MARKETAXESS HOLDINGS INC
Form 10-K
February 20, 2019

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Form 10-K

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2018

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to

Commission File Number 001-34091

MARKETAXESS HOLDINGS INC.

(Exact name of registrant as specified in its charter)

Delaware (State of incorporation)	52-2230784 (IRS Employer Identification No.)
55 Hudson Yards, New York, New York (Address of principal executive offices)	10001 (Zip Code)

(212) 813-6000

(Registrant's telephone number, including area code)

SECURITIES REGISTERED PURSUANT TO SECTION 12(b) OF THE ACT:

Title of each class:	Name of each exchange on which registered:
Common Stock, par value $0.003 per share	NASDAQ Global Select Market

SECURITIES REGISTERED PURSUANT TO SECTION 12(g) OF THE ACT:

None

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

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

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

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

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

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

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

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

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

The aggregate market value of the shares of common stock held by non-affiliates of the registrant as of June 30, 2018 (the last business day of the registrant's most recently completed second fiscal quarter) was approximately $7.2 billion computed by reference to the last reported sale price on the NASDAQ Global Select Market on that date. For purposes of this calculation, affiliates are considered to be officers, directors and holders of 10% or more of the outstanding common stock of the registrant on that date. The registrant had 37,578,970 shares of common stock, 1,012,868 of which were held by affiliates, outstanding on that date.

As of February 15, 2019, the aggregate number of shares of the registrant's common stock outstanding was 40,585,293.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement for the 2019 Annual Meeting of Stockholders are incorporated by reference into Items 10, 11, 12, 13 and 14 of Part III of this Form 10-K.

MARKETAXESS HOLDINGS INC.

2018 FORM 10-K ANNUAL REPORT

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PART I

Forward-Looking Statements

This report contains certain “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. Forward-looking statements may be identified by words such as “expects,” “intends,” “anticipates,” “plans,” “believes,” “seeks,” “estimates,” “will,” or words of similar meaning and include, but are not limited to, statements regarding the outlook for our future business and financial performance. Forward-looking statements are based on management’s current expectations and assumptions, which are subject to inherent uncertainties, risks and changes in circumstances that are difficult to predict. It is routine for our internal projections and expectations to change as the year or each quarter in the year progresses, and therefore it should be clearly understood that the internal projections and beliefs upon which we base our expectations may change prior to the end of each quarter or the year. Although these expectations may change, we are under no obligation to revise or update any forward-looking statements contained in this report. Actual future events or results may differ, perhaps materially, from those contained in the projections or forward-looking statements. Factors that could cause or contribute to such differences include those discussed below and elsewhere in this report, particularly in Item 1A. “Risk Factors.”

Item 1. Business.

MarketAxess Holdings Inc. (the “Company” or “MarketAxess”) operates a leading electronic trading platform that enables fixed-income market participants to efficiently trade corporate bonds and other types of fixed-income instruments using our patented trading technology. Over 1,500 institutional investor and broker-dealer firms are active users of our trading platform, accessing global liquidity in U.S. high-grade corporate bonds, emerging markets and high-yield bonds, European bonds, U.S. agency bonds, municipal bonds, leveraged loans, credit default swaps and other fixed-income securities. Through our Open Trading™ protocols, we execute bond trades between and among institutional investor and broker-dealer clients in an all-to-all anonymous trading environment in which MarketAxess acts as the matched principal counterparty. We also offer a number of trading-related products and services, including: Composite+ pricing and other market data products to assist clients with trading decisions; auto-execution and other execution services for clients requiring specialized workflow solutions; connectivity solutions that facilitate straight-through processing; and technology services to optimize trading environments. Through our Trax® division, we also offer a range of pre- and post-trade services, including trade matching, trade publication, regulatory transaction reporting and market and reference data across a range of fixed-income and other products.

Our platform’s innovative technology solutions are designed to increase the number of potential trading counterparties on our electronic trading platform and create a menu of solutions to address different trade sizes and bond liquidity characteristics. Our traditional Request-For-Quote (“RFQ”) model allows our institutional investor clients to simultaneously request competing, executable bids or offers from our broker-dealer clients and execute trades with the broker-dealer of their choice from among those that choose to respond. Our Open Trading protocols complement our RFQ model by increasing the number of potential counterparties and improving liquidity by allowing all participants to interact anonymously in an all-to-all trading environment. Clients can use our auto-execution technology with both our traditional RFQ and Open Trading protocols, thereby using rules-based execution to connect to diverse sources of liquidity while reducing trading inefficiencies and human errors. Our platform also provides our broker-dealer clients a solution that enables them to efficiently reach our institutional investor clients for the distribution and trading of bonds.

