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

FORM 10-Q

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

For the quarterly period ended September 30, 2019

OR

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

For the transition period from ________ to ________

Commission file number: 001-38855

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.)**

151 W. 42nd Street, New York, New York 10036
(Address of Principal Executive Offices) (Zip Code)

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

No changes
(Former name, former address and former fiscal year, if changed since last report)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.01 par value per share	**NDAQ**	**The Nasdaq Stock Market**
1.75% Senior Notes due 2029	**NDAQ29**	**The Nasdaq Stock Market**
3.875% Senior Notes due 2021	**NDAQ21**	**The Nasdaq Stock Market**
1.750% Senior Notes due 2023	**NDAQ23**	**The Nasdaq Stock Market**

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

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

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

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	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 ☒

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 October 28, 2019
Common Stock, $0.01 par value per share	163,915,065 shares

Nasdaq, Inc.

About this Form 10-Q

Throughout this Form 10-Q, 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 First North” refers to our alternative marketplaces for smaller companies and growth companies in the Nordic and Baltic regions.
- “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.

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

401(k) Plan: Voluntary Defined Contribution Savings Plan

2016 Credit Facility: $400 million senior unsecured term loan facility repaid in full and terminated in June 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 repaid in full on maturity in March 2019

2020 Notes: $600 million aggregate principal amount of 5.55% senior unsecured notes repaid in full and terminated in May 2019

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

2029 Notes: €600 million aggregate principal amount of 1.75% senior unsecured notes due March 28, 2029

ASU: Accounting Standards Update

BWise: BWise Beheer B.V. and its subsidiaries

CAT: A market-wide consolidated audit trail established by Nasdaq and other exchanges under an SEC approved plan

CCP: Central Counterparty

EMIR: European Market Infrastructure Regulation

Equity Plan: Nasdaq Equity Incentive Plan

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

Form 10-K: Annual Report on Form 10-K for the fiscal year ended December 31, 2018 that was filed with the SEC on February 22, 2019

IPO: Initial Public Offering

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

LIBOR: London Interbank Offered Rate

NFF: Nasdaq Financial Framework; Nasdaq's end-to-end technology solutions for market infrastructure operators, buy-side firms, sell-side firms and other non-financial markets.

NFX: Nasdaq Futures, Inc.

NPM: The NASDAQ Private Market, LLC

NSCC: National Securities Clearing Corporation

OCC: The Options Clearing Corporation

OTC: Over-the-Counter

PSU: Performance Share Unit

SaaS: Software as a Service

SEC: U.S. Securities and Exchange Commission

SERP: Supplemental Executive Retirement Plan

SFSA: Swedish Financial Supervisory Authority

S&P: Standard & Poor’s

S&P 500: S&P 500 Stock Index

TSR: Total Shareholder Return

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

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This Quarterly Report on Form 10-Q 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 Quarterly Report on Form 10-Q 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 Quarterly Report on Form 10-Q 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 Quarterly Report on Form 10-Q for IPOs and new listings of equity securities on the Nasdaq Nordic and Nasdaq Baltic exchanges and Nasdaq First North 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. We refer you to the “Risk Factors” section in our Form 10-K.

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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.

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 Quarterly Report on Form 10-Q 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 are intended to identify forward-looking statements. These include, among others, statements relating to:

- *our strategy and 2019 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 allocation 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 or which may affect us.*

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 or transition 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, market data products customers or other customers;*
- *our ability to develop and grow our non-trading businesses, including our technology and analytics offerings;*
- *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 on which we rely;*
- *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, or increased regulatory oversight domestically or internationally.*

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 more fully described in the "Risk Factors" section in our 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 Quarterly Report on Form 10-Q, including "Part I. Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations" and the condensed 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 - FINANCIAL INFORMATION
Item 1. Financial Statements.
Nasdaq, Inc.
Condensed Consolidated Balance Sheets
(in millions, except share and par value amounts)

	September 30, 2019	December 31, 2018
	(unaudited)	
Assets		
Current assets:		
Cash and cash equivalents	$ 304	$ 545
Restricted cash	29	41
Financial investments, at fair value	201	268
Receivables, net	399	384
Default funds and margin deposits	2,422	4,742
Other current assets	144	390
Total current assets	3,499	6,370
Property and equipment, net	361	376
Goodwill	6,232	6,363
Intangible assets, net	2,239	2,300
Operating lease assets	346	—
Other non-current assets	303	291
Total assets	$ 12,980	$ 15,700
Liabilities		
Current liabilities:		
Accounts payable and accrued expenses	$ 146	$ 198
Section 31 fees payable to SEC	34	109
Accrued personnel costs	137	199
Deferred revenue	267	194
Other current liabilities	147	253
Default funds and margin deposits	2,422	4,742
Short-term debt	539	875
Total current liabilities	3,692	6,570
Long-term debt	2,939	2,956
Deferred tax liabilities, net	525	501
Operating lease liabilities	327	—
Other non-current liabilities	170	224
Total liabilities	7,653	10,251
Commitments and contingencies		
Equity		
Nasdaq stockholders' equity:		
Common stock, $0.01 par value, 300,000,000 shares authorized, shares issued: 169,802,172 at September 30, 2019 and 170,709,425 at December 31, 2018; shares outstanding: 163,894,038 at September 30, 2019 and 165,165,104 at December 31, 2018	2	2
Additional paid-in capital	2,585	2,716
Common stock in treasury, at cost: 5,908,134 shares at September 30, 2019 and 5,544,321 shares at December 31, 2018	(328)	(297)
Accumulated other comprehensive loss	(1,833)	(1,530)
Retained earnings	4,901	4,558
Total Nasdaq stockholders' equity	5,327	5,449
Total liabilities and equity	$ 12,980	$ 15,700

See accompanying notes to condensed consolidated financial statements.

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Revenues:				
Market Services	$ 690	$ 586	$ 1,995	$ 1,968
Corporate Services	124	121	368	364
Information Services	198	179	585	528
Market Technology	84	68	239	194
Other revenues	—	10	10	87
Total revenues	1,096	964	3,197	3,141
Transaction-based expenses:				
Transaction rebates	(349)	(293)	(1,012)	(947)
Brokerage, clearance and exchange fees	(115)	(71)	(296)	(312)
Revenues less transaction-based expenses	632	600	1,889	1,882
Operating expenses:				
Compensation and benefits	175	164	518	534
Professional and contract services	31	33	99	105
Computer operations and data communications	33	32	98	94
Occupancy	24	23	72	72
General, administrative and other	40	28	95	73
Marketing and advertising	8	7	29	27
Depreciation and amortization	47	53	143	159
Regulatory	8	8	23	24
Merger and strategic initiatives	10	6	25	7
Restructuring charges	30	—	30	—
Total operating expenses	406	354	1,132	1,095
Operating income	226	246	757	787
Interest income	3	3	8	8
Interest expense	(29)	(38)	(97)	(112)
Net gain (loss) on divestiture of businesses	—	(8)	27	33
Other investment income	—	—	1	7
Net income from unconsolidated investees	15	6	71	13
Income before income taxes	215	209	767	736
Income tax provision	65	46	196	234
Net income attributable to Nasdaq	$ 150	$ 163	$ 571	$ 502
Per share information:				
Basic earnings per share	$ 0.91	$ 0.99	$ 3.46	$ 3.03
Diluted earnings per share	$ 0.90	$ 0.97	$ 3.42	$ 2.99
Cash dividends declared per common share	$ 0.47	$ 0.44	$ 1.38	$ 1.26

See accompanying notes to condensed consolidated financial statements.

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Net income	$ 150	$ 163	$ 571	$ 502
Other comprehensive income (loss):				
Foreign currency translation gains (losses)	(121)	22	(256)	(239)
Income tax expense[1][2]	(46)	(15)	(47)	(76)
Foreign currency translation, net	(167)	7	(303)	(315)
Employee benefit plan income tax expense[1]	—	—	—	(7)
Total other comprehensive income (loss), net of tax	(167)	7	(303)	(322)
Comprehensive income (loss) attributable to Nasdaq	$ (17)	$ 170	$ 268	$ 180

(1) Primarily includes income tax expense on Euro denominated notes.
(2) For the nine months ended September 30, 2018, includes a reclassification of the stranded tax effects related to the Tax Cuts and Jobs Act. See “Tax Cuts and Jobs Act,” of Note 17, “Income Taxes,” for further discussion.

See accompanying notes to condensed consolidated financial statements.

Nasdaq, Inc.
Condensed Consolidated Statements of Changes in Stockholders' Equity
(Unaudited)
(in millions)

	Three Months Ended September 30,				Nine Months Ended September 30,			
	2019		2018		2019		2018	
	Shares	$	Shares	$	Shares	$	Shares	$
Common stock	165	2	165	2	165	2	167	2
Additional paid-in capital								
Beginning balance		2,713		2,712		2,716		3,024
Share repurchase program	(2)	(150)	(1)	(54)	(2)	(200)	(4)	(394)
Share-based compensation	1	21	0	18	1	57	1	51
Stock option exercises, net	0	1	0	—	0	1	0	2
Other employee stock activity	0	—	0	—	0	11	0	(7)
Ending balance		2,585		2,676		2,585		2,676
Common stock in Treasury, at Cost								
Beginning balance		(327)		(290)		(297)		(247)
Other employee stock activity	0	(1)	0	(1)	0	(31)	0	(44)
Ending balance		(328)		(291)		(328)		(291)
Accumulated Other Comprehensive Loss								
Beginning balance		(1,666)		(1,191)		(1,530)		(862)
Other comprehensive income (loss)		(167)		7		(303)		(322)
Ending balance		(1,833)		(1,184)		(1,833)		(1,184)
Retained Earnings								
Beginning balance		4,829		4,309		4,558		3,963
Net income		150		163		571		502
Other comprehensive (income) loss		—		(1)		—		142
Cash dividends declared per common share		(78)		(72)		(228)		(208)
Ending balance		4,901		4,399		4,901		4,399
Total Stockholders' Equity	164	$ 5,327	164	$ 5,602	164	$ 5,327	164	$ 5,602

See accompanying notes to condensed consolidated financial statements.

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

	Nine Months Ended September 30,	
	2019	**2018**
Cash flows from operating activities:		
Net income	$ 571	$ 502
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	143	159
Share-based compensation	57	51
Deferred income taxes	(21)	(12)
Reversal of certain Swedish tax benefits	—	41
Net gain on divestiture of businesses	(27)	(33)
Non-cash restructuring charges	25	—
Net income from unconsolidated investees	(71)	(13)
Other reconciling items included in net income	18	10
Net change in operating assets and liabilities, net of effects of divestiture and acquisitions:		
Receivables, net	(7)	(11)
Other assets	(128)	(23)
Accounts payable and accrued expenses	(36)	6
Section 31 fees payable to SEC	(75)	(107)
Accrued personnel costs	(58)	(22)
Deferred revenue	52	74
Other liabilities	181	46
Net cash provided by operating activities	624	668
Cash flows from investing activities:		
Purchases of securities	(384)	(312)
Proceeds from sales and redemptions of securities	429	331
Proceeds from divestiture of businesses, net	108	286
Proceeds from sale of investment security	11	—
Acquisition of business, net of cash and cash equivalents acquired	(193)	—
Purchases of property and equipment	(88)	(72)
Other investing activities	(14)	(6)
Net cash provided by (used in) investing activities	(131)	227
Cash flows from financing activities:		
Proceeds from (repayments of) commercial paper, net	264	(170)
Repayments of debt obligations	(1,215)	(115)
Payment of debt extinguishment cost	(11)	—
Proceeds from issuances of long-term debt, net of issuance costs	680	—
Repurchases of common stock	(200)	(394)
Dividends paid	(228)	(208)
Proceeds received from employee stock activity	12	10
Payments related to employee shares withheld for taxes	(31)	(44)
Proceeds of customer funds	—	15
Net cash used in financing activities	(729)	(906)
Effect of exchange rate changes on cash and cash equivalents and restricted cash	(17)	(12)
Net decrease in cash and cash equivalents and restricted cash	(253)	(23)
Cash and cash equivalents and restricted cash at beginning of period	586	399
Cash and cash equivalents and restricted cash at end of period	$ 333	$ 376
Supplemental Disclosure Cash Flow Information		
Cash paid for:		
Interest	$ 97	$ 121
Income taxes, net of refund	$ 189	$ 195

See accompanying notes to condensed consolidated financial statements.

1. Organization and Nature of Operations

Nasdaq is a global technology company serving the capital markets and other industries. Our diverse offering of data, analytics, software and services enables clients to optimize and execute their business vision with confidence.

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 a Canadian exchange for the trading of certain 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, as Nasdaq Nordic. 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 European commodity-related products and services. Nasdaq Commodities' offerings include derivatives in oil, power, natural gas and carbon emission markets, seafood, 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, and connectivity to various data feeds. We also provide data center services, including co-location to market participants, whereby we offer firms cabinet space and power to house their own servers and other equipment within our data centers. Our broker services operations offer technology and customized securities administration solutions to financial participants in the Nordic market.

In March 2019, we entered into an agreement to sell Nordic Fund Market, an electronic mutual fund service which is a small part of our Broker Services business. The closing of this transaction occurred on October 31, 2019.

Corporate Services

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

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 and private funds.

In December 2018, we launched our Corporate Bond exchange for the listing and trading of corporate bonds. The new exchange operates pursuant to The Nasdaq Stock Market exchange license and is powered by NFF.

As of September 30, 2019, there were 3,091 total listings on The Nasdaq Stock Market, including 382 ETPs. The combined market capitalization was approximately $13.4 trillion. In Europe, the Nasdaq Nordic and Nasdaq Baltic exchanges, together with Nasdaq First North, were home to 1,028 listed companies with a combined market capitalization of approximately $1.4 trillion.

Our Corporate Solutions business includes our Investor Relations Intelligence and Governance Solutions businesses which serve both public and private companies and organizations. Our public clients can be companies listed on our exchanges or other U.S. and global exchanges. We help organizations enhance their ability to understand and expand their global shareholder base, and improve corporate governance through our suite of advanced technology, analytics, and consultative services. In October 2019, Nasdaq acquired the Center for Board Excellence, or CBE, a privately-held provider of corporate governance and compliance solutions for boards of directors, CEOs, corporate secretaries and general counsels. Nasdaq will combine CBE with its

Nasdaq Governance Solutions business, which includes board portal and collaboration technology solutions. We expect the combination will enhance Nasdaq's position as a leading provider of technology, research, insights and consultative services designed to advance governance excellence and collaboration at organizations worldwide.

In March 2019, we sold our BWise enterprise governance, risk and compliance software platform and in April 2018, we sold our Public Relations Solutions and Digital Media Services businesses. See Note 5, “Acquisitions and Divestitures,” for further discussion.

As of December 31, 2018, BWise was classified as held for sale. See Note 6, “Assets and Liabilities Held for Sale,” for further discussion.

For segment reporting purposes, we have included the revenues and expenses of BWise and the Public Relations Solutions and Digital Media Services businesses in corporate items. These businesses were part of the Corporate Solutions business, within our Corporate Services segment, prior to the date of sale. For discussion of business segments, see Note 19, “Business Segments.”

Information Services

Our Information Services segment includes our Market Data, Index and Investment Data & Analytics businesses.

Our Market Data 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 market data products enhance transparency of market activity within our exchanges and provide critical information to professional and non-professional investors globally.

Our Index business develops and licenses Nasdaq-branded indexes, associated derivatives, and financial products and also provides custom calculation services for third-party clients. As of September 30, 2019, we had 325 ETPs licensed to Nasdaq’s indexes which had $207 billion in assets under management.

Our Investment Data & Analytics business is a leading content and analytics cloud-based solutions provider used by asset managers, investment consultants and asset owners to help facilitate better investment decisions.

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, buy-side firms 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 100 marketplaces in 50 countries. Market Technology also provides market surveillance services to broker-dealer firms worldwide, as well as risk management solutions.

2. Basis of Presentation and Principles of Consolidation

The condensed 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 8, “Investments,” for further discussion of our equity method investments.

The accompanying condensed 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.

As permitted under U.S. GAAP, certain footnotes or other financial information can be condensed or omitted in the interim condensed consolidated financial statements. The information included in this Quarterly Report on Form 10-Q should be read in conjunction with the consolidated financial statements and accompanying notes included in Nasdaq’s Form 10-K. The year-end condensed balance sheet data was derived from the audited financial statements, but does not include all disclosures required by U.S. GAAP.

On January 1, 2019, we adopted ASU 2016-02, “Leases,” or ASU 2016-02. See Note 3, “Significant Accounting Policies Update,” for further discussion.

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

The preparation of condensed 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 condensed consolidated financial statements and accompanying notes. Actual results could differ from those estimates.

Subsequent Events

We have evaluated subsequent events through the issuance date of this Quarterly Report on Form 10-Q.

Recent Accounting Pronouncements

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.	January 1, 2020, with early adoption permitted for interim or annual goodwill impairment tests performed on testing dates after January 1, 2017.	We will adopt this standard on January 1, 2020. 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. 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.
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 will adopt this standard on January 1, 2020. Any impact will be recognized as a cumulative-effect adjustment to retained earnings as of the effective date to align our credit loss methodology with the new standard. We do not expect the adoption of this new standard to have a material impact on our consolidated balance sheets or our statements of income and it will not impact our cash flows.

3. Significant Accounting Policies Update

Our significant accounting policies are detailed in Note 2, "Summary of Significant Accounting Policies," in our Form 10-K. A significant change to our accounting policies as a result of adopting ASU 2016-02 is discussed below.

We adopted ASU 2016-02 on January 1, 2019, and elected the optional transition method to initially apply the standard at the January 1, 2019 adoption date. As a result, we applied the new lease standard prospectively to our leases existing or commencing on or after January 1, 2019. Comparative periods presented were not restated upon adoption. Similarly, new disclosures under the standard were made for periods beginning January 1, 2019, and not for prior comparative periods. Prior periods will continue to be reported under guidance in effect prior to January 1, 2019. In addition, we elected the package of practical expedients permitted under the transition guidance within the standard, which among other things, allowed us to not reassess contracts to determine if they contain leases, lease classification and initial direct costs. The standard did not impact our statements of income and had no impact on our cash flows.

We have operating leases which are primarily real estate leases for our U.S. and European headquarters and for general office space. These leases have varying lease terms ranging from 3 months to 17 years. We determine if an arrangement is a lease at inception. Operating leases are included in operating lease assets, other current liabilities, and operating lease liabilities in our condensed consolidated balance sheets as of September 30, 2019. As of September 30, 2019, we do not have any finance leases.

Operating lease assets represent our right to use an underlying asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the lease. Operating lease assets and liabilities are recognized at commencement date based on the present value of lease payments over the lease term. Since our leases do not provide an implicit rate, we use our incremental borrowing rate based on the information available at commencement date in determining the present value of lease payments. The operating lease asset also includes any lease payments made and excludes lease incentives. Our lease terms include options to extend or terminate the lease when we are reasonably certain that we will exercise that option. Lease expense for lease payments is recognized on a straight-line basis over the lease term. Certain of our lease agreements include rental payments adjusted periodically for inflation based on an index or rate. These payments are included in the initial measurement of the operating lease liability and operating lease asset. However, rental payments that are based on a change in an index or a rate are considered variable lease payments and are expensed as incurred.

We have lease agreements with lease and non-lease components, which are accounted for as a single performance obligation to the extent that the timing and pattern of transfer are similar for the lease and non-lease components and the lease component qualifies as an operating lease. We do not recognize lease liabilities and operating lease assets for leases with a term of 12 months or less. We recognize these lease payments on a straight-line basis over the lease term.

Our lease agreements do not contain any material residual value guarantees or material restrictions or covenants.

We sublease certain real estate to third parties. Our sublease portfolio consists of operating leases.

The following table provides supplemental balance sheet information related to Nasdaq's operating leases:

Leases	Balance Sheet Classification	September 30, 2019
		(in millions)
Assets:		
Operating lease assets	Operating lease assets	$ 346
Liabilities:		
Current lease liabilities	Other current liabilities	$ 60
Non-current lease liabilities	Operating lease liabilities	327
Total lease liabilities		$ 387

The following table summarizes Nasdaq's lease cost:

	Three Months Ended September 30, 2019	Nine Months Ended September 30, 2019
	(in millions)	
Operating lease cost[(1)]	$ 19	$ 58
Variable lease cost	6	18
Sublease income	(1)	(4)
Total lease cost	$ 24	$ 72

(1) Includes short-term lease cost, which was immaterial.

