPP, employees may purchase shares having a value not exceeding 10.0% of their annual compensation, subject to applicable annual Internal Revenue Service limitations. We record compensation expense related to the 15.0% discount that is given to our employees. The following table summarizes employee activity and expense associated with the ESPP for the years ended December 31, 2017, 2016 and 2015.

	Year Ended December 31,		
	2017	2016	2015
Number of shares purchased by employees	235,859	233,464	247,444
Weighted-average price of shares purchased	$ 58.26	$ 50.39	$ 40.95
Compensation expense (in millions)	$ 3	$ 4	$ 4

14. Nasdaq Stockholders' Equity

Common Stock

As of December 31, 2017 , 300,000,000 shares of our common stock were authorized, 172,373,432 shares were issued and 167,441,030 shares were outstanding. The holders of common stock are entitled to one vote per share, except that our certificate of incorporation limits the ability of any person to vote in excess of 5.0% of the then-outstanding shares of Nasdaq common stock.

Common Stock in Treasury, at Cost

We account for the purchase of treasury stock under the cost method with the shares of stock repurchased reflected as a reduction to Nasdaq stockholders' equity and included in common stock in treasury, at cost in the Consolidated Balance Sheets. Shares repurchased under our share repurchase program are currently retired and canceled. When treasury shares are reissued, they are recorded at the average cost of the treasury shares acquired. We held 4,932,402 shares of common stock in treasury as of December 31, 2017 and 3,921,718 shares as of December 31, 2016, most of which are related to shares of our common stock repurchased for the settlement of employee tax withholding obligations arising from the vesting of restricted stock.

Share Repurchase Program

In the fourth quarter of 2014, our board of directors authorized the repurchase of up to $500 million of our outstanding common stock and in the first quarter of 2016, our board of directors authorized the repurchase of an additional $370 million of our outstanding common stock under our share repurchase program.

These purchases may be made from time to time at prevailing market prices in open market purchases, privately-negotiated transactions, block purchase techniques or otherwise, as determined by our management. The purchases are primarily funded from existing cash balances. The share repurchase program may be suspended, modified or discontinued at any time.

The following table summarizes our share repurchase activity:

	Year Ended December 31,	
	2017	2016
Number of shares of common stock repurchased	2,843,519	1,547,778
Average price paid per share	$ 71.56	$ 64.42
Total purchase price (in millions)	$ 203	$ 100

As discussed above in "Common Stock in Treasury, at Cost," shares repurchased under our share repurchase program are currently retired and cancelled. As of December 31, 2017 , the remaining amount authorized for share repurchases under the program was $226 million . In January 2018, the board of directors authorized an additional $500 million for the share repurchase program bringing the total capacity to $726 million .

See "Definitive Agreement to Sell our Public Relations Solutions and Digital Media Services Businesses," of Note 21, "Subsequent Events," for further discussion.

Other Repurchases of Common Stock

For the year ended December 31, 2017 , we repurchased 1,008,882 shares of our common stock in settlement of employee tax withholding obligations arising from the vesting of restricted stock.

Preferred Stock

Our certificate of incorporation authorizes the issuance of 30,000,000 shares of preferred stock, par value $0.01 per share, issuable from time to time in one or more series. As of December 31, 2017 and December 31, 2016, no shares of preferred stock were issued or outstanding.

* * * * * *

Cash Dividends on Common Stock

During 2017, our board of directors declared the following cash dividends:

Declaration Date	Dividend Per Common Share	Record Date	Total Amount Paid	Payment Date
			(in millions)	
January 30, 2017	$ 0.32	March 17, 2017	$ 53	March 31, 2017
April 25, 2017	0.38	June 16, 2017	63	June 30, 2017
July 25, 2017	0.38	September 15, 2017	64	September 29, 2017
October 24, 2017	0.38	December 15, 2017	63	December 29, 2017
			$ 243	

The total amount paid of $243 million was recorded in retained earnings in the Consolidated Balance Sheets as of December 31, 2017 .

In April 2017, the board of directors declared a regular quarterly cash dividend of $0.38 per share on our outstanding common stock which reflected a 19.0% increase from our prior quarterly cash dividend of $0.32 . In addition, in April 2017, our board of directors adopted a dividend policy with the intention to provide shareholders with regular and growing dividends over the long term as earnings and cash flow grow.

In January 2018, the board of directors declared a regular quarterly cash dividend of $0.38 per share on our outstanding common stock. The dividend is payable on March 30, 2018 to shareholders of record at the close of business on March 16, 2018. The estimated amount of this dividend is $64 million . Future declarations of quarterly dividends and the establishment of future record and payment dates are subject to approval by the board of directors.

Accumulated Other Comprehensive Loss

The following table outlines the components of accumulated other comprehensive loss:

	Foreign Currency Translation Adjustments	Employee Benefit Plan Adjustments	Accumulated Other Comprehensive Loss
		(in millions)	
Gross balance, December 31, 2016	$ (1,481)	$ (35)	$ (1,516)
Income taxes	523	14	537
Net balance, December 31, 2016	$ (958)	$ (21)	$ (979)
Gross balance, December 31, 2017	$ (1,268)	$ (37)	$ (1,305)
Income taxes	428	15	443
Net balance, December 31, 2017	$ (840)	$ (22)	$ (862)

Foreign currency translation adjustments include cumulative gains (losses) on foreign currency translation adjustments from non-U.S. subsidiaries for which the functional currency is other than the U.S. dollar.

Employee benefit plan adjustments represent unrecognized net actuarial gains (losses) related to the Nasdaq Benefit Plans.

15. Earnings Per Share

The following table sets forth the computation of basic and diluted earnings per share:

	Year Ended December 31,		
	2017	2016	2015
	(in millions, except share and per share amounts)		
Numerator:			
Net income attributable to common shareholders	$ 734	$ 108	$ 428
Denominator:			
Weighted-average common shares outstanding for basic earnings per share	166,364,299	165,182,290	167,285,450
Weighted-average effect of dilutive securities:			
Employee equity awards	2,861,892	3,258,136	3,638,981
Contingent issuance of common stock	358,840	360,571	358,840
Weighted-average common shares outstanding for diluted earnings per share	169,585,031	168,800,997	171,283,271
Basic and diluted earnings per share:			
Basic earnings per share	$ 4.41	$ 0.65	$ 2.56
Diluted earnings per share	$ 4.33	$ 0.64	$ 2.50

Stock options to purchase 571,380 shares of common stock and 3,331,462 shares of restricted stock and PSUs were outstanding as of December 31, 2017 . For the year ended December 31, 2017 , we included 302,563 of the outstanding stock options and 2,978,856 shares of restricted stock and PSUs in the computation of diluted earnings per share, on a weighted-average basis, as their inclusion was dilutive. The remaining stock options, shares of restricted stock and PSUs are antidilutive, and as such, they were properly excluded.

Stock options to purchase 1,406,371 shares of common stock and 4,254,012 shares of restricted stock and PSUs were outstanding as of December 31, 2016 . For the year ended December 31, 2016 , we included all of the outstanding stock options and 3,663,919 shares of restricted stock and PSUs in the computation of diluted earnings per share, on a weighted-average basis, as their inclusion was dilutive. The remaining shares of restricted stock and PSUs are antidilutive, and as such, they were properly excluded.

Stock options to purchase 2,626,487 shares of common stock and 5,207,423 shares of restricted stock and PSUs were outstanding as of December 31, 2015 . For the year ended December 31, 2015 , we included all of the outstanding stock options and 4,842,383 shares of restricted stock and PSUs in the computation of diluted earnings per share, on a weighted-average basis, as their inclusion was dilutive. The remaining shares of restricted stock and PSUs are antidilutive, and as such, they were properly excluded.

16. Fair Value of Financial Instruments

The following table presents our financial assets that are measured at fair value on a recurring basis as of December 31, 2017 and December 31, 2016 . We did not have any financial liabilities measured at fair value on a recurring basis as of December 31, 2017 and December 31, 2016 .