Traditionally, bond trading has been a manual process, with product and price discovery conducted over the telephone between two or more parties. This traditional process has a number of shortcomings resulting primarily from the lack of a central trading facility for fixed-income securities, which makes it difficult to match buyers and sellers for particular issues. Many market participants also use e-mail and other electronic means of communication for trading these securities. While these electronic communication methods have addressed some of the limitations associated with traditional bond trading methods, we believe that the process is still hindered by limited liquidity, limited price transparency, significant transaction costs, compliance and regulatory challenges, and difficulty in executing numerous trades at one time. Our platform's functionality addresses many of the remaining shortcomings that result from trading bonds over the telephone or via e-mail.

Our services relating to trade execution range from providing a suite of trading protocols designed to fit the trading needs of our clients to innovative new trading technologies, such as auto-execution and the use of artificial intelligence, to assist our clients' trading decisions. Trading protocols include single and multiple-dealer inquiries; list trading, which is the ability to request bids and offers on multiple bonds at the same time; and swap trading, which is the ability to request an offer to purchase one bond and a bid to sell another bond, in a manner such that the two trades will be executed simultaneously, with payment based on the price differential of the bonds. Auto-execution allows clients to set eligibility criteria for their orders and our system will determine whether or not to execute a trade in accordance with the pre-defined parameters. Once a trade is completed on our platform, the broker-dealer client and institutional investor client may settle the trade with the assistance of our automated post-trade messaging, which facilitates the communication of trade acknowledgment and allocation information between our institutional investor and broker-dealer clients.

We are not a party to any of the disclosed trades that occur on our platform between institutional investor clients and broker-dealer clients; rather, we serve as an intermediary between broker-dealers and institutional investors, enabling them to meet, agree on a price and then transact directly with each other. However, in connection with our Open Trading protocols, we execute bond transactions between and among institutional investor and broker-dealer clients on a matched principal basis by serving as counterparty to both the buyer and the seller in matching back-to-back trades which are then settled through a third-party clearing broker. In 2018, 22.0% of all MarketAxess platform volume was executed via Open Trading protocols, up from 15.9% in 2017.

In recent years, corporate bond debt owned by institutional investors has increased, while the available base of capital for dealer market making has declined. Partly as a result of these trends, overall secondary turnover as a percentage of corporate debt outstanding has been falling, causing all market participants to look for new electronic trading solutions to improve liquidity and turnover. We have responded with a series of Open Trading protocols designed to allow our broker-dealer and institutional investor clients to interact in an all-to-all trading environment. During 2018, almost 1,000 participating client firms provided liquidity via our Open Trading solutions and we completed approximately 1.1 million Open Trading trades, an increase of 73.2% compared to 2017.

Our broker-dealer clients accounted for approximately 97.7% of the underwriting of newly-issued U.S. corporate bonds and approximately 83.6% of the underwriting of newly issued European corporate bonds in 2018. Although institutional investors, specialist market-making firms, proprietary trading firms and other non-traditional liquidity providers have increasingly provided liquidity on our platform through Open Trading™, we believe these broker-dealers still represent the principal source of secondary market liquidity in the markets in which we operate. Secondary market liquidity refers to the ability of market participants to buy or sell a security quickly and in large volume subsequent to the original issuance of the security, without substantially affecting the price of the security. In addition to trading fixed-income securities by traditional means, including the telephone and e-mail, our broker-dealer clients use proprietary single-dealer systems and other trading platforms, as well as our electronic trading platform.

In 2018, our volume in U.S. high-grade corporate bonds represented approximately 18.1% of the total estimated U.S. high-grade corporate bond volume, as reported by the Financial Industry Regulatory Authority (“FINRA”) Trade Reporting and Compliance Engine (“TRACE”). TRACE facilitates the mandatory reporting of over-the-counter (“OTC”) secondary market transactions in eligible fixed-income securities in the U.S., including trading between institutional investors and broker-dealers, as well as inter-dealer and retail trading. All broker-dealers that are FINRA member firms have an obligation to report transactions in corporate bonds to TRACE under a set of rules approved by the Securities and Exchange Commission (“SEC”).