The following table reconciles the undiscounted cash flows for each of the first five years and total of the remaining years to the operating lease liabilities recorded in our condensed consolidated balance sheet.

	September 30, 2019
	(in millions)
2019[(1)]	$ 19
2020	76
2021	66
2022	44
2023	39
Thereafter	261
Total lease payments	505
Less: interest[(2)]	(118)
Present value of lease liabilities[(3)]	$ 387

(1) Represents the estimated lease payments to be made for the remaining three months of 2019.
(2) Calculated using the interest rate for each lease.
(3) Includes the current portion of $60 million.

Total lease payments in the above table exclude $143 million of legally binding minimum lease payments for leases signed but not yet commenced primarily related to the expansion of our world headquarters. These leases will commence in 2020 with a lease term of 16 years.

The following table provides information related to Nasdaq's lease term and discount rate:

	September 30, 2019
Weighted-average remaining lease term (in years)	10.4
Weighted-average discount rate	4.6%

The following table provides supplemental cash flow information related to Nasdaq's operating leases:

	Nine Months Ended September 30, 2019
	(in millions)
Cash paid for amounts included in the measurement of operating lease liabilities	$ 59
Lease assets obtained in exchange for new operating lease liabilities	$ 20

4. Revenue From Contracts With Customers

Disaggregation of Revenue

The following tables summarize the disaggregation of revenue by major product and service and by segment for the three and nine months ended September 30, 2019 and 2018:

	Three Months Ended September 30, 2019				
	Market Services	Corporate Services	Information Services	Market Technology	Consolidated
	(in millions)				
Transaction-based trading and clearing, net	$ 154	$ —	$ —	$ —	$ 154
Trade management services	72	—	—	—	72
Listing services	—	74	—	—	74
Corporate solutions	—	50	—	—	50
Market data	—	—	102	—	102
Index	—	—	56	—	56
Investment data & analytics	—	—	40	—	40
Market technology	—	—	—	84	84
Revenues less transaction-based expenses	$ 226	$ 124	$ 198	$ 84	$ 632

	Three Months Ended September 30, 2018					
	Market Services	Corporate Services	Information Services	Market Technology	Other Revenues	Consolidated
	(in millions)					
Transaction-based trading and clearing, net	$ 150	$ —	$ —	$ —	$ —	$ 150
Trade management services	72	—	—	—	—	72
Listing services	—	72	—	—	—	72
Corporate solutions	—	49	—	—	—	49
Market data	—	—	95	—	—	95
Index	—	—	52	—	—	52
Investment data & analytics	—	—	32	—	—	32
Market technology	—	—	—	68	—	68
Other revenues	—	—	—	—	10	10
Revenues less transaction-based expenses	$ 222	$ 121	$ 179	$ 68	$ 10	$ 600

For the three months ended September 30, 2019, approximately 65.0% of Market Services revenues were recognized at a point in time and 35.0% were recognized over time. For the three months ended September 30, 2018, approximately 63.0% of Market Services revenues were recognized at a point in time and 37.0% were recognized over time. Substantially all revenues from the Corporate Services, Information Services and Market Technology segments were recognized over time for both the three months ended September 30, 2019 and 2018.

	Nine Months Ended September 30, 2019					
	Market Services	Corporate Services	Information Services	Market Technology	Other Revenues	Consolidated
	(in millions)					
Transaction-based trading and clearing, net	$ 468	$ —	$ —	$ —	$ —	$ 468
Trade management services	219	—	—	—	—	219
Listing services	—	219	—	—	—	219
Corporate solutions	—	149	—	—	—	149
Market data	—	—	302	—	—	302
Index	—	—	166	—	—	166
Investment data & analytics	—	—	117	—	—	117
Market technology	—	—	—	239	—	239
Other revenues	—	—	—	—	10	10
Revenues less transaction-based expenses	$ 687	$ 368	$ 585	$ 239	$ 10	$ 1,889

	Nine Months Ended September 30, 2018					
	Market Services	Corporate Services	Information Services	Market Technology	Other Revenues	Consolidated
	(in millions)					
Transaction-based trading and clearing, net	$ 489	$ —	$ —	$ —	$ —	$ 489
Trade management services	220	—	—	—	—	220
Listing services	—	217	—	—	—	217
Corporate solutions	—	147	—	—	—	147
Market data	—	—	293	—	—	293
Index	—	—	152	—	—	152
Investment data & analytics	—	—	83	—	—	83
Market technology	—	—	—	194	—	194
Other revenues	—	—	—	—	87	87
Revenues less transaction-based expenses	$ 709	$ 364	$ 528	$ 194	$ 87	$ 1,882

For the nine months ended September 30, 2019, approximately 65.0% of Market Services revenues were recognized at a point in time and 35.0% were recognized over time. For the nine months ended September 30, 2018, approximately 64.0% of Market Services revenues were recognized at a point in time and 36.0% were recognized over time. Substantially all revenues from the Corporate Services, Information Services and Market Technology segments were recognized over time for both the nine months ended September 30, 2019 and 2018.

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Contract Balances

Substantially all of our revenues are considered to be revenues from contracts with customers. The related accounts receivable balances are recorded in our Condensed Consolidated Balance Sheets as receivables which are net of allowance for doubtful accounts of $12 million as of September 30, 2019 and $13 million as of December 31, 2018. The changes in the balance between periods were immaterial. We do not have obligations for warranties, returns or refunds to customers.

For the majority of our contracts with customers, except for our market technology and listings services contracts, our performance obligations are short-term in nature and there is no significant variable consideration.

We do not have revenues recognized from performance obligations that were satisfied in prior periods. We have elected not to provide disclosures about transaction price allocated to unsatisfied performance obligations if contract durations are less than one year. Excluding our market technology contracts, for contract durations that are one-year or greater, materially all of the transaction price allocated to unsatisfied performance obligations is included in deferred revenue. For our market technology contracts, the portion of transaction price allocated to unsatisfied performance obligations is shown in the table below. Deferred revenue primarily represents our contract liabilities related to our fees for annual and initial listings, market technology, corporate solutions and information services contracts. Deferred revenue is the only significant contract asset or liability as of September 30, 2019. See Note 9, “Deferred Revenue,” for our discussion on deferred revenue balances, activity, and expected timing of recognition.

Transaction Price Allocated to Remaining Performance Obligations

As stated above, for contract durations that are one-year or greater, we do not have a material portion of transaction price allocated to unsatisfied performance obligations that are not included in deferred revenue other than for our market technology contracts. For our market technology contracts, the following table summarizes the amount of the transaction price allocated to performance obligations that are unsatisfied as of September 30, 2019:

	(in millions)
2019[1]	$ 78
2020	310
2021	159
2022	85
2023	45
2024 and thereafter	85
Total	$ 762

[1] Represents performance obligations to be recognized over the remaining three months of 2019.

Market technology deferred revenue, as discussed in Note 9, "Deferred Revenue," to the condensed consolidated financial statements, represents consideration received that is yet to be recognized as revenue for unsatisfied performance obligations.

5. Acquisitions and Divestitures

2019 Divestiture and Acquisition

We completed the following divestiture and acquisition in 2019. Financial results of each transaction are included in our condensed consolidated financial statements from the date of each divestiture or acquisition.

2019 Divestiture

In March 2019, we sold our BWise enterprise governance, risk and compliance software platform, which was part of our Corporate Solutions business within our Corporate Services segment, to SAI Global and recognized a pre-tax gain on the sale of $27 million, net of disposal costs ($20 million after tax). The pre-tax gain is included in net gain on divestiture of businesses in the Condensed Consolidated Statements of Income for the nine months ended September 30, 2019.

As of December 31, 2018, the assets and liabilities of BWise were held for sale. See Note 6, "Assets and Liabilities Held For Sale," for further discussion.

2019 Acquisition

	Purchase Consideration	Total Net Assets Acquired	Total Net Deferred Tax Liability	Acquired Intangible Assets	Goodwill
	(in millions)				
Cinnober	$ 219	$ 18	$ (19)	$ 79	$ 141

In January 2019, we acquired Cinnober, a Swedish financial technology provider to brokers, exchanges and clearinghouses worldwide for $219 million. Cinnober is part of our Market Technology segment.

Nasdaq used cash on hand to fund this acquisition.

As of September 30, 2019, the allocation of the purchase price, including effects of a measurement period adjustment, which is discussed below, is included in the table above. Additional adjustments to the provisional values may result before the end of the measurement period, a period not to exceed 12 months from the acquisition date. These adjustments, which may include tax and other estimates 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.

In the third quarter of 2019, we recorded a measurement period adjustment of $4 million which resulted in a decrease to net assets acquired and an increase in goodwill. The adjustment did not result in an impact to our Condensed Consolidated Statements of Income.

See "Intangible Assets" below for further discussion of intangible assets acquired in the Cinnober acquisition.

2018 Acquisition and Divestiture

We completed an acquisition in November 2018 and a divestiture in April 2018. Financial results of each transaction are included in our condensed consolidated financial statements from the date of the acquisition or divestiture.

2018 Acquisition

Acquisition of Quandl

In November 2018, we acquired Quandl, Inc., a provider of alternative and core financial data. Quandl is part of our Information Services segment.

Nasdaq used issuances of commercial paper to fund this acquisition.

2018 Divestiture

In April 2018, we sold our Public Relations Solutions and Digital Media Services businesses, which were part of our Corporate Solutions business, to West Corporation and recognized a pre-tax net gain on the sale of $33 million, net of disposal costs ($14 million after tax). This includes a post-closing working capital adjustment of $8 million ($5 million after tax) recorded during the three months ended September 30, 2018. The total net pre-tax gain is included in net gain on divestiture of businesses in the Condensed Consolidated Statements of Income for the nine months ended September 30, 2018.

Through a multi-year agreement with West, Nasdaq will continue to provide eligible Nasdaq-listed clients with access to public relations, webcasting and webhosting products and services as part of the terms of the transaction.

Intangible Assets

The following table presents the details of the customer relationships intangible asset at the date of acquisition for Cinnober which was the significant acquired intangible asset for this acquisition. All acquired intangible assets with finite lives are amortized using the straight-line method.

	($ in millions)
Customer relationships	$ 67
Discount rate used	9.5%
Estimated average useful life	13 years

Customer Relationships

Customer relationships represent the non-contractual and contractual relationships with customers.

Methodology

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.

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 acquisition of Cinnober, 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 5 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.

Pro Forma Results and Acquisition-Related Costs

The condensed consolidated financial statements for the three and nine months ended September 30, 2019 include the financial results of the above acquisitions from the date of each acquisition. Pro forma financial results 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 Condensed Consolidated Statements of Income.

6. Assets and Liabilities Held For Sale

In 2018, we decided to sell BWise, our enterprise governance, risk and compliance software platform and this business was recorded as held for sale as of December 31, 2018. BWise was part of our Corporate Solutions business within our Corporate Services segment.

We determined that we met all of the criteria to classify the assets and liabilities of BWise as held for sale. The disposal of BWise did not represent a strategic shift that would have a major effect on our operations and financial results and was, therefore, not classified as discontinued operations. As a result of this classification, the assets and liabilities of this business were recorded at the lower of their carrying amount or fair value less costs to sell.

In February 2019, we entered into an agreement to sell BWise and in March 2019, we completed the sale and recognized a pre-tax gain on the sale of $27 million, net of disposal costs ($20 million after tax). See “2019 Divestiture,” of Note 5, “Acquisitions and Divestitures,” for further discussion.

Major Classes of Assets and Liabilities Held For Sale

The carrying amounts of the major classes of assets and liabilities that were classified as held for sale at December 31, 2018 were as follows:

	December 31, 2018	
	(in millions)	
Receivables, net	$	13
Property and equipment, net		10
Goodwill[1]		47
Intangible assets, net[2]		16
Other assets		3
Total assets held for sale[3]	$	89
Deferred tax liabilities	$	4
Deferred revenue		12
Other current liabilities		4
Total liabilities held for sale[4]	$	20

(1) The assignment of goodwill was based on the relative fair value of the disposal group and the portion of the remaining reporting unit.

(2) Primarily represents customer relationships.

(3) Included in other current assets in the Condensed Consolidated Balance Sheets as of December 31, 2018.

(4) Included in other current liabilities in the Condensed Consolidated Balance Sheets as of December 31, 2018.

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7. Goodwill and Acquired Intangible Assets

Goodwill

The following table presents the changes in goodwill by business segment during the nine months ended September 30, 2019:

	Market Services		Corporate Services		Information Services		Market Technology		Total	
					(in millions)					
Balance at December 31, 2018	$	3,430	$	455	$	2,333	$	145	$	6,363
Goodwill acquired		—		—		—		137		137
Measurement period adjustment		—		—		—		4		4
Foreign currency translation adjustment		(138)		(16)		(95)		(23)		(272)
Balance at September 30, 2019	$	3,292	$	439	$	2,238	$	263	$	6,232

The goodwill acquired for Market Technology shown above relates to our acquisition of Cinnober. See “2019 Acquisition,” of Note 5, “Acquisitions and Divestitures,” for further discussion.

For further discussion of the measurement period adjustment of $4 million shown above, see “2019 Acquisition,” of Note 5, “Acquisitions and Divestitures.” This adjustment is included in our Condensed Consolidated Balance Sheets as of September 30, 2019.

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 nine months ended September 30, 2019 and 2018; 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:

	September 30, 2019				December 31, 2018			
	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	$ 62	$ (17)	$ 45	9	$ 54	$ (15)	$ 39	9
Customer relationships	1,599	(508)	1,091	18	1,532	(456)	1,076	18
Other	18	(4)	14	8	17	(2)	15	8
Foreign currency translation adjustment	(187)	63	(124)		(149)	64	(85)	
Total finite-lived intangible assets	$ 1,492	$ (466)	$ 1,026		$ 1,454	$ (409)	$ 1,045	
Indefinite-Lived Intangible Assets								
Exchange and clearing registrations	$ 1,257	$ —	$ 1,257		$ 1,257	$ —	$ 1,257	
Trade names	121	—	121		122	—	122	
Licenses	52	—	52		52	—	52	
Foreign currency translation adjustment	(217)	—	(217)		(176)	—	(176)	
Total indefinite-lived intangible assets	$ 1,213	$ —	$ 1,213		$ 1,255	$ —	$ 1,255	
Total intangible assets	$ 2,705	$ (466)	$ 2,239		$ 2,709	$ (409)	$ 2,300	

Amortization expense for acquired finite-lived intangible assets was $25 million for the three months ended September 30, 2019, $27 million for the three months ended September 30, 2018, $76 million for the nine months ended September 30, 2019, and $83 million for the nine months ended September 30, 2018. Amortization expense decreased in 2019 primarily due to certain assets becoming fully amortized in the fourth quarter of 2018, partially offset by additional amortization expense associated with acquired intangible assets in 2019. These amounts are included in depreciation and amortization expense in the Condensed Consolidated Statements of Income.

The estimated future amortization expense (excluding the impact of foreign currency translation adjustments of $124 million as of September 30, 2019) of acquired finite-lived intangible assets as of September 30, 2019 is as follows:

	(in millions)
2019[(1)]	$ 27
2020	105
2021	104
2022	100
2023	98
2024 and thereafter	716
Total	$ 1,150

(1) Represents the estimated amortization to be recognized for the remaining three months of 2019.

8. Investments

The following table presents the details of our investments:

	September 30, 2019	December 31, 2018
	(in millions)	
Trading securities	$ 201	$ 259
Available-for-sale investment securities	—	9
Financial investments, at fair value	$ 201	$ 268
Equity method investments	$ 159	$ 135
Equity securities	$ 49	$ 44

Financial Investments, at Fair Value

Trading Securities

Trading securities, which are included in financial investments, at fair value in the Condensed Consolidated Balance Sheets, are primarily comprised of highly rated European government debt securities, of which $166 million as of September 30, 2019 and December 31, 2018, are assets primarily utilized to meet regulatory capital requirements, mainly for our clearing operations at Nasdaq Clearing.

Available-for-Sale Investment Securities

As of December 31, 2018, available-for-sale investment securities, which are included in financial investments, at fair value in the Condensed Consolidated Balance Sheets, were primarily comprised of commercial paper. As of September 30, 2019 and December 31, 2018, the cumulative unrealized gains and losses on these securities were immaterial.

Equity Method Investments

As of September 30, 2019 and December 31, 2018, our equity method investments primarily included our equity interest in OCC.

The carrying amounts of our equity method investments are included in other non-current assets in the Condensed 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 three months ended September 30, 2019, $6 million for the three months ended September 30, 2018, $71 million for the nine months ended September 30, 2019, and $13 million for the nine months ended September 30, 2018.

The change for the three and nine months ended September 30, 2019 compared with the same periods in 2018 is primarily due to an increase in income recognized from our investment in OCC. Following the disapproval of the OCC capital plan in February 2019, described below, OCC suspended customer rebates and dividends to owners, including the unpaid dividend on 2018 results which Nasdaq expected to receive in March 2019. We were not able to determine the impact of the disapproval of the OCC capital plan on OCC's 2018 net income until March 2019, when OCC's 2018 financial statements were made available to us. As a result, in March 2019, we recognized an additional $36 million of income relating to our share of OCC's net income for the year ended December 31, 2018. We also recognized our share of OCC's net income of $15 million for the three months ended September 30, 2019 and $33 million for the nine months ended September 30, 2019.

OCC Capital Plan

In March 2015, OCC implemented a capital plan under which the options exchanges that are OCC’s stockholders contributed $150 million of new equity capital to OCC, committed to make future replenishment capital contributions under certain circumstances, and received commitments regarding future dividend payments and related matters. Nasdaq PHLX and ISE each contributed $30 million of new equity capital under the OCC capital plan. OCC adopted specific policies with respect to fees, customer refunds and stockholder dividends, which envisioned an annual dividend equal to the portion of OCC’s after-tax income that exceeded OCC’s capital requirements after payment of refunds to OCC’s clearing members (such refunds were generally 50% of the portion of OCC’s pre-tax income that exceeded OCC’s capital requirements). In 2018, 2017 and 2016, OCC disbursed annual dividends under the capital plan and Nasdaq, as the beneficial owner of shares held by Nasdaq PHLX and ISE, received $13 million in 2018, $10 million in 2017 and $4 million in 2016. The dividend recorded by Nasdaq in 2016 did not include the dividend due to ISE because our acquisition of ISE was completed in June 2016, after that year’s dividend had been paid.

In February 2016, after the SEC approved the rule change establishing the OCC capital plan, certain industry participants appealed that approval in the U.S. Court of Appeals. In February 2019, on remand from the Court of Appeals, the SEC disapproved the OCC rule change that established the capital plan. OCC began a phased return of capital contributed under the capital plan, and we received $44 million in February 2019, with the remainder to be repaid at a later date. As a result of the SEC's disapproval of the rule change, we are also released from any future capital replenishment obligations under the 2015 capital plan.

Equity Securities

The carrying amounts of our equity securities are included in other non-current assets in the Condensed Consolidated Balance Sheets. We elected the measurement alternative for primarily all of our equity securities as they do not have a readily determinable fair value. Under the measurement alternative, these securities 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. No material adjustments were made to the carrying value of our equity investments measured under the measurement alternative during the three and nine months ended September 30, 2019. As of September 30, 2019, our equity securities represent various strategic investments made through our corporate venture program and investments acquired through various acquisitions. As of December 31, 2018, our equity securities primarily represent various strategic investments made through our corporate venture program.

* * * * * *

9. Deferred Revenue

Deferred revenue represents consideration received that is yet to be recognized as revenue. The changes in our deferred revenue during the nine months ended September 30, 2019 are reflected in the following table:

	Initial Listing Revenues	Annual Listings Revenues	Market Technology Revenues	Corporate Solutions Revenues	Information Services Revenues	Other[1]	Total
	(in millions)						
Balance at December 31, 2018	$ 66	$ 4	$ 75	$ 36	$ 80	$ 20	$ 281
Deferred revenue billed in the current period, net of recognition	24	61	36	39	56	7	223
Revenue recognized that was included in the beginning of the period	(21)	(3)	(36)	(34)	(54)	(10)	(158)
Translation adjustment	(1)	(1)	(7)	—	—	—	(9)
Balance at September 30, 2019	$ 68	$ 61	$ 68	$ 41	$ 82	$ 17	$ 337

(1) Primarily includes deferred revenue from U.S. listing of additional shares fees which will continue to run-off as a result of the implementation of our all-inclusive annual fee. Listing of additional shares fees are included in our Listing Services business. The deferred revenue billed in the current period, net of recognition primarily pertains to our Market Services business.