	December 31, 2017			
	Total	Level 1	Level 2	Level 3
	(in millions)			
Financial investments, at fair value	$ 235	$ 135	$ 100	$ —
Default fund and margin deposit investments	2,129	371	1,758	—
Total	$ 2,364	$ 506	$ 1,858	$ —

	December 31, 2016			
	Total	Level 1	Level 2	Level 3
	(in millions)			
Financial investments, at fair value	$ 245	$ 151	$ 94	$ —
Default fund and margin deposit investments	1,900	614	1,286	—
Total	$ 2,145	$ 765	$ 1,380	$ —

Our Level 1 financial investments, at fair value were comprised of trading securities, mainly highly rated European government debt securities. Level 2 financial investments, at fair value were primarily comprised of trading securities, mainly European mortgage and corporate bonds, as of December 31, 2017 and were primarily comprised of available-for-sale investment securities in short-term commercial paper and trading securities, mainly European mortgage and corporate bonds, as of December 31, 2016. Of the Level 1 and Level 2 financial investments, at fair value, $160 million as of December 31, 2017 and $172 million as of December 31, 2016 are assets utilized to meet regulatory capital requirements, primarily for our clearing operations at Nasdaq Clearing.

Our default fund and margin deposit investments include cash contributions invested by Nasdaq Clearing, in accordance with its investment policy. Of the total balance of $3,988 million recorded in the Consolidated Balance Sheets as of December 31, 2017 , $1,909 million of cash contributions have been invested in highly rated European and U.S. government debt securities or central bank certificates and $220 million in reverse repurchase agreements. The remainder of this balance is held in cash. Of the total balance of $3,301 million recorded in the Consolidated Balance Sheets as of December 31, 2016 , $1,763 million of cash contributions have been invested in highly rated European and U.S. government debt securities and central bank certificates and $137 million of cash contributions have been invested in reverse repurchase agreements. The remainder of this balance is held in cash. See Note 17, “Clearing Operations,” for further discussion of default fund contributions and margin deposits.

There were no transfers between Level 1 and Level 2 of the fair value hierarchy as of December 31, 2017 and December 31, 2016 .

Financial Instruments Not Measured at Fair Value on a Recurring Basis

Some of our financial instruments are not measured at fair value on a recurring basis but are recorded at amounts that approximate fair value due to their liquid or short-term nature. Such financial assets and financial liabilities include: cash and cash equivalents, restricted cash, receivables, net, certain other current assets, accounts payable and accrued expenses, Section 31 fees payable to SEC, accrued personnel costs, commercial paper and certain other current liabilities.

In addition, our investments in OCC and EuroCCP N.V. are accounted for under the equity method of accounting and our investments in Borsa Istanbul and LCH.Clearnet Group Limited are carried at cost. See “Equity Method Investments,” and “Cost Method Investments,” of Note 7, “Investments,” for further discussion.

We also consider our debt obligations to be financial instruments. The fair value of our debt obligations, utilizing discounted cash flow analyses for our floating rate debt and prevailing market rates for our fixed rate debt, was $4.4 billion as of December 31, 2017 and $3.8 billion as of December 31, 2016 . The discounted cash flow analyses are based on borrowing rates currently available to us for debt with similar terms and maturities. The fair value of our commercial paper approximates the carrying value since the rates of interest on this short-term debt approximate market rates as of December 31, 2017 . Our commercial paper and our fixed rate and floating rate debt are categorized as Level 2 in the fair value hierarchy.

For further discussion of our debt obligations, see Note 10, “Debt Obligations.”

Non-Financial Assets Measured at Fair Value on a Non-Recurring Basis

Our non-financial assets, which include goodwill, intangible assets, and other long-lived assets, are not required to be carried at fair value on a recurring basis. Fair value measures of non-financial assets are primarily used in the impairment analysis of these assets. Any resulting asset impairment would require that the non-financial asset be recorded at its fair value. Nasdaq uses Level 3 inputs to measure the fair value of the above assets on a non-recurring basis. As of December 31, 2017 and December 31, 2016 , there were no non-financial assets measured at fair value on a non-recurring basis.

17. Clearing Operations

Nasdaq Clearing

Nasdaq Clearing is authorized and supervised under EMIR as a multi-asset clearinghouse by the SFSA and is authorized to

conduct clearing operations in Norway by the Norwegian Ministry of Finance. The clearinghouse acts as the CCP for exchange and OTC trades in equity derivatives, fixed income derivatives, resale and repurchase contracts, power derivatives, emission allowance derivatives, freight and fuel oil derivatives, iron ore derivatives and seafood derivatives.

Through our clearing operations in the financial markets, which include the resale and repurchase market, the commodities markets, and the seafood market, Nasdaq Clearing is the legal counterparty for, and guarantees the fulfillment of, each contract cleared. These contracts are not used by Nasdaq Clearing for the purpose of trading on its own behalf. As the legal counterparty of each transaction, Nasdaq Clearing bears the counterparty risk between the purchaser and seller in the contract. In its guarantor role, Nasdaq Clearing has precisely equal and offsetting claims to and from clearing members on opposite sides of each contract, standing as the CCP on every contract cleared. In accordance with the rules and regulations of Nasdaq Clearing, clearing members' open positions are aggregated to create a single portfolio for which default fund and margin collateral requirements are calculated. See "Default Fund Contributions and Margin Deposits" below for further discussion of Nasdaq Clearing's default fund and margin requirements.

Nasdaq Clearing maintains four member sponsored default funds: one related to financial markets, one related to commodities markets, one related to the seafood market, and a mutualized fund. Under this structure, Nasdaq Clearing and its clearing members must contribute to the total regulatory capital related to the clearing operations of Nasdaq Clearing. This structure applies an initial separation of default fund contributions for the financial, commodities and seafood markets in order to create a buffer for each market's counterparty risks. Simultaneously, a mutualized default fund provides capital efficiencies to Nasdaq Clearing's members with regard to total regulatory capital required. See "Default Fund Contributions" below for further discussion of Nasdaq Clearing's default fund. Power of assessment and a liability waterfall also have been implemented. See "Power of Assessment" and "Liability Waterfall" below for further discussion. These requirements ensure the alignment of risk between Nasdaq Clearing and its clearing members.

Default Fund Contributions and Margin Deposits

As of December 31, 2017 , clearing member default fund contributions and margin deposits were as follows:

	December 31, 2017		
	Cash Contributions	Non-Cash Contributions	Total Contributions
	(in millions)		
Default fund contributions	$ 360	$ 130	$ 490
Margin deposits	3,628	4,047	7,675
Total	$ 3,988	$ 4,177	$ 8,165

In accordance with its investment policy, of the total cash contributions of $3,988 million , Nasdaq Clearing has invested $1,909 million in highly rated European and U.S. government debt securities or central bank certificates and $220 million in reverse repurchase agreements. The remainder of this balance is held in cash. Of the total default fund contributions of $490 million , Nasdaq Clearing can utilize $454 million as capital resources in the event of a counterparty default. The remaining balance of $36 million pertains to member posted surplus balances.