Through our Trax® brand, we provide trade matching and regulatory reporting services for European investment firms and market and reference data across a range of fixed-income products. In response to the pre-and post-trade transparency mandates from the recast Markets in Financial Instruments Directive (“MiFID II”) in Europe, Trax® has been authorized by the UK Financial Conduct Authority (“FCA”) as an Approved Publication Arrangement (“APA”) and an Approved Reporting Mechanism (“ARM”). In addition to its APA and ARM reporting services, Trax® has developed a comprehensive suite of value-add solutions for MiFID II, including pre-trade transparency services, systematic internaliser (“SI”) determination and monitoring, best execution reporting, commodity position reporting, data quality analysis and peer benchmarking.

In 2018, 89.7% of our revenues were derived from commissions for trades executed on our platform and distribution fees that are billed to our broker-dealer clients on a monthly basis. We also derive revenues from information services, post-trade services and other income. Our expenses consist of employee compensation and benefits, depreciation and amortization, technology and communication expenses, professional and consulting fees, occupancy, marketing and advertising, clearing costs and other general and administrative expenses.

Industry Background

Fixed-income securities are issued by corporations, governments and other entities, and pay a pre-set absolute or relative rate of return. As of September 30, 2018, the most recent date available, there were approximately $42.4 trillion principal amount of fixed-income securities outstanding in the U.S. market, including $9.2 trillion principal amount of U.S. corporate bonds, according to SIFMA. The estimated average daily trading volume of U.S. corporate bonds, as measured by TRACE, was $28.6 billion in 2018. Primary dealer holdings of U.S. corporate bonds (investment-grade and high-yield) as reported by the Federal Reserve Bank of New York were $5.4 billion as of December 31, 2018. This represents less than one day of trading volume as measured by TRACE.

Prior to regulatory reforms, such as Basel III and regulations under The Dodd–Frank Wall Street Reform and Consumer Protection Act (the "Dodd-Frank Act"), dealer balance sheets were relatively elastic, so dealers were able to facilitate trading in most fixed-income products without dramatic price moves. The regulatory reforms enacted after the global financial crisis resulted in greater capital and liquidity requirements for dealers, which impacted market liquidity and diminished risk appetite by market intermediaries. The Volcker Rule, which limits proprietary trading by banks, has also had an impact on dealer inventories and the ability of dealers to act as market-makers. As a result, we believe market participants require different solutions to increase liquidity and we have responded with our Open Trading protocols, designed to increase the number of potential trading counterparties on our electronic trading platform by allowing our broker-dealer and institutional investor clients to interact in an all-to-all trading environment.

Markets for Securities Traded on our Platform

The U.S. corporate bond market consists of three broad categories of securities: investment-grade debt (so-called "high-grade"), which typically refers to debt rated BBB- or better by Standard & Poor's or Baa3 or better by Moody's Investor Service; debt rated below investment-grade (so-called "high-yield"), which typically refers to debt rated lower than BBB- by Standard & Poor's or Baa3 by Moody's Investor Service; and debt convertible into equity (so-called "convertible debt"). We use the terms high-grade debt and investment-grade debt interchangeably in this Annual Report on Form 10-K.

U.S. High-Grade Corporate Bond Market

The U.S. high-grade corporate bond market represents the largest subset of the U.S. corporate bond market. FINRA includes over 65,000 unique securities in the list of TRACE-eligible bonds, representing the majority of the daily trading volume of high-grade bonds. According to SIFMA, U.S. high-grade corporate bond debt outstanding has increased approximately 19.6% from $7.7 trillion at year-end 2013 to $9.2 trillion at September 30, 2018. Over the last five years, high-grade corporate bond issuance was over $1 trillion each year, exceeding pre-financial crisis levels. Notwithstanding the growth in the total amount of debt outstanding, turnover (which is the total amount traded as a percentage of the amount outstanding for the bonds that traded) is below pre-credit crisis levels. The trading volume of U.S. high-grade corporate bonds as reported by TRACE increased to approximately $5.1 trillion for the year ended December 31, 2018, compared to $4.9 trillion and $4.6 trillion for the years ended December 31, 2017 and 2016, respectively. We believe that the low level of turnover is an indicator of liquidity challenges in the credit markets.