As of September 30, 2019, we estimate that our deferred revenue will be recognized in the following years:

	Initial Listing Revenues	Annual Listings Revenues	Market Technology Revenues	Corporate Solutions Revenues	Information Services Revenues	Other[1]	Total
	(in millions)						
Fiscal year ended:							
2019[2]	$ 8	$ 61	$ 26	$ 21	$ 36	$ 5	$ 157
2020	25	—	33	20	46	7	131
2021	15	—	9	—	—	3	27
2022	10	—	—	—	—	1	11
2023	7	—	—	—	—	1	8
2024 and thereafter	3	—	—	—	—	—	3
Total	$ 68	$ 61	$ 68	$ 41	$ 82	$ 17	$ 337

(1) Other primarily includes revenues from U.S. listing of additional shares fees which are included in our Listing Services business.
(2) Represents the estimated amortization to be recognized for the remaining three months of 2019.

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.

10. Debt Obligations

The following table presents the changes in the carrying amount of our debt obligations during the nine months ended September 30, 2019:

	December 31, 2018	Additions	Payments, Accretion and Other	September 30, 2019
		(in millions)		
Short-term debt:				
Commercial paper	$ 275	$ 2,951	$ (2,687)	$ 539
Senior unsecured floating rate notes repaid on March 22, 2019	500	—	(500)	—
5.55% senior unsecured notes repaid on May 1, 2019[1]	599	—	(599)	—
$400 million senior unsecured term loan facility repaid on June 28, 2019 (average interest rate of 4.00% for the period January 1, 2019 through June 28, 2019)	100	—	(100)	—
Total short-term debt	1,474	2,951	(3,886)	539
Long-term debt:				
3.875% senior unsecured notes due June 7, 2021	686	—	(34)	652
4.25% senior unsecured notes due June 1, 2024	497	—	—	497
1.75% senior unsecured notes due May 19, 2023	682	—	(33)	649
3.85% senior unsecured notes due June 30, 2026	496	—	1	497
1.75% senior unsecured notes due March 28, 2029	—	665	(18)	647
$1 billion senior unsecured revolving credit facility due April 25, 2022	(4)	15	(14)	(3)
Total long-term debt	2,357	680	(98)	2,939
Total debt obligations	$ 3,831	$ 3,631	$ (3,984)	$ 3,478

(1) Balance was reclassified to short-term debt as of March 31, 2019.

Commercial Paper Program

Our U.S. dollar 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 fluctuates as short term interest rates and demand fluctuate. The fluctuation of these rates due to market conditions may impact our interest expense.

As of September 30, 2019, 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 11 days to 81 days and the weighted-average maturity is 18 days. The weighted-average effective interest rate is 2.33% 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 September 30, 2019, 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. For our Euro denominated notes, the “Payments, Accretion and Other” column also includes the impact of foreign currency translation. 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.

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.

Senior Unsecured Floating Rate Notes

In March 2019, we used net proceeds from the sale of commercial paper and cash on hand and repaid all of our 2019 Notes.

Nasdaq issued the 2019 Notes in September 2017. The 2019 Notes paid 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.

Early Extinguishment of 5.55% Senior Unsecured Notes Due 2020

Nasdaq issued the 2020 Notes in January 2010. The 2020 Notes paid interest semiannually at a rate of 5.55% per annum.

In May 2019, we primarily used the net proceeds from the 2029 Notes to repay in full and terminate our 2020 Notes. For further discussion of the 2029 Notes, see "1.75% Senior Unsecured Notes Due 2029" below. In connection with the early extinguishment of the 2020 Notes, we recorded a pre-tax charge of $11 million, which primarily included a make-whole redemption price premium. This charge is included in general, administrative and other expense in the Condensed Consolidated Statements of Income for the nine months ended September 30, 2019.

3.875% Senior Unsecured Notes Due 2021

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 decrease in the carrying amount of $34 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 Condensed Consolidated Balance Sheets as of September 30, 2019.

4.25% Senior Unsecured Notes Due 2024

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 Due 2023

In May 2016, Nasdaq issued the 2023 Notes. 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 decrease in the carrying amount of $33 million noted in the "Payments, Accretion and Other" column in the table above primarily reflects the translation of the 2023 Notes into U.S. dollars and is recorded in accumulated other comprehensive loss within stockholders' equity in the Condensed Consolidated Balance Sheets as of September 30, 2019.

3.85% Senior Unsecured Notes Due 2026

In June 2016, Nasdaq issued the 2026 Notes. 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%.

1.75% Senior Unsecured Notes Due 2029

In April 2019, Nasdaq issued the 2029 Notes at a discount. As a result of the discount, the proceeds received from the issuance were less than the aggregate principal amount.

The 2029 Notes are unsecured, pay interest annually in arrears, beginning on March 28, 2020 at a rate of 1.75% per annum until March 28, 2029 and such rate may vary with Nasdaq's debt rating up to a rate not to exceed 3.75%. The 2029 Notes may be redeemed by Nasdaq at any time, subject to a make-whole amount. The proceeds from the 2029 Notes, approximately $665 million after deducting the underwriting discount and expenses of this offering, were primarily used to redeem the 2020 Notes. For further discussion of the 2020 Notes, see "Early Extinguishment of 5.55% Senior Unsecured Notes Due 2020" above.

The 2029 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 decrease in the carrying amount of $18 million noted in the "Payments, Accretion and Other" column in the table above primarily reflects the translation of the 2029 Notes into U.S. dollars and is recorded in accumulated other comprehensive loss within stockholders' equity in the Condensed Consolidated Balance Sheets as of September 30, 2019.

Credit Facilities

Early Extinguishment of 2016 Credit Facility

In March 2016, Nasdaq entered into the 2016 Credit Facility. Under our 2016 Credit Facility, borrowings bore 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 varied with Nasdaq's debt rating.

In June 2019, we used proceeds from issuances of commercial paper to repay in full and terminate our 2016 Credit Facility.

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 a former credit facility. 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. Nasdaq is permitted to repay borrowings under our 2017 Credit Facility at any time in whole or in part, without penalty.

As of September 30, 2019, no amounts were outstanding on the 2017 Credit Facility. The $3 million balance represents unamortized debt issuance costs which are being accreted through interest expense over the life of the credit facility. Of the $1 billion that is available for borrowing, $541 million provides liquidity support for the commercial paper program and for a letter of credit. As such, as of September 30, 2019, the total remaining amount available under the 2017 Credit Facility was $459 million excluding the amounts that support the commercial paper program and letter of credit. 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. We are charged commitment fees of 0.125% to 0.4%, depending on our credit rating, whether or not amounts have been borrowed. These commitment fees are included in interest expense and were not material for both the three and nine months ended September 30, 2019 and 2018.

The 2017 Credit Facility contains 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 make certain restricted payments. The facility also contains 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.

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.

Other Credit Facilities

We also have credit facilities primarily related to our Nasdaq Clearing operations in order to provide further liquidity. Credit facilities, which are available in multiple currencies, totaled $198 million as of September 30, 2019 and $234 million as of December 31, 2018 in available liquidity, none of which was utilized.

Debt Covenants

As of September 30, 2019, we were in compliance with the covenants of all of our debt obligations.

11. 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 Condensed Consolidated Statements of Income was $4 million for the three months ended September 30, 2019, $3 million for the three months ended September 30, 2018, and $10 million for both the nine months ended September 30, 2019 and 2018.

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 Condensed Consolidated Statements of Income and was $5 million for both the three months ended September 30, 2019 and 2018, $15 million for the nine months ended September 30, 2019, and $17 million for the nine months ended September 30, 2018.

12. Share-Based Compensation

We have a share-based compensation program for employees and non-employee directors. 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 three and nine months ended September 30, 2019 and 2018 in the Condensed Consolidated Statements of Income:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
	(in millions)			
Share-based compensation expense before income taxes	$ 21	$ 18	$ 57	$ 51
Income tax benefit	(6)	(5)	(16)	(14)
Share-based compensation expense after income taxes	$ 15	$ 13	$ 41	$ 37

Common Shares Available Under Our Equity Plan

As of September 30, 2019, we had approximately 10.3 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 stock 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.

Summary of Restricted Stock Activity

The following table summarizes our restricted stock activity for the nine months ended September 30, 2019:

	Restricted Stock	
	Number of Awards	Weighted-Average Grant Date Fair Value
Unvested balances at January 1, 2019	1,583,375	$ 68.62
Granted	587,987	$ 84.73
Vested	(492,535)	$ 59.46
Forfeited	(127,501)	$ 73.36
Unvested balances at September 30, 2019	1,551,326	$ 77.23

As of September 30, 2019, $66 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

PSUs are based on performance measures that impact the amount of shares that each recipient will receive upon vesting. 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

The grant date fair value of PSUs under the one-year performance-based program is based on the closing stock price at the date of grant less the present value of future cash dividends. Under this program, an eligible employee receives a target grant of PSUs, but 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 one-year performance period. Compensation cost is recognized over the performance period and the three-year vesting period based on the probability that such performance measures will be achieved, taking into account an estimated forfeiture rate.

During 2018, certain grants of PSUs with a one-year performance period exceeded the applicable performance parameters. As a result, an additional 51,914 units above target were considered granted in the first quarter of 2019 and are included in the "Summary of PSU Activity" table below.

Three-Year PSU Program

Under the three-year performance-based program, each eligible individual receives PSUs, subject to market conditions, 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, taking into account an estimated forfeiture rate, regardless of whether the market condition is satisfied, provided that the requisite service period has been completed. 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 2016 with a three-year performance period exceeded the applicable performance parameters. As a result, an additional 99,622 units above target were considered granted in the first quarter of 2019 and are included in the "Summary of PSU Activity" table below.

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 nine months ended September 30, 2019:

	Nine Months Ended September 30,	
	2019	2018
Weighted-average risk free interest rate[(1)]	2.26%	2.36%
Expected volatility[(2)]	16.5%	18.7%
Weighted-average grant date share price	$89.00	$ 86.24
Weighted-average fair value at grant date	$97.65	$ 116.86

(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 nine months ended September 30, 2019:

	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 January 1, 2019	314,231	$ 74.01	837,750	$ 96.57
Granted[(1)]	179,599	$ 83.56	397,553	$ 96.55
Vested	(12,733)	$ 67.51	(431,751)	$ 93.25
Forfeited	(22,943)	$ 75.03	(6,101)	$ 103.29
Unvested balances at September 30, 2019	458,154	$ 77.88	797,451	$ 98.31

(1) Includes target awards granted and certain additional awards granted based on overachievement of performance parameters.

As of September 30, 2019, $14 million of total unrecognized compensation cost related to the one-year PSU program is expected to be recognized over a weighted-average period of 1.5 years. For the three-year PSU program, $37 million of total unrecognized compensation cost is expected to be recognized over a weighted-average period of 1.5 years.

Stock Options

In January 2017 and in connection with her appointment, our CEO received 268,817 performance-based non-qualified stock options which will vest one-third annually over a three-year period, with each vesting contingent upon the achievement of annual performance parameters. On January 29, 2019, Nasdaq's management compensation committee and board of directors determined that the performance goal for 2018 was met, resulting in the settlement of the second tranche of the grant. There were no stock option awards granted during the nine months ended September 30, 2019.

The weighted-average grant date fair value for the 2017 grant was $66.68. We estimated the fair value of this stock option award using the Black-Scholes valuation model using the following assumptions:

Expected life (in years)	6
Weighted-average risk free interest rate	2.1%
Expected volatility	25.6%
Dividend yield	1.92%

Our computation of expected life was based on an estimate of the average length of time between option grant and exercise. The interest rate for periods within the expected life of the award was based on the U.S. Treasury yield curve in effect at the time of grant. Our computation of expected volatility was an estimate of the future upward/downward fluctuations in the underlying share price. We used Nasdaq's historical volatility for the trailing 6-year period as of the grant date. Our computation of dividend yield was based on annualized dividends expressed as a percentage of share price.

Summary of Stock Option Activity

A summary of stock option activity for the nine months ended September 30, 2019 is as follows:

	Number of Stock Options	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (in millions)
Outstanding at January 1, 2019	448,966	$ 49.25	5.51	$ 14
Exercised	(62,624)	20.92		
Forfeited	(25)	20.10		
Outstanding at September 30, 2019	386,317	$ 53.68	5.43	$ 18
Exercisable at September 30, 2019	296,711	$ 49.76	4.87	$ 15

The net cash proceeds from the exercise of 9,216 stock options for the three months ended September 30, 2019 was immaterial. The net cash proceeds from the exercise of 62,624 stock options for the nine months ended September 30, 2019 was $1 million. The net cash proceeds from the exercise of 11,953 stock options for the three months ended September 30, 2018 was immaterial. We received net cash proceeds of $2 million from the exercise of 99,953 stock options for the nine months ended September 30, 2018.

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 September 30, 2019 of $99.35 and the exercise price, times the number of shares) based on stock options with an exercise price less than Nasdaq’s closing price of $99.35 as of September 30, 2019, 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 September 30, 2019 was 0.3 million and the weighted-average exercise price was $49.76. As of September 30, 2018, 0.3 million outstanding stock options were exercisable and the weighted-average exercise price was $36.55.

The total pre-tax intrinsic value of stock options exercised was $1 million for the three months ended September 30, 2019, $5 million for the nine months ended September 30, 2019, $1 million for the three months ended September 30, 2018, and $6 million for the nine months ended September 30, 2018.

ESPP

We have an ESPP under which approximately 1.7 million shares of our common stock have been reserved for future issuance as of September 30, 2019. 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 which totaled $1 million for both the three months ended September 30, 2019 and 2018 and $3 million for both the nine months ended September 30, 2019 and 2018.

13. Nasdaq Stockholders' Equity

Common Stock

As of September 30, 2019, 300,000,000 shares of our common stock were authorized, 169,802,172 shares were issued and 163,894,038 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 Condensed Consolidated Balance Sheets. Shares repurchased under our share repurchase program are currently retired and canceled and are therefore not included in the common stock in treasury balance. When treasury shares are reissued, they are recorded at the average cost of the treasury shares acquired. We held 5,908,134 shares of common stock in treasury as of September 30, 2019 and 5,544,321 shares as of December 31, 2018, 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 and PSUs.

Share Repurchase Program

In January 2018, our board of directors authorized an additional $500 million for the share repurchase program, increasing the aggregate authorized amount to $726 million.

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 share repurchase program has no defined expiration date.

The following is a summary of our share repurchase activity, reported based on settlement date, for the nine months ended September 30, 2019 and 2018:

	Nine Months Ended September 30,	
	2019	2018
Number of shares of common stock repurchased	2,053,855	4,508,426
Average price paid per share	$ 97.37	$ 87.43
Total purchase price (in millions)	$ 200	$ 394

As discussed above in "Common Stock in Treasury, at Cost," shares repurchased under our share repurchase program are currently retired and cancelled. As of September 30, 2019, the remaining amount authorized for share repurchases under the program was $132 million.

In October 2019, the board authorized an additional $500 million under the existing share repurchase program, bringing the aggregate authorized amount to $632 million as of October 22, 2019.

Other Repurchases of Common Stock

During the first nine months of 2019, we repurchased 363,813 shares of our common stock in settlement of employee tax withholding obligations arising from the vesting of restricted stock and PSUs.

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 September 30, 2019 and December 31, 2018, no shares of preferred stock were issued or outstanding.

Cash Dividends on Common Stock

During the first nine months of 2019, 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 29, 2019	$ 0.44	March 15, 2019	$ 73	March 29, 2019
April 23, 2019	0.47	June 14, 2019	77	June 28, 2019
July 23, 2019	0.47	September 13, 2019	78	September 27, 2019
			$ 228	

The total amount paid of $228 million was recorded in retained earnings in the Condensed Consolidated Balance Sheets at September 30, 2019.

In October 2019, the board of directors approved a regular quarterly cash dividend of $0.47 per share on our outstanding common stock. The dividend is payable on December 27, 2019 to shareholders of record at the close of business on December 13, 2019. The estimated amount of this dividend is $77 million. Future declarations of quarterly dividends and the establishment of future record and payment dates are subject to approval by the board of directors.

Our board of directors maintains a dividend policy with the intention to provide stockholders with regular and growing dividends over the long term as earnings and cash flow grow.

14. Earnings Per Share

The following table sets forth the computation of basic and diluted earnings per share:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Numerator:	(in millions, except share and per share amounts)			
Net income attributable to common shareholders	$ 150	$ 163	$ 571	$ 502
Denominator:				
Weighted-average common shares outstanding for basic earnings per share	164,331,832	164,227,243	165,086,951	165,622,428
Weighted-average effect of dilutive securities:				
Employee equity awards[(1)]	1,705,665	2,071,426	1,611,232	1,931,307
Contingent issuance of common stock[(2)]	992,247	992,247	330,749	330,749
Weighted-average common shares outstanding for diluted earnings per share	167,029,744	167,290,916	167,028,932	167,884,484
Basic and diluted earnings per share:				
Basic earnings per share	$ 0.91	$ 0.99	$ 3.46	$ 3.03
Diluted earnings per share	$ 0.90	$ 0.97	$ 3.42	$ 2.99

(1) PSUs, which are considered contingently issuable, are included in the computation of dilutive earnings per share on a weighted average basis when management determines that the applicable performance criteria would have been met if the performance period ended as of the date of the relevant computation.

(2) See “Non-Cash Contingent Consideration,” of Note 18, “Commitments, Contingencies and Guarantees,” for further discussion.

Securities that were not included in the computation of diluted earnings per share because their effect was antidilutive were immaterial for the three and nine months ended September 30, 2019 and 2018.

15. Fair Value of Financial Instruments

The following tables present our financial assets and financial liabilities that are measured at fair value on a recurring basis as of September 30, 2019 and December 31, 2018.

	September 30, 2019			
	Total	Level 1	Level 2	Level 3
Assets at Fair Value	(in millions)			
Financial investments, at fair value	$ 201	$ 152	$ 49	$ —
Default fund and margin deposit investments	1,134	134	1,000	—
Total assets at fair value	$ 1,335	$ 286	$ 1,049	$ —

	December 31, 2018			
	Total	Level 1	Level 2	Level 3
Assets at Fair Value	(in millions)			
Financial investments, at fair value	$ 268	$ 133	$ 135	$ —
Default fund and margin deposit investments	1,649	327	1,322	—
Total assets at fair value	$ 1,917	$ 460	$ 1,457	$ —
Liabilities at Fair Value				
Other financial instruments	$ 112	$ —	$ 112	$ —
Total liabilities at fair value	$ 112	$ —	$ 112	$ —

As of September 30, 2019 and December 31, 2018, Level 1 financial investments, at fair value were primarily comprised of trading securities and principally are highly rated European government debt securities. As of September 30, 2019 and December 31, 2018, Level 2 financial investments, at fair value were primarily comprised of trading securities, mainly European mortgage bonds and state owned enterprises. Level 2 financial investments, at fair value as of December 31, 2018 also included corporate bonds and time deposits. Of the Level 1 and Level 2 financial investments, at fair value, $166 million as of September 30, 2019 and December 31, 2018 are assets primarily utilized to meet regulatory capital requirements, mainly for our clearing operations at Nasdaq Clearing.

Our Level 1 default fund and margin deposit investments were primarily comprised of highly rated European and U.S. government debt securities as of September 30, 2019 and December 31, 2018. Level 2 default fund and margin deposit investments were primarily comprised of central bank certificates and reverse repurchase agreements as of September 30, 2019 and December 31, 2018.

Our Level 2 other financial instruments at December 31, 2018 include a liability associated with Nasdaq Clearing's requirement to fulfill the settlement of certain contracts of a defaulted member. The fair value of this guarantee was $112 million as of December 31, 2018 and is included in other current liabilities in the Condensed Consolidated Balance Sheets. Collateral of $112 million as of December 31, 2018 was recorded in other current assets which offsets this liability. See Note 16, “Clearing Operations,” for further discussion of default fund contributions and margin deposits.

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.

