WILLIS LEASE FINANCE CORP
Form 4
March 20, 2017

FORM 4

Check this box if no longer subject to Section 16. Form 4 or Form 5 obligations may continue. *See* Instruction 1(b).

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

STATEMENT OF CHANGES IN BENEFICIAL OWNERSHIP OF SECURITIES

Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934, Section 17(a) of the Public Utility Holding Company Act of 1935 or Section 30(h) of the Investment Company Act of 1940

OMB APPROVAL
OMB Number: 3235-0287
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(Print or Type Responses)

1. Name and Address of Reporting Person *
Spaulding Anthony R.

(Last) (First) (Middle)

773 SAN MARIN DRIVE, SUITE 2215

(Street)

NOVATO, CA 94998

(City) (State) (Zip)

2. Issuer Name **and** Ticker or Trading Symbol
WILLIS LEASE FINANCE CORP [wlfc]

3. Date of Earliest Transaction (Month/Day/Year)
03/17/2017

4. If Amendment, Date Original Filed(Month/Day/Year)

5. Relationship of Reporting Person(s) to Issuer

(Check all applicable)

_____ Director _____ 10% Owner
__X__ Officer (give title below) _____ Other (specify below)
SVP Tech Services, CSO

6. Individual or Joint/Group Filing(Check Applicable Line)
_X_ Form filed by One Reporting Person
___ Form filed by More than One Reporting Person

Table I - Non-Derivative Securities Acquired, Disposed of, or Beneficially Owned

1.Title of Security (Instr. 3)	2. Transaction Date (Month/Day/Year)	2A. Deemed Execution Date, if any (Month/Day/Year)	3. Transaction Code (Instr. 8)		4. Securities Acquired (A) or Disposed of (D) (Instr. 3, 4 and 5)			5. Amount of Securities Beneficially Owned Following Reported Transaction(s) (Instr. 3 and 4)	6. Ownership Form: Direct (D) or Indirect (I) (Instr. 4)	7. Nature of Indirect Beneficial Ownership (Instr. 4)
			Code	V	Amount	(A) or (D)	Price			
Common Stock	03/17/2017	03/17/2017	A		9,000 (1)	A	$ 25.3	11,166	D	

Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.

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SEC 1474 (9-02)

Table II - Derivative Securities Acquired, Disposed of, or Beneficially Owned
(*e.g.*, puts, calls, warrants, options, convertible securities)

1. Title of Derivative Security (Instr. 3)	2. Conversion or Exercise Price of Derivative Security	3. Transaction Date (Month/Day/Year)	3A. Deemed Execution Date, if any (Month/Day/Year)	4. Transaction Code (Instr. 8)		5. Number of Derivative Securities Acquired (A) or Disposed of (D) (Instr. 3, 4, and 5)		6. Date Exercisable and Expiration Date (Month/Day/Year)		7. Title and Amount of Underlying Securities (Instr. 3 and 4)		8. Price of Derivative Security (Instr. 5)	9. Nu Deriv Secur Bene Owne Follo Repo Trans (Instr
				Code	V	(A)	(D)	Date Exercisable	Expiration Date	Title	Amount or Number of Shares		

Reporting Owners

Reporting Owner Name / Address	Relationships			
	Director	10% Owner	Officer	Other
Spaulding Anthony R. 773 SAN MARIN DRIVE SUITE 2215 NOVATO, CA 94998			SVP Tech Services, CSO	

Signatures

Anthony R. Spaulding	03/20/2017
**Signature of Reporting Person	Date

Explanation of Responses:

* If the form is filed by more than one reporting person, *see* Instruction 4(b)(v).

** Intentional misstatements or omissions of facts constitute Federal Criminal Violations. *See* 18 U.S.C. 1001 and 15 U.S.C. 78ff(a).

(1) Restricted Stock Grant vesting in 3 years.

Note: File three copies of this Form, one of which must be manually signed. If space is insufficient, *see* Instruction 6 for procedure.
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54.8

Amortization of purchased intangibles
96.1

99.4

100.6

Depreciation and amortization
129.2

129.2

132.6

Loss on datacenter
27.1

—

—

(Gain) loss on sale of BM&FBOVESPA shares
(48.4
)

8.5

—

Debt prepayment costs
—

61.8

—

Undistributed earnings, net of losses, of unconsolidated subsidiaries
(2.3
)

(5.1
)

(8.6
)
Deferred income taxes
(83.0
)

63.3

78.9

Change in:

Accounts receivable
(8.1
)

(17.3
)

(38.5
)
Other current assets
3.2

(12.7
)

3.7

Other assets
5.4

(4.0
)

(11.5
)
Accounts payable
(2.6
)

(8.2
)

0.7

Income taxes payable
60.5

(82.1
)

(105.6
)
Other current liabilities
(39.2
)

(21.1
)

(46.1
)
Other liabilities
(22.5
)

(9.8
)

(2.8
)
Other
0.3

5.6

6.3

Net Cash Provided by Operating Activities
1,716.0

1,515.3

1,291.4

Cash Flows from Investing Activities

Explanation of Responses:

Proceeds from maturities and sales of available-for-sale marketable securities
41.7

38.3

37.5

Purchases of available-for-sale marketable securities
(45.9
)

(35.3
)

(38.3
)
Purchases of property, net
(91.8
)

(114.2
)

(140.7
)
Proceeds from sale of building properties
—

—

7.9

Investments in business ventures
(9.1
)

(16.7
)

(65.5
)
Proceeds from sale of business ventures
8.8

—

—

Proceeds from sale of BM&FBOVESPA shares
150.0

138.8

—

Settlement of derivative related to debt issuance
—

7.0

—

Net Cash Provided by (Used in) Investing Activities
53.7

17.9

(199.1
)

See accompanying notes to consolidated financial statements.

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CME GROUP INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS (continued)
(in millions)

	Year Ended December 31,		
	2016	2015	2014
Cash Flows from Financing Activities			
Proceeds from other borrowings, net of issuance costs	$—	$743.7	$—
Repayment of other borrowings	—	(673.0)	(750.0)
Cash dividends	(1,787.2)	(1,343.4)	(1,496.8)
Proceeds from finance lease obligation	130.0	—	—
Proceeds from exercise of stock options	51.8	64.0	53.3
Purchase of non-controlling interest	—	—	(4.7)
Excess tax benefits related to employee option exercises and restricted stock vesting	9.5	7.1	4.0
Settlement of contingent consideration	—	(7.0)	(3.6)
Other	2.2	1.9	1.9
Net Cash Used in Financing Activities	(1,593.7)	(1,206.7)	(2,195.9)
Net change in cash and cash equivalents	176.0	326.5	(1,103.6)
Cash and cash equivalents, beginning of period	1,692.6	1,366.1	2,469.7
Cash and Cash Equivalents, End of Period	$1,868.6	$1,692.6	$1,366.1
Supplemental Disclosure of Cash Flow Information			
Income taxes paid	$706.7	$716.6	$641.5
Interest paid	84.8	89.1	111.4
Non-cash financing activities:			
Declaration of annual variable dividend, payable in January 2017, January 2016 and January 2015	1,099.3	977.1	670.9

See accompanying notes to consolidated financial statements.

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CME GROUP INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. ORGANIZATION AND BUSINESS
Chicago Mercantile Exchange Inc. (CME), the Board of Trade of the City of Chicago, Inc. (CBOT), New York Mercantile Exchange, Inc. (NYMEX) and Commodity Exchange, Inc. (COMEX), wholly-owned subsidiaries of CME Group Inc. (CME Group), are designated contract markets for the trading of futures and options on futures contracts. CME, CBOT, NYMEX, COMEX, CME Clearing Europe Limited (CMECE) and CME Europe Limited (CME Europe) and their subsidiaries are referred to collectively as “the exchange” in the notes to the consolidated financial statements. CME Group and its subsidiaries are referred to collectively as “the company” in the notes to the consolidated financial statements.
CME Group offers a wide range of products for trading and/or clearing, including those based on interest rates, credit default, equity indexes, foreign exchange, agricultural commodities, energy and metals. Trades are executed through CME Group's electronic trading platforms, open outcry and privately negotiated transactions. Through its clearing houses, CME Group offers clearing, settlement and guarantees for all products cleared through the exchange.
2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES
Basis of Presentation. The accompanying consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States and include the accounts of the company and its majority-owned subsidiaries. All intercompany transactions and balances have been eliminated.
Use of Estimates. The preparation of consolidated financial statements requires management to make estimates and assumptions that affect the reported amounts and the disclosure of contingent amounts in the consolidated financial statements and accompanying notes. Estimates are based on historical experience, where applicable, and assumptions management believes are reasonable under the circumstances. Due to the inherent uncertainty involved with estimates, actual results may differ.
Cash and Cash Equivalents. Cash and cash equivalents consist of cash and highly liquid investments with a maturity of three months or less at the time of purchase.
Financial Investments. The company maintains short-term and long-term investments, classified as available-for-sale or trading securities. Available-for-sale investments are carried at their fair value, with unrealized gains and losses, net of deferred income taxes, reported as a component of accumulated other comprehensive income. Trading securities held in connection with non-qualified deferred compensation plans are recorded at fair value, with net realized and unrealized gains and losses and dividend income reported as investment income. Also, the company maintains long-term investments accounted for under the cost method and equity method, depending upon the degree of influence over the investee as held by the company.
The company reviews its investments to determine whether a decline in fair value below the cost basis is other-than-temporary. If events and circumstances indicate that a decline in the value of the assets has occurred and is deemed to be other-than-temporary, the carrying value of the investments is reduced to its fair value and a corresponding impairment is charged to earnings.
Fair Value of Financial Instruments. The company uses a three-level classification hierarchy of fair value measurements that establishes the quality of inputs used to measure fair value. The fair value of a financial instrument is the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value of financial instruments is determined using various techniques that involve some level of estimation and judgment, the degree of which is dependent on the price transparency and the complexity of the instruments.
Derivative Investments. The company uses derivative instruments, designated as cash flow hedges, to limit exposure to changes in interest rates. Derivatives are recorded at fair value in the consolidated balance sheets. The effective portion of the changes in the fair value of cash flow hedges is deferred in accumulated other comprehensive income. Any realized gains and losses from effective hedges are classified as interest expense in the consolidated statements of income, and any ineffective or excluded portion of a hedge is recognized in earnings immediately.

Accounts Receivable. Accounts receivable are comprised of trade receivables and unbilled revenue, including clearing and transaction fees and market data and information services revenue. All accounts receivable are stated at cost. Exposure to losses on receivables for clearing and transaction fees and other amounts owed by clearing firms is dependent on each clearing firm's financial condition and the memberships that collateralize fees owed to the exchange. The exchange retains the right to liquidate exchange memberships to satisfy a clearing firm's receivable. The allowance for doubtful accounts is calculated based on historical losses and management's assessment of probable future collections.

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Performance Bonds and Guaranty Fund Contributions. Performance bonds and guaranty fund contributions held for clearing firms may be in the form of cash, securities or other non-cash deposits.
Performance bonds and guaranty fund contributions received in the form of cash held by CME and CMECE may be invested in U.S. government securities, U.S. government agency securities and certain foreign government securities acquired through and held by a bank or broker-dealer subsidiary of a bank, a cash account at the Federal Reserve Bank of Chicago, reverse repurchase agreements secured with highly rated government securities, money market funds or through CME's Interest Earning Facility (IEF) program. Any interest earned on CME investments accrues to CME and is included in investment income in the consolidated statements of income. CME and CMECE may distribute any interest earned on CME and CMECE investments to the clearing firms at their discretion. Because CME and CMECE have control of the cash collateral and the benefits and risks of ownership accrue to CME and CMECE, cash performance bonds and guaranty fund contributions are reflected in the consolidated balance sheets. Performance bonds and guaranty fund contributions assets on the consolidated balance sheets include reinvestments in U.S. Treasury and U.S. government agency securities with maturity dates of 90 days or less. U.S. Treasury and U.S. government agency securities are purchased by CME, at its discretion, using cash collateral.
Securities and other non-cash deposits may include U.S. Treasury securities, U.S. government agency securities, Eurobonds, corporate bonds, other foreign government securities and gold bullion. Securities and other non-cash deposits are held in safekeeping by a custodian bank. Interest and gains or losses on securities deposited to satisfy performance bond and guaranty fund requirements accrue to the clearing firm. Because the benefits and risks of ownership accrue to the clearing firm, non-cash performance bonds and guaranty fund contributions are not reflected in the consolidated balance sheets.
Cash contributed by CMECE to its guaranty funds is classified as restricted cash and is included in other current assets and other assets in the consolidated balance sheets.
Property, Equipment and Leasehold Improvements. Property, equipment and leasehold improvements are stated at cost, less accumulated depreciation and amortization. Depreciation and amortization are calculated using the straight-line method, generally over two to thirty-nine years. Property and equipment are depreciated over their estimated useful lives. Leasehold improvements are amortized over the shorter of the remaining term of the respective lease to which they relate or the remaining useful life of the leasehold improvement. Land is reported at cost. Internal and external costs incurred in developing or obtaining computer software for internal use which meet the requirements for capitalization are amortized on a straight-line basis over the estimated useful life of the software, generally two to four years.
Operating Leases. Most leases in which the company is the tenant are accounted for as operating leases. Landlord allowances are recorded as a reduction to rent expense on a straight-line basis over the term of the lease. For sale leaseback transactions, the company evaluates the sale and the lease arrangement based on the company's continuing involvement and recognizes the sale leaseback as either a sale leaseback transaction or under the financing method, which requires the asset to remain on the consolidated balance sheets throughout the term of the lease and the proceeds to be recognized as a finance lease obligation. A portion of the lease payments is recognized as a reduction of the finance lease obligation and a portion is recognized as interest expense based on an imputed interest rate.
Goodwill and Other Intangible Assets. Goodwill represents the excess of the purchase price over the fair value of the net assets acquired in a business combination. The company reviews goodwill and indefinite-lived intangible assets for impairment at least quarterly and whenever events or circumstances indicate that their carrying values may not be recoverable. The company may test goodwill quantitatively for impairment by comparing the carrying value of a reporting unit to its estimated fair value. Estimating the fair value of a reporting unit involves significant judgments inherent in the analysis including estimating the amount and timing of future cash flows and the selection of appropriate discount rates and long-term growth rate assumptions. Changes in these estimates and assumptions could materially affect the determination of fair value for the reporting unit. If the carrying amount exceeds fair value, an impairment loss is recorded. In certain circumstances, goodwill may be reviewed qualitatively for indications of impairment without utilizing valuation techniques to estimate fair value.
The company evaluates the recoverability of indefinite-lived intangible assets by comparing the estimated fair value of the intangible asset to its carrying value. If the indefinite-lived intangible asset carrying value exceeds its fair value, an

impairment loss is recognized in an amount equal to that excess. Estimating the fair value of indefinite-lived intangible assets involves the use of valuation techniques that rely on significant estimates and assumptions including forecasted revenue growth rates, forecasted allocations of expense and risk-adjusted discount rates. Changes in these estimates and assumptions could materially affect the determination of fair value for indefinite-lived intangible assets. In certain circumstances, indefinite-lived intangible assets may be reviewed qualitatively for indications of impairment without utilizing valuation techniques to estimate fair value.