Default Fund Contributions

Contributions made to the default funds are proportional to the exposures of each clearing member. When a clearing member is active in more than one market, contributions must be made to all markets' default funds in which the member is active. Clearing members' eligible contributions may include cash and non-cash contributions. Cash contributions received are held in cash or invested by Nasdaq Clearing, in accordance with its investment policy, either in highly rated government debt securities, time deposits, central bank certificates or reverse repurchase agreements with highly rated government debt securities as collateral. Nasdaq Clearing maintains and manages all cash deposits related to margin collateral. All risks and rewards of collateral ownership, including interest, belong to Nasdaq Clearing. Clearing members' cash contributions are included in default funds and margin deposits in the Consolidated Balance Sheets as both a current asset and a current liability. Non-cash contributions include highly rated government debt securities that must meet specific criteria approved by Nasdaq Clearing. Non-cash contributions are pledged assets that are not recorded in the Consolidated Balance Sheets as Nasdaq Clearing does not take legal ownership of these assets and the risks and rewards remain with the clearing members. These balances may fluctuate over time due to changes in the amount of deposits required and whether members choose to provide cash or non-cash contributions. Assets pledged are held at a nominee account in Nasdaq Clearing's name for the benefit of the clearing members and are immediately accessible by Nasdaq Clearing in the event of a default. In addition to clearing members' required contributions to the liability waterfall, Nasdaq Clearing is also required to contribute capital to the liability waterfall and overall regulatory capital as specified under its clearinghouse rules. As of December 31, 2017 , Nasdaq Clearing committed capital totaling $114 million to the liability waterfall and overall regulatory capital, in the form of government debt securities, which are recorded as financial investments, at fair value in the Consolidated Balance Sheets. The combined regulatory capital of the clearing members and Nasdaq Clearing will serve to secure the obligations of a clearing member and may be used to cover losses sustained by a clearing member in the event of a default.

Margin Deposits

Nasdaq Clearing requires all clearing members to provide collateral, which may consist of cash and non-cash contributions, to guarantee performance on the clearing

members' open positions, or initial margin. In addition, clearing members must also provide collateral to cover the daily margin call if needed. See "Default Fund Contributions" above for further discussion of cash and non-cash contributions.

Similar to default fund contributions, Nasdaq Clearing maintains and manages all cash deposits related to margin collateral. All risks and rewards of collateral ownership, including interest, belong to Nasdaq Clearing. These cash deposits are recorded in default funds and margin deposits in the Consolidated Balance Sheets as both a current asset and current liability. Pledged margin collateral is not recorded in our Consolidated Balance Sheets as all risks and rewards of collateral ownership, including interest, belong to the counterparty. Assets pledged are held at a nominee account in Nasdaq Clearing's name for the benefit of the clearing members and are immediately accessible by Nasdaq Clearing in the event of a default.

Nasdaq Clearing marks to market all outstanding contracts and requires payment from clearing members whose positions have lost value. The mark-to-market process helps identify any clearing members that may not be able to satisfy their financial obligations in a timely manner allowing Nasdaq Clearing the ability to mitigate the risk of a clearing member defaulting due to exceptionally large losses. In the event of a default, Nasdaq Clearing can access the defaulting member's margin deposits to cover the defaulting member's losses.

Regulatory Capital and Risk Management Calculations

Nasdaq Clearing manages risk through a comprehensive counterparty risk management framework, which is comprised of policies, procedures, standards and financial resources. The level of regulatory capital is determined in accordance with Nasdaq Clearing's regulatory capital policy, as approved by the SFSA. Regulatory capital calculations are continuously updated through a proprietary capital-at-risk calculation model that establishes the appropriate level of capital.

As mentioned above, Nasdaq Clearing is the legal counterparty for each contract traded and thereby guarantees the fulfillment of each contract. Nasdaq Clearing accounts for this guarantee as a performance guarantee. We determine the fair value of the performance guarantee by considering daily settlement of contracts and other margining and default fund requirements, the risk management program, historical evidence of default payments, and the estimated probability of potential default payouts. The calculation is determined using proprietary risk management software that simulates gains and losses based on historical market prices, extreme but plausible market scenarios, volatility and other factors present at that point in time for those particular unsettled contracts. Based on this analysis, the estimated liability was nominal and no liability was recorded as of December 31, 2017 .

The market value of derivative contracts outstanding prior to netting was as follows:

	December 31, 2017
	(in millions)
Commodity and seafood options, futures and forwards [1][2][3]	$ 524
Fixed-income options and futures [1][2]	729
Stock options and futures [1][2]	132
Index options and futures [1][2]	111
Total	$ 1,496

(1) We determined the fair value of our option contracts using standard valuation models that were based on market-based observable inputs including implied volatility, interest rates and the spot price of the underlying instrument.

(2) We determined the fair value of our futures contracts based upon quoted market prices and average quoted market yields.

(3) We determined the fair value of our forward contracts using standard valuation models that were based on market-based observable inputs including LIBOR rates and the spot price of the underlying instrument.

The total number of derivative contracts cleared through Nasdaq Clearing for the years ended December 31, 2017 and 2016 was as follows:

	December 31, 2017	December 31, 2016
Commodity and seafood options, futures and forwards [1]	2,824,188	3,530,746
Fixed-income options and futures	20,376,383	14,639,065
Stock options and futures	26,023,816	28,496,143
Index options and futures	44,928,284	50,636,527
Total	94,152,671	97,302,481

(1) The total volume in cleared power related to commodity contracts was 1,199 Terawatt hours (TWh) for the year ended December 31, 2017 and 1,658 TWh for the year ended December 31, 2016 .

The outstanding contract value of resale and repurchase agreements was $2.3 billion as of December 31, 2017 and $1.9 billion as of December 31, 2016 . The total number of contracts cleared was 8,534,986 for the year ended December 31, 2017 and was 7,941,666 for the year ended December 31, 2016 .

Power of Assessment

To further strengthen the contingent financial resources of the clearinghouse, Nasdaq Clearing has power of assessment that provides the ability to collect additional funds from its clearing members to cover a defaulting member's remaining obligations up to the limits established under the terms of the clearinghouse rules. The power of assessment corresponds to 100.0% of the clearing member's aggregate contribution to the financial, commodities and seafood markets' default funds.

Liability Waterfall

The liability waterfall is the priority order in which the capital resources would be utilized in the event of a default where the defaulting clearing member's collateral would not be sufficient to cover the cost to settle its portfolio. If a default occurs and the defaulting clearing member's collateral, including cash deposits and pledged assets, is depleted, then capital is utilized in the following amount and order:

- junior capital contributed by Nasdaq Clearing, which totaled $18 million as of December 31, 2017 ;
- a loss sharing pool related only to the financial market that is contributed to by clearing members and only applies if the defaulting member's portfolio includes interest rate swap products;
- specific market default fund where the loss occurred (i.e., the financial, commodities, or seafood market), which includes capital contributions of the clearing members on a pro-rata basis;
- senior capital contributed to each specific market by Nasdaq Clearing, calculated in accordance with clearinghouse rules, which totaled $24 million as of December 31, 2017 ; and
- mutualized default fund, which includes capital contributions of the clearing members on a pro-rata basis.

If additional funds are needed after utilization of the mutualized default fund, then Nasdaq Clearing will utilize its power of assessment and additional capital contributions will be required by non-defaulting members up to the limits established under the terms of the clearinghouse rules.

18. Leases

We lease some of our office space under non-cancelable operating leases with third parties and sublease office space to third parties. Some of our lease agreements contain renewal options and escalation clauses based on increases in property taxes and building operating costs.

As of December 31, 2017 , future minimum lease payments under non-cancelable operating leases (net of sublease income) are as follows:

	Gross Lease Commitments	Sublease Income	Net Lease Commitments
		(in millions)	
Year ending December 31:			
2018	$ 90	$ 3	$ 87
2019	76	3	73
2020	70	3	67
2021	57	3	54
2022	51	3	48
Thereafter	113	3	110
Total future minimum lease payments	$ 457	$ 18	$ 439

Rent expense for operating leases (net of sublease income of $3 million in 2017, $4 million in 2016, and $5 million in 2015) was $83 million in 2017, $78 million in 2016, and $88 million in 2015.

19. Commitments, Contingencies and Guarantees

Guarantees Issued and Credit Facilities Available

In addition to the default fund contributions and margin collateral pledged by clearing members discussed in Note 17, "Clearing Operations," we have obtained financial guarantees and credit facilities which are guaranteed by us through counter indemnities, to provide further liquidity related to our clearing businesses. Financial guarantees issued to us totaled $14 million as of December 31, 2017 and $13 million as of December 31, 2016 . As discussed in "Other Credit Facilities," of Note 10, "Debt Obligations," clearing-related credit facilities, which are available in multiple currencies, totaled $187 million as of December 31, 2017 and $170 million as of December 31, 2016 , in available liquidity, none of which was utilized.