Our investment in OCC is accounted for under the equity method of accounting. We have elected the measurement alternative for the majority of our equity securities, which primarily represent various strategic investments made through our corporate venture program. See “Equity Method Investments,” and “Equity Securities,” of Note 8, “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 $3.7 billion as of September 30, 2019 and $3.9 billion as of December 31, 2018. 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 September 30, 2019. 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 September 30, 2019 and December 31, 2018, there were no non-financial assets measured at fair value on a non-recurring basis.

16. Clearing Operations

Nasdaq Clearing

Nasdaq Clearing is authorized and supervised under EMIR as a multi-asset clearinghouse by the SFSA. Such authorization is effective for all member states of the European Union and certain other non-member states that are part of the European Economic Area, including Norway. 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, fuel oil 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, default fund and margin collateral requirements are calculated for each clearing member's positions in accounts with the CCP. 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 align risk between Nasdaq Clearing and its clearing members.

Nasdaq Commodities Clearing Default

In September 2018, a member of the Nasdaq Clearing commodities market defaulted due to inability to post sufficient collateral to cover increased margin requirements for the positions of the relevant member, which had experienced losses due to sharp adverse movements in the Nordic - German power market spread. Nasdaq Clearing followed default procedures and offset the future market risk on the defaulting member's positions. The default resulted in an initial loss of $133 million. In accordance with the liability waterfall, the first $8 million of the loss was allocated to Nasdaq Clearing's junior capital and the remainder was allocated on a pro-rata basis to the commodities clearing members' default funds. In September 2018, these funds were replenished.

In December 2018, we initiated a capital relief program. The capital relief program was a voluntary program open to each commodities default fund participant; each such participant who agreed to the capital relief program received a proportion of the funds made available under the capital relief program as reflected by their proportionate share of the aggregate of the clearing members' default fund replenishments. As of September 30, 2019, we have disbursed substantially all of the $23 million offered through the program. In addition to the capital relief program, we are pursuing recovery of assets from the defaulted member which will be allocated back to default fund participants.

As a result of the default, a liability of $112 million as of December 31, 2018 was recorded in other current liabilities and collateral of $112 million as of December 31, 2018 was recorded in other current assets in the Condensed Consolidated Balance Sheets in order to allow Nasdaq Clearing to fulfill the settlement of certain contracts of the defaulted member arising from the default management process. We had established mitigating positions. As of September 30, 2019, these contracts and mitigating positions have either expired or were sold to a third party together with associated collateral. The collateral and liability were previously included in default funds and margin deposits.

Default Fund Contributions and Margin Deposits

As of September 30, 2019, clearing member default fund contributions and margin deposits were as follows:

	September 30, 2019		
	Cash Contributions	Non-Cash Contributions	Total Contributions
	(in millions)		
Default fund contributions	$ 406	$ 119	$ 525
Margin deposits	2,016	3,757	5,773
Total	$ 2,422	$ 3,876	$ 6,298

In accordance with its investment policy, of the total cash contributions of $2,422 million, Nasdaq Clearing has invested $856 million in highly rated European and U.S. government debt securities or central bank certificates with maturity dates primarily 90 days or less and $278 million in reverse repurchase agreements secured with highly rated government securities with maturity dates that range from 2 days to 18 days. The carrying value of these securities approximates their fair value due to the short-term nature of the instruments and reverse repurchase agreements. The remainder of this balance was held in cash in demand deposit accounts at central banks and large, highly rated financial institutions. Of the total default fund contributions of $525 million, Nasdaq Clearing can utilize $422 million as capital resources in the event of a counterparty default. The remaining balance of $103 million pertains to member posted surplus balances.

In the investment activity related to default fund and margin contributions, we are exposed to counterparty risk related to reverse repurchase agreement transactions, which reflect the risk that the counterparty might become insolvent and, thus, fail to meet its obligations to Nasdaq Clearing. We mitigate this risk by only engaging in transactions with high credit quality reverse repurchase agreement counterparties and by limiting the acceptable collateral under the reverse repurchase agreement to high quality issuers, primarily government securities and other securities explicitly guaranteed by a government. The value of the underlying security is monitored during the lifetime of the contract, and in the event the market value of the underlying security falls below the reverse repurchase amount, our clearinghouse may require additional collateral or a reset of the contract.

Default Fund Contributions

Required contributions 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 Condensed 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 Condensed 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 September 30, 2019, Nasdaq Clearing committed capital totaling $140 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 Condensed Consolidated Balance Sheets. The combined regulatory capital of the clearing members and Nasdaq Clearing is intended to secure the obligations of a clearing member exceeding such member's own margin and default fund deposits 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 and are recorded in revenues. These cash deposits are recorded in default funds and margin deposits in the Condensed Consolidated Balance Sheets as both a current asset and a current liability. Pledged margin collateral is not recorded in our Condensed 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 and default fund 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 cleared 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, excluding any liability related to the Nasdaq commodities clearing default (see discussion above), the estimated liability was nominal and no liability was recorded as of September 30, 2019.

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 $32 million as of September 30, 2019;
- 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 $20 million as of September 30, 2019; 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 liability waterfall, 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.

In addition to the capital held to withstand counterparty defaults described above, Nasdaq Clearing also has committed capital of $88 million to ensure that it can handle an orderly wind-down of its operation, and that it is adequately protected against investment, operational, legal, and business risks.

Market Value of Derivative Contracts Outstanding

The following table includes the market value of derivative contracts outstanding prior to netting:

	September 30, 2019
	(in millions)
Commodity and seafood options, futures and forwards[1][2][3]	$ 359
Fixed-income options and futures[1][2]	925
Stock options and futures[1][2]	120
Index options and futures[1][2]	81
Total	$ 1,485

(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.

Derivative Contracts Cleared

The following table includes the total number of derivative contracts cleared through Nasdaq Clearing for the nine months ended September 30, 2019 and 2018:

	September 30, 2019	September 30, 2018
Commodity and seafood options, futures and forwards[1][2]	393,153	1,506,560
Fixed-income options and futures	15,780,707	16,833,278
Stock options and futures	18,030,431	17,735,228
Index options and futures	35,752,600	35,569,046
Total	69,956,891	71,644,112

(1) The total volume in cleared power related to commodity contracts was 614 Terawatt hours (TWh) for the nine months ended September 30, 2019 and 853 TWh for the nine months ended September 30, 2018.
(2) In July 2018, the Nasdaq freight product offering was migrated to NFX, our U.S.-based futures exchange.

The outstanding contract value of resale and repurchase agreements was $2.1 billion as of September 30, 2019 and $4.1 billion as of September 30, 2018. The total number of contracts cleared was 5,580,836 for the nine months ended September 30, 2019 and was 6,835,634 for the nine months ended September 30, 2018.

17. Income Taxes

Income Tax Provision

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

	Three Months Ended September 30,		Percentage Change
	2019	2018	
	(in millions)		
Income tax provision	$ 65	$ 46	41.3 %
Effective tax rate	30.2%	22.0%	

	Nine Months Ended September 30,		Percentage Change
	2019	2018	
	(in millions)		
Income tax provision	$ 196	$ 234	(16.2)%
Effective tax rate	25.6%	31.8%	

The higher effective tax rate in the third quarter of 2019 is primarily due to a tax benefit recorded in the third quarter of 2018 for accelerated tax deductions taken on the 2017 return and a change in uncertain tax positions recorded in the third quarter of 2019. The lower effective tax rate in the first nine months of 2019 is primarily due to the 2018 reversal of certain Swedish tax benefits recorded in prior years, 2019 tax benefits from a dividends received deduction related to capital distributions from the OCC, and the reversal of a previously accrued tax penalty in Finland, partially offset by uncertain tax positions recorded in third quarter of 2019.

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 history of pre-tax earnings and losses, are taken into account in assessing the ability to realize deferred tax assets.

Tax Audits

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 2008 through 2016 are currently under examination by the Internal Revenue Service and we are subject to examination by the Internal Revenue Service for 2017 and 2018. Several state tax returns are currently under examination by the respective tax authorities for the years 2007 through 2017. Non-U.S. tax returns are subject to examination by the respective tax authorities for the years 2009 through 2018. 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. In addition, other than the Swedish tax matter described below, we do not expect to settle any material tax audits in the next twelve months.

The Swedish Tax Agency disallowed certain interest expense deductions for the years 2013 - 2017. We appealed this decision to the Lower Administrative Court which denied our appeal in 2018. During 2018, we further appealed to the Administrative Court of Appeal, however, we were no longer able to assert that we were more than likely to be successful and, as such, we recorded a related tax expense. In November 2019, the Administrative Court of Appeal upheld the disallowance of these deductions. As we have not recognized any benefits related to the disallowed deductions and we have paid the related assessments from the Swedish Tax Agency, the decision of the Administrative Court of Appeal does not impact our consolidated financial statements.

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.

Tax Cuts and Jobs Act

On January 1, 2018, we adopted ASU 2018-02, “Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income (Topic 220).” As a result of the adoption of this standard, we recorded a reclassification of $142 million for stranded tax effects related to the Tax Cuts and Jobs Act from accumulated other comprehensive loss to retained earnings within stockholders’ equity in the Condensed Consolidated Balance Sheets as of September 30, 2018. Of the $142 million of stranded tax effects, $135 million relates to the effect on net foreign currency translation gains and losses and $7 million relates to the effect on employee benefit plan adjustment gains and losses. These provisional amounts were finalized in the fourth quarter of 2018.

18. 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 16, “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 $11 million as of September 30, 2019 and $12 million as of December 31, 2018. As discussed in “Other Credit Facilities,” of Note 10, “Debt Obligations,” we also have credit facilities primarily related to our Nasdaq Clearing operations, which are available in multiple currencies, and totaled $198 million as of September 30, 2019 and $234 million as of December 31, 2018, 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 Industrial and Commercial Bank of China Financial Services LLC, or ICBC. As of September 30, 2019, we have contributed $15 million of clearing deposits to ICBC in connection with this clearing arrangement. These deposits are recorded in other current assets in our Condensed Consolidated Balance Sheets. Some of the trading activity in

Execution Access is cleared by ICBC through the Fixed Income Clearing Corporation, with ICBC acting as agent. 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). 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 Condensed Consolidated Balance Sheets for these arrangements. However, no guarantee can be provided that these arrangements will at all times be sufficient.

Other 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 16, "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 condensed 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 Condensed 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 September 30, 2019, these escrow agreements provide for future payment by us of up to an aggregate of $12 million which is included in other current liabilities in the Condensed 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 Condensed Consolidated Balance Sheets for these arrangements.

Legal and Regulatory Matters

Litigation

As previously disclosed, we 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. The plaintiffs appealed the judgment of dismissal to the United States Court of Appeals for the Second Circuit (although opting not to appeal the dismissal with respect to Barclays PLC or the dismissal of claims under Section 6(b) of the Exchange Act). 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. On May 18, 2018, the exchanges filed a motion to dismiss the amended complaint, raising issues not addressed in the proceedings to date. On May 28, 2019, the district court denied the exchanges' renewed motion to dismiss. On June 17, 2019, the exchanges filed a motion to certify the district court's order for immediate review by the Second Circuit and on July 16, 2019, the district court denied the motion. Given the preliminary nature of the proceedings, we are unable to estimate what, if any, liability may result from this litigation. However, we believe that the claims are without merit and will continue to litigate vigorously.

Nasdaq Commodities Clearing Default

During September 2018, a clearing member of Nasdaq Clearing's commodities market was declared in default. We are responding to requests for information and are cooperating fully with the SFSA in the associated regulatory audits. While we are currently unable to predict the outcome of this matter, we do not believe it will have a material impact on our consolidated financial statements. See “Nasdaq Commodities Clearing Default,” of Note 16, “Clearing Operations,” for further information on this event.

SEC Decisions

In recent years, certain industry groups have challenged the level of fees that U.S. exchanges charge for market data and connectivity. We have defeated two challenges in federal appeals court pertaining to market data and an additional challenge at the administrative level within the SEC. However, in October 2018, the SEC reversed that administrative decision and found that Nasdaq had not met a burden of demonstrating that certain challenged fees were fair and reasonable; we estimate that this decision will reduce our annual revenues by approximately $1 million. Nasdaq has appealed this decision to the U.S. Court of Appeals for the District of Columbia Circuit. In addition, the SEC remanded a series of additional challenges to market data and connectivity fees back to Nasdaq for further consideration. Nasdaq has also appealed this decision to the U.S. Court of Appeals for the District of Columbia Circuit. We are unable to predict the outcome or the timing of the ultimate resolution of these matters.

Other Matters

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 inquiries. Management believes that censures, fines, penalties or other sanctions that could result from any ongoing examinations or inquiries 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. See “Tax Audits,” of Note 17, “Income Taxes,” for further discussion.

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19. 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 business segments for the three and nine months ended September 30, 2019 and 2018:

	Market Services	Corporate Services	Information Services	Market Technology	Corporate Items	Consolidated
	(in millions)					
Three Months Ended September 30, 2019						
Total revenues	$ 690	$ 124	$ 198	$ 84	$ —	$ 1,096
Transaction-based expenses	(464)	—	—	—	—	(464)
Revenues less transaction-based expenses	226	124	198	84	—	632
Operating income (loss)	$ 129	$ 45	$ 126	$ 15	$ (89)	$ 226
Three Months Ended September 30, 2018						
Total revenues	$ 586	$ 121	$ 179	$ 68	$ 10	$ 964
Transaction-based expenses	(364)	—	—	—	—	(364)
Revenues less transaction-based expenses	222	121	179	68	10	600
Operating income (loss)	$ 121	$ 40	$ 117	$ 9	$ (41)	$ 246
Nine Months Ended September 30, 2019						
Total revenues	$ 1,995	$ 368	$ 585	$ 239	$ 10	$ 3,197
Transaction-based expenses	(1,308)	—	—	—	—	(1,308)
Revenues less transaction-based expenses	687	368	585	239	10	1,889
Operating income (loss)	392	134	372	29	(170)	757
Nine Months Ended September 30, 2018						
Total revenues	$ 1,968	$ 364	$ 528	$ 194	$ 87	$ 3,141
Transaction-based expenses	(1,259)	—	—	—	—	(1,259)
Revenues less transaction-based expenses	709	364	528	194	87	1,882
Operating income (loss)	402	117	342	20	(94)	787

Certain amounts are allocated to corporate items in our management reports as we believe they do not contribute to a meaningful evaluation of a particular segment's ongoing operating performance. These items, which are shown in the table below, include the following:

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 acquisitions and divestitures in recent years that 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.

Restructuring charges: In September 2019, we initiated a restructuring plan. See Note 20, “Restructuring Charges,” for a discussion of the plan. We believe performance measures excluding restructuring charges provide management with a more useful representation of our segments' ongoing activity in each period.

Clearing default loss: In September 2018, we recorded an $8 million loss related to a default of a Nasdaq Clearing commodities member. See “Nasdaq Commodities Clearing Default,” of Note 16, “Clearing Operations,” for further discussion of the default. We have included the loss related to the default in corporate items as we believe it is non-recurring, as there has never been a loss due to member default in our clearinghouse, and should be excluded when evaluating the ongoing operating performance of the Market Services segment. Any expenses associated with the evaluation and enhancement of processes and procedures will be reflected within the Market Services segment.

2019 and 2018 divestitures: We have included in corporate items the revenues and expenses of BWise and the Public Relations Solutions and Digital Media Services businesses which were part of the Corporate Solutions business within our Corporate Services segment as BWise was sold in March 2019 and the Public Relations Solutions and Digital Media Services businesses were sold in April 2018. See “2019 Divestiture,” and “2018 Divestiture,” of Note 5, “Acquisitions and Divestitures,” for further discussion.

Other significant items: We have included certain other charges or gains in corporate items, to the extent we believe they should be excluded when evaluating the ongoing operating performance of each individual segment. For the three and nine months ended September 30, 2019, other significant items included a provision for notes receivable associated with the funding of technology development for the CAT, litigation costs, and out of period tax charges. The provision for notes receivable is a consequence of changes to the CAT project, and particularly, the decision by Nasdaq and the other exchanges to impair the value of the technology built by the original vendor, who has been replaced. For the nine months ended September 30, 2019, other significant items also included loss on extinguishment of debt which is recorded in general, administrative and other expense in our Condensed Consolidated Statements of Income. For the three and nine months ended September 30, 2018, other significant items included litigation costs and for the nine months ended September 30, 2018, out of period tax charges.

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.

* * * * * *

A summary of our corporate items is as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
	(in millions)			
Revenues - divested businesses	$ —	$ 10	$ 10	$ 87
Expenses:				
Amortization expense of acquired intangible assets	25	27	76	83
Merger and strategic initiatives expense	10	6	25	7
Restructuring charges	30	—	30	—
Provision for notes receivable	20	—	20	—
Clearing default loss	—	8	—	8
Extinguishment of debt	—	—	11	—
Expenses - divested businesses	—	8	8	75
Other	4	2	10	8
Total expenses	89	51	180	181
Operating loss	$ (89)	$ (41)	$ (170)	$ (94)

20. Restructuring Charges

In September 2019, we initiated the transition of certain technology platforms to advance the company's strategic opportunities as a technology and analytics provider and continue the re-alignment of certain business areas. In connection with these restructuring efforts, we are retiring certain elements of our marketplace infrastructure and technology product offerings as we implement NFF and other technologies internally and externally. As a result of these actions, we expect to incur $65 million to $75 million in pre-tax charges over a two year period related primarily to non-cash items such as asset impairments, accelerated depreciation as well as third-party consulting costs. Restructuring charges are recorded on restructuring plans that have been committed to by management and are, in part, based upon management’s best estimates of future events.

The following table presents a summary of the 2019 restructuring plan charges in the Condensed Consolidated Statements of Income for the three and nine months ended September 30, 2019 which primarily consisted of asset impairment charges mainly related to capitalized software.

	Three and Nine Months Ended September 30, 2019
	(in millions)
Asset impairments	$ 23
Accelerated depreciation	2
Severance and employee-related costs	3
Other	2
Total restructuring charges	$ 30

Item 2. 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 condensed consolidated financial statements and related notes included in this Form 10-Q.

Overview

Nasdaq is a global technology company serving the capital markets and other industries. Our diverse offering of data, analytics, software and services enables clients to optimize and execute their business vision with confidence. We manage, operate and provide our products and services in four business segments: Market Services, Corporate Services, Information Services and Market Technology.

Third Quarter and Nine Months Ended 2019 Recent Developments

Cash Dividends on Common Stock

- In April, the board of directors approved a regular quarterly cash dividend of $0.47 per share on our outstanding common stock, which reflects a 7.0% increase from our prior quarterly cash dividend of $0.44.
- For the nine months ended September 30, 2019, we returned $228 million to shareholders through dividend payments.
- In both July and October 2019, the board of directors approved a regular quarterly cash dividend of $0.47 per share on our outstanding common stock.

Share Repurchase Program

- During the nine months ended September 30, 2019, we repurchased 2,053,855 common shares at a cost of $200 million. As of September 30, 2019, the remaining amount authorized for share repurchases under our share repurchase program was $132 million. In October 2019, the board authorized an additional $500 million under the existing share repurchase program, bringing the aggregate authorized amount to $632 million as of October 22, 2019.

Debt Issuance and Repayments

- In April 2019, we issued the 2029 Notes and in May 2019, we primarily used the net proceeds from the 2029 Notes to repay in full and terminate our 2020 Notes.
- In June 2019, we used proceeds from issuances of commercial paper to repay in full and terminate our 2016 Credit Facility.

Corporate Highlights - Third Quarter 2019

- We continue to see strong client traction in our Market Technology segment. Market Technology annualized recurring revenue, or ARR, is a new metric that we introduced in the second quarter of 2019 that is intended to increase the transparency of the company's SaaS and recurring revenues. ARR totaled $255 million in the third quarter of 2019, an increase of 17% year over year. New order intake totaled $62 million during the third quarter of 2019. We also continued to realize strong growth in our surveillance business. See "Key Drivers," in this Item 2 for further discussion of ARR.
- Our index revenues and ETP assets under management tracking Nasdaq indexes each set a new quarterly record. Overall assets under management in ETPs benchmarked to Nasdaq's proprietary index families totaled $207 billion as of September 30, 2019, which included $92 billion, or 44%, tracking smart beta indexes.
- The Nasdaq Stock Market led U.S. exchanges for IPOs during the first nine months of 2019 with a 76% win rate. In the U.S. market, The Nasdaq Stock Market welcomed 206 new listings in the first nine months of 2019, including 138 IPOs. Nasdaq's Nordic and Baltic exchanges and Nasdaq First North added 36 new listings, including 22 IPOs.
- In October 2019, Nasdaq acquired the Center for Board Excellence, or CBE, a privately-held provider of corporate governance and compliance solutions for boards of directors, CEOs, corporate secretaries and general counsels. See "Corporate Services," of Note 1, "Organization and Nature of Operations," to the condensed consolidated financial statements for further discussion of this acquisition.
- Nasdaq Private Market announced an agreement with PJT Partners LP to provide enhanced execution capabilities for general partner, or GP, sponsored secondary transactions using the Nasdaq Private Market technology platform. The market for GP-sponsored secondary transactions has seen significant transaction volume growth over the last six years, and Nasdaq believes that the combined offering can bring greater standardization and efficiency to this market while appealing to an even broader universe of general partners, limited partners and secondary investors.