U.S. Crossover and High-Yield Bond Market

We define the high-yield bond market generally to include all debt rated lower than BBB- by Standard & Poor's or Baa3 by Moody's Investor Service. We define the crossover market to include any debt issue rated below investment-grade by one agency but investment-grade by the other. The total annual amount of high-yield corporate bond issuance as reported by SIFMA decreased by 39.1% to $173.0 billion in 2018 from $284.9 billion in 2017. The average daily trading volume of high-yield bonds as measured by TRACE for the year ended December 31, 2018 was approximately $8.0 billion compared to $8.2 billion and $8.5 billion for the years ended December 31, 2017 and 2016, respectively.

Emerging Markets Bond Market

We define the emerging markets bond market generally to include U.S. dollar, Euro or local currency denominated bonds issued by sovereign entities or corporations domiciled in a developing country. These issuers are typically located in Latin America, Asia, or Central and Eastern Europe. Examples of countries we classify as emerging markets include: Argentina, Brazil, Colombia, Mexico, Peru, the Philippines, Russia, Turkey and Venezuela.

The institutional investor base for emerging markets bonds includes many crossover investors from the high-yield and high-grade investment areas. Institutional investors have been drawn to emerging markets bonds by their high returns and high growth potential. The average daily trading volume of emerging markets debt, as reported by the Emerging Markets Trade Association for the nine months ended September 30, 2018, the most recent date available, was $20.3 billion compared to $19.9 billion and $20.7 billion for the years ended December 31, 2017 and 2016, respectively.

European Corporate Bond Market

The European corporate bond market consists of a broad range of products, issuers and currencies. We define the European corporate bond market generally to consist of bonds intended to be distributed to European investors, primarily bonds issued by European corporations, excluding bonds that are issued by corporations domiciled in an emerging markets country and excluding most government bonds that trade in Europe. Examples include:

- bonds issued by European corporations, denominated in any currency;
- bonds generally denominated in Euros, U.S. dollars or British Pounds Sterling intended to be distributed to European investors, excluding bonds that are issued by corporations domiciled in an emerging market;

- bonds issued by supra-national organizations (entities that include a number of central banks or government financial authorities, such as the World Bank), agencies and governments located in Europe, generally denominated in Euros, U.S. dollars or British Pounds Sterling, provided that such currency is not the currency of the country where the bond was issued; and
- floating-rate notes issued by European corporations.

We believe that the European corporate bond market is impacted by many of the same factors as the U.S. high-grade corporate bond market. The total amount of Euro denominated high-grade and high-yield bonds yearly issuance as reported by International Capital Markets Association decreased by 12.0% to $393.6 billion in 2018 from $447.4 billion in 2017. The average daily trading volume of European corporate bonds as estimated by Trax® for the year ended December 31, 2018 was approximately $9.2 billion compared to $8.7 billion and $8.2 billion for the years ended December 31, 2017 and 2016, respectively.

U.S. Agency Bond Market

We define the U.S. agency bond market to include debt issued by a U.S. government-sponsored enterprise. Some prominent issuers of agency bonds are the Federal National Mortgage Association and Federal Home Loan Mortgage Corporation. The total amount of U.S. agency bonds outstanding was approximately $1.9 trillion as of September 30, 2018 as reported by SIFMA. The average daily trading volume of U.S. agency bonds (excluding mortgage-backed securities) as measured by TRACE was $3.6 billion for the year ended December 31, 2018 compared to $3.8 billion and $5.1 billion for the years ended December 31, 2017 and 2016, respectively.

U.S. Municipal Bond Market

Municipal bonds are debt securities issued by states, cities, counties and other governmental entities in the U.S. to fund day-to-day obligations and to finance a wide variety of public projects, such as highways or water systems. Depending on the type of financing, payments of the principal and interest on a municipal bond may come from general revenues of the municipal issuer, specific tax receipts, revenues generated from a public project, or payments from private entities or from a combination of sources. In addition to being issued for many different purposes, municipal securities are also issued in many different forms, such as fixed rate, zero coupon or variable rate bonds. The interest paid on municipal securities is typically exempt from federal income taxation and may be exempt from state income and other taxes as well. As of December 31, 2018, there were over 1.5 million different municipal bonds outstanding, in the total aggregate principal amount of more than $3.8 trillion. In 2018, the average daily trading volume of municipal bonds, excluding variable rate demand notes, as measured by the Municipal Securities Rulemaking Board ("MSRB") was $6.0 billion for the year ended December 31, 2018 compared to $5.5 billion and $7.4 billion for the years ended December 31, 2017 and 2016, respectively.