Intangible assets subject to amortization are also assessed for impairment at least annually or when indicated by a change in economic or operational circumstances. The impairment assessment of these assets requires management to first compare the book value of the amortizing asset to undiscounted cash flows only if there are indicators of a change in circumstances. If the

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book value exceeds the undiscounted cash flows, management is then required to estimate the fair value of the assets and record an impairment loss for the excess of the carrying value over the fair value and annually challenge the useful lives.

Business Combinations. The company accounts for business combinations using the acquisition method. The method requires the acquirer to recognize the assets acquired, liabilities assumed, and any non-controlling interest in the acquiree at the acquisition date, measured at their fair values as of that date. The company may use independent valuation services to assist in determining the estimated fair values.

Employee Benefit Plans. The company recognizes the funded status of defined benefit postretirement plans in its consolidated balance sheets. Changes in that funded status are recognized in the year of change in other comprehensive income (loss). Plan assets and obligations are measured at year end. The company recognizes future changes in actuarial gains and losses and prior service costs in the year in which the changes occur through other comprehensive income (loss).

Foreign Currency Translation. Foreign currency denominated assets and liabilities are re-measured into the functional currency using period-end exchange rates. Gains and losses from foreign currency transactions are included in other expense in the accompanying consolidated statements of income. When the functional currency differs from the reporting currency, revenues and expenses of foreign subsidiaries are translated from their functional currencies into U.S. dollars using weighted-average exchange rates while their assets and liabilities are translated into U.S. dollars using period-end exchange rates. Gains and losses resulting from foreign currency translations are included in accumulated other comprehensive income (loss) within shareholders' equity.

Revenue Recognition. Revenue recognition policies for specific sources of revenue are discussed below.

Clearing and Transaction Fees. Clearing and transaction fees include per-contract charges for trade execution, clearing, trading on the company's electronic trading platform and other fees. Fees are charged at various rates based on the product traded, the method of trade, the exchange trading privileges of the customer making the trade and the type of contract. Clearing and transaction fees are recognized as revenue when a buy and sell order are matched and the trade is cleared. Therefore, unfilled or canceled buy and sell orders have no impact on revenue. On occasion, the customer's exchange trading privileges may not be properly entered by the clearing firm and incorrect fees are charged for the transactions. When this information is corrected within the time period allowed by the exchange, a fee adjustment is provided to the clearing firm. A reserve is established for estimated fee adjustments to reflect corrections to customer exchange trading privileges. The reserve is based on the historical pattern of adjustments processed as well as specific adjustment requests. The company believes the allowances are adequate to cover estimated adjustments.

Market Data and Information Services. Market data and information services represent revenue earned for the dissemination of market information. Revenues are accrued each month based on the number of devices reported by vendors. The exchange conducts periodic examinations of the number of devices reported and assesses additional fees as necessary. On occasion, customers will pay for services in a lump sum payment; however, revenue is recognized as services are provided.

Access and Communication Fees. Access fees are the connectivity charges to customers of the company's electronic trading platform that are also used by market data vendors and customers. The fees include co-location fees, access fees for the electronic trading platform, line charges and hardware rental charges and can vary depending on the type of connection provided. An additional installation fee may be charged depending on the type of service requested and a disconnection fee may also be charged if certain conditions are met. Revenue is generally recognized monthly as the service is provided.

Communication fees consist of equipment rental and usage charges to customers and firms that utilize various telecommunications hubs located internationally as well as networks and services in the Chicago and New York City facilities. Revenue is billed and recognized on a monthly basis.

Other Revenues. Other revenues include processing services revenue, which is revenue generated from various strategic relationships, as well as management fees earned under the IEF programs and collateral management fees. For processing services revenue and IEF revenue, revenue is recognized as services are provided.

Concentration of Revenue. One firm represented 13% and another firm represented 11% of the company's clearing and transaction fees revenue in 2016. One firm represented 13% of the company's clearing and transaction fees revenue in 2015 and one firm represented 12% of the company's clearing and transaction fees revenue in 2014. Should a clearing firm withdraw from the exchange, management believes that the customer portion of that firm's trading activity would likely transfer to another clearing firm. Therefore, management does not believe that the company is exposed to significant risk from the ongoing loss of revenue received from a particular clearing firm.
The two largest resellers of market data represented approximately 40% of market data and information services revenue in 2016, 43% in 2015, and 44% in 2014. Should one of these vendors no longer subscribe to the company's market data,

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management believes that the majority of that firm's customers would likely subscribe to the market data through another reseller. Therefore, management does not believe that the company is exposed to significant risk from a loss of revenue received from any particular market data reseller.

Share-Based Payments. The company accounts for share-based payments at fair value, which is based on the grant date price of the equity awards issued. The company recognizes expense relating to stock-based compensation on an accelerated basis. As a result, the expense associated with each vesting date within a stock grant is recognized over the period of time that each portion of that grant vests. The company estimates expected forfeitures of stock grants.

Marketing Costs. Marketing costs are incurred for the production and communication of advertising as well as other marketing activities. These costs are expensed when incurred, except for costs related to the production of broadcast advertising, which are expensed when the first broadcast occurs.

Income Taxes. Deferred income taxes arise from temporary differences between the tax basis and book basis of assets and liabilities. A valuation allowance is recognized if it is anticipated that some or all of a deferred tax asset may not be realized. The company accounts for uncertainty in income taxes recognized in its consolidated financial statements by using a more-likely-than-not recognition threshold based on the technical merits of the tax position taken or expected to be taken. The company classifies interest and penalties related to uncertain tax positions in income tax expense.

Segment Reporting. The company reports the results of its operations as one operating segment primarily comprised of CME, CBOT, NYMEX and COMEX. The remaining operations do not meet the thresholds for reporting separate segment information.

Newly Adopted and Recently Issued Accounting Pronouncements. In the first quarter of 2016, the company adopted the Financial Accounting Standards Board (FASB) standards update regarding changes to the presentation of debt issuance costs. The update requires debt issuance costs related to a recognized debt liability to be presented as a deduction from the carrying value of the debt liability. Previously, debt issuance costs were recognized as deferred charges within other assets in the consolidated balance sheets. The standards update was applied on a retrospective basis, adjusting all prior periods presented, as if the new accounting methodology was in effect during those periods. At December 31, 2015, $12.1 million of debt issuance costs were reclassified in the consolidated balance sheet from other assets to long-term debt compared with what was previously reported. At December 31, 2016, $11.1 million of debt issuance costs were deducted from long-term debt. The change in accounting policy has been reflected in the table within Note 8.

In the first quarter of 2016, the company adopted the FASB's standards update that simplifies the classification of deferred tax assets and liabilities. The update eliminated the previous requirement to present deferred tax assets and liabilities as current and non-current in a classified balance sheet. Instead, all deferred tax assets, along with valuation allowances, and deferred tax liabilities are required to be classified as non-current. Companies are still required to offset deferred tax assets and liabilities for each taxpaying component within a tax jurisdiction. Beginning in the first quarter of 2016, the company adopted this standards update on a prospective basis and classified all deferred tax assets and liabilities as non-current within the tables in Note 10. Prior period deferred tax assets and liabilities were not retrospectively adjusted.

In May 2014, the FASB issued a new standard on revenue recognition that replaces numerous, industry-specific requirements and converges U.S. accounting standards with International Financial Reporting Standards. The new standard introduces a framework for recognizing revenue that focuses on the transfer of control rather than risks and rewards. The new standard also requires significant additional disclosures about the nature, amount, timing and uncertainty of revenue and cash flows arising from customer contracts, including significant judgments, changes in judgments and assets recognized from costs incurred to obtain or fulfill a contract. The application of the new standard becomes effective in the first annual period beginning after December 15, 2017, with early adoption permitted. This guidance may be adopted using one of two transition methods: retrospectively to each prior reporting period presented (full retrospective method) or retrospectively with the cumulative effect of initially applying the guidance recognized at the date of initial adoption (the modified retrospective approach). Management is on course to comply with the guidance by the effective date. The project team is currently in the contract review phase, which is expected to be completed by mid-2017. Management expects to reach a conclusion on whether there will be changes in revenue recognition, which method of adoption will be used and the impact the guidance will have on policies, process and controls towards the end of 2017.

In January 2016, the FASB issued a standards update that will change how entities measure certain equity investments. It does not change the guidance for classifying and measuring investments in debt securities and loans. Under the new guidance, entities will have to measure many equity investments at fair value and recognize any changes in fair value in net income, unless the investments qualify for a practicability exception. Entities will no longer be able to recognize unrealized holding gains and losses on equity securities classified today as available for sale in other comprehensive income. The update is effective for reporting periods beginning after December 15, 2017. Early adoption is permitted. The company is still in the process of evaluating the impact of this update on the consolidated financial statements.

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In February 2016, the FASB issued a standards update that requires lessees to recognize on the balance sheet the assets and liabilities associated with the rights and obligations created by those leases. The guidance for lessors is largely unchanged from current U.S. GAAP. Under the new guidance, a lessee will be required to recognize assets and liabilities for leases with lease terms of more than 12 months. Consistent with current U.S. GAAP, the recognition, measurement, and presentation of expenses and cash flows arising from a lease by a lessee primarily will depend on its classification as a finance or operating lease. The update is effective for reporting periods beginning after December 15, 2018. Early adoption is permitted. The company is in the process of evaluating the impact of this update on the consolidated financial statements.

In March 2016, the FASB issued a standards update that will change certain aspects of accounting for share-based payments to employees. The guidance will require all income tax effects of awards to be recognized in the income statement when the awards vest or are settled. It will also allow an employer to repurchase more of an employee's shares for tax withholding purposes without triggering liability accounting and to make a policy election to account for forfeitures as they occur. The update is effective for reporting periods beginning after December 15, 2016. The company will implement this standards update in the first quarter of 2017 and update the disclosure according to the new requirements.

In June 2016, the FASB issued guidance that changes how credit losses are measured for most financial assets measured at amortized cost and certain other instruments. The standard requires an entity to estimate its lifetime expected credit loss and record an allowance, that when deducted from the amortized cost basis of the financial asset, presents the net amount expected to be collected on the financial asset. This forward-looking expected loss model generally will result in the earlier recognition of allowances for losses. The standard also amends the impairment model for available for sale debt securities and requires entities to determine whether all or a portion of the unrealized loss on an available for sale debt security is a credit loss. Severity and duration of the unrealized loss are no longer permissible factors in concluding whether a credit loss exists. Entities will recognize improvements to estimated credit losses on available for sale debt securities immediately in earnings rather than as interest income over time. The standard is effective for reporting periods beginning after December 15, 2019. The standard's provisions must be applied as a cumulative-effect adjustment to retained earnings as of the beginning of the first reporting period in which the guidance is effective. Early adoption is permitted for reporting periods beginning in 2019. The company is in the process of evaluating the impact of this standard on the consolidated financial statements.

In November 2016, the FASB issued a standards update aimed at promoting consistency in the classification and presentation of changes in restricted cash on the statement of cash flows. Previously, there was diversity in practice as to whether the change in restricted cash was included in the reconciliation of beginning-of-period and end-of-period total cash amounts shown on the statement of cash flows. The amendments require that a statement of cash flows explain the change during the period in the total of cash, cash equivalents, as well as amounts described as restricted cash on the balance sheet. This guidance is effective for fiscal years beginning after December 15, 2017 and interim periods within those fiscal years. Early adoption is permitted. The amendments must be applied using a retrospective transition method to each period presented. The company is in the process of evaluating the impact of this update on our consolidated financial statements.

3. MARKETABLE SECURITIES

Available-for-Sale Securities. Certain marketable securities have been classified as available-for-sale. The amortized cost and fair value of these securities at December 31 were as follows:

(in millions)	2016 Amortized Cost	2016 Fair Value	2015 Amortized Cost	2015 Fair Value
U.S. Treasury securities	$—	$—	$16.1	$16.2
Corporate debt securities	20.0	20.2	—	—
Asset-backed security	0.6	0.3	0.7	0.3
Equity securities	0.1	0.1	0.1	0.1
Total	$20.7	$20.6	$16.9	$16.6

The U.S. Treasury securities and corporate debt securities are maintained for a non-qualified retirement and benefit plan under the COMEX Members' Recognition and Retention Plan (MRRP) (note 11).

Net unrealized gains (losses) on marketable securities classified as available-for-sale are reported as a component of other comprehensive income (loss) and included in the accompanying consolidated statements of comprehensive income and consolidated statements of equity.

The fair value and gross unrealized losses of the asset-backed security were $0.3 million and $0.3 million, respectively, at December 31, 2016. The asset-backed security was in an unrealized loss position for more than 12 months at December 31, 2016 and was deemed not to be other-than-temporarily impaired. The company does not intend to sell and is not required to sell this asset-backed security prior to maturity.

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The amortized cost and fair value of the corporate debt securities and asset-backed security at December 31, 2016, by contractual maturity, were as follows:

(in millions)	Amortized Cost	Fair Value
Maturity of one year or less	$ 0.2	$ 0.2
Maturity between one and five years	7.3	7.4
Maturity between five and ten years	5.7	5.7
Maturity greater than ten years	7.4	7.2
Total	$ 20.6	$ 20.5

Trading Securities. The company maintains additional investments in a diverse portfolio of mutual funds related to its non-qualified deferred compensation plans (note 11). The fair value of these securities was $62.7 million and $55.9 million at December 31, 2016 and 2015, respectively.