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.

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Market Services				
Equity Derivative Trading and Clearing				
U.S. equity options				
Total industry average daily volume (in millions)	17.8	16.5	17.5	17.7
Nasdaq PHLX matched market share	15.5%	16.4%	15.8%	16.0%
The Nasdaq Options Market matched market share	8.8%	8.5%	9.0%	9.3%
Nasdaq BX Options matched market share	0.2%	0.3%	0.3%	0.4%
Nasdaq ISE Options matched market share	9.0%	9.0%	9.0%	8.7%
Nasdaq GEMX Options matched market share	4.4%	4.8%	4.1%	4.6%
Nasdaq MRX Options matched market share	0.3%	0.1%	0.2%	0.1%
Total matched market share executed on Nasdaq's exchanges	38.2%	39.1%	38.4%	39.1%
Nasdaq Nordic and Nasdaq Baltic options and futures				
Total average daily volume of options and futures contracts(1)	329,409	279,329	355,206	332,743
Cash Equity Trading				
Total U.S.-listed securities				
Total industry average daily share volume (in billions)	6.94	6.35	7.13	6.94
Matched share volume (in billions)	90.3	77.8	268.6	250.3
The Nasdaq Stock Market matched market share	18.0%	15.9%	15.4%	15.3%
Nasdaq BX matched market share	1.6%	2.9%	1.9%	3.1%
Nasdaq PSX matched market share	0.7%	0.7%	0.7%	0.8%
Total matched market share executed on Nasdaq's exchanges	20.3%	19.5%	18.0%	19.2%
Market share reported to the FINRA/Nasdaq Trade Reporting Facility	29.1%	30.4%	29.6%	32.5%
Total market share(2)	49.4%	49.9%	47.6%	51.7%
Nasdaq Nordic and Nasdaq Baltic securities				
Average daily number of equity trades executed on Nasdaq's exchanges	581,260	553,709	579,120	608,739
Total average daily value of shares traded (in billions)	$ 4.1	$ 4.8	$ 4.6	$ 5.5
Total market share executed on Nasdaq's exchanges	72.7%	65.7%	69.9%	67.4%
FICC				
Fixed Income				
U.S. fixed income volume ($ billions traded)	$ 3,033	$ 3,194	$ 8,669	$ 12,484
Total average daily volume of Nasdaq Nordic and Nasdaq Baltic fixed income contracts	104,092	121,747	115,147	126,149
Commodities				
Power contracts cleared (TWh)(3)	194	276	614	853
Corporate Services				
Initial public offerings				
The Nasdaq Stock Market	41	52	138	145
Exchanges that comprise Nasdaq Nordic and Nasdaq Baltic	4	3	22	38
Total new listings				
The Nasdaq Stock Market(4)	66	85	206	236
Exchanges that comprise Nasdaq Nordic and Nasdaq Baltic(5)	8	6	36	50
Number of listed companies				
The Nasdaq Stock Market(6)	3,091	3,049	3,091	3,049
Exchanges that comprise Nasdaq Nordic and Nasdaq Baltic(7)	1,028	1,010	1,028	1,010
Information Services				
Number of licensed ETPs	325	358	325	358
ETP assets under management tracking Nasdaq indexes (in billions)	$ 207	$ 206	$ 207	$ 206
Market Technology				
Order intake (in millions)(8)	$ 62	$ 40	$ 162	$ 149
ARR (in millions)(9)	$ 255	$ 218	N/M	N/M

(1) Includes Finnish option contracts traded on Eurex.

(2) 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.

(3) Transactions executed on Nasdaq Commodities or OTC and reported for clearing to Nasdaq Commodities measured by Terawatt hours (TWh).

(4) 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.

(5) 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.

(6) Number of total listings on The Nasdaq Stock Market at period end, including 382 ETPs as of September 30, 2019 and 390 as of September 30, 2018.

(7) Represents companies listed on the Nasdaq Nordic and Nasdaq Baltic exchanges and companies on the alternative markets of Nasdaq First North at period end.

(8) Total contract value of orders signed during the period.

(9) ARR for a given period is the annualized revenue of Market Technology support and SaaS subscription contracts. ARR is currently one of our key performance metrics to assess the health and trajectory of our business. ARR does not have any standardized definition and is therefore unlikely to be comparable to similarly titled measures presented by other companies. ARR should be viewed independently of revenue and deferred revenue and is not intended to be combined with or to replace either of those items. ARR is not a forecast and the active contracts during the reporting period used in calculating ARR may or may not be extended or renewed by our customers.

N/M - Not meaningful.

* * * * * *

Financial Summary

The following table summarizes our financial performance for the three and nine months ended September 30, 2019 as compared to the same periods in 2018. The comparability of our results of operations between reported periods is impacted by our acquisition of Cinnober in January 2019, the divestiture of the BWise enterprise governance, risk and compliance software platform in March 2019, the divestiture of the Public Relations Solutions and Digital Media Services businesses in April 2018, and an increase in net income from unconsolidated investees. See Note 5, "Acquisitions and Divestitures," and "Equity Method Investments," of Note 8, "Investments," to the condensed consolidated financial statements for further discussion of these transactions. For a detailed discussion of our results of operations, see "Segment Operating Results" below.

	Three Months Ended September 30,		Percentage Change	Nine Months Ended September 30,		Percentage Change
	2019	2018		2019	2018	
	(in millions, except per share amounts)			(in millions, except per share amounts)		
Revenues less transaction-based expenses	$ 632	$ 600	5.3 %	$ 1,889	$ 1,882	0.4 %
Operating expenses	406	354	14.7 %	1,132	1,095	3.4 %
Operating income	226	246	(8.1)%	757	787	(3.8)%
Interest expense	(29)	(38)	(23.7)%	(97)	(112)	(13.4)%
Net gain on divestiture of businesses	—	(8)	(100.0)%	27	33	(18.2)%
Net income from unconsolidated investees	15	6	150.0 %	71	13	446.2 %
Income before income taxes	215	209	2.9 %	767	736	4.2 %
Income tax provision	65	46	41.3 %	196	234	(16.2)%
Net income attributable to Nasdaq	$ 150	$ 163	(8.0)%	$ 571	$ 502	13.7 %
Diluted earnings per share	$ 0.90	$ 0.97	(7.2)%	$ 3.42	$ 2.99	14.4 %
Cash dividends declared per common share	$ 0.47	$ 0.44	6.8 %	$ 1.38	$ 1.26	9.5 %

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 3. Quantitative and Qualitative Disclosures about Market Risk."

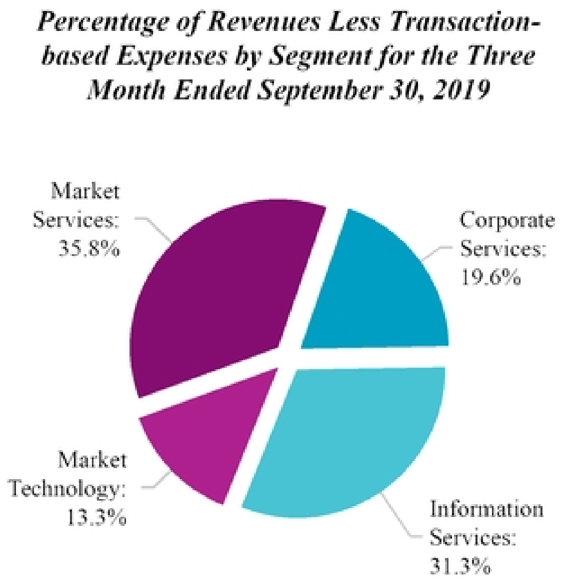
Segment Operating Results

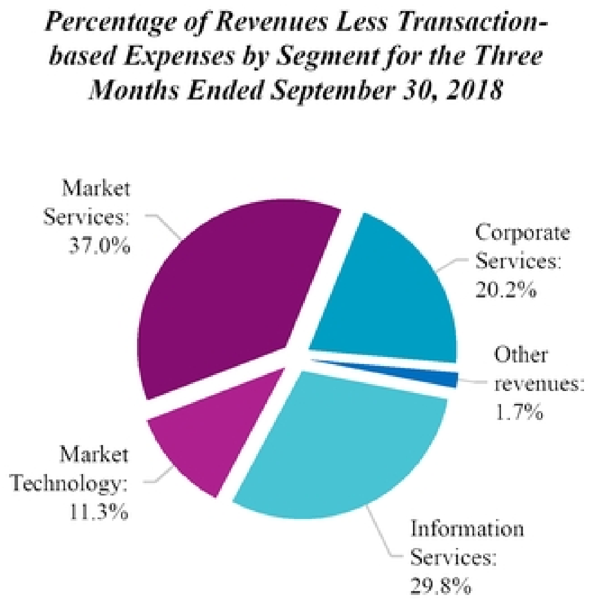
The following table shows our revenues by segment, transaction-based expenses for our Market Services segment and total revenues less transaction-based expenses:

	Three Months Ended September 30, 2019	Three Months Ended September 30, 2018	Percentage Change	Nine Months Ended September 30, 2019	Nine Months Ended September 30, 2018	Percentage Change
	(in millions)			(in millions)		
Market Services	$ 690	$ 586	17.7 %	$ 1,995	$ 1,968	1.4 %
Transaction-based expenses	(464)	(364)	27.5 %	(1,308)	(1,259)	3.9 %
Market Services revenues less transaction-based expenses	226	222	1.8 %	687	709	(3.1)%
Corporate Services	124	121	2.5 %	368	364	1.1 %
Information Services	198	179	10.6 %	585	528	10.8 %
Market Technology	84	68	23.5 %	239	194	23.2 %
Other revenues[(1)]	—	10	(100.0)%	10	87	(88.5)%
Total revenues less transaction-based expenses	$ 632	$ 600	5.3 %	$ 1,889	$ 1,882	0.4 %

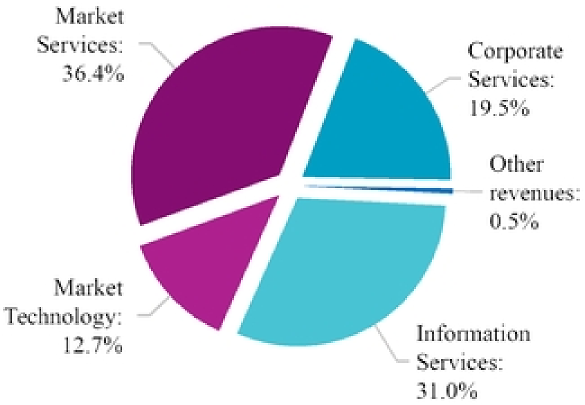
(1) Includes the revenues from the BWise enterprise governance, risk and compliance software platform which was sold in March 2019 and the Public Relations Solutions and Digital Media Services businesses which were sold in April 2018. Prior to the sale dates, these revenues were included in our Corporate Solutions business within our Corporate Services segment. See "2019 Divestiture," and "2018 Divestiture," of Note 5, "Acquisitions and Divestitures," to the condensed consolidated financial statements for further discussion.

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 $632 million for the three months ended September 30, 2019, $600 million for the three months ended September 30, 2018, $1,889 million for the nine months ended September 30, 2019, and $1,882 million for the nine months ended September 30, 2018:

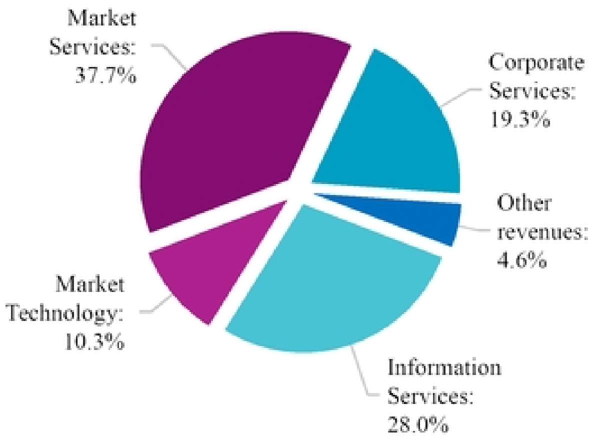




Percentage of Revenues Less Transaction-based Expenses by Segment for the Nine Months Ended September 30, 2019



Percentage of Revenues Less Transaction-based Expenses by Segment for the Nine Months Ended September 30, 2018



MARKET SERVICES

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

	Three Months Ended September 30, 2019	Three Months Ended September 30, 2018	Percentage Change	Nine Months Ended September 30, 2019	Nine Months Ended September 30, 2018	Percentage Change
	(in millions)			(in millions)		
Market Services Revenues:						
Equity Derivative Trading and Clearing Revenues[1]	$ 209	$ 190	10.0 %	$ 605	$ 621	(2.6)%
Transaction-based expenses:						
Transaction rebates	(121)	(115)	5.2 %	(353)	(370)	(4.6)%
Brokerage, clearance and exchange fees[1]	(13)	(7)	85.7 %	(33)	(34)	(2.9)%
Equity derivative trading and clearing revenues less transaction-based expenses	**75**	**68**	**10.3 %**	**219**	**217**	**0.9 %**
Cash Equity Trading Revenues[2]	392	303	29.4 %	1,117	1,056	5.8 %
Transaction-based expenses:						
Transaction rebates	(227)	(176)	29.0 %	(657)	(571)	15.1 %
Brokerage, clearance and exchange fees[2]	(102)	(64)	59.4 %	(262)	(276)	(5.1)%
Cash equity trading revenues less transaction-based expenses	**63**	**63**	**— %**	**198**	**209**	**(5.3)%**
FICC Revenues	17	21	(19.0)%	54	71	(23.9)%
Transaction-based expenses:						
Transaction rebates	(1)	(2)	(50.0)%	(2)	(6)	(66.7)%
Brokerage, clearance and exchange fees	—	—	— %	(1)	(2)	(50.0)%
FICC revenues less transaction-based expenses	**16**	**19**	**(15.8)%**	**51**	**63**	**(19.0)%**
Trade Management Services Revenues	**72**	**72**	**— %**	**219**	**220**	**(0.5)%**
Total Market Services revenues less transaction-based expenses	**$ 226**	**$ 222**	**1.8 %**	**$ 687**	**$ 709**	**(3.1)%**

(1) Includes Section 31 fees of $11 million in the third quarter of 2019, $30 million in the first nine months of 2019, $7 million in the third quarter of 2018 and $30 million in the first nine months of 2018. 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 $98 million in the third quarter of 2019, $251 million in the first nine months of 2019, $60 million in the third quarter of 2018 and $264 million in the first nine months of 2018. 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 increased in the third quarter of 2019 and decreased in the first nine months of 2019 compared with the same periods in 2018 and equity derivative trading and clearing revenues less transaction-based expenses increased in both the third quarter and first nine months of 2019 compared with the same periods in 2018. The increase in equity derivative trading and clearing revenues in the third quarter was primarily due to higher U.S. industry trading volumes, a higher U.S. gross capture rate, and higher Section 31 pass-through fee revenue, partially offset by lower overall U.S. matched market share executed on Nasdaq's exchanges. The decrease in equity derivative trading and clearing revenues in the first nine months of 2019 was primarily due to lower U.S. industry trading volumes and lower overall U.S. matched market share executed on Nasdaq's exchanges, partially offset by a higher U.S. gross capture rate. The increase in equity derivative trading and clearing revenues less transaction-based expenses in the third quarter of 2019 primarily reflects higher U.S. industry trading volumes and U.S. revenue capture, partially offset by lower overall U.S. matched market share executed on Nasdaq's exchanges. The increase in equity derivative trading and clearing revenues less transaction-based expenses in the first nine months of 2019 was primarily due to a higher U.S. net capture rate, partially offset by lower U.S. industry trading volumes, lower overall U.S. matched market share executed on Nasdaq's exchanges and an unfavorable impact from foreign exchange of $3 million.

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. Section 31 fees increased in the third quarter of 2019 compared with the same period in 2018 primarily due to higher average SEC fee rates. Section 31 fees were unchanged in the first nine months of 2019 compared with the same period in 2018.

Transaction rebates, in which we credit a portion of the per share execution charge to the market participant, increased in the third quarter of 2019 compared with the same period in 2018 primarily due to higher U.S. industry trading volumes, partially offset by lower overall U.S. matched market share executed on Nasdaq's exchanges. Transaction rebates decreased in the first nine months of 2019 compared with the same period in 2018 primarily due to lower U.S. industry trading volumes and a decrease in our overall U.S. matched market share executed on Nasdaq's exchanges, partially offset by an increase in the U.S. rebate capture rate.

Brokerage, clearance and exchange fees increased in the third quarter and decreased in the first nine months of 2019 compared with the same periods in 2018. The increase in the third quarter was primarily due to increase in Section 31 pass-through fees, as discussed above. The decrease in the first nine months of 2019 was primarily due to a decline in routing fees.

Cash Equity Trading Revenues

Cash equity trading revenues increased in both the third quarter and first nine months of 2019 compared with the same periods in 2018 and cash equity trading revenues less transaction-based expenses were unchanged in the third quarter of 2019 and decreased in the first nine months of 2019 compared with the same periods in 2018. The increase in cash equity trading revenues in the third quarter of 2019 was primarily due to higher U.S. industry trading volumes, a higher U.S. gross capture rate, higher overall U.S. matched market share executed on Nasdaq's exchanges, and higher Section 31 pass-through fee revenue, as discussed below. The increase in cash equity trading revenues in the first nine months of 2019 was primarily due to higher overall U.S. matched market share executed on Nasdaq's exchanges, a higher U.S. gross capture rate, and higher U.S. industry trading volumes, partially offset by lower Section 31 pass-through fee revenue, as discussed below and an unfavorable impact from foreign exchange of $6 million related to Nasdaq's Nordic exchanges.

Cash equity trading revenues less transaction-based expenses were unchanged in the third quarter of 2019 as higher U.S. industry volumes were offset by a lower U.S. net capture rate due to higher overall matched market share executed on Nasdaq's exchanges, driving customers to reach higher volume tiers. The decrease in cash equity trading revenues less transaction-based expenses in the first nine months of 2019 primarily reflects a lower U.S. net capture rate due to a particularly strong 2018 period, partially offset by higher overall U.S. matched market share executed on Nasdaq's exchanges. In addition, in Europe, lower industry trading volumes and an unfavorable impact from foreign exchange of $6 million related to Nasdaq's Nordic exchanges were partially offset by a higher European 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. Section 31 fees increased in the third quarter and decreased in the first nine months of 2019 compared with the same periods in 2018. The increase in the third quarter of 2019 was primarily due to higher average SEC fee rates and a higher dollar value traded on Nasdaq’s exchanges. The decrease in the first nine months of 2019 was primarily due to lower dollar value traded on Nasdaq’s exchanges.

Transaction rebates increased in the third quarter and first nine months of 2019 compared with the same periods in 2018. 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 increase in the third quarter was primarily due to higher U.S. industry trading volumes, a higher U.S. rebate capture rate, and an increase in our overall U.S. matched market share executed on Nasdaq's exchanges. The increase in the first nine months of 2019 was primarily due to a higher U.S. rebate capture rate, an increase in our overall U.S. matched market share executed on Nasdaq’s exchanges, and higher U.S. industry trading volumes.

Brokerage, clearance and exchange fees increased in the third quarter of 2019 and decreased in the first nine months of 2019 compared with the same periods in 2018 primarily due to Section 31 pass-through fees, as discussed above.