Credit Derivative Market

Credit derivatives are contracts that allow market participants to obtain credit protection or assume credit exposure associated with a broad range of issuers of fixed-income securities and other debt obligations without ownership of the underlying security. Among the most significant requirements of the derivatives section of the Dodd-Frank Act are mandatory clearing of certain derivatives transactions ("swaps") through regulated central clearing organizations and mandatory trading of those swaps through either regulated exchanges or swap execution facilities ("SEFs"), in each case, subject to certain key exceptions. We operate a swap execution facility pursuant to the U.S. Commodity Futures Trading Commission's ("CFTC") rules and we list certain credit derivatives for trading by U.S. persons and other participants on our SEF. The SEC has not yet finalized its rules for security-based SEFs that would govern the execution of single-name credit derivatives.

Post-Trade Reporting, Publishing and Matching Services

In Europe, all firms regulated as "investment firms" under MiFID II are required to submit complete and accurate details of qualifying transactions to their national regulator no later than the close of the working day following the date of the transaction. This process is known as transaction reporting. Pursuant to the associated Markets in Financial Instruments Regulation ("MiFIR"), the number of fields and the complexity of the information that must be reported to regulators was significantly enhanced. Firms may either report directly to the regulator or use an entity that is licensed as an ARM. In addition, under MiFIR, all regulated investment firms are required to comply with pre- and post-trade transparency requirements pursuant to which quotes and trades must be made public subject to a system of waivers and deferrals. Firms are required to utilize an APA to comply with the post-trade transparency requirement. Trade matching enables counterparties to agree on the terms of a trade shortly after execution, reducing the risk of trade errors and fails during settlement.

Our Competitive Strengths

We believe that we are well positioned to strengthen our market position in electronic trading in our existing products and to extend our presence into new products and services by capitalizing on our competitive strengths, including:

Significant Trading Volumes with Participation by Leading Broker-Dealers and Institutional Investors

Our electronic trading platform provides access to the liquidity provided through the participation on our platform of over 1,500 active institutional investor and broker-dealer clients, including substantially all of the leading broker-dealers in global fixed-income trading. We believe these broker-dealers represent the principal source of secondary market liquidity for U.S. high-grade corporate bonds, emerging markets and high-yield bonds, European high-grade corporate bonds and the other markets in which we operate. Our broker-dealer clients are motivated to continue to utilize our platform due to the presence on the platform of our large network of institutional investor clients and their ability to use our Open Trading protocols to help manage their risk, source liquidity, and facilitate transactions on behalf of their clients.

As shown in the chart below, our total bond trading volume increased from $767.0 billion in 2014 to $1.7 trillion in 2018.

Our adjusted estimated share of U.S. high-grade and high-yield corporate bond volume from 2014 to 2018 is shown in the chart below:

* We adjusted the reported U.S. high-grade TRACE volumes to eliminate the increased reporting of affiliate back-to-back trades by certain broker-dealers that occurred from April 2014 through October 2015 because we believe that the TRACE volume, as adjusted by us, provide a more accurate comparison to prior period reporting.

Execution Benefits to Clients

Benefits to Both Institutional Investor and Broker-Dealer Clients. We offer additional benefits over traditional fixed-income trading methods that are shared by both institutional investor and broker-dealer clients, including:

Transparent Pricing on a Range of Securities. The price discovery process includes the ability to view indicative prices from our broker-dealer clients' inventory available on our platform, access to real-time pricing information and analytical tools available on our BondTicker® service (including spread-to-Treasury data, search capabilities and independent third-party credit research) and the ability to request executable bids and offers simultaneously from all of our participating broker-dealer clients during the trade process on any debt security in our database of corporate bonds. Institutional investors and broker-dealer clients can search bonds in inventory based on combinations of issuer, issue, rating, maturity, spread-to-Treasury, size and dealer providing the listing, in a fraction of the time it takes to do so manually. Through our Open Trading protocols, participants may also elect to display live requests for bids or offers anonymously to all other users of our electronic trading platform in order to create broader visibility of their inquiry among market participants and increase the likelihood that the request results in a trade. We believe that broader participation in client inquiries will result in more trade matches and lower transaction costs.