4. PERFORMANCE BONDS AND GUARANTY FUND CONTRIBUTIONS

The company operates two clearing houses: CME Clearing (a division of CME) and CMECE. The clearing houses clear and guarantee the settlement of contracts traded in their respective markets. In their guarantor roles, the clearing houses have precisely equal and offsetting claims to and from clearing firms on opposite sides of each contract, standing as an intermediary on every contract cleared. Clearing firm positions in the United States are held according to Commodity and Futures Trading Commission (CFTC) regulatory account segregation standards. To the extent that funds are not otherwise available to satisfy an obligation under the applicable contract, the clearing houses bear counterparty credit risk in the event that future market movements create conditions that could lead to clearing firms failing to meet their obligations to the clearing houses. The clearing houses reduce the exposure through risk management programs that include initial and ongoing financial standards for designation as a clearing firm, performance bond requirements, daily mark-to-market, mandatory guaranty fund contributions and intra-day monitoring.

Each CME clearing firm is required to deposit and maintain balances in the form of cash, U.S. government securities, certain foreign government securities, bank letters of credit or other approved investments to satisfy performance bond and guaranty fund requirements. Clearing firms that clear through CMECE are required to deposit and maintain collateral in the form of cash, certain U.S. and foreign government securities or other approved investments to satisfy performance bond and guaranty fund requirements. All non-cash deposits are marked-to-market and haircut on a daily basis. Securities deposited by the clearing firms are not reflected in the consolidated financial statements and the clearing houses do not earn any interest on these deposits. These balances may fluctuate significantly over time due to investment choices available to clearing firms and changes in the amount of contributions required.

In addition, the rules and regulations of CBOT require that collateral be provided for delivery of physical commodities, maintenance of capital requirements and deposits on pending arbitration matters. To satisfy these requirements, clearing firms that have accounts that trade certain CBOT products have deposited cash, U.S. Treasury securities or letters of credit.

The clearing houses mark-to-market open positions at least once a day (twice a day for futures and options contracts), and require payment from clearing firms whose positions have lost value and make payments to clearing firms whose positions have gained value. The clearing houses have the capability to mark-to-market more frequently as market conditions warrant.

Under the extremely unlikely scenario of simultaneous default by every clearing firm who has open positions with unrealized losses, the maximum exposure related to positions other than credit default and interest rate swap contracts would be one half day of changes in fair value of all open positions, before considering the clearing houses' ability to access defaulting clearing firms' collateral deposits. For CME's cleared credit default swap and interest rate swap contracts, the maximum exposure related to CME's guarantee would be one full day of changes in fair value of all open positions, before considering CME's ability to access defaulting clearing firms' collateral. During 2016, the clearing houses transferred an average of approximately $3.2 billion a day through their clearing systems for settlement from clearing firms whose positions had lost value to clearing firms whose positions had gained value. The clearing houses reduce the guarantee exposure through initial and maintenance performance bond requirements and mandatory guaranty fund contributions. The company believes that the guarantee liability is immaterial and therefore has not recorded any liability at December 31, 2016.

At December 31, 2016, performance bond and guaranty fund contribution assets on the consolidated balance sheets include cash as well as U.S. Treasury and U.S. government agency securities with maturity dates of 90 days or less. U.S. Treasury and U.S. government agency securities are purchased by CME, at its discretion, using cash collateral. The benefits, including interest earned, and risks of ownership accrue to CME. Interest earned is included in investment income on the consolidated statements of income. The U.S. Treasury and U.S. government agency securities held at December 31, 2016 will mature during the first quarter of 2017.

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The amortized cost and fair value of these securities at December 31 were as follows:

(in millions)	2016 Amortized Cost	2016 Fair Value	2015 Amortized Cost	2015 Fair Value
U.S. Treasury securities	$5,548.9	$5,549.0	$10,973.9	$10,973.9
U.S. government agency securities	1,228.3	1,228.3	—	—

CME has been designated as a systemically important financial market utility by the Financial Stability Oversight Council and is authorized to establish and maintain a cash account at the Federal Reserve Bank of Chicago. CME has received approval to establish this account at the Federal Reserve Bank of Chicago for clearing members' proprietary cash balances and the account is now operational. At December 31, 2016, CME maintained $6.2 billion within the cash account at the Federal Reserve Bank of Chicago.

CME Clearing

Clearing firms, at their option, may instruct CME to deposit the cash held by CME into one of the IEF programs. The total principal in the IEF programs was $6.8 billion at December 31, 2016 and $11.3 billion at December 31, 2015. The consolidated statements of income reflect management fees earned under the IEF programs of $10.1 million, $11.3 million and $14.9 million during 2016, 2015 and 2014, respectively. These fees are included in other revenues.

CME and The Options Clearing Corporation (OCC) have a perpetual cross-margin arrangement, whereby a clearing firm may maintain a cross-margin account in which a CME clearing firm's positions in certain equity index futures and options are combined with certain positions cleared by OCC for purposes of calculating performance bond requirements. The performance bond deposits are held jointly by CME and OCC. Cross-margin cash, securities and letters of credit jointly held with OCC under the cross-margin agreement are reflected at 50% of the total, or CME's proportionate share per that agreement. If a participating firm defaults, the gain or loss on the liquidation of the firm's open position and the proceeds from the liquidation of the cross-margin account would be allocated 50% each to CME and OCC. The company believes that the guarantee liability is immaterial and therefore has not recorded any liability at December 31, 2016.

In addition, CME has perpetual cross-margin agreements with Fixed Income Clearing Corporation (FICC) whereby the clearing firms' offsetting positions with CME and FICC are subject to reduced performance bond requirements. Clearing firms maintain separate performance bond deposits with each clearing house, but depending on the net offsetting positions between CME and FICC, each clearing house may reduce that firm's performance bond requirements. In the event of a firm default, the total liquidation net gain or loss on the firm's offsetting open positions and the proceeds from the liquidation of the performance bond collateral held by each clearing house's supporting offsetting positions would be divided evenly between CME and FICC. Additionally, if, after liquidation of all the positions and collateral of the defaulting firm at each respective clearing organization, and taking into account any cross-margining loss sharing payments, any of the participating clearing organizations has a remaining liquidating surplus, and any other participating clearing organization has a remaining liquidating deficit, any additional surplus from the liquidation would be shared with the other clearing house to the extent that it has a remaining liquidating deficit. Any remaining surplus funds would be passed to the bankruptcy trustee. The company believes that the guarantee liability is immaterial and therefore has not recorded any liability at December 31, 2016.

Each CME clearing firm for futures and options is required to deposit and maintain specified guaranty fund contributions in the form of cash or approved securities. In the event that performance bonds, guaranty fund contributions and other assets required to support clearing membership of a defaulting CME clearing firm are inadequate to fulfill that clearing firm's outstanding financial obligation, the base guaranty fund for contracts other than credit default and interest rate swaps is available to cover potential losses after first utilizing $100.0 million of corporate contributions designated by CME to be used in the event of a default of a clearing firm for the base guaranty fund.

CME maintains separate guaranty funds to support the clearing firms that clear interest rate swap products and credit default swap products. The funds for interest rate and credit default swaps are independent of the base guaranty fund and are isolated to clearing firms for products in the respective asset class. Each clearing firm for cleared interest rate swaps and cleared credit default swaps is required to deposit and maintain specified guaranty fund contributions in the form of cash or approved securities. In the event that performance bonds, guaranty fund contributions and other assets required to support clearing membership of a defaulting clearing firm for cleared interest rate swap contracts are inadequate to fulfill that clearing firm's outstanding financial obligation, the interest rate swaps contracts guaranty fund is available to cover potential losses after first utilizing $150.0 million of corporate contributions designated by CME to be used in the event of a default of a cleared interest rate swap clearing firm. In the event that performance bonds, guaranty fund contributions and other assets required to support clearing membership of a defaulting clearing firm for cleared credit default swap contracts are inadequate to fulfill that clearing firm's outstanding financial obligation, the credit default swaps contracts guaranty fund is available to cover potential losses

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after first utilizing corporate contributions designated by CME to be used in the event of default of a cleared credit default swap clearing firm, which is equal to the greater of $50.0 million and 5% of the credit default swap guaranty fund, up to a maximum of $100.0 million.

CME maintains a 364-day multi-currency line of credit with a consortium of domestic and international banks to be used in certain situations by CME Clearing. CME may use the proceeds to provide temporary liquidity in the unlikely event of a clearing firm default, in the event of a liquidity constraint or default by a depositary (custodian of the collateral), or in the event of a temporary disruption with the domestic payments system that would delay payment of settlement variation between CME and its clearing firms. Clearing firm guaranty fund contributions received in the form of cash or U.S. Treasury securities as well as the performance bond assets of a defaulting firm can be used to collateralize the facility. The line of credit provides for borrowings of up to $7.0 billion. At December 31, 2016, guaranty fund contributions available for CME clearing firms were $6.0 billion. CME has the option to request an increase in the line from $7.0 billion to $10.0 billion, subject to the approval of participating banks. In addition to the 364-day fully secured, committed multi-currency line of credit, the company also has the option to use the $2.3 billion multi-currency revolving senior credit facility to provide liquidity for the clearing house in the unlikely event of default.

CMECE

CMECE maintains a guaranty fund for CMECE commodity and foreign exchange clearing firms. In the unlikely event of default by a CMECE clearing firm, CMECE would first apply assets of the defaulting clearing firm to satisfy its payment obligations. These assets include the defaulting firm's performance bonds and guaranty fund contributions. Thereafter, if the default remains unsatisfied after first applying assets of the defaulting clearing firm to satisfy its payment obligation, CMECE would use guaranty fund contributions of $50.0 million of CMECE funds. At December 31, 2016, clearing firms contribution to the commodity and foreign exchange guaranty fund was $24.8 million. Once clearing firms fully contribute to the guaranty fund, CMECE will still use at least $20.0 million of CMECE funds in addition to the commodity or foreign exchange clearing firms' guaranty fund contributions in the event of a default.

CMECE also maintains a guaranty fund for CMECE interest rate swap clearing firms. In the unlikely event of default by a CMECE clearing firm, CMECE would first apply assets of the defaulting clearing firm to satisfy its payment obligations. These assets include the defaulting firm's performance bonds and guaranty fund contributions. If the default remains unsatisfied, CMECE would apply guaranty fund contributions of $39.8 million for interest rate swap clearing firms that will be contributed by CMECE. Interest rate swap clearing firm contributions to the interest rate swap guaranty fund totaled $92.3 million at December 31, 2016.

CME and CMECE

CME is required under the Commodity Exchange Act in the United States to segregate cash and securities deposited by clearing firms on behalf of its customers. In addition, CME requires segregation of all funds deposited by its clearing firms from operating funds. CMECE holds cash and securities deposited by clearing firms in segregated accounts, and maintains distinct accounts for its own operating funds.

Cash and non-cash deposits held as performance bonds and guaranty fund contributions at fair value at December 31 for CME and CMECE were as follows:

(in millions)	2016 Cash	2016 Non-Cash Deposits and IEF Funds	2015 Cash	2015 Non-Cash Deposits and IEF Funds
Performance bonds[1]	$35,726.5	$111,764.2	$33,592.8	$91,954.4
Guaranty fund contributions	1,702.4	5,246.3	1,919.2	5,290.0
Cross-margin arrangements	107.9	351.3	37.8	163.7
Performance bond collateral for delivery	6.7	—	3.2	—
Total	$37,543.5	$117,361.8	$35,553.0	$97,408.1

(1) Cash performance bonds include cash collateral reinvested in U.S. Treasury securities at December 31, 2016 and 2015 and U.S. government agency securities at December 31, 2016.

Performance bonds and guaranty fund contributions include collateral for clearing firms for both clearing houses. Cross-margin arrangements include collateral for the cross-margin accounts with OCC and FICC. The performance bond collateral for delivery includes deposits to meet CBOT delivery requirements.
Cash performance bonds may include intraday settlement, if any, that is owed to the clearing firms and paid the following business day. The balance of intraday settlements was $131.7 million and $210.2 million at December 31, 2016 and 2015,

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respectively. Intraday settlements may be invested on an overnight basis and are offset by an equal liability owed to clearing firms.

In addition to cash, securities and other non-cash deposits, irrevocable letters of credit may be used as performance bond deposits for clearing firms. At December 31, these letters of credit, which are not included in the accompanying consolidated balance sheets, were as follows:

(in millions)	2016	2015
Performance bonds	$2,273.7	$2,642.6
Performance bond collateral for delivery	1,759.8	1,208.0
Total Letters of Credit	$4,033.5	$3,850.6

All cash, securities and letters of credit posted as performance bonds are only available to meet the financial obligations of that clearing firm to the clearing houses.

5. PROPERTY

In March 2016, the company sold its datacenter in the Chicago area for $130.0 million. At the time of the sale, the company leased back a portion of the property. The sale leaseback transaction was recognized under the financing method and not as a sale leaseback arrangement under generally accepted accounting principles due to the company's participation in future revenues and development work, which constitutes continuing involvement in the datacenter. Under the financing method, the assets remain on the consolidated balance sheet throughout the term of the lease and the proceeds of $130.0 million from the transaction are recognized as a finance lease obligation within other liabilities and other current liabilities in the consolidated balance sheet. A portion of the lease payments will be recognized as a reduction of the finance lease obligation and a portion will be recognized as interest expense based on an imputed interest rate.

The net cost basis of the property and equipment legally sold was $153.1 million at the date of the sale. At March 31, 2016, the company wrote down the property and equipment to a fair value of $130.0 million based on qualitative indications of impairment and a quantitative analysis based on undiscounted cash flows. The company recognized a net loss on the transaction of $27.1 million through other expenses, which includes the write down to fair value and certain other transaction-related costs. The company recognized a total net loss and expenses of $28.6 million, which also includes $1.5 million of legal and other fees incurred. The property and equipment legally sold will continue to be recognized on the consolidated balance sheets and will continue to be depreciated on the consolidated statements of income over the useful life.

A summary of the property accounts at December 31 is presented below:

(in millions)	2016	2015	Estimated Useful Life
Land and land improvements	$7.8	$17.7	10 - 20 years (1)
Building and building improvements	179.4	280.8	3 - 39 years
Leasehold improvements	180.3	248.5	3 - 24 years
Furniture, fixtures and equipment	293.4	333.3	2 - 7 years
Software and software development costs	361.5	400.0	2 - 4 years
Total property	1,022.4	1,280.3	
Less accumulated depreciation and amortization	(597.2)	(788.6)	
Property, net	$425.2	$491.7	

(1) Estimated useful life applies only to land improvements.