FICC Revenues

FICC revenues and FICC revenues less transaction-based expenses decreased in the third quarter and first nine months of 2019 compared with the same periods in 2018 primarily the result of a decline in revenues related to U.S. fixed income products primarily due to lower volumes and a decline in revenues in European commodities products due to lower volumes. The decreases in FICC revenues and FICC revenues less transaction-based expenses in the first nine months also included an unfavorable impact from foreign exchange of $3 million. The decrease in FICC revenues less transaction-based expenses in the first nine months of 2019 was partially offset by higher net revenues at NFX due to pricing changes.

Trade Management Services Revenues

Trade management services revenues were unchanged in the third quarter of 2019 and decreased slightly in the first nine months of 2019 compared with the same periods in 2018. The decrease was primarily due to an unfavorable impact from foreign exchange of $2 million.

CORPORATE SERVICES

The following table shows revenues from our Corporate Services segment:

	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Percentage Change	2019	2018	Percentage Change
	(in millions)			(in millions)		
Corporate Services:						
Listing Services	$ 74	$ 72	2.8%	$ 219	$ 217	0.9%
Corporate Solutions	$ 50	$ 49	2.0%	$ 149	$ 147	1.4%
Total Corporate Services	$ 124	$ 121	2.5%	$ 368	$ 364	1.1%

Listing Services Revenues

Listing services revenues increased in both the third quarter and first nine months of 2019 compared with the same periods in 2018 primarily due to higher listings revenues due to an increase in the number of listed companies. The increase in the first nine months of 2019 was partially offset by the run-off of fees earned from U.S. listing of additional shares and an unfavorable impact from foreign exchange of $5 million.

Corporate Solutions Revenues

Corporate solutions revenues increased in both the third quarter and first nine months of 2019 compared with the same periods in 2018 due to an increase in investor relations intelligence revenues in the third quarter of 2019 and an increase in governance solutions revenues in the first nine months of 2019.

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INFORMATION SERVICES

The following table shows revenues from our Information Services segment:

	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Percentage Change	2019	2018	Percentage Change
	(in millions)			(in millions)		
Information Services:						
Market Data	$ 102	$ 95	7.4%	$ 302	$ 293	3.1%
Index	56	52	7.7%	166	152	9.2%
Investment Data & Analytics	40	32	25.0%	117	83	41.0%
Total Information Services	$ 198	$ 179	10.6%	$ 585	$ 528	10.8%

Market Data Revenues

Market data revenues increased in both the third quarter and first nine months of 2019 compared with the same periods in 2018 primarily due to higher U.S. tape revenues from under-reported data usage and new proprietary data sales. The increase in the first nine months of 2019 was partially offset by an unfavorable impact from foreign exchange of $4 million.

Index Revenues

Index revenues increased in both the third quarter and first nine months of 2019 compared with the same periods in 2018 primarily due to higher licensing revenues from futures trading linked to the Nasdaq 100 Index and higher average assets under management in ETPs linked to Nasdaq indexes.

Investment Data & Analytics Revenues

Investment data & analytics revenues increased in both the third quarter and first nine months of 2019 compared with the same periods in 2018 primarily due to an increase in eVestment revenues resulting from a $4 million purchase price adjustment on deferred revenue in the third quarter of 2018 and $22 million in the first nine months of 2018 as well as organic sales growth in eVestment and the impact of our acquisition of Quandl.

MARKET TECHNOLOGY

The following table shows revenues from our Market Technology segment:

	Three Months Ended September 30, 2019	Three Months Ended September 30, 2018	Percentage Change	Nine Months Ended September 30, 2019	Nine Months Ended September 30, 2018	Percentage Change
	(in millions)			(in millions)		
Market Technology	$ 84	$ 68	23.5%	$ 239	$ 194	23.2%

Market Technology Revenues

Market technology revenues increased in both the third quarter and first nine months of 2019 compared with the same periods in 2018 primarily due to the inclusion of revenues associated with the acquisition of Cinnober, an increase in the size and number of software delivery projects, and an increase in SaaS surveillance revenues. The increase in the first nine months was offset by an unfavorable impact from foreign exchange of $6 million and a decrease in change request revenues.

OTHER REVENUES

Other revenues for the third quarter of 2018 and first nine months of 2019 and 2018 include the revenues from the BWise enterprise governance, risk and compliance software platform, which was sold in March 2019. Other revenues for the first nine months of 2018 also include the revenues from the Public Relations Solutions and Digital Media Services businesses which were sold in April 2018. Prior to the sale dates, these revenues were included in our Corporate Solutions business. See “2019 Divestiture,” and “2018 Divestiture,” of Note 5, “Acquisitions and Divestitures,” to the condensed consolidated financial statements for further discussion of these divestitures.

Expenses

Operating Expenses

The following table shows our operating expenses:

	Three Months Ended September 30, 2019	Three Months Ended September 30, 2018	Percentage Change	Nine Months Ended September 30, 2019	Nine Months Ended September 30, 2018	Percentage Change
	(in millions)			(in millions)		
Compensation and benefits	$ 175	$ 164	6.7 %	$ 518	$ 534	(3.0)%
Professional and contract services	31	33	(6.1)%	99	105	(5.7)%
Computer operations and data communications	33	32	3.1 %	98	94	4.3 %
Occupancy	24	23	4.3 %	72	72	— %
General, administrative and other	40	28	42.9 %	95	73	30.1 %
Marketing and advertising	8	7	14.3 %	29	27	7.4 %
Depreciation and amortization	47	53	(11.3)%	143	159	(10.1)%
Regulatory	8	8	— %	23	24	(4.2)%
Merger and strategic initiatives	10	6	66.7 %	25	7	257.1 %
Restructuring charges	30	—	N/M	30	—	N/M
Total operating expenses	$ 406	$ 354	14.7 %	$ 1,132	$ 1,095	3.4 %

N/M - Not meaningful.

Compensation and benefits expense increased in the third quarter of 2019 and decreased in the first nine months of 2019 compared with the same periods in 2018. The increase in the third quarter of 2019 was primarily due to higher salary costs and higher compensation expense from our 2019 and 2018 acquisitions, partially offset by lower compensation costs resulting from our 2019 divestiture. The decrease in the first nine months of 2019 was primarily due to lower compensation costs resulting from our 2019 and 2018 divestitures and lower performance incentives, partially offset by higher compensation costs resulting from our 2019 and 2018 acquisitions. The increase in the third quarter was partially offset by a favorable impact from foreign exchange of $4 million and the decrease in the first nine months included a favorable impact from foreign exchange of $15 million.

Headcount increased to 4,339 employees as of September 30, 2019 from 4,024 as of September 30, 2018 primarily due to our 2019 and 2018 acquisitions, partially offset by our 2019 divestiture.

Professional and contract services expense decreased in both the third quarter and first nine months of 2019 compared with the same periods in 2018. The decrease in the third quarter was primarily due to our 2019 divestiture, partially offset by certain litigation and consulting costs. The decrease in the first nine months was primarily due to our 2019 and 2018 divestitures and also included a favorable impact from foreign exchange of $3 million.

Computer operations and data communications expense increased in both the third quarter and the first nine months of 2019 compared with the same periods in 2018 primarily due to higher market data feed costs, partially offset by lower costs due to our 2018 divestiture. The increase in the first nine months was partially offset by a favorable impact from foreign exchange of $2 million.

Occupancy expense increased slightly in the third quarter and was unchanged for the first nine months of 2019 compared with the same periods in 2018. In both periods, higher costs were primarily associated with additional facility and rent costs resulting from expansion of our new world headquarters and our 2019 and 2018 acquisitions. The increase in the first nine months was partially offset by lower costs due to our 2018 divestiture and a favorable impact from foreign exchange of $2 million.

General, administrative and other expense increased in both the third quarter and the first nine months of 2019 compared with the same periods in 2018. The increase in both periods was primarily due to a provision recorded for notes receivable associated with the funding of technology development for the CAT, partially offset by the clearing default loss which occurred in the third quarter of 2018. See “Nasdaq Commodities Clearing Default,” of Note 16, “Clearing Operations,” for further discussion of the default. The increase in the first nine months of 2019 also included a pre-tax charge of $11 million for a make-whole redemption price premium paid on the early extinguishment of our 2020 Notes, partially offset by lower costs resulting from our 2019 and 2018 divestitures and a favorable impact from foreign exchange of $2 million.

Marketing and advertising expense increased in both the third quarter and first nine months of 2019 primarily due to an increase in advertising spend.

Depreciation and amortization expense decreased in both the third quarter and first nine months of 2019 compared with the same periods in 2018 primarily due to a decrease in amortization expense recorded on capitalized software as a result of our 2019 restructuring plan, a decrease in amortization expense recorded on intangible assets which became fully amortized and the cessation of depreciation expense on the BWise assets that were reclassified to assets held for sale as of December 31, 2018. Partially offsetting these decreases was additional amortization expense associated with acquired intangible assets. The decrease in the first nine months also included a favorable impact from foreign exchange of $2 million. See Note 20, “Restructuring Charges,” to the condensed consolidated financial statements for further discussion of our 2019 restructuring plan and charges associated with this plan.

Merger and strategic initiatives expense increased in both the third quarter and first nine months of 2019 compared with the same periods in 2018. We have pursued various strategic initiatives and completed acquisitions and divestitures 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 and will vary based on the size and frequency of the activities described above.

Restructuring charges were $30 million in the third quarter and first nine months of 2019. See Note 20, “Restructuring Charges,” to the condensed consolidated financial statements for further discussion of our 2019 restructuring plan and charges associated with this plan.

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Non-operating Income and Expenses

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

	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Percentage Change	2019	2018	Percentage Change
	(in millions)			(in millions)		
Interest income	$ 3	$ 3	— %	$ 8	$ 8	— %
Interest expense	(29)	(38)	(23.7)%	(97)	(112)	(13.4)%
Net interest expense	(26)	(35)	(25.7)%	(89)	(104)	(14.4)%
Net gain (loss) on divestiture of businesses	—	(8)	(100.0)%	27	33	(18.2)%
Other investment income	—	—	— %	1	7	(85.7)%
Net income from unconsolidated investees	15	6	150.0 %	71	13	446.2 %
Total non-operating income (expenses)	$ (11)	$ (37)	(70.3)%	$ 10	$ (51)	(119.6)%

Interest Expense

Interest expense decreased in both the third quarter and first nine months of 2019 compared with the same periods in 2018 primarily due to lower outstanding debt obligations and the refinancing of the 2020 Notes with the 2029 Notes at a lower interest rate. See Note 10, "Debt Obligations," to the condensed consolidated financial statements for further discussion of our debt obligations.

The following table shows our interest expense:

	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Percentage Change	2019	2018	Percentage Change
	(in millions)			(in millions)		
Interest expense on debt	$ 27	$ 35	(22.9)%	$ 91	$ 105	(13.3)%
Accretion of debt issuance costs and debt discount	1	2	(50.0)%	4	5	(20.0)%
Other bank and investment-related fees	1	1	— %	2	2	— %
Interest expense	$ 29	$ 38	(23.7)%	$ 97	$ 112	(13.4)%

Net Gain (Loss) on Divestiture of Businesses

The net gain on divestiture of businesses for the first nine months of 2019 relates to our 2019 divestiture. See "2019 Divestiture," of Note 5, "Acquisitions and Divestitures," to the condensed consolidated financial statements for further discussion.

The net gain (loss) on divestiture of businesses for the third quarter and first nine months of 2018 relates to our 2018 divestiture. See "2018 Divestiture," of Note 5, "Acquisitions and Divestitures," to the condensed consolidated financial statements for further discussion.

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Other Investment Income

Other investment income in the first nine months of 2018 primarily related to dividend income received on an equity security.

Net Income from Unconsolidated Investees

Net income from unconsolidated investees increased in both the third quarter and first nine months of 2019 compared with the same periods in 2018 primarily due to income recognized from our equity method investment in OCC. See "Equity Method Investments," of Note 8, "Investments," to the condensed consolidated financial statements for further discussion.

Tax Matters

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

	Three Months Ended September 30,		Percentage Change
	2019	2018	
	($ in millions)		
Income tax provision	$ 65	$ 46	41.3 %
Effective tax rate	30.2%	22.0%	

	Nine Months Ended September 30,		Percentage Change
	2019	2018	
	(in millions)		
Income tax provision	$ 196	$ 234	(16.2)%
Effective tax rate	25.6%	31.8%	

For further discussion of our tax matters, see Note 17, "Income Taxes," to the condensed consolidated financial statements.

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 our 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. In addition, other companies, including companies in our industry, may calculate such measures differently, which reduces their usefulness as comparative measures. Investors should not rely on any single financial measure when evaluating our business. This non-GAAP information should be considered as supplemental in nature and is not meant as a substitute for our operating results in accordance with U.S. GAAP. We recommend investors review the U.S. GAAP financial measures included in this Quarterly Report on Form 10-Q, including our condensed 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 acquisitions and divestitures in recent years that 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 comparisons in Nasdaq's performance between periods.

Restructuring charges: We initiated the transition of certain technology platforms to advance our strategic opportunities as a technology and analytics provider and continue the re-alignment of certain business areas. See Note 20, "Restructuring Charges," for further discussion of the restructuring plan. Charges associated with this plan represent a fundamental shift in our strategy and technology as well as executive re-alignment and will be excluded for purposes of calculating non-GAAP measures as they are not reflective of ongoing operating performance or comparisons in Nasdaq's performance between periods.

Clearing default loss: In September 2018, we recorded an $8 million loss related to a default of a Nasdaq Clearing commodities member. See "Nasdaq Commodities Clearing Default," of Note 16, "Clearing Operations," for further discussion of the default. We have excluded the loss related to the default as we believe it is non-recurring, as there has never been a loss due to member default in our clearinghouse, and should be excluded when evaluating the ongoing operating performance of Nasdaq. Any expenses associated with the evaluation and enhancement of processes and procedures will not be excluded from our GAAP results.

Net income from unconsolidated investee: See "OCC Capital Plan," of Note 8, "Investments," for further discussion. Our income on our investment in OCC will vary significantly compared to prior years due to the disapproval of the OCC's capital plan. Accordingly, we will exclude this income from current and prior periods for purposes of calculating non-GAAP measures which provide a more meaningful analysis of Nasdaq's ongoing operating performance or comparisons in 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 the third quarter and first nine months of 2019, other significant items included a provision for notes receivable associated with the funding of technology development for the CAT, litigation costs, and out of period tax charges. For the first nine months 2019, other significant items also included loss on extinguishment of debt which is recorded in general, administrative and other expense in our Condensed Consolidated Statements of Income.

The first nine months of 2019 also included a net gain on a divestiture of a business which represents our pre-tax net gain of $27 million on the sale of BWise. For the third quarter and first nine months of 2018, other significant items includes a net gain on divestiture of businesses associated with the sale of our Public Relations Solutions and Digital Media Services businesses. We recognized a pre-tax net gain on the sale of $33 million for the nine months ended September 30, 2018 which includes a post closing working capital adjustment of $8 million recorded during the three months ended September 30, 2018. For the third quarter and first nine months of 2018, other significant items included litigation costs and for the nine months ended September 30, 2018, out of period tax charges.

Significant tax items: For the third quarter and first nine months of 2019 and 2018, the non-GAAP adjustment to the income tax provision included the tax impact of each non-GAAP adjustment and for the first nine months of 2019, a tax benefit of $10 million related to capital distributions from the OCC and a reversal of a previously accrued tax penalty in Finland. See "OCC Capital Plan," of Note 8, "Investments," for further discussion of our OCC investment. Additional adjustments included the following items:

- For the first nine months of 2019 and 2018, excess tax benefits related to employee share-based compensation reflect the recognition of the income tax effects of share-based awards when awards vest or are settled. 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.

- For the first nine months of 2018, we recorded a reversal of certain Swedish tax benefits. See Note 17, “Income Taxes,” to the condensed consolidated financial statements for further discussion.
- The impact of enacted U.S. tax legislation is related to the Tax Cuts and Jobs Act which was enacted on December 22, 2017. For the three months ended September 30, 2018, we recorded a decrease to tax expense of $4 million related to the remeasurement of our deferred tax assets and liabilities as of the enactment date. For the first nine months of 2018, we recorded an increase to tax expense of $1 million, consisting of a $5 million increase to tax expense which reflects the reduced federal tax benefit associated with state unrecognized tax benefits, partially offset by the $4 million decrease described above.

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The following tables represent 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:

	Three Months Ended September 30, 2019		Three Months Ended September 30, 2018	
	(in millions, except share and per share amounts)			
	Net Income	Diluted Earnings Per Share	Net Income	Diluted Earnings Per Share
U.S. GAAP net income attributable to Nasdaq and diluted earnings per share	$ 150	$ 0.90	$ 163	$ 0.97
Non-GAAP adjustments:				
Amortization expense of acquired intangible assets	25	0.15	27	0.16
Merger and strategic initiatives expense	10	0.06	6	0.05
Restructuring charges	30	0.18	—	—
Provision for notes receivable	20	0.12	—	—
Clearing default loss	—	—	8	0.05
Net income from unconsolidated investee	(15)	(0.09)	(5)	(0.03)
Net loss on divestiture of business	—	—	8	0.05
Other	4	0.02	2	0.01
Total non-GAAP adjustments	74	0.44	46	0.29
Adjustment to the income tax provision to reflect non-GAAP adjustments and other tax items	(12)	(0.07)	(16)	(0.11)
Impact of enacted U.S. tax legislation	—	—	(4)	(0.02)
Total non-GAAP tax adjustments	(12)	(0.07)	(20)	(0.13)
Total non-GAAP adjustments, net of tax	62	0.37	26	0.16
Non-GAAP net income attributable to Nasdaq and diluted earnings per share	$ 212	$ 1.27	$ 189	$ 1.13
Weighted-average common shares outstanding for diluted earnings per share		167,029,744		167,290,916

	Nine Months Ended September 30, 2019		Nine Months Ended September 30, 2018	
	(in millions, except share and per share amounts)			
	Net Income	Diluted Earnings Per Share	Net Income	Diluted Earnings Per Share
U.S. GAAP net income attributable to Nasdaq and diluted earnings per share	$ 571	$ 3.42	$ 502	$ 2.99
Non-GAAP adjustments:				
Amortization expense of acquired intangible assets	76	0.46	83	0.49
Merger and strategic initiatives expense	25	0.15	7	0.04
Restructuring charges	30	0.18	—	—
Provision for notes receivable	20	0.12	—	—
Clearing default loss	—	—	8	0.05
Net income from unconsolidated investee	(69)	(0.41)	(12)	(0.07)
Extinguishment of debt	11	0.07	—	—
Net gain on divestiture of businesses	(27)	(0.16)	(33)	(0.19)
Other	10	0.05	6	0.04
Total non-GAAP adjustments	76	0.46	59	0.36
Adjustment to the income tax provision to reflect non-GAAP adjustments and other tax items	(23)	(0.14)	(10)	(0.06)
Excess tax benefits related to employee share-based compensation	(4)	(0.03)	(5)	(0.03)
Reversal of certain Swedish tax benefits	—	—	41	0.24
Impact of enacted U.S. tax legislation	—	—	1	0.01
Total non-GAAP tax adjustments	(27)	(0.17)	27	0.16
Total non-GAAP adjustments, net of tax	49	0.29	86	0.52
Non-GAAP net income attributable to Nasdaq and diluted earnings per share	$ 620	$ 3.71	$ 588	$ 3.51
Weighted-average common shares outstanding for diluted earnings per share		167,028,932		167,884,484

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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. Currently, our cost and availability of funding remain healthy.

In March 2019, we used net proceeds from the sale of commercial paper and cash on hand to redeem all of our 2019 Notes. In April 2019, we issued the 2029 Notes and in May 2019, we primarily used the net proceeds from the 2029 Notes to repay in full and terminate our 2020 Notes. In addition, in June 2019, we used proceeds from issuances of commercial paper to repay in full and terminate our 2016 Credit Facility. See "1.75% Senior Unsecured Notes Due 2029," "Early Extinguishment of 5.55% Senior Unsecured Notes Due 2020," and "Early Extinguishment of 2016 Credit Facility," of Note 10, "Debt Obligations," to the condensed consolidated financial statements for further discussion of the 2029 Notes and the early extinguishment of both the 2020 Notes and 2016 Credit Facility.

We have the 2017 Credit Facility and a commercial paper program, which enable us to borrow efficiently at reasonable short-term interest rates. The commercial paper program is supported by our 2017 Credit Facility. See "Commercial Paper Program," and "2017 Credit Facility," of Note 10, "Debt Obligations," to the condensed consolidated financial statements for further discussion.