Expanded Liquidity Pool. In the post-financial crisis years, liquidity has remained a persistent concern for market participants as regulators raised banks' capital requirements and adopted other measures that prompted many dealers to reduce market-making activities even as the buy side's bond holdings have grown rapidly. In this environment, Open Trading, our fully electronic, all-to-all trading environment, has emerged as one solution to the post-crisis liquidity problem. As a result, the liquidity options for Open Trading participants are broader and more diverse compared to the traditional model of bilateral trading with a limited set of dealer counterparties. The expanded pool of liquidity providers includes investment managers, global dealers, regional dealers and specialist market-making and proprietary trading firms. During 2018, almost 1,000 unique liquidity providers participated in Open Trading. Open Trading improves the ability of both dealers and institutional investors to find natural and opportunistic matches, move orders more efficiently, and achieve significant increases in execution quality and price improvement.

Greater Trading Accuracy. Our electronic trading platform includes verification mechanisms at various stages of the execution process which result in greater accuracy in the processing, confirming and clearing of trades between institutional investor and broker-dealer clients, including real-time trade details, STP, account allocations, automated audit trails and trade detail matching. These verification mechanisms are designed to ensure that our institutional investor and broker-dealer clients are sending accurate trade messages by providing multiple opportunities to verify they are trading the correct bond, at the agreed-upon price and size. Our platform assists our institutional investor clients in automating the transmittal of order tickets from the portfolio manager to the trader, and from the trader to back-office personnel. This automation provides more timely execution and a reduction in the likelihood of errors that can result from manual entry of information into different systems.

Efficient Risk Monitoring and Compliance. Institutional investors, broker-dealers and their regulators are increasingly focused on ensuring that best execution is achieved for fixed-income trades. Our electronic trading platform offers both institutional investors and broker-dealers an automated audit trail for each stage in the trading cycle. This enables compliance personnel to review information relating to trades more easily and with greater reliability. Trade information, including time, price and spread-to-Treasury, is stored securely and automatically on our electronic trading platform. This data represents a valuable source of information for our clients' compliance personnel. Importantly, we believe the automated audit trail, together with the competitive pricing and transaction cost analysis that is a feature of our electronic trading platform, gives fiduciaries the ability to demonstrate that they have achieved best execution on behalf of their clients.

Benefits to Institutional Investor Clients

We believe we provide numerous benefits to our institutional investor clients over traditional fixed-income trading methods, including:

Competitive Prices. By enabling institutional investors to simultaneously request bids or offers from our broker-dealer clients, we believe our electronic trading platform creates an environment that motivates our broker-dealer clients to provide competitive prices and gives institutional investors confidence that they are obtaining a competitive price. For typical MarketAxess multi-dealer corporate bond inquiries, the range of competitive spread-to-Treasury responses is approximately 13 basis points (a basis point is 1/100 of 1% in yield). As an example of the potential cost savings to institutional investors, a one basis point savings on a $1 million face amount trade of a bond with 10 years to maturity translates to aggregate savings of approximately $720. We believe our Open Trading protocols enhance our institutional investor clients' ability to obtain a competitive price by allowing all of our Open Trading participants to interact in an all-to-all trading environment, thereby increasing the potential sources of liquidity for each participant, as well as the likelihood of receiving a competitive price response.

Improved Cost Efficiency. We believe that we provide improved efficiency by reducing the time and labor required to conduct broad product and price discovery. Single-security and multi-security (bid or offer lists) inquiries can be efficiently conducted with multiple broker-dealers. Our auto-execution technology uses rules-based execution logic to reduce trading inefficiencies and human errors while allowing traders to focus on higher-value trades. In addition, our BondTicker® service eliminates the need for manually-intensive phone calls or e-mail communications to gather, sort and analyze information concerning historical transaction prices.

Limited Information Leakage. Our Open Trading protocols allow our institutional investor clients to maintain their anonymity from trade initiation through to settlement without limiting their number of potential trading counterparties. In addition, our Private Axes® protocol allows participants to negotiate bilaterally on an anonymous basis to minimize information leakage when transacting in larger trade sizes.

Benefits to Broker-Dealer Clients

We also provide substantial benefits to our broker-dealer clients over traditional fixed-income trading methods, including:

Greater Sales Efficiency. We offer our broker-dealer clients broad connectivity with our institutional investor clients. Through this connectivity, our broker-dealer clients are able to efficiently display their indications of interest to buy and sell various securities. We also enable broker-dealers to broaden their distribution by participating in transactions to which they otherwise may not have had access. In addition, the ability to post prices and electronically execute on straightforward trades enables bond sales professionals at broker-dealer firms to focus their efforts on higher value-added trades and more complex transactions.