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6. INTANGIBLE ASSETS AND GOODWILL

Intangible assets consisted of the following at December 31:

(in millions)	2016 Assigned Value	2016 Accumulated Amortization	2016 Net Book Value	2015 Assigned Value	2015 Accumulated Amortization	2015 Net Book Value
Amortizable Intangible Assets:						
Clearing firm, market data and other customer relationships	$2,838.8	$ (849.2)	$1,989.6	$2,838.8	$ (754.5)	$2,084.3
Technology-related intellectual property	29.4	(28.6)	0.8	29.4	(27.2)	2.2
Other	2.4	(1.0)	1.4	2.4	(1.0)	1.4
Total Amortizable Intangible Assets	$2,870.6	$ (878.8)	1,991.8	$2,870.6	$ (782.7)	2,087.9
Indefinite-Lived Intangible Assets:						
Trade names			450.0			450.0
Total Intangible Assets—Other, Net			$2,441.8			$2,537.9
Trading products [1]			$17,175.3			$17,175.3

(1) Trading products represent futures and options products acquired in our business combinations with CBOT Holdings, Inc., NYMEX Holdings, Inc. and The Board of Trade of Kansas City, Missouri, Inc. Clearing and transaction fees are generated through the trading of these products. These trading products, most of which have traded for decades, require authorization from the CFTC. Product authorizations from the CFTC have no term limits.

The originally assigned useful lives for the amortizable intangible assets as of December 31, 2016 are as follows:

Clearing firm, market data and other customer relationships	5 - 30 years
Technology-related intellectual property	4 - 5 years
Other	3 - 24.5 years

Total amortization expense for intangible assets was $96.1 million, $99.4 million and $100.6 million for the years ended December 31, 2016, 2015 and 2014, respectively. As of December 31, 2016, the future estimated amortization expense related to amortizable intangible assets is expected to be as follows:

(in millions)	
2017	$ 95.5
2018	94.7
2019	94.7
2020	94.7
2021	94.7
Thereafter	1,517.5

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Goodwill activity consisted of the following for the years ended December 31, 2016 and 2015:

(in millions)	Balance at December 31, 2015	Business Combinations	Divestitures	Other Activity	Balance at December 31, 2016
CBOT Holdings	$ 5,066.4	$ —	$ —	$ —	$ 5,066.4
NYMEX Holdings	2,462.2	—	—	—	2,462.2
Other	40.4	—	—	—	40.4
Total Goodwill	$ 7,569.0	$ —	$ —	$ —	$ 7,569.0

(in millions)	Balance at December 31, 2014	Business Combinations	Divestitures	Other Activity	Balance at December 31, 2015
CBOT Holdings	$ 5,035.7	$ —	$ 30.7	$ —	$ 5,066.4
NYMEX Holdings	2,462.2	—	—	—	2,462.2
Other	71.1	—	(30.7)	—	40.4
Total Goodwill	$ 7,569.0	$ —	$ —	$ —	$ 7,569.0

7. LONG-TERM INVESTMENTS

The company maintains various long-term investments as described below. The investments are recorded in other assets in the consolidated balance sheets.

BM&FBOVESPA S.A. At December 31, the company owned an approximate 2% interest in BM&FBOVESPA S. A. (BM&FBOVESPA). BM&FBOVESPA is a stock and derivatives exchange in Brazil. The company accounts for its investment in BM&FBOVESPA as an available-for-sale security. During 2016, the company sold approximately 28.0 million shares of BM&FBOVESPA and recognized a net gain of $48.4 million within investment income on the consolidated statements of income based on the average cost method. The fair value of the investment was $218.7 million and $199.1 million at December 31, 2016 and 2015, respectively. The cost basis of the investment was $157.0 million and $258.4 million at December 31, 2016 and 2015, respectively.

Bolsa Mexicana de Valores, S.A.B de C.V. The company owns an approximate 2% interest in Bolsa Mexicana de Valores, S.A.B. de C.V. (Bolsa Mexicana), a financial exchange operator in Mexico. The company accounts for its investment in Bolsa Mexicana stock as an available-for-sale security. The fair value of the investment in Bolsa Mexicana at December 31, 2016 and 2015 was $15.4 million and $15.5 million, respectively. The cost basis of the investment was $17.3 million at December 31, 2016 and 2015. The company and Bolsa Mexicana maintain a strategic partnership that includes an order routing agreement for derivative products.

Bursa Malaysia Derivatives Berhad. The company owns a 25% interest in Bursa Malaysia Derivatives Berhad (Bursa Malaysia), and accounts for its investment in Bursa Malaysia using the equity method of accounting. The company's investment in Bursa Malaysia was $28.3 million at December 31, 2016. The company and Bursa Malaysia have entered into several agreements including agreements to provide licensing, order routing and trade matching services.

DME Holdings Limited. The company owns an approximate 50% interest in DME Holdings Limited (DME Holdings), and accounts for its investment in DME Holdings using the equity method of accounting. The company's investment in DME Holdings was $17.4 million at December 31, 2016. The company and DME Holdings maintain an agreement for Dubai Mercantile Exchange futures contracts to be exclusively traded on the CME Globex platform.

S&P/DJI Indices LLC. The company owns a 27% interest in S&P/Dow Jones Indices LLC (S&P/DJI) and accounts for its investment in S&P/DJI using the equity method of accounting. The company's investment in S&P/DJI was $946.2 million at December 31, 2016. The company has long-term exclusive licensing agreements with S&P/DJI to list products based on the Standard & Poor's Indices and Dow Jones Indices.

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Explanation of Responses:

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8. DEBT

Long-term debt consisted of the following at December 31:

(in millions)	2016	2015
$750.0 million fixed rate notes due September 2022, stated rate of 3.00% (1)	$745.2	$744.4
$750.0 million fixed rate notes due March 2025, stated rate of 3.00% (2)	744.2	743.4
$750.0 million fixed rate notes due September 2043, stated rate of 5.30% (3)	741.8	741.5
Total long-term debt	$2,231.2	$2,229.3

(1) In August 2012, the company entered into a forward-starting interest rate swap agreement that modified the interest obligation associated with these notes so that the interest payable on the notes effectively became fixed at a rate of 3.32%.

(2) In December 2014, the company entered into a forward-starting interest rate swap agreement that modified the interest obligation associated with these notes so that the interest payable on the notes effectively became fixed at a rate of 3.11%.

(3) In August 2012, the company entered into a forward-starting interest rate swap agreement that modified the interest obligation associated with these notes so that the interest payable on the notes effectively became fixed at a rate of 4.73%.

Long-term debt maturities, at par value, were as follows as of December 31, 2016:

(in millions)	Par Value
2017	$ —
2018	—
2019	—
2020	—
2021	—
Thereafter	2,250.0

9. DERIVATIVE INVESTMENTS

The company mitigates certain financial exposures to interest rate risk through the use of derivative financial instruments as part of its risk management program. All derivatives have been designated as cash flow hedges. There were no derivative instruments outstanding in the consolidated balance sheets at December 31, 2016 and 2015.

The pre-tax effect of derivative instruments on the consolidated statements of income as well as accumulated other comprehensive income (OCI) within the consolidated statements of comprehensive income and consolidated statements of shareholders' equity for the years ended December 31, 2016 and 2015 were as follows:

	Gains (Losses) Recognized in OCI (Effective Portion)		(Gains) Losses Reclassified from Accumulated OCI (Effective Portion)			Gains (Losses) Recognized in Income (Ineffective Portion)		
(in millions)	2016	2015	Location	2016	2015	Location	2016	2015
Interest rate contracts	$ —	$ (4.7)	Interest and other borrowing costs	$(1.2)	$(1.2)	Gains (losses) on derivative investments	$ —	$(1.8)

At December 31, 2016, the company expects to reclassify $1.2 million of net gains on derivative instruments from accumulated other comprehensive income to net income as a net reduction to interest expense during the next twelve months.

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10. INCOME TAXES

The company is subject to regulation under a wide variety of U.S., federal, state and foreign tax laws and regulations. Income before income taxes and the income tax provision consisted of the following for the years ended December 31:

(in millions)	2016	2015	2014
Income before income taxes:			
Domestic	$2,221.8	$1,927.3	$1,783.7
Foreign	65.8	29.5	(12.3)
Total	$2,287.6	$1,956.8	$1,771.4
Income tax provision:			
Current:			
Federal	$684.4	$554.5	$526.4
State	118.6	81.0	36.5
Foreign	33.5	11.0	2.7
Total	836.5	646.5	565.6
Deferred:			
Federal	(95.4)	75.6	47.1
State	10.0	(12.0)	32.4
Foreign	2.4	(0.3)	(0.6)
Total	(83.0)	63.3	78.9
Total Income Tax Provision	$753.5	$709.8	$644.5

Reconciliation of the statutory U.S. federal income tax rate to the effective tax rate is as follows:

	2016	2015	2014
Statutory U.S. federal tax rate	35.0 %	35.0 %	35.0 %
State taxes, net of federal benefit	3.7	3.0	1.6
Domestic production activities deduction	(1.3)	(1.3)	(1.4)
Increase (decrease) in domestic valuation allowance	(4.7)	0.1	0.1
Impact of revised state and local apportionment estimates	0.5	(0.7)	1.1
Other, net	(0.3)	0.2	—
Effective Tax Rate	32.9 %	36.3 %	36.4 %

In 2016, the effective rate was lower than the statutory tax rate largely due to the release of the valuation allowances related to the sale of BM&FBOVESPA shares. These decreases were partially offset by an increase in state tax expense and the state apportionment impact on deferred tax liabilities.

In 2015, the effective rate was higher than the statutory tax rate primarily due to the impact of state and local income taxes. The effective rate was primarily reduced by the Section 199 Domestic Productions Activities Deduction (Section 199 deduction) and the impact of state and local apportionment factors in deferred tax expense. The Section 199 deduction is related to certain activities performed by the company's electronic platform.

In 2014, the effective tax rate was higher than the statutory tax rate largely due to state income taxes and the impact of revised state and local apportionment factors on the company's deferred tax expense. However, the state income tax expense was reduced for benefits achieved in various settlements of state and local income tax audits. The effective tax rate was primarily reduced by the Section 199 deduction.

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At December 31, deferred income tax assets (liabilities) consisted of the following:

(in millions)	2016	2015
Net Current Deferred Income Tax Assets:		
Unrealized loss on securities	$—	$1.1
Stock-based compensation	—	19.1
Accrued expenses and other	—	7.7
Net Current Deferred Income Tax Assets	$—	$27.9
Net Non-Current Deferred Income Tax Assets:		
Domestic unrealized loss on investment in BM&FBOVESPA	$14.4	$85.6
Foreign losses	14.2	15.6
Domestic losses	4.9	14.1
Stock-based compensation	38.1	24.1
Deferred compensation and other benefit plans	32.6	31.8
Property	31.4	27.3
Unrealized losses on securities	21.2	14.9
Accrued expenses and other	12.4	—
Subtotal	169.2	213.4
Valuation allowance	(14.9)	(122.3)
Total non-current deferred income tax assets	154.3	91.1
Non-Current Deferred Income Tax Liabilities:		
Purchased intangible assets	(7,445.3)	(7,434.1)
Accrued expenses and other	—	(15.3)
Total non-current deferred income tax liabilities	(7,445.3)	(7,449.4)
Net Non-Current Deferred Income Tax Liabilities	$(7,291.0)	$(7,358.3)

A valuation allowance is recorded when it is more-likely-than-not that some portion or all of the deferred income tax assets may not be realized. The ultimate realization of the deferred income tax assets depends on the ability to generate sufficient taxable income of the appropriate character in the future and in the appropriate taxing jurisdictions. At December 31, 2016 and 2015, the company had domestic and foreign income tax loss carry forwards of $96.8 million and $124.5 million, respectively. These amounts primarily related to losses from the acquisition of Swapstream Limited and its affiliates, the acquisition of Pivot, Inc., losses incurred in the operation of various foreign entities and capital losses from the sales of securities. At December 31, 2016 and 2015, the company also had net built-in, unrealized capital gains (losses) of $19.3 million and $(270.9) million, respectively. At December 31, 2016 and 2015, the company determined that it was not more-likely-than-not that deferred income tax assets related to the acquisition of Swapstream Limited and its affiliates and other deferred income tax assets created from the start-up of various foreign operations will be fully realized. At December 31, 2015, the company also determined that it was not more-likely-than not that the deferred income tax assets related to certain capital losses and certain built-in losses would be fully realized. As a result, valuation allowances of $14.9 million and $122.3 million were recorded at December 31, 2016 and 2015, respectively.

The following is a summary of the company's unrecognized tax benefits:

(in millions)	2016	2015	2014
Gross unrecognized tax benefits	$252.1	$206.9	$187.6
Unrecognized tax benefits, net of tax impacts in other jurisdictions	216.1	179.6	160.8
Unrecognized interest and penalties related to uncertain tax positions	32.7	19.5	11.0
Interest and penalties recognized in the consolidated statements of income	13.2	8.6	(12.5)

The company does not believe it is reasonably possible that within the next twelve months, unrecognized tax benefits will change by a significant amount.

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A reconciliation of the beginning and ending amounts of unrecognized tax benefits is as follows:

(in millions)	2016	2015	2014
Balance at January 1	$206.9	$187.6	$231.6
Additions based on tax positions related to the current year	29.6	20.4	30.5
Additions for tax positions of prior years	18.5	2.7	24.9
Reductions for tax positions of prior years	(2.8)	(3.8)	(51.8)
Reductions resulting from the lapse of statutes of limitations	(0.1)	—	—
Settlements with taxing authorities	—	—	(47.6)
Balance at December 31	$252.1	$206.9	$187.6

The company is subject to U.S. federal income tax as well as income taxes in Illinois and multiple other state, local and foreign jurisdictions. As of December 31, 2016, substantially all federal and state income tax matters had been concluded through 2007 and 2006, respectively.

11. EMPLOYEE BENEFIT PLANS

Pension Plans. CME maintains a non-contributory defined benefit cash balance pension plan for eligible employees. CME's plan provides for a pay-based credit added to the cash balance account based on age and earnings and includes salary and cash bonuses in the definition of earnings. Employees who have completed a continuous 12-month period of employment and have reached the age of 21 are eligible to participate. Participant cash balance accounts receive an interest credit equal to the greater of the one-year constant maturity yield for U.S. Treasury notes or 4.0%. Participants become vested in their accounts after three years of service. The measurement date used for the plan is December 31.