As of September 30, 2019, no amounts were outstanding on the 2017 Credit Facility. The $3 million balance represents unamortized debt issuance costs. Of the $1 billion that is available for borrowing, $541 million provides liquidity support for the commercial paper program and for a letter of credit. As such, as of September 30, 2019, the total remaining amount available under the 2017 Credit Facility was $459 million, excluding the amounts that support the commercial paper program and letter of credit.

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. See "Non-Cash Contingent Consideration," of Note 18, "Commitments, Contingencies and Guarantees," to the condensed 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.

The value of various assets and liabilities, including cash and cash equivalents, receivables, accounts payable and accrued expenses, the current portion of long-term debt and commercial paper can fluctuate from month to month. Working capital (calculated as current assets less current liabilities) was $(193) million as of September 30, 2019, compared with $(200) million as of December 31, 2018, an increase of $7 million. Current asset balance changes decreased working capital by $2,871 million, with decreases in default funds and margin deposits, other current assets, cash and cash equivalents, financial investments, at fair value and restricted cash, partially offset by an increase in receivables, net. Current liability balance changes increased working capital by $2,878 million, due to decreases in default funds and margin deposits, short-term debt, other current liabilities, Section 31 fees payable to the SEC, accrued personnel costs, and accounts payable and accrued expenses, partially offset by increases in deferred revenue.

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, regulatory capital requirements, and cash flows on our liquidity and capital resources.

Financial Assets

The following table summarizes our financial assets:

	September 30, 2019	December 31, 2018
	(in millions)	
Cash and cash equivalents	$ 304	$ 545
Restricted cash	29	41
Financial investments, at fair value	201	268
Total financial assets	$ 534	$ 854

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 September 30, 2019, our cash and cash equivalents of $304 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 September 30, 2019 decreased $241 million from December 31, 2018, primarily due to:

- repayments of debt obligations;
- cash dividends paid on our common stock;
- repurchases of our commons stock;
- cash paid for an acquisition, net of cash and cash equivalents acquired; and
- purchases of property and equipment, partially offset by;
- proceeds from issuances of long-term debt, net of issuance costs;
- net cash provided by operating activities;
- proceeds from commercial paper, net; and
- proceeds from the divestiture of a business.

See "Cash Flow Analysis" below for further discussion.

Restricted cash is restricted from withdrawal due to contractual or regulatory requirements or is not available for general use. Restricted cash was $29 million as of September 30, 2019 and $41 million as of December 31, 2018, a decrease of $12 million. The decrease primarily relates to a decrease in customer funds held in connection with privately negotiated securities transactions. Restricted cash is classified as restricted cash in the Condensed Consolidated Balance Sheets.

Repatriation of Cash

Our cash and cash equivalents held outside of the U.S. in various foreign subsidiaries totaled $192 million as of September 30, 2019 and $367 million as of December 31, 2018. The remaining balance held in the U.S. totaled $112 million as of September 30, 2019 and $178 million as of December 31, 2018.

Unremitted earnings of subsidiaries outside of the U.S. are used to finance our international operations and are considered to be indefinitely reinvested.

Share Repurchase Program

See "Share Repurchase Program," of Note 13, "Nasdaq Stockholders' Equity," to the condensed 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:

	2019	2018
First quarter	$ 0.44	$ 0.82
Second quarter	0.47	—
Third quarter	0.47	0.44
Total	$ 1.38	$ 1.26

See "Cash Dividends on Common Stock," of Note 13, "Nasdaq Stockholders' Equity," to the condensed consolidated financial statements for further discussion of the dividends.

Financial Investments, at Fair Value

Our financial investments, at fair value totaled $201 million as of September 30, 2019 and $268 million as of December 31, 2018 and are primarily comprised of trading securities and principally are highly rated European government debt securities. Of these securities, $166 million as of September 30, 2019 and December 31, 2018 are assets primarily utilized to meet regulatory capital requirements, mainly for our clearing operations at Nasdaq Clearing. See Note 8, "Investments," to the condensed consolidated financial statements for further discussion of our trading securities.

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Debt Obligations

The following table summarizes our debt obligations by contractual maturity:

	Maturity Date	September 30, 2019	December 31, 2018
		(in millions)	
Short-term debt:			
Commercial paper	Weighted-average maturity of 18 days	$ 539	$ 275
Senior unsecured floating rate notes	Repaid March 2019	—	500
5.55% senior unsecured notes[1]	Repaid May 2019	—	599
$400 million senior unsecured term loan facility	Repaid June 2019	—	100
Total short-term debt		539	1,474
Long-term debt:			
3.875% senior unsecured notes	June 2021	652	686
$1 billion senior unsecured revolving credit facility	April 2022	(3)	(4)
1.75% senior unsecured notes	May 2023	649	682
4.25% senior unsecured notes	June 2024	497	497
3.85% senior unsecured notes	June 2026	497	496
1.75% senior unsecured notes	March 2029	647	—
Total long-term debt		2,939	2,357
Total debt obligations		$ 3,478	$ 3,831

(1) Balance was reclassified to short-term debt as of March 31, 2019.

In addition to the $1 billion senior unsecured revolving credit facility, we also have other credit facilities primarily related to our Nasdaq Clearing operations in order to provide further liquidity. Other credit facilities, which are available in multiple currencies, totaled $198 million as of September 30, 2019 and $234 million as of December 31, 2018, in available liquidity, none of which was utilized.

As of September 30, 2019, we were in compliance with the covenants of all of our debt obligations.

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

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Regulatory 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 September 30, 2019, our required regulatory capital of $140 million is comprised of highly rated European government debt securities that are included in financial investments, at fair value in the Condensed 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. As of September 30, 2019, the combined required minimum net capital totaled $1 million and the combined excess capital totaled $45 million. The required minimum net capital is included in restricted cash in the Condensed Consolidated Balance Sheets.

Nordic and Baltic Exchange Regulatory Capital Requirements

The entities that operate trading venues in the Nordic and Baltic countries are each subject to local regulations and are required to maintain regulatory capital intended to ensure their general financial soundness and liquidity. As of September 30, 2019, our required regulatory capital of $31 million is invested in European government debt securities that are included in financial investments, at fair value and restricted cash in the Condensed Consolidated Balance Sheets.

Other Capital Requirements

We operate several other businesses which are subject to local regulation and are required to maintain certain levels of regulatory capital. As of September 30, 2019, other required regulatory capital was $16 million and was primarily included in restricted cash and financial investments, at fair value in the Condensed Consolidated Balance Sheets.

* * * * * *

Cash Flow Analysis

The following table summarizes the changes in cash flows:

	Nine Months Ended September 30, 2019	Nine Months Ended September 30, 2018	Percentage Change
Net cash provided by (used in):	(in millions)		
Operating activities	$ 624	$ 668	(6.6)%
Investing activities	(131)	227	(157.7)%
Financing activities	(729)	(906)	(19.5)%
Effect of exchange rate changes on cash and cash equivalents and restricted cash	(17)	(12)	41.7 %
Net decrease in cash and cash equivalents and restricted cash	(253)	(23)	1,000.0 %
Cash and cash equivalents and restricted cash at beginning of period	586	399	46.9 %
Cash and cash equivalents and restricted cash at end of period	$ 333	$ 376	(11.4)%

Net Cash Provided by Operating Activities

Net cash provided by operating activities primarily consists of net income adjusted for certain non-cash items such as: depreciation and amortization expense of property and equipment; amortization expense of acquired finite-lived intangible assets which can be episodic, depending on the timing and size of a related business combination; expense associated with share-based compensation; and net income from unconsolidated investees.

Net cash provided by operating activities is also impacted by the effects of changes in operating assets and liabilities such as: accounts receivable which is impacted by the timing of customer billings and related collections from our customers; accounts payable and accrued expenses due to timing of payments; accrued personnel costs which are impacted by employee performance targets and the timing of payments related to employee bonus incentives; and Section 31 fees payable to the SEC, which is impacted by the timing of collections from customers and payments to the SEC.

Net cash provided by operating activities decreased $44 million for the nine months ended September 30, 2019 compared with the same period in 2018. The decrease was primarily driven by higher performance incentive payments made in the first nine months of 2019 compared to the same period in 2018 primarily due to prior year performance, partially offset by growth in net income.

Net Cash Used in Investing Activities

Net cash used in investing activities for the nine months ended September 30, 2019 primarily relates to $193 million of cash used for the acquisition of Cinnober, $88 million of purchases of property and equipment, partially offset by receipt of cash of $108 million related to our 2019 divestiture and $45 million of net proceeds from sales and redemptions of securities.

Net cash provided by investing activities for the nine months ended September 30, 2018 primarily relates to $286 million of cash received from our 2018 divestiture and $19 million of net proceeds from sales and redemptions of securities, partially offset by $72 million of purchases of property and equipment.

Net Cash Used in Financing Activities

Net cash used in financing activities for the nine months ended September 30, 2019 primarily relates to $1,215 million in repayments of debt obligations, $228 million of dividend payments to our shareholders, and $200 million in repurchases of common stock, partially offset by $680 million from proceeds related to long-term debt issuances and $264 million in net borrowings of commercial paper.

Net cash used in financing activities for the nine months ended September 30, 2018 primarily relates to $394 million in repurchases of common stock, $208 million of dividend payments to our shareholders, $170 million of net repayments of commercial paper, and $115 million of repayments of debt obligations.

See Note 5, “Acquisitions and Divestitures,” to the condensed consolidated financial statements for further discussion of our divestitures and acquisitions.

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

See “Share Repurchase Program,” and “Cash Dividends on Common Stock,” of Note 13, “Nasdaq Stockholders’ Equity,” to the condensed consolidated financial statements for further discussion of our share repurchase program and cash dividends paid on our common stock.

Contractual Obligations and Contingent Commitments

In the first nine months of 2019, there were no significant changes to our contractual obligations and commercial commitments from those disclosed in “Part II. Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our Form 10-K, other than the changes related to our adoption of the new lease accounting standard, ASU 2016-02. See Note 3, “Significant Accounting Policies Update,” for further discussion.

Off-Balance Sheet Arrangements

For discussion of off-balance sheet arrangements see:

- Note 16, “Clearing Operations,” to the condensed consolidated financial statements for further discussion of our non-cash default fund contributions and margin deposits received for clearing operations; and
- Note 18, “Commitments, Contingencies and Guarantees,” to the condensed consolidated financial statements for further discussion of:
  - Guarantees issued and credit facilities available;
  - Other guarantees;
  - Non-cash contingent consideration;
  - Escrow agreements;
  - Routing brokerage activities;
  - Legal and regulatory matters; and
  - Tax audits.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

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 September 30, 2019, 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 the fair value of these securities will decrease if market interest rates increase. If market interest rates were to increase immediately and uniformly by 100 basis points from levels as of September 30, 2019, the fair value of this portfolio would have declined by $3 million.

Debt Obligations

As of September 30, 2019, 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 amounts outstanding from the sale of commercial paper under our commercial paper program, which have variable interest rates. As of September 30, 2019, we had principal amounts outstanding of $540 million of commercial paper. A hypothetical 100 basis points increase in interest rates on our outstanding commercial paper would increase annual interest expense by approximately $5 million based on borrowings as of September 30, 2019.

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Foreign Currency Exchange Rate Risk

We are subject to foreign currency exchange rate risk. Our primary transactional exposure to foreign currency denominated revenues less transaction-based expenses and operating income for the three and nine months ended September 30, 2019 is presented in the following tables:

	Euro	Swedish Krona	Other Foreign Currencies	U.S. Dollar	Total
	(in millions, except currency rate)				
Three Months Ended September 30, 2019					
Average foreign currency rate to the U.S. dollar	1.1112	0.1042	#	N/A	N/A
Percentage of revenues less transaction-based expenses	7.0%	7.9 %	4.8 %	80.3%	100.0%
Percentage of operating income	13.1%	(10.4)%	(6.3)%	103.6%	100.0%
Impact of a 10% adverse currency fluctuation on revenues less transaction-based expenses	$ (4)	$ (5)	$ (3)	$ —	$ (12)
Impact of a 10% adverse currency fluctuation on operating income	$ (3)	$ (2)	$ (2)	$ —	$ (7)

	Euro	Swedish Krona	Other Foreign Currencies	U.S. Dollar	Total
	(in millions, except currency rate)				
Nine Months Ended September 30, 2019					
Average foreign currency rate to the U.S. dollar	1.1234	0.1063	#	N/A	N/A
Percentage of revenues less transaction-based expenses	7.5%	8.0 %	4.9 %	79.6%	100.0%
Percentage of operating income	12.9%	(4.2)%	(5.9)%	97.2%	100.0%
Impact of a 10% adverse currency fluctuation on revenues less transaction-based expenses	$ (14)	$ (15)	$ (9)	$ —	$ (38)
Impact of a 10% adverse currency fluctuation on operating income	$ (10)	$ (3)	$ (4)	$ —	$ (17)

\# 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. The financial statements of these subsidiaries are translated into U.S. dollars for consolidated reporting using a current rate of exchange, with net gains or losses recorded in accumulated other comprehensive loss within stockholders’ equity in the Condensed Consolidated Balance Sheets.

Our primary exposure to net assets in foreign currencies as of September 30, 2019 is presented in the following table:

	Net Assets	Impact of a 10% Adverse Currency Fluctuation
	(in millions)	
Swedish Krona[(1)]	$ 3,112	$ (311)
Norwegian Krone	166	(17)
Canadian Dollar	126	(13)
British Pound	207	(21)
Euro	33	(3)
Australian Dollar	100	(10)

(1) Includes goodwill of $2,296 million and intangible assets, net of $575 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 evaluating the counterparties with which we make investments and execute agreements. For our investment portfolio, our 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 Fixed Income business to trade in U.S. Treasury securities. Execution Access has a clearing arrangement with Industrial and Commercial Bank of China Financial Services LLC, or ICBC. As of September 30, 2019, we have contributed $15 million of clearing deposits to ICBC in connection with this clearing arrangement. These deposits are recorded in other current assets in our Consolidated Balance Sheets. Some of the trading activity in Execution Access is cleared by ICBC through the Fixed Income Clearing Corporation, with ICBC acting as agent. 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). 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 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 Condensed Consolidated Balance Sheets. 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.

We also are exposed to credit risk through our clearing operations with Nasdaq Clearing. See Note 16, "Clearing Operations," to the condensed consolidated financial statements for further discussion. Our clearinghouse holds material amounts of clearing member cash deposits which are held or invested primarily to provide security of capital while minimizing credit, market and liquidity risks. While we seek to achieve a reasonable rate of return, we are primarily concerned with preservation of capital and managing the risks associated with these deposits. As the clearinghouse may pass on interest revenues (minus costs) to the members, this could include negative or reduced yield due to market conditions. The following is a summary of the risks associated with these deposits and how these risks are mitigated.

- *Credit Risk.* When the clearinghouse has the ability to hold cash collateral at a central bank, the clearinghouse utilizes its access to the central bank system to minimize credit risk exposures. When funds are not held at a central bank, we seek to substantially mitigate credit risk by ensuring that investments are primarily placed in highly rated government and supranational debt instruments.
- *Liquidity Risk.* Liquidity risk is the risk a clearinghouse may not be able to meet its payment obligations in the right currency, in the right place and the right time. To mitigate this risk, the clearinghouse monitors liquidity requirements closely and maintains funds and assets in a manner which minimizes the risk of loss or delay in the access by the clearinghouse to such funds and assets. For example, holding funds with a central bank where possible or investing in highly liquid government or supranational debt instruments serves to reduce liquidity risks.
- *Interest Rate Risk.* Interest rate risk is the risk that interest rates rise causing the value of purchased securities to decline. If we were required to sell securities prior to maturity, and interest rates had risen, the sale of the securities might be made at a loss relative to the latest market price. Our clearinghouse seeks to manage this risk by making short term investments of members' cash deposits. In addition, the clearinghouse investment guidelines allow for direct purchases or repurchase

agreements of high quality sovereign debt (for example, European government and U.S. Treasury securities), central bank certificates and supranational debt instruments with short dated maturities.

- *Security Issuer Risk.* Security issuer risk is the risk that an issuer of a security defaults on its payment when the security matures. This risk is mitigated by limiting allowable investments and collateral under reverse repurchase agreements to high quality sovereign, government agency or supranational debt instruments.

* * * * * *

Item 4. 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, Accounting and 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, Accounting and 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***. During the quarter ended June 30, 2019, we implemented a new enterprise resource planning, or ERP, system, by transitioning certain of our operations, including the general ledger, to the new ERP system. We have modified our existing controls infrastructure, as well as added other processes and internal controls, to adapt to our new ERP system and to take advantage of the increased functionality of the new system.

There have been no 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 September 30, 2019 that have materially affected, or are reasonably likely to materially affect, Nasdaq's internal control over financial reporting.

PART II - OTHER INFORMATION

Item 1. Legal Proceedings

See "Legal and Regulatory Matters - Litigation," of Note 18, "Commitments, Contingencies and Guarantees," to the condensed consolidated financial statements, which is incorporated herein by reference.

Item 1A. Risk Factors

In addition to the other information set forth in this Quarterly Report on Form 10-Q, you should carefully consider the factors discussed under "Risk Factors" in our Form 10-K. These risks could materially and adversely affect our business, financial condition and results of operations. The risks and uncertainties in our Form 10-K and Form 10-Q 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.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

Issuer Purchases of Equity Securities

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 September 30, 2019:

Period[1][2]	(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)
July 2019				
Share repurchase program	835,962	$ 100.71	835,962	$ 197
Employee transactions	4,818	$ 103.46	N/A	N/A
August 2019				
Share repurchase program	679,444	$ 96.86	679,444	$ 132
Employee transactions	4,298	$ 97.93	N/A	N/A
September 2019				
Share repurchase program	—	$ —	—	$ 132
Employee transactions	131	$ 103.79	N/A	N/A
Total Quarter Ended September 30, 2019				
Share repurchase program	1,515,406	$ 98.98	1,515,406	$ 132
Employee transactions	9,247	$ 100.89	N/A	N/A

(1) See "Share Repurchase Program," of Note 13, "Nasdaq Stockholders' Equity," to the condensed consolidated financial statements for further discussion of our share repurchase program.

(2) During the fiscal quarter ended September 30, 2019, we purchased shares from employees in connection with the settlement of employee tax withholding obligations arising from the vesting of restricted stock and PSUs.

Item 3. Defaults Upon Senior Securities

None.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

None.

Item 6. Exhibits

Exhibit Number	
10.1	Retirement Agreement and General Release of Claims, between Nasdaq and Thomas A. Wittman, effective July 10, 2019.*
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, Accounting and 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	The following materials from the Nasdaq, Inc. Quarterly Report on Form 10-Q for the quarter ended September 30, 2019, formatted in iXBRL (Inline eXtensible Business Reporting Language): (i) Condensed Consolidated Balance Sheets as of September 30, 2019 and December 31, 2018; (ii) Condensed Consolidated Statements of Income for the three and nine months ended September 30, 2019 and 2018; (iii) Condensed Consolidated Statements of Comprehensive Income (Loss) for the three and nine months ended September 30, 2019 and 2018; (iv) Condensed Consolidated Statements of Changes in Stockholders' Equity for the three and nine months ended September 30, 2019 and 2018; (v) Condensed Consolidated Statements of Cash Flows for the nine months ended September 30, 2019 and 2018; and (vi) notes to condensed consolidated financial statements.
104	Cover Page Interactive Data File, formatted in iXBRL and contained in Exhibit 101.

* Management contract or compensatory plan or arrangement.

SIGNATURES

Pursuant to the requirements 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.

Nasdaq, Inc.
(Registrant)

Date:	November 6, 2019	**By:**	/s/ Adena T. Friedman
		Name:	**Adena T. Friedman**
		Title:	**President and Chief Executive Officer**
Date:	November 6, 2019	**By:**	/s/ Michael Ptasznik
		Name:	**Michael Ptasznik**
		Title:	**Executive Vice President, Accounting and Corporate Strategy and Chief Financial Officer**

Exhibit 10.1

RETIREMENT AGREEMENT AND GENERAL RELEASE OF CLAIMS

July 9, 2019

Thomas Wittman
[Address]

Dear Tom,

This General Release and Retirement Agreement (“Agreement”), reflects our mutual agreement and understanding concerning your retirement from Nasdaq, Inc. or any of its subsidiaries or affiliates (the “Company”), as set forth below. Please review the following information and address any questions you may have concerning this notice to the Chief People Officer, Bryan Smith. This Agreement becomes valid upon the Company’s receipt of your signed and dated copy no later than July 12, 2019.