Execution Access is an introducing broker which operates the trading platform for our Fixed Income business to trade in U.S. Treasury securities. Execution Access has a clearing arrangement with Cantor Fitzgerald. As of December 31, 2017 , we have contributed $19 million of clearing deposits to Cantor Fitzgerald in connection with this clearing arrangement. These deposits are recorded in other current assets in our Consolidated Balance Sheets. This clearing agreement will end on July 31, 2018, and will be replaced by a clearing agreement with ICBC. Some of the trading activity in Execution Access is cleared by Cantor Fitzgerald (and similarly will be by ICBC after July 31, 2018) through the Fixed Income Clearing Corporation. Execution Access assumes the counterparty risk of clients that do not clear through the Fixed Income Clearing Corporation. Counterparty risk of clients exists for Execution Access between the trade date and the settlement date of the individual transactions, which is at least one business day (or more, if specified by the U.S. Treasury issuance calendar). All of Execution Access' obligations under the clearing arrangement with Cantor Fitzgerald are guaranteed by Nasdaq. Counterparties that do not clear through the Fixed Income Clearing Corporation are subject to a credit due diligence

process and may be required to post collateral, provide principal letters, or provide other forms of credit enhancement to Execution Access for the purpose of mitigating counterparty risk. Daily position trading limits are also enforced for such counterparties.

We believe that the potential for us to be required to make payments under these arrangements is mitigated through the pledged collateral and our risk management policies. Accordingly, no contingent liability is recorded in the Consolidated Balance Sheets for these arrangements. However, no guarantee can be provided that these arrangements will at all times be sufficient.

Lease Commitments

We lease some of our office space under non-cancelable operating leases with third parties and sublease office space to third parties. Some of our lease agreements contain renewal options and escalation clauses based on increases in property taxes and building operating costs.

In February 2018, we entered into a lease agreement as part of a plan to relocate our world headquarters. See "New World Headquarters," of Note 21, "Subsequent Events," for further discussion.

Other Guarantees

We have provided other guarantees of $3 million as of December 31, 2017 and December 31, 2016 . These guarantees are primarily related to obligations for our rental and leasing contracts as well as performance guarantees on certain market technology contracts related to the delivery of software technology and support services. We have received financial guarantees from various financial institutions to support the above guarantees.

Through our clearing operations in the financial markets, Nasdaq Clearing is the legal counterparty for, and guarantees the performance of, its clearing members. See Note 17, "Clearing Operations," for further discussion of Nasdaq Clearing performance guarantees.

We have provided a guarantee related to lease obligations for The Nasdaq Entrepreneurial Center, Inc. which is a not-for-profit organization designed to convene, connect and engage aspiring and current entrepreneurs. This entity is not included in the consolidated financial statements of Nasdaq.

We believe that the potential for us to be required to make payments under these arrangements is unlikely. Accordingly, no contingent liability is recorded in the Consolidated Balance Sheets for the above guarantees.

Non-Cash Contingent Consideration

As part of the purchase price consideration of a prior acquisition, we have agreed to future annual issuances of 992,247 shares of Nasdaq common stock which approximated certain tax benefits associated with the transaction. Such contingent future issuances of Nasdaq common stock will be paid ratably through 2027 if Nasdaq's total gross revenues equal or exceed $25 million in each such year. The contingent future issuances of Nasdaq common stock are subject to anti-dilution protections and acceleration upon certain events.

Escrow Agreements

In connection with prior acquisitions, we entered into escrow agreements to secure the payment of post-closing adjustments and to ensure other closing conditions. As of December 31, 2017 , these escrow agreements provide for future payment of $18 million , of which $14 million is included in other current liabilities and $4 million is included in other non-current liabilities in the Consolidated Balance Sheets.

Routing Brokerage Activities

One of our broker-dealer subsidiaries, Nasdaq Execution Services, provides a guarantee to securities clearinghouses and exchanges under its standard membership agreements, which require members to guarantee the performance of other members. If a member becomes unable to satisfy its obligations to a clearinghouse or exchange, other members would be required to meet its shortfalls. To mitigate these performance risks, the exchanges and clearinghouses often require members to post collateral, as well as meet certain minimum financial standards. Nasdaq Execution Services' maximum potential liability under these arrangements cannot be quantified. However, we believe that the potential for Nasdaq Execution Services to be required to make payments under these arrangements is unlikely. Accordingly, no contingent liability is recorded in the Consolidated Balance Sheets for these arrangements.

Legal and Regulatory Matters

As previously disclosed, we were named as a defendant in a putative class action, Rabin v. NASDAQ OMX PHLX LLC, et al., No. 15-551 (E.D. Pa.), filed in 2015 in the United States District Court for the Eastern District of Pennsylvania. On April 21, 2016, the court entered an order granting our motion to dismiss the complaint. The plaintiff appealed the dismissal to the Court of Appeals for the Third Circuit on May 18, 2016. On October 25, 2017, the Third Circuit issued a decision affirming the dismissal of the case, and on November 22, 2017, denied a petition for rehearing and rehearing en banc.

We also are named as one of many defendants in City of Providence v. BATS Global Markets, Inc., et al., 14 Civ. 2811 (S.D.N.Y.), which was filed on April 18, 2014 in the United States District Court for the Southern District of New York. The district court appointed lead counsel, who filed an amended complaint on September 2, 2014. The amended complaint names as defendants seven national exchanges, as well as Barclays PLC, which operated a private alternative trading

system. On behalf of a putative class of securities traders, the plaintiffs allege that the defendants engaged in a scheme to manipulate the markets through high-frequency trading; the amended complaint asserts claims against us under Section 10(b) of the Exchange Act and Rule 10b-5, as well as under Section 6(b) of the Exchange Act. The plaintiffs seek injunctive and monetary relief of an unspecified amount. We filed a motion to dismiss the amended complaint on November 3, 2014. In response, the plaintiffs filed a second amended complaint on November 24, 2014, which names the same defendants and alleges essentially the same violations. We then filed a motion to dismiss the second amended complaint on January 23, 2015. On August 26, 2015, the district court entered an order dismissing the second amended complaint in its entirety with prejudice, concluding that most of the plaintiffs' theories were foreclosed by absolute immunity and in any event that the plaintiffs failed to state any claim. The plaintiffs appealed the judgment of dismissal to the United States Court of Appeals for the Second Circuit. The Second Circuit heard oral argument on August 24, 2016. On August 25, 2016, the Second Circuit issued an order requesting the SEC's views on whether the district court had subject-matter jurisdiction over the case, and whether the defendants are immune from suit regarding the challenged conduct. The SEC filed its brief on November 28, 2016. The exchanges and plaintiffs filed supplemental briefs responding to the SEC's brief on December 12, 2016. On December 19, 2017, the Second Circuit issued an opinion vacating the district court's judgment of dismissal and remanding to the district court for further proceedings. The exchanges filed a petition before the Second Circuit seeking panel or en banc rehearing on January 31, 2018, addressing Section 10(b) and Rule 10b-5 issues and absolute immunity. Given the preliminary nature of the proceedings, we are unable to estimate what, if any, liability may result from this litigation. However, we believe (as the district court concluded) that the claims are without merit and will continue to litigate vigorously.

Except as disclosed above and in prior reports filed under the Exchange Act, we are not currently a party to any litigation or proceeding that we believe could have a material adverse effect on our business, consolidated financial condition, or operating results. However, from time to time, we have been threatened with, or named as a defendant in, lawsuits or involved in regulatory proceedings.