The following is a summary of the change in projected benefit obligation:

(in millions)	2016	2015
Balance at January 1	$217.3	$223.7
Service cost	16.7	18.4
Interest cost	10.3	9.8
Actuarial (gain) loss	5.3	(11.6)
Benefits paid	(9.7)	(23.0)
Balance at December 31	$239.9	$217.3

The aggregate accumulated benefit obligation was $211.4 million and $190.8 million at December 31, 2016 and 2015, respectively.

The following is a summary of the change in fair value of plan assets:

(in millions)	2016	2015	2014
Balance at January 1	$217.5	$225.1	$193.6
Actual return on plan assets	16.0	(7.2)	14.3
Employer contributions	15.0	22.6	26.0
Benefits paid	(9.7)	(23.0)	(8.8)
Balance at December 31	$238.8	$217.5	$225.1

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The plan assets are classified into a fair value hierarchy in their entirety based on the lowest level of input that is significant to each asset or liability’s fair value measurement. Valuation techniques for level 2 assets use significant observable inputs such as quoted prices for similar assets, quoted market prices in inactive markets and other inputs that are observable or can be supported by observable market data. The fair value of each major category of plan assets as of December 31 is indicated below.

(in millions)	2016	2015
Level 2:		
Money market funds	$31.5	$26.5
Mutual funds:		
Fixed income	68.6	61.6
Foreign equity	64.5	60.0
U.S. equity	63.9	59.9
Commodity	10.3	9.5
Total	$238.8	$217.5

At December 31, 2016, the projected benefit obligation exceeded the fair value of pension plan assets by $1.1 million and the excess was recorded as a non-current pension liability in other liabilities. At December 31, 2015, the fair value of pension plan assets exceeded the projected benefit obligation by $0.2 million and the excess was recorded as a non-current pension asset in other assets.

CME's funding goal is to have its pension plan 100% funded at each year-end on a projected benefit obligation basis, while also satisfying any minimum required contribution and obtaining the maximum tax deduction. Year-end 2016 assumptions have been used to project the assets and liabilities from December 31, 2016 to December 31, 2017. The result of this projection is that estimated liabilities would exceed the fair value of the plan assets at December 31, 2017 by approximately $13.9 million. Accordingly, it is estimated that a $13.9 million contribution in 2017 will allow the company to meet its funding goal.

The components of net pension expense and the assumptions used to determine the end-of-year projected benefit obligation and net pension expense in aggregate are indicated below:

(in millions)	2016	2015	2014
Components of Net Pension Expense:			
Service cost	$16.7	$18.4	$17.1
Interest cost	10.3	9.8	9.6
Expected return on plan assets	(15.7)	(16.3)	(14.0)
Recognized net actuarial loss	3.2	2.7	0.6
Net Pension Expense	$14.5	$14.6	$13.3
Assumptions Used to Determine End-of-Year Benefit Obligation:			
Discount rate	4.30 %	4.60 %	4.20 %
Rate of compensation increase	5.00	5.00	5.00
Cash balance interest crediting rate	4.00	4.00	4.00
Assumptions Used to Determine Net Pension Expense:			
Discount rate	4.60 %	4.20 %	5.10 %
Rate of compensation increase	5.00	5.00	5.00
Expected return on plan assets	7.50	7.50	7.50
Interest crediting rate	4.00	4.00	4.00

The discount rate for the plan was determined based on the market value of a theoretical settlement bond portfolio. This portfolio consisted of U.S. dollar denominated Aa-rated corporate bonds across the full maturity spectrum. A single equivalent discount rate was determined to align the present value of the required cash flow with that settlement value. The resulting discount rate was reflective of both the current interest rate environment and the plan's distinct liability characteristics.

The basis for determining the expected rate of return on plan assets for the plan is comprised of three components: historical returns, industry peers and forecasted return. The plan's total return is expected to equal the composite performance of the security markets over the long term. The security markets are represented by the returns on various domestic and international stock, bond and commodity indexes. These returns are weighted according to the allocation of plan assets to each market and measured individually.

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The overall objective of the plan is to achieve required long-term rates of return in order to meet future benefit payments. The component of the investment policy for the plan that has the most significant impact on returns is the asset mix. The asset mix has a minimum and maximum range depending on asset class. The plan assets are diversified to minimize the risk of large losses by any one or more individual assets. Such diversification is accomplished, in part, through the selection of asset mix and investment management. The asset allocation for the plan, by asset category, at December 31 was as follows:

	2016	2015
Fixed income	28.8%	28.3%
Foreign equity	27.0	27.6
U.S. equity	26.7	27.5
Money market funds	13.2	12.2
Commodity	4.3	4.4

The range of target allocation percentages for 2017 is as follows:

	Minimum	Maximum
Fixed income	33.0 %	45.0 %
U.S. equity	23.5	35.0
Foreign equity	23.5	35.0
Commodity	2.0	8.0

At times, the company may determine that it is necessary to place some assets in cash equivalent investments in order to pay expected plan liabilities. Given this, the actual asset allocation for the plan may not fall within the target allocation ranges from time to time.

According to the plan's investment policy, the plan is not allowed to invest in securities that compromise independence, short sales of securities directly owned by the plan, securities purchased on margin or other uses of borrowed funds, derivatives not used for hedging purposes, restricted stock or illiquid securities or any other transaction prohibited by employment laws. If the plan directly invests in short-term and long-term debt obligations, the investments are limited to obligations rated at the highest rating category by Standard & Poor's (S&P) or Moody's.

The pre-tax balance and activity of the prior service costs and actuarial losses for the pension plan, which are included in other comprehensive income (loss), for 2016 are as follows:

(in millions)	Prior Service Costs	Actuarial Loss
Balance at January 1	$ 0.1	$ 60.8
Unrecognized net loss	—	5.1
Recognized as a component of net pension expense	(0.1)	(3.1)
Balance at December 31	$ —	$ 62.8

The company expects to amortize $3.5 million of actuarial loss and prior service costs from accumulated other comprehensive income (loss) into net periodic benefit costs in 2017.

At December 31, 2016, anticipated benefit payments from the plan in future years are as follows:

(in millions)	
2017	$12.5
2018	14.0
2019	15.1
2020	16.0
2021	17.6
2022-2026	109.0

Savings Plans. CME maintains a defined contribution savings plan pursuant to Section 401(k) of the Internal Revenue Code, whereby all U.S. employees are participants and have the option to contribute to this plan. CME matches employee contributions up to 3% of the employee's base salary and may make additional discretionary contributions.

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Explanation of Responses:

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In addition to the plan for U.S. employees, the company maintains defined contribution savings plans for employees in international locations.

Aggregate expense for all of the defined contribution savings plans amounted to $11.3 million, $11.7 million and $11.2 million in 2016, 2015 and 2014, respectively.

CME Non-Qualified Plans. CME maintains non-qualified plans, under which participants may make assumed investment choices with respect to amounts contributed on their behalf. Although not required to do so, CME invests such contributions in assets that mirror the assumed investment choices. The balances in these plans are subject to the claims of general creditors of the exchange and totaled $62.7 million and $55.9 million at December 31, 2016 and 2015 respectively. Although the value of the plans is recorded as an asset in marketable securities in the consolidated balance sheets, there is an equal and offsetting liability. The investment results of these plans have no impact on net income as the investment results are recorded in equal amounts to both investment income and compensation and benefits expense.

Supplemental Savings Plan. CME maintains a supplemental plan to provide benefits for employees who have been impacted by statutory limits under the provisions of the qualified pension and savings plan. Employees in this plan are subject to the vesting requirements of the underlying qualified plans.

Deferred Compensation Plan. A deferred compensation plan is maintained by CME, under which eligible employees and members of the board of directors may contribute a percentage of their compensation and defer income taxes thereon until the time of distribution.

COMEX Members' Retirement Plan and Benefits. COMEX maintains a non-qualified retirement and benefit plan under the COMEX MRRP. This plan provides benefits to certain members of the COMEX division based on long-term membership, and participation is limited to individuals who were COMEX division members prior to NYMEX's acquisition of COMEX in 1994. No new participants were permitted into the plan after the date of this acquisition. All benefits to be paid under the MRRP are based on reasonable actuarial assumptions which are based upon the amounts that are available and are expected to be available to pay benefits. Total contributions to the plan were $3.0 million in 2016, $2.0 million in 2015, and $0.8 million for 2014. At December 31, 2016 and 2015, the obligation for the MRRP totaled $19.4 million and $19.9 million, respectively. Assets with a fair value of $22.0 million and $22.0 million have been allocated to this plan at December 31, 2016 and 2015, respectively, and are included in marketable securities and cash and cash equivalents in the consolidated balance sheets. The balances in this plan are subject to the claims of general creditors of COMEX.

12. COMMITMENTS

Operating Leases. CME Group has entered into various non-cancellable operating lease agreements, with the most significant being as follows:

- In March 2016, the company sold its datacenter and leased back a portion of the property. The sale leaseback transaction was recognized under the financing method and not as a sale leaseback arrangement. The operating lease, which has an initial lease term ending in March 2031, contains two consecutive renewal options for five years.
- In November 2013, the company sold a building in New York and leased back a portion of the property. The operating lease, which has an initial lease term ending on December 31, 2028, contains two consecutive renewal options for five years.
- In April 2012, the company sold two buildings in Chicago at 141 W. Jackson and leased back a portion of the property. The operating lease, which has an initial lease term ending on April 30, 2027, contains four consecutive renewal options for five years.
- In January 2011, the company entered into an operating lease for office space in London. The initial lease term terminates on March 24, 2026, with an option to terminate without penalty in January 2021.
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In July 2008, the company renegotiated the operating lease for its headquarters at 20 South Wacker Drive in Chicago. The lease, which has an initial term ending on November 30, 2022, contains two consecutive renewal options for seven and ten years and a contraction option which allows the company to reduce its occupied space after November 30, 2018. In addition, the company may exercise a lease expansion option in December 2017.

In August 2006, the company entered into an operating lease for additional office space in Chicago. The initial lease term terminates on November 30, 2023. The lease contains two 5-year renewal options beginning in 2023.

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At December 31, 2016, future minimum payments under non-cancellable operating leases were payable as follows (in millions):

Year	
2017	$59.0
2018	59.3
2019	60.0
2020	60.0
2021	55.2
Thereafter	309.6
Total	$603.1

Total rental expense, including equipment rental, was $47.9 million in 2016, $54.8 million in 2015 and $51.0 million in 2014.

Other Commitments. Commitments include material contractual purchase obligations that are non-cancellable. Purchase obligations relate to advertising, licensing, hardware, software and maintenance as well as telecommunication services. At December 31, 2016, future minimum payments due under purchase obligations were payable as follows (in millions):

Year	
2017	$13.7
2018	14.3
2019	10.3
2020	9.2
2021	3.5
Thereafter	1.1
Total	$52.1

13. CONTINGENCIES

Legal and Regulatory Matters. In 2013, the CFTC filed suit against NYMEX and two former employees alleging disclosure of confidential customer information in violation of the Commodity Exchange Act. NYMEX's motion to dismiss was denied in 2014. Based on its investigation to date and advice from legal counsel, the company believes that it has strong factual and legal defenses to the claim.

In the normal course of business, the company discusses matters with its regulators raised during regulatory examinations or otherwise subject to their inquiry and oversight. These matters could result in censures, fines, penalties or other sanctions. Management believes the outcome of any resulting actions will not have a material impact on its consolidated financial position or results of operations. However, the company is 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.

In addition, the company is a defendant in, and has potential for, various other legal proceedings arising from its regular business activities. While the ultimate results of such proceedings against the company cannot be predicted with certainty, the company believes that the resolution of any of these matters on an individual or aggregate basis will not have a material impact on its consolidated financial position or results of operations.

At December 31, 2015, the company had accrued $3.5 million for legal and regulatory matters that were probable and estimable. No accrual was required for legal and regulatory matters that were probable and estimable as of December 31, 2016.

Intellectual Property Indemnifications. Certain agreements with customers and other third parties related to accessing the CME platforms, utilizing market data services and licensing CME SPAN software may contain indemnifications from intellectual property claims that may be made against them as a result of their use of the applicable products and/or services. The potential future claims relating to these indemnifications cannot be estimated and therefore no liability has been recorded.

14. GUARANTEES

Mutual Offset Agreement. CME and Singapore Exchange Limited (SGX) have a mutual offset agreement with a current term through October 2017. This agreement enables market participants to open a futures position on one exchange and liquidate it on the other. The term of the agreement will automatically renew for a one-year period unless either party provides advance notice of its intent to terminate. CME can maintain collateral in the form of U.S. Treasury securities or irrevocable, standby letters of credit. At December 31, 2016, CME was contingently liable to SGX on irrevocable letters of credit totaling $435.0 million. Regardless of the collateral, CME guarantees all cleared transactions submitted through SGX and would initiate

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procedures designed to satisfy these financial obligations in the event of a default, such as the use of performance bonds and guaranty fund contributions of the defaulting clearing firm. The company believes that its guarantee liability is immaterial and therefore has not recorded any liability at December 31, 2016.

Family Farmer and Rancher Protection Fund. In 2012, the company established the Family Farmer and Rancher Protection Fund (the Fund). The Fund is designed to provide payments, up to certain maximum levels, to family farmers, ranchers and other agricultural industry participants who use the company's agricultural products and who suffer losses to their segregated account balances due to their CME clearing member becoming insolvent. Under the terms of the Fund, farmers and ranchers are eligible for up to $25,000 per participant. Farming and ranching cooperatives are eligible for up to $100,000 per cooperative. The Fund has an aggregate maximum payment amount of $100.0 million. Since its establishment, the Fund has made payments of approximately $2.0 million, which leaves $98.0 million available for future claims. If payments to participants were to exceed this amount, payments would be pro-rated. Clearing members and customers must register in advance with the company and provide certain documentation in order to substantiate their eligibility. The company believes that its guarantee liability is immaterial and therefore has not recorded any liability at December 31, 2016.

15. CAPITAL STOCK

Shares Outstanding. The following table presents information regarding capital stock:

	December 31,	
(in thousands)	2016	2015
Class A common stock authorized	1,000,000	1,000,000
Class A common stock issued and outstanding	338,240	336,938
Class B-1 common stock authorized, issued and outstanding	0.6	0.6
Class B-2 common stock authorized, issued and outstanding	0.8	0.8
Class B-3 common stock authorized, issued and outstanding	1.3	1.3
Class B-4 common stock authorized, issued and outstanding	0.4	0.4

CME Group has no shares of preferred stock issued and outstanding.