1. Retirement Date and Transition Period

a. As of December 31, 2019 (“Retirement Date”), you will retire from your service as an employee of the Company. Between July 1, 2019 (“Transition Date”) and your Retirement Date (the “Transition Period”), you agree to transition into the role of an Executive Advisor North America Trading and Market Services and satisfactorily perform the duties of that role as assigned by the President and CEO. During the Transition Period, your regular salary will remain unchanged at $550,000 per annum and you shall remain fully eligible for participation in the Company’s benefits plans in which you now participate through the Retirement Date. You will also be paid for all accrued but unused vacation and any unreimbursed business expenses (in accordance with Company policy), after your Retirement Date (or earlier separation).

   If you do not execute this Agreement, your health benefits provided through the Company will continue through the end of the last month of your employment. Pursuant to federal law, and independent of this Agreement, you and your eligible dependents will be eligible to elect benefits continuation coverage if you timely apply for COBRA benefits. Information regarding your rights under COBRA will be provided to you in a separate mailing. If you choose to accept the offer of separation and benefits set forth in Paragraph 2 of this Agreement, your group health, vision, and dental benefits will end on the Retirement Date. You will be separately notified of your benefit conversion privileges and COBRA rights.

b. During the “Transition Period,” the Company reserves the right to relieve you from all job duties, alter your job duties (consistent with your role as Executive Advisor), or require you to work from home. During the Transition Period, you agree to work as directed, transfer knowledge of your job duties to others as requested, and maintain a professional demeanor.

2. Separation Benefits

In consideration for signing this Agreement, in full settlement of any compensation and benefits to which you would otherwise be entitled, and in exchange for the promises, covenants, releases, and waivers set forth herein:

a. Provided the Company has received a copy of this Agreement signed by you and the seven day revocation period set forth below has expired, you will receive a bonus payment under the ECIP for 2019 based upon your target bonus opportunity of $825,000. The bonus will be paid on or about March 2, 2020. If Nasdaq terminates your employment due to gross misconduct or gross negligence (as determined in Nasdaq's sole discretion), or you voluntarily resign before December 31, 2019, you will not be entitled to any part of the CIP bonus.

b. Provided that you timely elect to continue COBRA coverage, the Company agrees to continue to pay the employer's share of your medical, dental and vision premiums from January 1, 2020 until June 30, 2021 ("COBRA Reimbursement Period"). You will still be responsible for paying the employee share of the premium, which will be the same contribution paid as an active employee would pay for this coverage, as specified by the plan administrator. During the COBRA Reimbursement Period, you agree to timely pay the Company (or the party identified by the Company) your share of the applicable COBRA premium, and that if you stop making such payment your applicable COBRA coverage will cease.

c. If, during the COBRA Reimbursement Period, you begin full-time employment with an employer who provides health insurance benefits for which you are eligible, the Company's obligation under paragraph (b) shall forever cease upon the expiration of the waiting period (if any) for entitlement to insurance coverage through your new employer. You agree to notify the Company in writing within seven (7) days of your commencement of fulltime employment during the COBRA Reimbursement Period. In any event, and notwithstanding any provision to the contrary in this paragraph, the Company shall have no obligation to make any payments for COBRA premiums paid for health insurance coverage beyond the expiration of the COBRA Reimbursement Period. Nothing in this Agreement will affect the continuation coverage rules under COBRA, except that the Company's payment of any applicable insurance premiums during the COBRA Reimbursement Period will be credited as payment by the Company for purposes of your payment required under COBRA.

d. Unless your employment ends any time before December 31, 2019 due to your resignation, gross misconduct, or gross negligence, you will remain eligible for (i) continued vesting and payment of the Three Year Performance Share Units ("PSU's") granted on March 31, 2017 ("2017 Grant"), on March 29, 2018 ("2018 Grant"), and on April 1, 2019 ("2019 Grant), and (ii) vesting of the RSUs granted on August 1, 2017 ("2017 Grant), with accelerated vesting of any unvested RSUs within 60 days from your Retirement Date. To the extent this Agreement conflicts with all relevant PSU and RSU Agreements, this Agreement will apply, provided that the time and form of settlement of the PSU's shall be governed by the terms of the applicable award agreement and governing plan document. Consistent with the Nasdaq Equity Plan, in the event a change in control event occurs after your Retirement Date, all unvested awards shall vest immediately, at target, prior to the effective time of such change in control. Upon termination of employment due to death, your Estate shall be entitled to receive accelerated vesting of all unvested equity compensation awarded to you as of that date. All other benefits, if any, due to your estate shall be determined in accordance with the plans, policies and practices of the Company in effect at that time.

e. The Company will continue to provide, for a period of 24 months following your Retirement Date, financial and tax services (currently provided by Ayco) and executive physical exams (currently provided by EHE International).

f. If you accept another position with the Company, or materially violate the terms of any employment restrictions noted herein and such violation remains uncured after written notice from the Company, while you are receiving separation payments and benefits under this paragraph, you will not receive any additional separation payments and benefits following your start date in the new position or date of such material violation.

3. **General Release of Claims.** You, for yourself and your heirs, executors, administrators, assigns, agents and beneficiaries, if any, do hereby agree to execute and be bound by this General Release of Claims. You acknowledge and agree that the Separation Payment provided to you and on your behalf pursuant to this Agreement: (i) is in full discharge of any and all liabilities and obligations of the Company to you, monetarily or with respect to your employment; and (ii) exceeds any payment, benefit, or other thing of value to which you might otherwise be entitled. You release the Company from all Claims (as defined below) through the date of this Agreement. You agree not to file a lawsuit or arbitration to assert any such Claim. Further, you agree that should any other person, organization or entity file a lawsuit or arbitration to assert any such Claim, you will not seek or accept any personal relief in such action. In exchange for your waiver of Claims, the Company, its subsidiaries, directors and agents acting on behalf of the Company expressly waive and release any and all Claims against you that may be waived and released by law, and agree not to file a lawsuit or arbitration to assert any such Claims.

a. Definition of "Claims." Except as stated below, "Claims" includes without limitation all actions or demands of any kind that you may now have or have had or reasonably known you should have had (although you are not being asked to waive Claims that may arise after the date of this Agreement). More specifically, Claims include rights, causes of action, damages, penalties, losses, attorneys' fees, costs, expenses, obligations, agreements, judgments and all other liabilities of any kind or description whatsoever, either in law or in equity, whether known or unknown, suspected or unsuspected. The nature of Claims covered by this release includes without limitation all actions or demands in any way based on your employment with the Company, the terms and conditions of such employment, or your separation from employment. More specifically, all of the following are among the types of Claims which are waived and barred by this General Release of Claims to the extent allowable under applicable law:

- Contract Claims, whether express or implied;
- Tort Claims, such as for defamation or emotional distress;
- Claims under federal, state and municipal laws, regulations, ordinance or court decisions of any kind;
- Claims of discrimination, harassment or retaliation, whether based on race, color, religion, gender, sex, age, sexual orientation, handicap and/or disability, genetic information, national origin, or any other legally protected class;
- Claims under the AGE DISCRIMINATION IN EMPLOYMENT ACT, Title VII of the Civil Rights Act of 1964, as amended, the Americans with Disabilities Act as amended, the Genetic

Information Nondiscrimination Act, the Family and Medical Leave Act, and similar state and local statutes, laws and ordinances;

- Claims under the Employee Retirement Income Security Act, the Occupational Safety and Health Act, the False Claims Act, and similar state and local statutes, laws and ordinances;

- Claims for wrongful discharge; and

- Claims for attorneys' fees, including litigation expenses and/or costs.

The foregoing description of claims is intended to be illustrative and is not exhaustive.

b. <u>Exclusions</u>**:** Notwithstanding any other provision of this release, the following are <u>**not**</u> barred by the release: (a) Claims relating to the validity of this Agreement; (b) Claims by either party to enforce this Agreement; (c) Claims which are not legally waivable, including SEC whistleblowing claims pursuant to Rule 21F17; (d) Claims by you for indemnification; and (e) Claims by you for accrued vested benefits and compensation under the Company's respective benefits and compensation plans. In addition, this General Release of Claims will not operate to limit or bar your right to file an administrative charge of discrimination with the Equal Employment Opportunity Commission (EEOC) or to testify, assist or participate in an investigation, hearing or proceeding conducted by the EEOC. However, the release <u>does</u> bar your right to recover any personal or monetary relief, including if you or anyone on your behalf seeks to file a lawsuit or arbitration on the same basis as the charge of discrimination.

4. <u>**Confidentiality**</u>. You agree to keep the terms of this Separation Agreement confidential, except that you may disclose the terms to your immediate family, attorneys, accountants, or tax planners, in response to a subpoena, or as otherwise specifically permitted, required, or ordered by law. Nothing in this Agreement should have a chilling effect on your ability to engage in whistleblowing activity, by prohibiting or restricting you (or your attorney) from initiating communications directly with, or responding to any inquiry from, or providing testimony before, the SEC or FINRA regarding your employment at the Company, and nothing prevents you from reporting to, communicating with, contacting, responding to an inquiry from, providing relevant information to, participating or assisting in an investigation conducted by, or receiving a monetary award from the SEC or any other governmental enforcement agency related to such communication (except as noted in Section 3(b) above).

5. <u>**Cooperation and Legal Representation**</u>. You agree to reasonably cooperate with the Company in transitioning your responsibilities and in relation to any actual or threatened legal proceedings concerning Companyrelated matters about which you have relevant knowledge.

6. <u>**Non-Disparagement**</u>. You agree that you will not disparage or defame the reputation, character, image, products, or services of the Company or the Released Parties, provided that you shall respond accurately and fully to any question, inquiry, or request for information when required by legal process. The Company agrees that neither the Company nor its directors and senior executive officers shall disparage or defame you or your reputation, character or image, provided that they will respond accurately and fully to any question, inquiry or request for information when required by legal process.

7. <u>**Non-Admission.**</u> This Agreement does not represent an admission of liability or finding of wrongdoing by you, the Company, or any of Releases.

8. **Return of Company Property**. You agree to promptly return to the Company all property that belongs to the Company, including without limitation all equipment, supplies, documents, files (electronic and hardcopy), and computer disks in good working order. You agree not to "wipe" or otherwise destroy, erase, or compromise company files, records or information contained on any Company issued electronic equipment prior to returning these items. You further agree to remove from any personal computer all data files containing Company information. Notwithstanding the foregoing, you may take and retain an electronic copy of your contact list and calendar, and any files or information relating to your employment relationship with the Company or this Agreement, or as may be necessary for preparation of your personal income tax returns. You may retain your Company-provided iPad and iPhone (provided the Company shall have the right to delete all files and emails containing confidential or proprietary information) and the Company will take all action necessary with the carrier to transfer your iPhone number to your personal account.

9. **Continuing Obligations**. You acknowledge your continuing obligations to the Company contained in any proprietary rights or other confidentiality agreements that you signed in favor of the Company during your employment, including the continuing obligations agreement you have previously signed related to confidentiality, nonsolicitation of customers and employees, and intellectual property protection/inventions assignment.

10. **Non-Competition**.

For a period of 12 months from your last date of employment, you shall not, directly or indirectly, without the prior written permission of the Company, anywhere in the world where at the date of such termination the Company is doing business or planning to do business, enter into the employ of or render any services to: InterContinental Exchange, CME Group, CBOE Holdings, Deutsche Borse, London Stock Exchange Group, TMX, MEMX, & IEX Group. This paragraph supersedes any prior noncompete restriction you signed in your capacity as an employee of the Company. All other restrictions from prior agreements, including nonsolicitation of customers or employees, remain, as noted in Section 9 above.

You acknowledge and agree that the provisions of, and your obligations under, this Agreement are reasonable in scope and necessary for the protection of the Company and its legitimate business interests; that your breach (or threatened breach) of any such provisions or obligations will result in grave and irreparable harm to the Company, inadequately compensable in money damages; and that the Company shall be entitled to seek and obtain, in addition to any legal remedies that might be available to it, injunctive relief to prevent and/or remedy such a breach or threatened breach Upon the issuance (or denial) of an injunction, the underlying merits of any dispute shall be resolved in accordance with the arbitration provisions of Section 12 of this Agreement.

11. **Breach.** Should you materially breach this Agreement and such breach continues for a period of at least 30 days after you receive written notice thereof from the Company, then:

a. The Company shall have no further obligations to you under this Agreement (including but not limited to any obligation to make any further payments to you or on your behalf);

b. The Company shall be entitled to recoup the amount of any payment you received pursuant to this Agreement, but only to the extent that you are determined to owe such an amount pursuant to an arbitration proceeding undertaken pursuant to Section 12 hereof;

c. The Company shall have all rights and remedies available to it under this Agreement and any applicable law; and

d. All of your promises, covenants, representations, and warranties under this Agreement shall remain in full force and effect.

Should the Company materially breach this Agreement and such breach continues for a period of at least 30 days after the Company receives written notice thereof from you asserting such breach has occurred, then you shall have no further obligations under this Agreement, you shall have all rights and remedies available to you under this Agreement and any applicable law, and all of the Company's promises, covenants, representations, and warranties under this Agreement shall remain in full force and effect.

12. **Arbitration.** Any dispute arising between the parties under this Agreement (except as provided in Section 3 of this Agreement), under any statute, regulation, or ordinance, and/or in connection with your employment or termination thereof, shall be submitted to binding arbitration before the American Arbitration Association ("AAA") for resolution. Such arbitration shall be conducted in New York, New York, and the arbitrator will apply New York law, including federal law as applied in New York courts. The arbitration shall be conducted by a single arbitrator, in accordance with the AAA's Employment Arbitration Rules. The arbitrator's decision shall be final and binding on the parties, and judgment on any award may be confirmed and entered in any state or federal court in the State and City of New York. The arbitration shall be conducted on a strictly confidential basis, and you shall not disclose the existence of a claim, the nature of a claim, any documents, exhibits, or information exchanged or presented in connection with such a claim, or the result of any action (collectively, "Arbitration Materials"), to any third party, with the sole exception of your legal counsel, who also shall be bound by these confidentiality terms. In the event of any court proceeding to challenge or enforce an arbitrator's award, the parties hereby consent to the exclusive jurisdiction of the state and federal courts in New York, New York and agree to venue in that jurisdiction. To the extent allowable by law, the parties agree to take all steps necessary to protect the confidentiality of the Arbitration Materials in connection with any such proceeding, agree to file all Confidential Information (and documents containing Confidential Information) under seal, and agree to the entry of an appropriate protective order encompassing the confidentiality terms of this Agreement.

13. **Severability**. You agree that if any provision of this General Release of Claims is or shall be declared invalid or unenforceable by a court of competent jurisdiction, then such provision will be modified only to the extent necessary to cure such invalidity, with a view to enforcing the parties' intention as set forth in this Agreement to the extent permissible. All remaining provisions of this Agreement shall not be affected thereby and shall remain in full force and effect.

14. **Choice of Law.** This Agreement shall be governed by and construed in accordance with the laws of New York, excluding any choice of law principles. It constitutes the parties' entire agreement, arrangement, and understanding regarding the subject matter herein, superseding any prior or contemporaneous agreements, arrangements, or understandings, whether written or oral, between you on one hand and the Company on the other hand regarding the same subject matter. It may not be modified, amended, discharged, or terminated, nor may any of its provisions be varied or waived, except by a further signed written agreement between the parties. It shall be binding upon the signing parties and their respective heirs, legal representatives, successors, and assigns.

15. **<u>Advice to Consult Legal Representative and Consideration Period</u>.** The Company recommends that you consult with an attorney of your own choosing, at your own expense, with regard to entering into this Agreement. You acknowledge that you have carefully read and understand the provisions of this Agreement. You have been provided with a consideration period consisting of at least twentyone (21) calendar days to consider the terms of the General Release of Claims from the date this Agreement first was presented to you. You understand that any change to this offer, whether material or immaterial, will not restart the running of the consideration period. You understand that you may take the entire consideration period to consider this Agreement and that you may return this Agreement in less than the full consideration period only if your decision to shorten it was knowing and voluntary and was not induced in any way by the Company.

16. **<u>Revocation Period</u>.** You have seven (7) calendar days from the date you sign this General Release of Claims to revoke it if you choose to do so. If you elect to revoke, you must give written notice of such revocation to Employer by emailing it to [***] within the seven (7) calendar day period. You understand that if you revoke this General Release of Claims, you will not be entitled to the benefits offered as consideration for this Agreement.

17. **<u>Employee Certification - Validity of Agreement</u>.** You certify that you have carefully read this Agreement and have executed it voluntarily and with full knowledge and understanding of its significance, meaning and binding effect. You further declare that you are competent to understand the content and effect of this Agreement and that your decision to enter into this Agreement has not been influenced in any way by fraud, duress, coercion, mistake or misleading information. You have not relied on any information except what is set forth in this Agreement.

18. **<u>Section 409A</u>.** It is the intent of the parties to this Agreement that no payments under this Agreement be subject to the additional tax on deferred compensation imposed by Section 409A of the Internal Revenue Code of 1986, as amended (the “Code”). Each payment made under this Agreement will be treated as a separate payment for purposes of Section 409A of the Code and the right to a series of installment payments under this Agreement is to be treated as a right to a series of separate payments. Notwithstanding any provision of this Agreement to the contrary, in the event that any payment to you or any benefit hereunder is made upon, or as a result of your termination of employment, and you are a “specified employee” (as that term is defined under Code Section 409A) at the time you become entitled to any such payment or benefit, and provided further that such payment or benefit does not otherwise qualify for an applicable exemption from Code Section 409A, then no such payment or benefit shall be paid or commenced to be paid to you under this Agreement until the date that is the earlier to occur of: (i) your death, or (ii) six (6) months and one (1) day following your termination of employment (the “Delay Period”). Any payments which you would otherwise have received during the Delay Period shall be payable to you in a lump sum on the date that is six (6) months and one (1) day following the effective date of your termination.

19. **<u>Miscellaneous</u>.** This Agreement (i) may be executed in identical counterparts, which together shall constitute a single agreement; (ii) shall be fairly interpreted in accordance with its terms and without any strict construction in favor of or against either party, notwithstanding which party may have drafted it; and (iii) shall inure to the benefit of and shall be binding upon the parties hereto and their respective heirs, legal representatives, successors, and assigns. For the avoidance of doubt, in the unlikely event that you die prior to receiving all consideration set forth herein, the Company shall provide all such consideration to your estate at the same times as otherwise required to the extent permitted by law.

NOTICE TO EMPLOYEE: YOUR SIGNATURE INDICATES THAT YOU HAVE CAREFULLY READ AND UNDERSTAND THE TERMS OF THIS AGREEMENT, RELEASE AND WAIVER OF CLAIMS AND RIGHTS, THAT YOU WERE ADVISED TO CONSULT AN ATTORNEY ABOUT THIS AGREEMENT, THAT THIS AGREEMENT PROVIDES BENEFITS TO WHICH YOU ARE NOT OTHERWISE ENTITLED AND THAT YOU ARE SIGNING THIS DOCUMENT VOLUNTARILY AND NOT AS A RESULT OF COERCION, DURESS OR UNDUEINFLUENCE.

Thomas A Witt

Signature

7/10/2019

Date

Thomas Wittman

Print name

On behalf of Company:

Signature

7/10/19

Date

Bryan E. Smith

Print Name

Exhibit 31.1

CERTIFICATION

I, Adena T. Friedman, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q 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 and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

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

Date: November 6, 2019

Exhibit 31.2

CERTIFICATION

I, Michael Ptasznik, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q 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 and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

	/s/ Michael Ptasznik
Name:	Michael Ptasznik
Title:	Executive Vice President, Accounting and Corporate Strategy and Chief Financial Officer

Date: November 6, 2019

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 Quarterly Report on Form 10-Q of Nasdaq, Inc. (the “Company”) for the period ended September 30, 2019 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, Accounting and 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:	November 6, 2019

	/s/ Michael Ptasznik
Name:	Michael Ptasznik
Title:	Executive Vice President, Accounting and Corporate Strategy and Chief Financial Officer
Date:	November 6, 2019

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.