In the normal course of business, Nasdaq discusses matters with its regulators raised during regulatory examinations or otherwise subject to their inquiry and oversight. These matters could result in censures, fines, penalties or other sanctions. Management believes the outcome of any resulting actions will not have a material impact on its consolidated financial position or results of operations. However, we are unable to predict the outcome or the timing of the ultimate resolution of these matters, or the potential fines, penalties or injunctive or other equitable relief, if any, that may result from these matters.

Tax Audits

We are engaged in ongoing discussions and audits with taxing authorities on various tax matters, the resolutions of which are uncertain. Currently, there are matters that may lead to assessments, some of which may not be resolved for several years. Based on currently available information, we believe we have adequately provided for any assessments that could result from those proceedings where it is more likely than not that we will be assessed. We review our positions on these matters as they progress.

20. Business Segments

We manage, operate and provide our products and services in four business segments: Market Services, Corporate Services, Information Services and Market Technology. See Note 1, "Organization and Nature of Operations," for further discussion of our reportable segments.

Our management allocates resources, assesses performance and manages these businesses as four separate segments. We evaluate the performance of our segments based on several factors, of which the primary financial measure is operating income. Results of individual businesses are presented based on our management accounting practices and structure.

The following table presents certain information regarding our operating segments for the years ended December 31, 2017 , 2016 and 2015 :

	Market Services	Corporate Services	Information Services	Market Technology	Corporate Items	Consolidated
			(in millions)			
2017						
Total revenues	$ 2,418	$ 656	$ 588	$ 303	$ —	$ 3,965
Transaction-based expenses	(1,537)	—	—	—	—	(1,537)
Revenues less transaction-based expenses	881	656	588	303	—	2,428
Depreciation and amortization	95	49	25	$ 19	—	188
Operating income (loss)	481	184	418	$ 65	(149)	999
Total assets	9,471	866	3,420	627	1,402	15,786
Purchase of property and equipment	59	41	10	34	—	144
2016						
Total revenues	$ 2,255	$ 635	$ 540	$ 275	$ —	$ 3,705
Transaction-based expenses	(1,428)	—	—	—	—	(1,428)
Revenues less transaction-based expenses	827	635	540	275	—	2,277
Depreciation and amortization	87	47	18	18	—	170
Operating income (loss)	450	158	383	69	(221)	839
Total assets	8,626	1,263	2,439	559	1,263	14,150
Purchase of property and equipment	62	37	8	27	—	134
2015						
Total revenues	$ 2,084	$ 562	$ 512	$ 245	$ —	$ 3,403
Transaction-based expenses	(1,313)	—	—	—	—	(1,313)
Revenues less transaction-based expenses	771	562	512	245	—	2,090
Depreciation and amortization	64	42	14	18	—	138
Operating income (loss)	413	140	365	58	(256)	720
Total assets	6,906	576	2,456	752	1,171	11,861
Purchase of property and equipment	53	38	11	31	—	133

Certain amounts are allocated to corporate items in our management reports based on the decision that those activities should not be used to evaluate the segment's ongoing operating performance. The following items are allocated to corporate items for segment reporting purposes:

Amortization expense of acquired intangible assets: We amortize intangible assets acquired in connection with various acquisitions. Intangible asset amortization expense can vary from period to period due to episodic acquisitions completed, rather than from our ongoing business operations. As such, if intangible asset amortization is included in performance measures, it is more difficult to assess the day-to-day operating performance of the segments, and the relative operating performance of the segments between periods. Management does not consider intangible asset amortization expense for the purpose of evaluating the performance of our segments or their managers or when making decisions to allocate resources. Therefore, we believe performance measures excluding intangible asset amortization expense provide management with a more useful representation of our segments' ongoing activity in each period.

Merger and strategic initiatives expense: We have pursued various strategic initiatives and completed a number of acquisitions in recent years which have resulted in expenses which would not have otherwise been incurred. These expenses generally include integration costs, as well as legal, due diligence and other third party transaction costs. The frequency and the amount of such expenses vary significantly based on the size, timing and complexity of the transaction. Accordingly, we do not allocate these costs for purposes of disclosing segment results because they do not contribute to a meaningful evaluation of a particular segment's ongoing operating performance.

Restructuring charges: Restructuring charges are associated with our 2015 restructuring plan to improve performance, cut costs and reduce spending and are primarily related to (i) severance and other termination benefits, (ii) asset impairment charges, and (iii) other charges. We do not allocate these restructuring costs because they do not contribute to a meaningful evaluation of a particular segment's ongoing operating performance.

Other significant items: We have excluded certain other charges or gains that are the result of other non-comparable events to measure operating performance. For the year ended December 31, 2017, other significant items included loss on extinguishment of debt and a sublease loss reserve charge recorded on space we currently occupy due to excess capacity. For 2016, other significant items primarily included a regulatory fine received by our exchange in Stockholm and Nasdaq Clearing, the release of a sublease loss reserve due to the early exit of a facility and costs associated with the acceleration of previously granted equity awards due to the retirement of our former CEO. For 2015, other significant items included the reversal of a VAT refund. We believe the exclusion of such amounts allows management and investors to better understand the financial results of Nasdaq.

* * * * * *

A summary of our corporate items is as follows:

	Year Ended December 31,		
	2017	2016	2015
	(in millions)		
Amortization expense of acquired intangible assets	$ 92	$ 82	$ 62
Merger and strategic initiatives expense	44	76	10
Restructuring charges	—	41	172
Loss on extinguishment of debt	10	—	—
Regulatory matter	1	6	—
Sublease loss reserve	2	(1)	—
Reversal of VAT refund receivables	—	—	12
Executive compensation	—	12	—
Other	—	5	—
Total	$ 149	$ 221	$ 256

Total assets increased $1,636 million as of December 31, 2017 compared with December 31, 2016 primarily due to an increase in default funds and margin deposits, reflecting an increase in cash margin deposits pledged by members of our Nasdaq Clearing business resulting from an increase in clearing volume. Also contributing to the increase is an increase in goodwill and intangible assets associated with our 2017 acquisitions, partially offset by a decrease in deferred tax assets primarily due to the impact of the Tax Cuts and Jobs Act. See Note 11, "Income Taxes," for further discussion. Total assets increased $2,289 million as of December 31, 2016 compared with December 31, 2015 primarily due to new regulatory rules in 2016 that require all collateral pledged by members of our Nasdaq Clearing business to be recorded on the balance sheet and an increase in goodwill associated with our 2016 acquisitions, partially offset by a pre-tax, non-cash intangible asset impairment charge of $578 million to write off the full value of the eSpeed trade name. For further discussion of the impairment charge, see "Intangible Asset Impairment Charges," of Note 6, "Goodwill and Acquired Intangible Assets."

For further discussion of our segments' results, see "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations—Segment Operating Results."

Geographic Data

The following table presents total revenues and property and equipment, net by geographic area for 2017, 2016 and 2015. Revenues are classified based upon the location of the customer. Property and equipment information is based on the physical location of the assets.

	Total Revenues	Property and Equipment, Net
	(in millions)	
2017:		
United States	$ 3,062	$ 247
All other countries	903	153
Total	$ 3,965	$ 400
2016:		
United States	$ 2,659	$ 244
All other countries	1,046	118
Total	$ 3,705	$ 362
2015:		
United States	$ 2,408	$ 217
All other countries	995	106
Total	$ 3,403	$ 323

Our property and equipment, net for all other countries primarily includes assets held in Sweden.

No single customer accounted for 10.0% or more of our revenues in 2017, 2016 and 2015.

21. Subsequent Events

Definitive Agreement to Sell our Public Relations Solutions and Digital Media Services Businesses

In January 2018, we announced that we entered into a definitive agreement to sell our Public Relations Solutions and Digital Media Services businesses within our Corporate Solutions business for $335 million, subject to post-closing adjustments. The closing of this transaction, which is subject to regulatory approvals and customary closing conditions, is projected to occur in the second quarter of 2018. Nasdaq expects to use the proceeds from the sale for share repurchases. In conjunction with this, Nasdaq's board of directors has authorized an additional $500 million for the share repurchase program bringing the total capacity to $726 million .