Associated Trading Rights. Members of CME, CBOT, NYMEX and COMEX own or lease trading rights which entitle them to access open outcry trading, discounts on trading fees and the right to vote on certain exchange matters as provided for by the rules of the particular exchange and CME Group's or the subsidiaries' organizational documents. Each class of CME Group Class B common stock is associated with a membership in a specific division for trading at CME. A CME trading right is a separate asset that is not part of or evidenced by the associated share of Class B common stock of CME Group. The Class B common stock of CME Group is intended only to ensure that the Class B shareholders of CME Group retain rights with respect to representation on the board of directors and approval rights with respect to the core rights described below.

Trading rights at CBOT are evidenced by Class B memberships in CBOT, at NYMEX by Class A memberships in NYMEX and at COMEX by COMEX Division Memberships. Members of CBOT, NYMEX and COMEX do not have any rights to elect members of the board of directors and are not entitled to receive dividends or other distributions on their memberships or trading permits.

Core Rights. Holders of CME Group Class B common shares have the right to approve changes in specified rights relating to the trading privileges at CME associated with those shares. These core rights relate primarily to trading right protections, certain trading fee protections and certain membership benefit protections. Votes on changes to these core rights are weighted by class. Each class of Class B common stock has the following number of votes on matters relating to core rights: Class B-1, six votes per share; Class B-2, two votes per share; Class B-3, one vote per share; and Class B-4, 1/6th of one vote per share. The approval of a majority of the votes cast by the holders of shares of Class B common stock is required in order to approve any changes to core rights. Holders of shares of Class A common stock do not have the right to vote on changes to core rights.

Voting Rights. With the exception of the matters reserved to holders of CME Group Class B common stock, holders of CME Group common stock vote together on all matters for which a vote of common shareholders is required. In these votes, each holder of shares of Class A or Class B common stock of CME Group has one vote per share.

Transfer Restrictions. Each class of CME Group Class B common stock is subject to transfer restrictions contained in the Certificate of Incorporation of CME Group. These transfer restrictions prohibit the sale or transfer of any shares of Class B common stock separate from the sale of the associated trading rights.

Election of Directors. The CME Group Board of Directors is currently comprised of 22 members. Holders of Class B-1, Class B-2 and Class B-3 common stock have the right to elect six directors, of which three are elected by Class B-1 shareholders, two

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are elected by Class B-2 shareholders and one is elected by Class B-3 shareholders. The remaining directors are elected by the Class A and Class B shareholders voting as a single class.

Dividends. Holders of Class A and Class B common stock of CME Group are entitled to receive proportionately such dividends, if any, as may be declared by the CME Group board of directors.

CME Group Omnibus Stock Plan. CME Group has adopted an Omnibus Stock Plan under which stock-based awards may be made to employees. A total of 40.2 million Class A common stock shares have been reserved for awards under the plan. Awards totaling 23.7 million shares have been granted and are outstanding or have been exercised under this plan at December 31, 2016 (note 16).

NYMEX Holdings Omnibus Long-Term Incentive Plan. In connection with the merger with NYMEX Holdings, CME Group assumed NYMEX Holdings' 2006 Omnibus Long-Term Incentive Plan (NYMEX Omnibus Stock Plan). Under the plan, stock-based awards may be made to any director, officer or employee of the company and other key individuals providing services to the company. A total of 5.0 million shares had been reserved for awards under the plan. In connection with receiving shareholder approval to increase the amount of authorized shares under the CME Group Omnibus Stock Plan in May 2009, the company undertook to freeze future awards under this plan. The plan terminated during 2016 and, as a result, the remaining shares authorized for future awards expired.

Director Stock Plan. CME Group has adopted a Director Stock Plan under which awards are made to non-executive directors as part of their annual compensation. A total of 625,000 Class A shares have been reserved under this plan, and approximately 347,000 shares have been awarded through December 31, 2016.

Employee Stock Purchase Plan. CME Group has adopted an Employee Stock Purchase Plan (ESPP) under which employees may purchase Class A shares at 90% of the market value of the shares using after-tax payroll deductions. A total of 500,000 Class A shares have been reserved under this plan, of which approximately 240,000 shares have been purchased through December 31, 2016 (note 16).

16. STOCK-BASED PAYMENTS

CME Group adopted an Omnibus Stock Plan under which stock-based awards may be made to employees. A total of 40.2 million Class A shares have been reserved for awards under the plan. Awards totaling 23.7 million shares have been granted and are outstanding or have been exercised under the plan as of December 31, 2016. Awards granted generally vest over a four-year period, with 25% vesting one year after the grant date and on that same date in each of the following three years.

Total compensation expense for stock-based payments and total income tax benefit recognized in the consolidated statements of income for stock-based awards were as follows:

(in millions)	2016	2015	2014
Compensation expense	$66.4	$61.0	$55.0
Income tax benefit recognized	38.6	32.4	19.5

Excluding estimates of future forfeitures, at December 31, 2016, there was $106.3 million of total unrecognized compensation expense related to employee stock-based compensation arrangements that had not yet vested. This expense is expected to be recognized over a weighted average period of 2.3 years.

Stock options have not been granted since 2012. The following table summarizes stock option activity for 2016. Aggregate intrinsic value is in millions.

	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (in years)	Aggregate Intrinsic Value
Outstanding at December 31, 2015	1,814,051	$ 73	3.3	$ 38.7
Exercised	(692,784)	76		
Cancelled	(99,730)	101		
Outstanding at December 31, 2016	1,021,537	69	2.9	47.4
	1,021,537	69	2.9	47.4

Exercisable at December 31,
2016
The total intrinsic value of options exercised during 2016, 2015 and 2014 was $19.9 million, $29.5 million and $29.5 million, respectively.

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In 2016, the company granted 539,408 shares of restricted Class A common stock and 8,402 shares of restricted stock units. Restricted common stock and restricted stock units generally have a vesting period of two to four years. The fair value related to these grants was $59.6 million, which is recognized as compensation expense on an accelerated basis over the vesting period. Beginning with restricted stock grants in September 2010, dividends are accrued on restricted Class A common stock and restricted stock units and are paid once the restricted stock vests. In 2016, the company also granted 263,626 performance shares. The fair value related to these grants was $25.9 million, which is recognized as compensation expense on an accelerated and straight-lined basis over the vesting period. The vesting of these shares is contingent on meeting stated performance or market conditions.

The following table summarizes restricted stock, restricted stock units, and performance shares activity for 2016:

	Number of Shares	Weighted Average Grant Date Fair Value
Outstanding at December 31, 2015	1,922,298	$ 83
Granted	811,436	105
Vested	(569,892)	72
Cancelled	(343,264)	73
Outstanding at December 31, 2016	1,820,578	98

The total fair value of restricted stock, restricted stock units, and performance shares that vested during 2016, 2015 and 2014 was $59.8 million, $43.3 million and $40.5 million, respectively.

Under an ESPP, eligible employees may acquire shares of Class A common stock using after-tax payroll deductions made during consecutive offering periods of approximately six months in duration. Shares are purchased at the end of each offering period at a price of 90% of the closing price of the Class A common stock as reported on the NASDAQ Global Select Market. Compensation expense is recognized on the dates of purchase for the discount from the closing price. In 2016, 2015 and 2014, a total of 19,858, 19,756 and 23,678 shares, respectively, of Class A common stock were issued to participating employees. These shares are subject to a six-month holding period. Annual expense of $0.2 million for the purchase discount was recognized in 2016, 2015 and 2014.

Non-executive directors receive an annual award of Class A common stock with a value equal to $100,000. Non-executive directors may also elect to receive some or all of the cash portion of their annual stipend, up to $60,000, in shares of stock based on the closing price at the date of distribution. As a result, 26,439, 25,853 and 33,735 shares of Class A common stock were issued to non-executive directors during 2016, 2015 and 2014, respectively. These shares are not subject to any vesting restrictions. Expense of $2.4 million, $2.5 million and $2.1 million related to these stock-based payments was recognized for the years ended December 31, 2016, 2015 and 2014, respectively.

17. ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)

The following tables present changes in the accumulated balances for each component of other comprehensive income (loss) attributable to CME Group, including current period other comprehensive income and reclassifications out of accumulated other comprehensive income (loss):

(in millions)	Investment Securities	Defined Benefit Plans	Derivative Investments	Foreign Currency Translation	Total
Balance at December 31, 2015	$ (95.0)	$ (36.6)	$ 59.6	$ (8.8)	$ (80.8)
Other comprehensive income before reclassifications and income tax benefit (expense)	170.0	(5.1)	—	(8.2)	156.7
Amounts reclassified from accumulated other comprehensive income	(48.7)	3.2	(1.2)	—	(46.7)
Income tax benefit (expense)	(45.8)	0.7	0.5	1.3	(43.3)
Net current period other comprehensive income attributable to CME Group	75.5	(1.2)	(0.7)	(6.9)	66.7

Balance at December 31, 2016	$ (19.5)	$(37.8)	$ 58.9	$ (15.7)	$(14.1)

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(in millions)	Investment Securities	Defined Benefit Plans	Derivative Investments	Foreign Currency Translation	Total
Balance at December 31, 2014	$ (22.9)	$ (31.3)	$ 62.6	$ (2.2)	$ 6.2
Other comprehensive income before reclassifications and income tax benefit (expense)	(78.0)	(11.2)	(4.7)	(10.6)	(104.5)
Amounts reclassified from accumulated other comprehensive income	8.5	2.7	0.6	—	11.8
Income tax benefit (expense)	(2.6)	3.2	1.1	4.0	5.7
Net current period other comprehensive income attributable to CME Group	(72.1)	(5.3)	(3.0)	(6.6)	(87.0)
Balance at December 31, 2015	$ (95.0)	$ (36.6)	$ 59.6	$ (8.8)	$ (80.8)

(in millions)	Investment Securities	Defined Benefit Plans	Derivative Investments	Foreign Currency Translation	Total
Balance at December 31, 2013	$ 98.9	$ (12.8)	$ 65.0	$ 0.9	$ 152.0
Other comprehensive income before reclassifications and income tax benefit (expense)	(116.6)	(30.0)	(2.3)	(5.2)	(154.1)
Amounts reclassified from accumulated other comprehensive income	—	0.3	(1.5)	—	(1.2)
Income tax benefit (expense)	(5.2)	11.2	1.4	2.1	9.5
Net current period other comprehensive income attributable to CME Group	(121.8)	(18.5)	(2.4)	(3.1)	(145.8)
Balance at December 31, 2014	$ (22.9)	$ (31.3)	$ 62.6	$ (2.2)	$ 6.2

18. FAIR VALUE MEASUREMENTS

The company uses a three-level classification hierarchy of fair value measurements for disclosure purposes.

- Level 1 inputs, which are considered the most reliable evidence of fair value, consist of quoted prices (unadjusted) for identical assets or liabilities in active markets.
- Level 2 inputs consist of observable market data, other than level 1 inputs, such as quoted prices for similar assets and liabilities in active markets or inputs other than quoted prices that are directly observable.
- Level 3 inputs consist of unobservable inputs which are derived and cannot be corroborated by market data or other entity-specific inputs.

Level 1 assets generally include U.S. Treasury securities, U.S. government agency securities, investments in publicly traded mutual funds, equity securities and corporate debt securities with quoted market prices. In general, the company uses quoted prices in active markets for identical assets to determine the fair value of marketable securities and equity investments. If quoted prices are not available to determine fair value, the company uses other inputs that are directly observable.

Assets included in level 2 generally consist of asset-backed securities. Asset-backed securities were measured at fair value based on matrix pricing using prices of similar securities with similar inputs such as maturity dates, interest rates and credit ratings.

The company determined the fair value of its contingent consideration liability, considered a level 3 liability, using a discounted cash flow model to calculate the present value of future payouts. The liability was included in level 3 because management used significant unobservable inputs, including a discount rate of 20% and payout probability of 100%. Significant increases or decreases in any of those inputs in isolation would result in a significantly different fair value.

Financial assets and liabilities recorded in the consolidated balance sheets as of December 31, 2016 and 2015 were classified in their entirety based on the lowest level of input that was significant to each asset or liability's fair value measurement.

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Financial Instruments Measured at Fair Value on a Recurring Basis:

	December 31, 2016			
(in millions)	Level 1	Level 2	Level 3	Total
Assets at Fair Value:				
Marketable securities:				
Corporate debt securities	$20.2	$ —	$ —	$20.2
Mutual funds	62.7	—	—	62.7
Equity securities	0.1	—	—	0.1
Asset-backed securities	—	0.3	—	0.3
Total Marketable Securities	83.0	0.3	—	83.3
Performance bonds and guaranty fund contributions (1):				
U.S. Treasury securities	5,549.0	—	—	5,549.0
U.S. government agencies securities	1,228.3	—	—	1,228.3
Equity investments	234.1	—	—	234.1
Total Assets at Fair Value	$7,094.4	$ 0.3	$ —	$7,094.7

	December 31, 2015			
(in millions)	Level 1	Level 2	Level 3	Total
Assets at Fair Value:				
Marketable securities:				
U.S. Treasury securities	$16.2	$ —	$ —	$16.2
Mutual funds	55.9	—	—	55.9
Equity securities	0.1	—	—	0.1
Asset-backed securities	—	0.3	—	0.3
Total Marketable Securities	72.2	0.3	—	72.5
Performance bonds and guaranty fund contributions (1):				
U.S. Treasury securities	10,973.9	—	—	10,973.9
Equity investments	214.5	—	—	214.5
Total Assets at Fair Value	$11,260.6	$ 0.3	$ —	$11,260.9
Liabilities at Fair Value:				
Contingent consideration	—	—	0.3	0.3
Total Liabilities at Fair Value	$—	$ —	$ 0.3	$0.3

(1) Performance bonds and guaranty fund contributions on the consolidated balance sheets at December 31, 2016 and 2015 include cash collateral that has been invested in U.S. Treasury securities. Performance bonds and guaranty fund contributions on the consolidated balance sheet at December 31, 2016 also include cash collateral that has been invested in U.S. government agencies securities.

There were no transfers of assets between level 1, level 2 and level 3 during 2016 and 2015. There were no level 3 assets valued at fair value on a recurring basis during 2016 and 2015. The following is a reconciliation of level 3 liabilities valued at fair value on a recurring basis during 2016 and 2015.

(in millions)	Contingent Consideration
Fair value of liability at December 31, 2014	$ 17.7
Realized and unrealized gains (losses):	
Included in other expense	1.3
Settlements	(18.7)
Fair Value of Liability at December 31, 2015	0.3
Realized and unrealized gains (losses):	
Included in other expense	(0.3)
Fair Value of Liability at December 31, 2016	$ —

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In the first quarter of 2016, the company sold a datacenter and leased back a portion of the property. Under generally accepted accounting principles, the transaction has been recognized under the financing method instead of recognized as a sale leaseback arrangement. As a result, the property and equipment legally sold will continue to be recognized on the consolidated balance sheets and was written down to a fair value of $130.0 million at March 31, 2016. During 2016, the company also recorded impairment charges totaling $5.5 million on one of its strategic investments. The fair value of the investment was estimated to be zero at September 30, 2016. Both assessments were based on qualitative indications of impairment and a quantitative analysis of undiscounted cash flows. The fair values of the datacenter and strategic investment are considered level 3 and nonrecurring. There were no other level 3 assets or liabilities valued at fair value on a nonrecurring basis during 2016 and 2015.

The fair values of the fixed-rate notes due 2022, 2025 and 2043, which are classified as level 2 under the fair value hierarchy, were estimated using quoted market prices. At December 31, 2016, the fair values of the fixed-rate notes by maturity date were as follows:

(in millions)	Fair Value
$750.0 million fixed rate notes due September 2022, stated rate of 3.00%	$ 762.8
$750.0 million fixed rate notes due March 2025, stated rate of 3.00%	744.8
$750.0 million fixed rates notes due September 2043, stated rate of 5.30%	863.5

19. EARNINGS PER SHARE

Basic earnings per share is computed by dividing net income attributable to CME Group by the weighted average number of shares of all classes of common stock outstanding for each reporting period. Diluted earnings per share reflects the increase in shares using the treasury stock method to reflect the impact of an equivalent number of shares of common stock if stock options were exercised and restricted stock awards were converted into common stock.

Anti-dilutive stock options and stock awards were as follows for the years presented:

(in thousands)	2016	2015	2014
Stock options	171	420	1,330
Stock awards	138	115	124
Total	309	535	1,454

The following table presents the earnings per share calculation for the years presented:

	2016	2015	2014
Net Income Attributable to CME Group (in millions)	$1,534.1	$1,247.0	$1,127.1
Weighted Average Common Shares Outstanding (in thousands):			
Basic	337,496	336,224	334,409
Effect of stock options and stock awards	1,470	1,670	1,654
Diluted	338,966	337,894	336,063
Earnings per Common Share Attributable to CME Group:			
Basic	$4.55	$3.71	$3.37
Diluted	4.53	3.69	3.35

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20. QUARTERLY INFORMATION (UNAUDITED)

(in millions, except per share data)	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year to Date
Year Ended December 31, 2016					
Total revenues	$934.2	$906.4	$841.7	$912.9	$3,595.2
Operating income	573.9	563.3	525.3	540.2	2,202.7
Non-operating income (expense)	4.6	2.8	23.5	54.0	84.9
Income before income taxes	578.5	566.1	548.8	594.2	2,287.6
Net income attributable to CME Group	367.8	320.1	472.8	373.4	1,534.1
Earnings per common share attributable to CME Group:					
Basic	$1.09	$0.95	$1.40	$1.10	$4.55
Diluted	1.09	0.95	1.39	1.10	4.53
Year Ended December 31, 2015					
Total revenues	$842.7	$820.0	$850.3	$813.8	$3,326.8
Operating income	507.3	495.1	516.4	469.9	1,988.7
Non-operating income (expense)	16.5	(47.0)	—	(1.4)	(31.9)
Income before income taxes	523.8	448.1	516.4	468.5	1,956.8
Net income attributable to CME Group	330.4	265.0	359.9	291.7	1,247.0
Earnings per common share attributable to CME Group:					
Basic	$0.98	$0.79	$1.07	$0.87	$3.71
Diluted	0.98	0.78	1.06	0.86	3.69

21. SUBSEQUENT EVENTS

The company has evaluated subsequent events through the date the financial statements were issued. The company has determined that there were no subsequent events that require disclosure except the following:

In January 2017, the company sold its remaining ownership interest in BM&FBOVESPA for approximately $244.1 million.

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ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Not applicable.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, has evaluated the effectiveness of our disclosure controls and procedures (as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (Exchange Act)) as of the end of the period covered by this Annual Report on Form 10-K. Based on such evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that, as of the end of such period, our disclosure controls and procedures are effective.

Management's Annual Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting. Our internal control system has been designed to provide reasonable assurance to management and the board of directors regarding the preparation and fair presentation of published financial statements.

Management assessed the effectiveness of the Company's internal control over financial reporting as of December 31, 2016. Management based its assessment on criteria for effective internal control over financial reporting described in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework). Management's assessment included evaluating the design of our internal control over financial reporting and testing the operational effectiveness of our internal control over financial reporting. The results of its assessment were reviewed with the audit committee of the board of directors.

Based on this assessment, management believes that, as of December 31, 2016, our internal control over financial reporting is effective. The effectiveness of our internal control over financial reporting as of December 31, 2016 has been audited by Ernst & Young LLP, an independent registered public accounting firm, as stated in the report on page 88.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors and Shareholders of CME Group Inc. and Subsidiaries

We have audited the accompanying consolidated balance sheets of CME Group Inc. and subsidiaries as of December 31, 2016 and 2015, and the related consolidated statements of income, comprehensive income, equity and cash flows for each of the three years in the period ended December 31, 2016. Our audits also included the financial statement schedule listed in the Index under Item 15(a)(2). These financial statements and schedule are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements and schedule based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the consolidated financial position of CME Group Inc. and subsidiaries at December 31, 2016 and 2015, and the consolidated results of their operations and their cash flows for each of the three years in the period ended December 31, 2016, in conformity with U.S. generally accepted accounting principles. Also, in our opinion, the related financial statement schedule, when considered in relation to the basic financial statements taken as a whole, presents fairly in all material respects the information set forth therein.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), CME Group Inc. and subsidiaries’ internal control over financial reporting as of December 31, 2016, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 27, 2017 expressed an unqualified opinion thereon.

/s/ Ernst & Young, LLP

Chicago, Illinois
February 27, 2017

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors and Shareholders of CME Group Inc. and Subsidiaries

We have audited CME Group Inc. and subsidiaries' internal control over financial reporting as of December 31, 2016, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). CME Group Inc. and subsidiaries' management is responsible for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Annual Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the company's internal control over financial reporting based on our audit.

We conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

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

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

In our opinion, CME Group Inc. and subsidiaries maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the consolidated balance sheets of CME Group Inc. and subsidiaries as of December 31, 2016 and 2015, and the related consolidated statements of income, comprehensive income, equity, and cash flows for each of the three years in the period ended December 31, 2016 of CME Group Inc. and subsidiaries and our report dated February 27, 2017, expressed an unqualified opinion thereon.

/s/ Ernst & Young LLP

Chicago, Illinois
February 27, 2017

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Changes in Internal Control over Financial Reporting

As required by Rule 13a-15(d) under the Exchange Act, the company's management, including the company's Chief Executive Officer and Chief Financial Officer, have evaluated the company's internal control over financial reporting (as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) to determine whether any changes occurred during the fourth quarter of 2016 that have materially affected, or are reasonably likely to materially affect, the company's internal control over financial reporting. There were no changes in the company's internal control over financial reporting during the period covered by this report that have materially affected, or are reasonably likely to materially affect, internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

Not applicable.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

We have adopted a written code of conduct applicable to all of our employees, including our Chairman and Chief Executive Officer, President, Chief Financial Officer, Chief Accounting Officer and other senior financial officers. In accordance with SEC rules and regulations, our Code of Conduct is available on our website at www.cmegroup.com under the “Investor Relations-Corporate Governance” link. We intend to disclose promptly on our Web site any substantive amendments to our Code of Conduct and, in accordance with the listing requirements of the NASDAQ, any waivers granted to our executive officers or Board members will be promptly disclosed on a Current Report on Form 8-K. In addition, we have adopted Corporate Governance Principles which govern the practices of our board of directors. You may also obtain a copy of our Code of Conduct and our Corporate Governance Principles by following the instructions in the section of this Annual Report on Form 10-K entitled “Item 1. Business-Available Information.” Certain of the information called for by this item is hereby incorporated herein by reference to the relevant portions of CME Group’s definitive proxy statement for the Annual Meeting of Shareholders to be held on May 24, 2017, to be filed by CME Group with the SEC pursuant to Regulation 14A within 120 days after December 31, 2016 (Proxy Statement). Additional information called for by this item is contained in Item 1 of this Annual Report on Form 10-K under the caption “Employees-Senior Leadership Team and Executive Officers.”

ITEM 11. EXECUTIVE COMPENSATION

Certain of the information called for by this item is hereby incorporated herein by reference to the relevant portions of the Proxy Statement.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED SHAREHOLDER MATTERS

Certain of the information called for by this item is hereby incorporated herein by reference to the relevant portions of the Proxy Statement.

ITEM 13. CERTAIN RELATIONSHIPS, RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE

Certain of the information called for by this item is hereby incorporated herein by reference to the relevant portions of the Proxy Statement.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

Certain of the information called for by this item is hereby incorporated herein by reference to the relevant portions of the Proxy Statement.

Explanation of Responses:

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PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES
(a) Financial Statements, Financial Statement Schedules and Exhibits
(1) Financial Statements
The following Consolidated Financial Statements and related Notes included within Item 8, together with the Reports of Independent Registered Public Accounting Firm with respect thereto and included within Item 9A, are hereby incorporated by reference:
Reports of Independent Registered Public Accounting Firm
Consolidated Balance Sheets at December 31, 2016 and 2015
Consolidated Statements of Income for the Years Ended December 31, 2016, 2015 and 2014
Consolidated Statements of Comprehensive Income for the Years Ended December 31, 2016, 2015 and 2014
Consolidated Statements of Equity for the Years Ended December 31, 2016, 2015 and 2014
Consolidated Statements of Cash Flows for the Years Ended December 31, 2016, 2015 and 2014
Notes to Consolidated Financial Statements
(2) Financial Statement Schedules
The following Financial Statement Schedule is filed as part of this Annual Report on Form 10-K:
CME Group Inc. and Subsidiaries
Schedule II—Valuation and Qualifying Accounts
For the Years Ended December 31, 2016, 2015 and 2014
(dollars in millions)

	Balance at beginning of year	Charged (credited) to costs and expenses	Other[(1)]	Balance at end of year
Year Ended December 31, 2016				
Allowance for doubtful accounts	$ 1.9	$ 2.4	$ (0.8)	$ 3.5
Allowance for deferred tax assets	122.3	(107.4)	—	14.9
Year Ended December 31, 2015				
Allowance for doubtful accounts	$ 1.2	$ 1.1	$ (0.4)	$ 1.9
Allowance for deferred tax assets	99.2	(2.4)	25.5	122.3
Year Ended December 31, 2014				
Allowance for doubtful accounts	$ 1.2	$ 0.1	$ (0.1)	$ 1.2
Allowance for deferred tax assets	47.5	—	51.7	99.2

(1) Includes write-offs of doubtful accounts and additions to allowance for deferred tax assets through accumulated other comprehensive income (loss).

All other schedules have been omitted because the information required to be set forth in those schedules is not applicable or is shown in the consolidated financial statements or notes thereto.
(3) Exhibits
See (b) Exhibits below

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(b) Exhibits

Exhibit Number	Description of Exhibit
3.	Articles of Incorporation and Bylaws
3.1	Fourth Amended and Restated Certificate of Incorporation of CME Group Inc. (incorporated by reference to Exhibit 3.1 to CME Group Inc.’s Current Report on Form 8-K, filed with the SEC on May 29, 2012, File No. 001-31553).
3.2	Thirteenth Amended and Restated Bylaws of CME Group Inc. (incorporated by reference to Exhibit 3.1 to CME Group Inc.’s Current Report on Form 8-K, filed with the SEC on February 13, 2017, File No. 001-31553).
4.	Instruments Defining the Rights of Security Holders
4.1	Amended and Restated Commercial Paper Dealer Agreement, dated as of October 20, 2014, among CME Group Inc., as Issuer, and Barclays Capital Inc. (incorporated by reference to Exhibit 4.1 to CME Group's 10-K, filed with the SEC on February 26, 2015, File No. 001-31553).
4.2	Amended and Restated Issuing and Paying Agency Agreement, dated as of September 26, 2014, between CME Group Inc. and Bank of America, National Association, as Issuing and Paying Agent (incorporated by reference to Exhibit 4.2 to CME Group's 10-K, filed with the SEC on February 26, 2015, File No. 001-31553).
4.3	Amended and Restated Commercial Paper Dealer Agreement, dated as of October 20, 2014, between CME Group Inc., as Issuer, and Merrill Lynch, Pierce, Fenner & Smith Incorporated, as Dealer (incorporated by reference to Exhibit 4.3 to CME Group's 10-K, filed with the SEC on February 26, 2015, File No. 001-31553).
4.4	Amended and Restated Commercial Paper Dealer Agreement, dated as of October 20, 2014, between CME Group Inc., as Issuer, and Goldman, Sachs & Co., as Dealer (incorporated by reference to Exhibit 4.4 to CME Group's 10-K, filed with the SEC on February 26, 2015, File No. 001-31553).
4.5	Indenture, dated August 12, 2008, between CME Group Inc. and U.S. Bank National Association (incorporated by reference to Exhibit 4.1 to CME Group Inc.’s Current Report on Form 8-K, filed with the SEC on August 13, 2008, File No. 001-31553).
4.6	Fifth Supplemental Indenture (including the form of 3.00% note due 2022), dated September 10, 2012, between CME Group Inc. and U.S. Bank National Association (incorporated by reference to Exhibit 4.2 to CME Group Inc.'s Current Report on Form 8-K, filed with the SEC on September 10, 2012, File No. 001-31553).
4.7	Sixth Supplemental Indenture (including the form of 5.300% note due 2043), dated as of September 9, 2013, between CME Group Inc. and U.S. Bank National Association (incorporated by reference to Exhibit 4.2 to CME Group Inc.'s Current Report on Form 8-K, filed with the SEC on September 9. 2013, File No. 001-31553).