New World Headquarters

In February 2018, we announced that we will consolidate our offices in New York City and move to a single location at MarketSite, 4 Times Square, New York, NY which will be our new world headquarters. As part of this plan, we entered into a new lease agreement for additional space at the MarketSite location.

Exhibit 12.1

Nasdaq, Inc.
Computation of Ratio of Earnings to Fixed Charges (Dollars in Millions)

	Year Ended December 31,				
	2017	**2016**	**2015**	**2014**	**2013**
Determination of earnings:					
Pre-tax income from continuing operations	$ 880	$ 136 [2]	$ 630 [2]	$ 594	$ 600 [3]
Add: distributed income from equity investees	10	5	—	—	—
Add: fixed charges	162	151	127	134	126
Less: income from unconsolidated investees	(16)	(9)	(18)	(2)	—
Pre-tax earnings before fixed charges	$ 1,036	$ 283	$ 739	$ 726	$ 726
Total fixed charges - interest expense [1]	$ 162	$ 151	$ 127	$ 134	$ 126
Ratio of earnings to fixed charges	6.40	1.87	5.82	5.42	5.76

[1] Consists of interest expense on all debt obligations (including accretion of debt issuance costs and debt discount) and the portion of operating lease rental expense that is representative of the interest factor.
[2] Includes an asset impairment charge of $578 million in 2016 and costs of $41 million in 2016 and $172 million in 2015 associated with Nasdaq's 2015 restructuring program that was announced in 2015.
[3] Includes costs of $9 million in 2013 associated with Nasdaq's 2012 restructuring program that was announced in 2012.

Exhibit 21.1

SUBSIDIARIES

U.S. Subsidiaries

1. A.S.A.P. Advisor Services, Inc. (incorporated in New York)
2. BoardVantage, Inc. (incorporated in Delaware)
3. Boston Stock Exchange Clearing Corporation (incorporated in Massachusetts)
4. BWise Internal Control, Inc. (incorporated in New York)
5. Channel Capital Group Inc. (incorporated in Delaware)
6. Consolidated Securities Source LLC (organized in Delaware)
7. Curzon Street Acquisition, LLC (organized in Delaware)
8. Dianum, LLC (organized in Delaware)
9. Directors Desk, LLC (organized in Delaware)
10. Dorsey, Wright & Associates, LLC (organized in Virginia)
11. ETC Acquisition Corp. (incorporated in Delaware)
12. eVestment Alliance Holdings, Inc. (incorporated in Delaware)
13. eVestment Alliance Holdings, LLC (organized in Georgia)
14. eVestment Alliance, LLC (organized in Georgia)
15. eVestment, Inc. (incorporated in Delaware)
16. ExactEquity, LLC (organized in Delaware)
17. Execution Access, LLC (organized in Delaware)
18. FinQloud LLC (organized in Delaware)
19. FINRA/NASDAQ Trade Reporting Facility LLC (organized in Delaware)
20. FTEN, Inc. (incorporated in Delaware)
21. Fundspire, Inc. (incorporated in Delaware)
22. Global Network Content Services, LLC (organized in Florida)
23. GlobeNewswire, Inc. (incorporated in California)
24. GraniteBlock, Inc. (incorporated in Delaware)
25. Granite Redux, Inc. (incorporated in Delaware)
26. Inet Futures Exchange, LLC (organized in Delaware)
27. International Securities Exchange Holdings, Inc. (incorporated in Delaware)
28. ISE ETF Ventures LLC (organized in Delaware)
29. Kleos Managed Services Holdings, LLC (organized in Delaware)
30. Kleos Managed Services, L.P. (organized in Delaware)
31. Longitude LLC (organized in Delaware)
32. Marketwire, Inc. (organized in California)
33. MW Holdco (2006) Inc. (organized in Delaware)
34. Nasdaq BX, Inc. (incorporated in Delaware)
35. Nasdaq Capital Markets Advisory LLC (organized in Delaware)
36. Nasdaq Commodities Clearing LLC (organized in Delaware)
37. Nasdaq Corporate Services, LLC (organized in Delaware)
38. Nasdaq Corporate Solutions, LLC (organized in Delaware)
39. NASDAQ Energy Futures, LLC (organized in Delaware)
40. Nasdaq Execution Services, LLC (organized in Delaware)
41. NASDAQ Futures, Inc. (incorporated in Pennsylvania)
42. Nasdaq GEMX, LLC (organized in Delaware)
43. NASDAQ Global, Inc. (incorporated in Delaware)
44. Nasdaq Information, LLC (organized in Delaware)
45. Nasdaq International Market Initiatives, Inc. (incorporated in Delaware)

46. Nasdaq ISE, LLC (organized in Delaware)
47. Nasdaq MRX, LLC (organized in Delaware)
48. NASDAQ OMX BX Equities LLC (organized in Delaware)
49. NASDAQ OMX (San Francisco) Insurance LLC (organized in Delaware)
50. Nasdaq PHLX LLC (organized in Delaware)
51. Nasdaq Technology Services, LLC (organized in Delaware)
52. Norway Acquisition LLC (organized in Delaware)
53. NPM Securities, LLC (organized in Delaware)
54. Operations & Compliance Network, LLC (incorporated in Delaware)
55. Public Plan IQ Limited Liability Company (organized in New Jersey)
56. SecondMarket Labs, LLC (organized in Delaware)
57. SecondMarket Solutions, Inc. (organized in Delaware)
58. SMTX, LLC (organized in Delaware)
59. Strategic Financial Solutions, LLC (organized in Nevada)
60. Sybenetix Inc. (incorporated in Delaware)
61. The Nasdaq Options Market LLC (organized in Delaware)
62. The NASDAQ Private Market, LLC (organized in California)
63. The Nasdaq Stock Market LLC (organized in Delaware)
64. The Stock Clearing Corporation of Philadelphia (incorporated in Pennsylvania)
65. U.S. Exchange Holdings, Inc. (incorporated in Delaware)

Non-U.S. Subsidiaries

1. 2157971 Ontario Ltd (organized in Canada)
2. AB Nasdaq Vilnius (organized in Lithuania) (96.35% owned, directly or indirectly, by Nasdaq, Inc.)
3. AS eCSD Expert (organized in Estonia)
4. AS Pensionikeskus (organized in Estonia)
5. BoardVantage (HK) Limited (organized in Hong Kong)
6. BoardVantage (UK) Limited (organized in the United Kingdom)
7. BoardVantage Singapore Pte. Limited (organized in Singapore)
8. BWise Beheer B.V. (organized in the Netherlands)
9. BWise B.V. (organized in the Netherlands)
10. BWise Germany GmbH (organized in Germany)
11. BWISE Holding B.V. (organized in the Netherlands)
12. Clearing Control CC AB (organized in Sweden)
13. Curzon Street Holdings Limited (organized in the United Kingdom)
14. Eignarhaldsfelagid Verdbrefathing hf. (organized in Iceland)
15. Ensoleillement Inc. (organized in Canada)
16. eVestment Alliance Australia Pty Ltd (organized in Australia)
17. eVestment Alliance Hong Kong Limited (organized in Hong Kong)
18. eVestment Alliance (UK) Limited (organized in the United Kingdom)
19. Farm Church Holdings ULC (organized in Canada)
20. Indxis Ltd (organized in the United Kingdom)
21. LLC "SYBENETIX UKRAINE" (organized in Ukraine)
22. Longitude S.A. (organized in Luxembourg)
23. Marketwire China Holding (HK) Ltd. (organized in Hong Kong)
24. Marketwired UK Ltd (organized in the United Kingdom)
25. Nasdaq AB (organized in Sweden)
26. Nasdaq (Asia Pacific) Pte. Ltd. (organized in Singapore)