4.80	Seventh Supplemental Indenture (including the form of 3.000% Notes due 2025), dated as of March 9, 2015, between CME Group Inc. and U.S. Bank National Association (incorporated by reference to Exhibit 4.2 to CME Group Inc.'s Current Report on Form 8-K, filed with the SEC on March 9, 2015, File No. 001-31553).
10.	Material Contracts
10.1(1)	CME Group Inc. Amended and Restated Omnibus Stock Plan, amended and restated effective as of May 23, 2012 (incorporated by reference to Exhibit 10.1 to CME Group Inc.’s Form 8-K, filed with the SEC on May 29, 2012, File No. 001-31553); First Amendment to the Amended and Restated Omnibus Stock Plan, effective as of December 5, 2012 (incorporated by reference to Exhibit 10.1 to CME Group Inc.'s Form 10-K, filed with the SEC on February 28, 2013, File No. 001-31553).
10.2(1)	Form of Equity Grant Letter for Executive Officers (incorporated by reference to Exhibit 10.2 to CME Group Inc.'s Form 10-K, filed with the SEC on February 28, 2013, File No. 001-31553).
10.3(1)	Form of equity grant letter for performance based shares based on specific Company initiatives (incorporated by reference to Exhibit 10.7 to CME Group Inc.'s Form 10-Q, filed with the SEC on August 5, 2011, File No. 001-31553).

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Exhibit Number	Description of Exhibit
10.4(1)	Form of equity grant letter for annual grant of performance shares (incorporated by reference to Exhibit 10.4 to CME Group Inc.'s Form 10-K, filed with the SEC on February 28, 2013, File No. 001-31553).
10.5(1)	CME Group Inc. Director Stock Plan, amended and restated effective as of May 21, 2014 (incorporated by reference to Exhibit 10.1 to CME Group Inc.'s Current Report on Form 8-K, filed with the SEC on May 28, 2014, File No. 001-31553).
10.6(1)	Form of Equity Stipend Grant Letter for Non-Executive Directors (incorporated by reference to Exhibit 10.4 to CME Group Inc.'s Form 10-K, filed with the SEC on February 26, 2010, File No. 001-31553).
10.7(1)	CME Group Inc.'s Amended and Restated Employee Stock Purchase Plan, amended and restated as of May 23, 2012 (incorporated by reference to Exhibit 10.2 to CME Group Inc.'s Form 8-K, filed with the SEC on May 29, 2012, File No. 001-31553; First Amendment to the Amended and Restated Employee Stock Purchase Plan, effective as of December 5, 2012 (incorporated by reference to Exhibit 10.7 to CME Group Inc.'s Form 10-K, filed with the SEC on February 28, 2013, File No. 001-31553).
10.8(1)	Chicago Mercantile Exchange Inc. Senior Management Supplemental Deferred Savings Plan (SMSDSP), Amended and Restated (incorporated by reference to Exhibit 10.9 to CME Group Inc.'s Form 10-K, filed with the SEC on February 26, 2016, File No. 001-31553).
10.9(1)	Amended and Restated Chicago Mercantile Exchange Inc. Directors' Deferred Compensation Plan, amended and restated as of January 1, 2009 (incorporated by reference to Exhibit 10.9 to CME Group Inc.'s Form 10-K, filed with the SEC on March 2, 2009, File No. 001-31553).
10.10(1)	Chicago Mercantile Exchange Inc. Supplemental Executive Retirement Plan consisting of the Grandfathered Supplemental Retirement Plan, amended and restated as of January 1, 2008, and the Amended and Restated 409A Supplemental Executive Retirement Plan, amended and restated as of January 1, 2008 (incorporated by reference to Exhibit 10.9 to CME Group Inc.'s Form 10-K, filed with the SEC on February 28, 2008, File No. 000-33379).
10.11(1)	Chicago Mercantile Exchange Inc. Supplemental Executive Retirement Trust; First Amendment thereto, dated September 7, 1993 (incorporated by reference to Exhibit 10.5 to Chicago Mercantile Exchange Inc.'s Form S-4, filed with the SEC on February 24, 2000, File No. 333-95561).
10.12(1)	Recognition and Retention Plan for Members of the COMEX Division of New York Mercantile Exchange (incorporated by reference to Exhibit 10.11 to NYMEX Holdings, Inc.'s Form 10-K, filed with the SEC on March 29, 2001, File No. 333-30332); Amendment to the Recognition and Retention Plan for Members of the COMEX Division of the New York Mercantile Exchange, dated October 22, 2015 (incorporated by reference to Exhibit 10.1 to CME Group's Form 10-Q, filed with the SEC on November 6, 2015, File No. 001-31533).
10.13(1)	Amended and Restated CME Group Inc. Incentive Plan for Named Executive Officers (Amended and Restated as of May 21, 2014) (incorporated by reference to Exhibit 10.2 to CME Group Inc.’s Form 8-K, filed with the SEC on May 28, 2014, File No. 001-31553).
10.14(1)	CME Group Inc. Severance Plan for Eligible Executives, amended and restated effective January 1, 2013 (incorporated by reference to Exhibit 10.16 to CME Group Inc.'s Form 10-K, filed with the SEC on February

	28, 2014, File No. 001-31553); First Amendment to CME Group Inc. Severance Plan for Eligible Executives, effective as of October 13, 2014 (incorporated by reference to Exhibit 10.16 to CME Group's 10-K, filed with the SEC on February 26, 2015, File No. 001-31553).
10.15(1)	CME Group Inc. Severance Plan, amended and restated effective January 1, 2013 (incorporated by reference to Exhibit 10.17 to CME Group Inc.'s Form 10-K, filed with the SEC on February 28, 2014, File No. 001-31553); First Amendment to the Amended and Restated CME Group Inc. Severance Plan, effective October 13, 2014 (incorporated by reference to Exhibit 10.17 to CME Group's 10-K, filed with the SEC on February 26, 2015, File No. 001-31553).
10.16(1)	Amended and Restated Agreement, effective as of December 7, 2016, between CME Group Inc. and Terrence A. Duffy (incorporated by reference to Exhibit 10.1 to CME Group Inc.'s Form 8-K, filed with the SEC on December 9, 2016, File No. 001-31553).
10.17(1)	Agreement, effective as of November 11, 2015, between CME Group Inc. and Phupinder S. Gill (incorporated by reference to Exhibit 10.2 to CME Group Inc.'s Form 8-K, filed with the SEC on November 12, 2015, File No. 001-31553).
10.18(1)	Consulting Agreement between Leo Melamed and CME Group Inc., dated June 26, 2009 (incorporated by reference to Exhibit 10.2 to CME Group Inc.'s Form 10-Q, filed with the SEC on August 6, 2009, File No. 001-31553).

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Exhibit Number	Description of Exhibit
10.19(1)	Consulting Agreement between Leo Melamed and Chicago Mercantile Exchange Holdings Inc., dated November 14, 2005 (incorporated by reference to Exhibit 10.28 to Chicago Mercantile Exchange Holdings Inc.'s Form 10-K filed with the SEC on March 6, 2006, File No. 000-33379); Amendment, dated as of June 21, 2012 (incorporated by reference to Exhibit 10.4 to CME Group Inc.'s Form 10-Q, filed with the SEC on August 8, 2012, File No. 001-31553).
10.20(2)	License Agreement, dated June 29, 2012, between Standard & Poor's Financial Services LLC and Chicago Mercantile Exchange Inc. (incorporated by reference to Exhibit 10.6 to CME Group Inc.'s Form 10-Q, filed with the SEC on August 8, 2012, File No. 001-31553).
10.21(2)	Amended and Restated Index License Agreement, between CME Group Index Services LLC and the Board of Trade of the City of Chicago, Inc., effective as of July 1, 2011 (incorporated by reference to Exhibit 10.5 to CME Group Inc.'s Form 10-Q, filed with the SEC on August 8, 2012, File No. 001-31553).
10.22(2)	License Agreement, effective as of October 9, 2003, between The Nasdaq Stock Market, Inc., a subsidiary of National Association of Securities Dealers, Inc., and Chicago Mercantile Exchange Inc. (incorporated by reference to Exhibit 10.9 to Chicago Mercantile Exchange Holdings Inc.'s Form 10-K, filed with the SEC on March 11, 2004, File No. 001-31553), Amendment, dated April 26, 2005 (incorporated by reference to Exhibit 10.1 to Chicago Mercantile Exchange Holdings Inc.'s Form 10-Q, filed with the SEC on August 4, 2005, File No. 001-31553); Amendment, dated June 22, 2005 (incorporated by reference to Exhibit 10.2 to Chicago Mercantile Exchange Holdings Inc.'s Form 10-Q, filed with the SEC on August 4, 2005, File No. 001-31553); Amendment, dated as of June 26, 2008 (incorporated by reference to Exhibit 10.1 to CME Group Inc.'s Form 10-Q, filed with the SEC on August 7, 2008, File No. 001-31553).
10.23	Credit Agreement, dated as of March 19, 2015, among CME Group Inc., certain financial institutions and other persons party thereto as lenders, and Bank of America, N.A., as Administrative Agent (incorporated by reference to Exhibit 10.1 to CME Group Inc.'s Form 8-K, filed with the SEC on March 24, 2015, File No. 001-31553).
10.24	$250,000,000 Credit Agreement, dated as of November 30, 2012, among CME Group Inc., as borrower, and the lenders party thereto, and Bank of America, N.A., as administrative agent, Barclays Bank plc, Citibank, N.A., UBS Securities LLC, and Wells Fargo Bank, National Association, as co-syndication agents, and Merrill Lynch, Pierce, Fenner & Smith Incorporated, Barclays Bank plc, UBS Securities LLC, and Wells Fargo Securities, LLC, as joint lead arrangers and joint book managers (incorporated by reference to Exhibit 10.2 to CME Group Inc.'s Form 8-K, filed with the SEC on December 5, 2012, File No. 001-31533).
10.25	364-Day Chicago Mercantile Exchange Credit Facility, dated as of November 3, 2016, between Chicago Mercantile Exchange Inc., certain lenders and Bank of America, N.A., as Administrative Agent (incorporated by reference to Exhibit 10.1 to CME Group Inc.'s Form 8-K, filed with the SEC on November 8, 2016, File No. 001-31553).
10.26	Amended and Restated Commercial Paper Dealer Agreement, dated as of October 20, 2014, among CME Group Inc., as Issuer, and Barclays Capital Inc., as Dealer (incorporated by reference to Exhibit 4.1 above).
10.27	Amended and Restated Issuing and Paying Agency Agreement, dated as of September 26, 2014, between CME Group Inc. and Bank of America, National Association, as Issuing and Paying Agent (incorporated by reference to Exhibit 4.2 above).

10.28	Amended and Restated Commercial Paper Dealer Agreement, dated as of October 20, 2014, between CME Group Inc., as Issuer, and Merrill Lynch, Pierce, Fenner & Smith Incorporated, as Dealer (incorporated by reference to Exhibit 4.3 above).
10.29	Amended and Restated Commercial Paper Dealer Agreement, dated as of October 20, 2014, between CME Group Inc., as Issuer, and Goldman, Sachs & Co., as Dealer (incorporated by reference to Exhibit 4.4 above).
10.30(1)	Form of Severance Protection Agreement (incorporated by reference to Exhibit 10.2 to CME Group Inc.'s Form 8-K, filed with the SEC on December 9, 2016, File No. 001-31553).
10.31(1)	Retirement Agreement, dated February 15, 2017 between CME Group Inc. and Phupinder S. Gill (incorporated by reference to Exhibit 10.1 to CME Group Inc.'s Form 8-K, filed with the SEC on February 17, 2017, File No. 001-31553).
12.1*	Ratio of Earnings to Fixed Charges.
21.1*	List of Subsidiaries of CME Group Inc.
23.1*	Consent of Ernst & Young LLP.
31.1*	Section 302—Certification of Terrence A. Duffy.

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Exhibit Number	Description of Exhibit
31.2*	Section 302—Certification of John W. Pietrowicz.
32.1*	Certification Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS*	XBRL Instance Document
101.SCH*	XBRL Taxonomy Extension Schema Document
101.CAL*	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF*	XBRL Taxonomy Extension Definition Linkbase
101.LAB*	XBRL Taxonomy Extension Label Linkbase Document
101.PRE*	XBRL Taxonomy Extension Presentation Linkbase Document

* Filed herewith.

(1) Management contract or compensatory plan or arrangement.

(2) Confidential treatment pursuant to Rule 406 of the Securities Act has been previously granted by the SEC for portions of this exhibit.

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ITEM 16. FORM 10-K SUMMARY

None.

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SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Chicago and State of Illinois on the 27th day of February, 2017.

CME Group Inc.

By: /S/ JOHN W. PIETROWICZ
John W. Pietrowicz
Senior Managing Director and Chief Financial Officer

Signature	Title
/S/ TERRENCE A. DUFFY Terrence A. Duffy	Chairman of the Board, Director and Chief Executive Officer
/S/ JOHN W. PIETROWICZ John W. Pietrowicz	Senior Managing Director and Chief Financial Officer
/S/ JACK TOBIN Jack Tobin	Managing Director and Chief Accounting Officer
/S/ LEO MELAMED Leo Melamed	Chairman Emeritus and Director
/S/ JEFFREY M. BERNACCHI Jeffrey M. Bernacchi	Director
/S/ TIMOTHY S. BITSBERGER Timothy S. Bitsberger	Director
/S/ CHARLES P. CAREY Charles P. Carey	Director
/S/ DENNIS H. CHOOKASZIAN Dennis H. Chookaszian	Director
/s/ ELIZABETH A. COOK Elizabeth A. Cook	Director
/s/ ANA DUTRA Ana Dutra	Director
/S/ MARTIN J. GEPSMAN Martin J. Gepsman	Director
/S/ LARRY G. GERDES Larry G. Gerdes	Director

/S/ DANIEL R. GLICKMAN Daniel R. Glickman	Lead Director
/s/ WILLIAM W. HOBERT William W. Hobert	Director
/S/ WILLIAM P. MILLER II William P. Miller II	Director

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Explanation of Responses:

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/S/ JAMES E. OLIFF James E. Oliff	Director
/S/ RONALD A. PANKAU Ronald A. Pankau	Director
/s/ ALEX J. POLLOCK Alex J. Pollock	Director
/S/ JOHN F. SANDNER John F. Sandner	Director
/S/ TERRY L. SAVAGE Terry L. Savage	Director
/S/ WILLIAM R. SHEPARD William R. Shepard	Director
/S/ HOWARD J. SIEGEL Howard J. Siegel	Director
/S/ DENNIS A. SUSKIND Dennis A. Suskind	Director
/S/ DAVID J. WESCOTT David J. Wescott	Director