27. Nasdaq Australia Holding Pty Ltd (organized in Australia)
28. Nasdaq Broker Services AB (organized in Sweden)
29. Nasdaq Canada Inc. (organized in Canada)
30. Nasdaq Clearing AB (organized in Sweden)
31. Nasdaq Copenhagen A/S (organized in Denmark)
32. Nasdaq Corporate Solutions Canada ULC (organized in Canada)
33. Nasdaq Corporate Solutions (India) Private Limited (organized in India)
34. Nasdaq Corporate Solutions International Limited (organized in the United Kingdom)
35. Nasdaq CSD Iceland hf. (organized in Iceland)
36. Nasdaq CSD SE (organized in Latvia)
37. Nasdaq CXC Limited (organized in Canada)
38. Nasdaq Exchange and Clearing Services AB (organized in Sweden)
39. Nasdaq France SAS (organized in France)
40. Nasdaq Germany GmbH (organized in Germany)
41. Nasdaq Helsinki Ltd (organized in Finland)
42. Nasdaq Holding AB (organized in Sweden)
43. Nasdaq Holding Denmark A/S (organized in Denmark)
44. Nasdaq Holding Luxembourg Sárl (organized in Luxembourg)
45. Nasdaq Iceland hf. (organized in Iceland)
46. Nasdaq International Ltd (organized in the United Kingdom)
47. Nasdaq Korea Ltd. (organized in South Korea)
48. Nasdaq Ltd (organized in Hong Kong)
49. Nasdaq NLX Ltd (organized in the United Kingdom)
50. Nasdaq Nordic Ltd (organized in Finland)
51. NASDAQ OMX Europe Ltd (organized in the United Kingdom)
52. Nasdaq Oslo ASA (organized in Norway)
53. Nasdaq Pty Ltd (organized in Australia)
54. Nasdaq Riga, AS (organized in Latvia) (92.98% owned, directly or indirectly, by Nasdaq, Inc.)
55. Nasdaq Stockholm AB (organized in Sweden)
56. Nasdaq Tallinn AS (organized in Estonia)
57. Nasdaq Technology AB (organized in Sweden)
58. Nasdaq Technology Canada Inc. (organized in Canada)
59. Nasdaq Technology Energy Systems AS (organized in Norway)
60. Nasdaq Technology Italy Srl (organized in Italy)
61. Nasdaq Technology (Japan) Ltd (organized in Japan)
62. Nasdaq Teknoloji Servisi Limited Sirketi (organized in Turkey)
63. Nasdaq Treasury AB (organized in Sweden)
64. Nasdaq Vilnius Services UAB (organized in Lithuania)
65. OMX Netherlands B.V. (organized in the Netherlands)
66. OMX Netherlands Holding B.V. (organized in the Netherlands)
67. OMX Treasury Euro AB (organized in Sweden) (99.9% owned, directly or indirectly, by Nasdaq, Inc.)
68. OMX Treasury Euro Holding AB (organized in Sweden)
69. PerTrac Financial Solutions Hong Kong Limited (organized in Hong Kong)
70. Shareholder.com B.V. (organized in the Netherlands)
71. SMARTS (Asia) Ltd (organized in China)
72. SMARTS Broker Compliance Pty Ltd (organized in Australia)
73. SMARTS Market Surveillance Pty Ltd (organized in Australia)
74. Sybenetix Limited (organized in the United Kingdom)
75. TopQ Software Limited (organized in the United Kingdom)

76. Whittaker & Garnier Limited (organized in the United Kingdom)

*The list of subsidiaries does not include not-for-profit entities or foreign branches of particular subsidiaries.

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statement (Form S-3 No. 333-209080) of Nasdaq, Inc.,

(2) Registration Statement (Form S-8 No. 333-196838) pertaining to Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.) Equity Incentive Plan,

(3) Registration Statement (Form S-8 No. 333-167724) pertaining to Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.) Employee Stock Purchase Plan,

(4) Registration Statement (Form S-8 No. 333-167723) pertaining to Nasdaq, Inc. (f/k/a The NASDAQ OMX Group, Inc.) Equity Incentive Plan,

(5) Registration Statement (Form S-8 No. 333-110602) pertaining to The Nasdaq Stock Market, Inc. Equity Incentive Plan,

(6) Registration Statement (Form S-8 No. 333-106945) pertaining to the Employment Agreement with Robert Greifeld of The Nasdaq Stock Market, Inc.,

(7) Registration Statement (Form S-8 No. 333-76064) pertaining to The Nasdaq Stock Market, Inc. 2000 Employee Stock Purchase Plan,

(8) Registration Statement (Form S-8 No. 333-72852) pertaining to The Nasdaq Stock Market, Inc. 2000 Employee Stock Purchase Plan, and

(9) Registration Statement (Form S-8 No. 333-70992) pertaining to The Nasdaq Stock Market, Inc. Equity Incentive Plan;

of our reports dated February 28, 2018, with respect to the consolidated financial statements of Nasdaq, Inc. and the effectiveness of internal control over financial reporting of Nasdaq, Inc. included in this Annual Report (Form 10-K) of Nasdaq, Inc. for the year ended December 31, 2017.

New York, New York
February 28, 2018

Exhibit 24.1

POWER OF ATTORNEY
ANNUAL REPORT ON FORM 10-K
NASDAQ, INC.

Know all men by these presents, that the undersigned, a director of Nasdaq, Inc., a Delaware corporation, hereby constitutes and appoints Edward S. Knight and Joan C. Conley, and each of them acting individually, the undersigned's true and lawful attorneys-in-fact and agents, each with full power and substitution and resubstitution, for him and in his name, place, and stead, in any case and all capacities to:

(1) execute for and on behalf of the undersigned, an Annual Report on Form 10-K of Nasdaq, Inc. for the fiscal year ended December 31, 2017, including any and all amendments and additions thereto (collectively, the "Annual Report") in accordance with the Securities Exchange Act of 1934, as amended, and the rules thereunder;

(2) do and perform any and all acts for and on behalf of the undersigned which may be necessary or desirable to file, or cause to be filed, the Annual Report with all exhibits thereto (including this Power of Attorney), and other documents in connection therewith, with the United States Securities and Exchange Commission; and

(3) take any other action or any type whatsoever in connection with the foregoing which, in the opinion of such attorneys-in-fact, may be of benefit to, in the best interest of, or legally required by, the undersigned, it being understood that the documents executed by such attorneys-in-fact on behalf of the undersigned pursuant to this Power of Attorney shall be in such form and shall contain such terms and conditions as such attorneys-in-fact may approve in such attorneys-in-fact's discretion.

The undersigned hereby grants to each attorney-in-fact full power and authority to do and perform any and every act and thing whatsoever requisite, necessary or proper to be done in the exercise of any of the rights and powers herein granted, as fully to all intents and purposes as the undersigned might or could do if personally present, with full power of substitution or revocation, hereby ratifying and confirming all that such shall lawfully do or cause to be done by virtue of this Power of Attorney and the rights and powers herein granted.

IN WITNESS WHEREOF, the undersigned has caused this Power of Attorney to be executed as of February 28, 2018.

/s/ Melissa M. Arnoldi

Signature

POWER OF ATTORNEY
ANNUAL REPORT ON FORM 10-K
NASDAQ, INC.

Know all men by these presents, that the undersigned, a director of Nasdaq, Inc., a Delaware corporation, hereby constitutes and appoints Edward S. Knight and Joan C. Conley, and each of them acting individually, the undersigned's true and lawful attorneys-in-fact and agents, each with full power and substitution and resubstitution, for him and in his name, place, and stead, in any case and all capacities to:

(1) execute for and on behalf of the undersigned, an Annual Report on Form 10-K of Nasdaq, Inc. for the fiscal year ended December 31, 2017, including any and all amendments and additions thereto (collectively, the "Annual Report") in accordance with the Securities Exchange Act of 1934, as amended, and the rules thereunder;

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(3) take any other action or any type whatsoever in connection with the foregoing which, in the opinion of such attorneys-in-fact, may be of benefit to, in the best interest of, or legally required by, the undersigned, it being understood that the documents executed by such attorneys-in-fact on behalf of the undersigned pursuant to this Power of Attorney shall be in such form and shall contain such terms and conditions as such attorneys-in-fact may approve in such attorneys-in-fact's discretion.

The undersigned hereby grants to each attorney-in-fact full power and authority to do and perform any and every act and thing whatsoever requisite, necessary or proper to be done in the exercise of any of the rights and powers herein granted, as fully to all intents and purposes as the undersigned might or could do if personally present, with full power of substitution or revocation, hereby ratifying and confirming all that such shall lawfully do or cause to be done by virtue of this Power of Attorney and the rights and powers herein granted.

IN WITNESS WHEREOF, the undersigned has caused this Power of Attorney to be executed as of February 28, 2018.

/s/ Charlene T. Begley

Signature

POWER OF ATTORNEY
ANNUAL REPORT ON FORM 10-K
NASDAQ, INC.

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(2) do and perform any and all acts for and on behalf of the undersigned which may be necessary or desirable to file, or cause to be filed, the Annual Report with all exhibits thereto (including this Power of Attorney), and other documents in connection therewith, with the United States Securities and Exchange Commission; and

(3) take any other action or any type whatsoever in connection with the foregoing which, in the opinion of such attorneys-in-fact, may be of benefit to, in the best interest of, or legally required by, the undersigned, it being understood that the documents executed by such attorneys-in-fact on behalf of the undersigned pursuant to this Power of Attorney shall be in such form and shall contain such terms and conditions as such attorneys-in-fact may approve in such attorneys-in-fact's discretion.

The undersigned hereby grants to each attorney-in-fact full power and authority to do and perform any and every act and thing whatsoever requisite, necessary or proper to be done in the exercise of any of the rights and powers herein granted, as fully to all intents and purposes as the undersigned might or could do if personally present, with full power of substitution or revocation, hereby ratifying and confirming all that such shall lawfully do or cause to be done by virtue of this Power of Attorney and the rights and powers herein granted.

IN WITNESS WHEREOF, the undersigned has caused this Power of Attorney to be executed as of February 28, 2018.

/s/ Steven D. Black

Signature

POWER OF ATTORNEY
ANNUAL REPORT ON FORM 10-K
NASDAQ, INC.

Know all men by these presents, that the undersigned, a director of Nasdaq, Inc., a Delaware corporation, hereby constitutes and appoints Edward S. Knight and Joan C. Conley, and each of them acting individually, the undersigned's true and lawful attorneys-in-fact and agents, each with full power and substitution and resubstitution, for him and in his name, place, and stead, in any case and all capacities to:

(1) execute for and on behalf of the undersigned, an Annual Report on Form 10-K of Nasdaq, Inc. for the fiscal year ended December 31, 2017, including any and all amendments and additions thereto (collectively, the "Annual Report") in accordance with the Securities Exchange Act of 1934, as amended, and the rules thereunder;

(2) do and perform any and all acts for and on behalf of the undersigned which may be necessary or desirable to file, or cause to be filed, the Annual Report with all exhibits thereto (including this Power of Attorney), and other documents in connection therewith, with the United States Securities and Exchange Commission; and

(3) take any other action or any type whatsoever in connection with the foregoing which, in the opinion of such attorneys-in-fact, may be of benefit to, in the best interest of, or legally required by, the undersigned, it being understood that the documents executed by such attorneys-in-fact on behalf of the undersigned pursuant to this Power of Attorney shall be in such form and shall contain such terms and conditions as such attorneys-in-fact may approve in such attorneys-in-fact's discretion.

The undersigned hereby grants to each attorney-in-fact full power and authority to do and perform any and every act and thing whatsoever requisite, necessary or proper to be done in the exercise of any of the rights and powers herein granted, as fully to all intents and purposes as the undersigned might or could do if personally present, with full power of substitution or revocation, hereby ratifying and confirming all that such shall lawfully do or cause to be done by virtue of this Power of Attorney and the rights and powers herein granted.

IN WITNESS WHEREOF, the undersigned has caused this Power of Attorney to be executed as of February 28, 2018.

/s/ Essa Kazim

Signature

POWER OF ATTORNEY
ANNUAL REPORT ON FORM 10-K
NASDAQ, INC.

Know all men by these presents, that the undersigned, a director of Nasdaq, Inc., a Delaware corporation, hereby constitutes and appoints Edward S. Knight and Joan C. Conley, and each of them acting individually, the undersigned's true and lawful attorneys-in-fact and agents, each with full power and substitution and resubstitution, for him and in his name, place, and stead, in any case and all capacities to:

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IN WITNESS WHEREOF, the undersigned has caused this Power of Attorney to be executed as of February 28, 2018.

/s/ Thomas A. Kloet

Signature

POWER OF ATTORNEY
ANNUAL REPORT ON FORM 10-K
NASDAQ, INC.

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IN WITNESS WHEREOF, the undersigned has caused this Power of Attorney to be executed as of February 28, 2018.

/s/ John D. Rainey

Signature

POWER OF ATTORNEY
ANNUAL REPORT ON FORM 10-K
NASDAQ, INC.

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IN WITNESS WHEREOF, the undersigned has caused this Power of Attorney to be executed as of February 28, 2018.

/s/ Michael R. Splinter

Signature

POWER OF ATTORNEY
ANNUAL REPORT ON FORM 10-K
NASDAQ, INC.

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The undersigned hereby grants to each attorney-in-fact full power and authority to do and perform any and every act and thing whatsoever requisite, necessary or proper to be done in the exercise of any of the rights and powers herein granted, as fully to all intents and purposes as the undersigned might or could do if personally present, with full power of substitution or revocation, hereby ratifying and confirming all that such shall lawfully do or cause to be done by virtue of this Power of Attorney and the rights and powers herein granted.

IN WITNESS WHEREOF, the undersigned has caused this Power of Attorney to be executed as of February 28, 2018.

/s/ Lars R. Wedenborn

Signature

Exhibit 31.1

CERTIFICATION

I, Adena T. Friedman, certify that:

1. I have reviewed this Annual Report on Form 10-K of Nasdaq, Inc.;

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(s) 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(s) 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.

/s/ Adena T. Friedman

Name: Adena T. Friedman

Title: President and Chief Executive Officer

Date: February 28, 2018

Exhibit 31.2

CERTIFICATION

I, Michael Ptasznik, certify that:

1. I have reviewed this Annual Report on Form 10-K of Nasdaq, Inc.;

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(s) 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(s) 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.

/s/ Michael Ptasznik

Name: Michael Ptasznik

Title: Executive Vice President, Corporate Strategy and Chief Financial Officer

Date: February 28, 2018

Exhibit 32.1

Certification 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 on Form 10-K of Nasdaq, Inc. (the "Company") for the year ended December 31, 2017 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), Adena T. Friedman, as President and Chief Executive Officer of the Company, and Michael Ptasznik, as Executive Vice President, Corporate Strategy and Chief Financial Officer of the Company, each hereby certifies, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that, to the best of her or his knowledge:

(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 the operations of the Company.

/s/ Adena T. Friedman

Name: Adena T. Friedman
Title: President and Chief Executive Officer
Date: February 28, 2018

/s/ Michael Ptasznik

Name: Michael Ptasznik
Title: Executive Vice President, Corporate Strategy and Chief Financial Officer
Date: February 28, 2018

This certification accompanies the Report pursuant to § 906 of the Sarbanes-Oxley Act of 2002 and shall not, except to the extent required by the Sarbanes-Oxley Act of 2002, be deemed filed by the Company for purposes of § 18 of the Securities Exchange Act of 1934, as amended.