More Efficient Inventory Management. The posting of inventory to, and the ability to respond to inquiries from, a broad pool of institutional investors, creates an increased opportunity for broker-dealers to identify demand for their inventory, particularly in less liquid securities. Broker-dealers are also increasingly turning toward Open Trading as a new source of liquidity as they manage their risk exposure. As a result, we believe they can achieve enhanced bond inventory turnover by using our platform, which may limit credit exposure.

Growing, Comprehensive International Offering and Client Base

Our platform provides global fixed-income market participants with trading functionality across global hard currency and local currency markets, connecting clients in over 50 countries to local and global dealers. MarketAxess has over 740 client firms located outside the U.S. that access our platform through our regulated venues in Europe, Asia and Latin America. Our Open Trading functionality allows international clients to access cross-border liquidity with minimal ramp-up time or regulatory hurdles.

The MarketAxess emerging markets trading platform also offers the most comprehensive offering for local currency bond trading across the Latin America, Central & Eastern Europe, Middle East and Africa ("CEEMEA"), and Asia-Pacific ("APAC") regions. Our platform provides clients with the ability to trade local currency debt denominated in over 25 local currencies with over 100 emerging market dealers.

Full Trading Cycle Service Offerings

In addition to services directly related to the execution of trades, we offer our clients several other services throughout the trading cycle. In the pre-trade period, our platform assists our participants by providing them with value-added services, such as real-time and historical trade price information, liquidity and turnover analytics, bond reference data and trade order matching alerts. Following the execution of a trade, our platform supports all of the essential tools and functionalities to enable our participants to realize the full benefits of electronic trading and demonstrate best execution, including real-time trade details, STP, account allocations, automated audit trails, regulatory trade reporting, trade detail matching, and transaction cost analysis.

Robust, Scalable Technology

We have developed proprietary technology that is highly secure, fault-tolerant and provides adequate capacity for our current operations, as well as for substantial growth. Our highly scalable systems are designed to accommodate additional volume, products and clients with relatively little modification and low incremental costs.

Proven Innovator with an Experienced Management Team

Since our inception, we have been an innovator in the fixed-income securities markets. The members of our management team average more than 20 years of experience in the securities industry. We have consistently sought to benefit participants in the markets we serve by attempting to replicate the essential features of fixed-income trading, including the existing relationships between broker-dealers and their institutional investor clients, while applying technology to eliminate weaknesses in traditional trading methods and improve liquidity. In recent years, MarketAxess has received industry recognition from key independent publications for its innovations and contributions to the fixed-income market. For example, in 2018, Open Trading won the Waters Technology "Buy-Side Technology Award" for the Best Buy-Side Execution Venue, and Composite+ won the Risk "Market Technology Award" for the Electronic Trading Support Product of the Year and the Waters Technology "American Financial Technology Award" for the Best Artificial Intelligence (AI) Technology Initiative.

Some of the innovations we have introduced to electronic trading include:

- the first multi-dealer disclosed trading platform for U.S. high-grade corporate bonds;
- the first electronic Treasury benchmarking for U.S. high-grade corporate bond trades;
- BondTicker®, our information services product, combining TRACE bond data with MarketAxess data and analytical tools;
-

bid and offer list technology for corporate bond trading, enabling institutional investors to request executable prices for multiple securities simultaneously;

- the first disclosed client to multi-dealer trading platform for credit derivative indices;
- public Market Lists for corporate bonds, giving institutional investors the ability to display their bid and offer lists anonymously to the entire MarketAxess trading community; and
- Axess All®, the first intra-day trade tape for the European fixed-income market.

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Independence

We believe the current regulatory environment creates competitive advantages for independent companies like us that are less prone to conflicts of interest. As an independent company, we are free to make business and trading protocol decisions with the best interests of both our institutional investor and broker-dealer clients in mind. We are also able to attract industry leaders with valuable skills and insights to our independent Board of Directors.

Our Strategy

Our objective is to provide the leading global electronic trading platform for fixed-income securities, connecting broker-dealers and institutional investors more easily and efficiently, while offering a broad array of information, trading and technology services to market participants across the trading cycle. The key elements of our strategy are:

Broaden Our Client Base in Our Existing Markets and Increase Penetration with Existing Clients

We intend to use our broad network of over 1,500 active institutional investor and broker-dealer participants to drive more clients to our leading electronic fixed-income trading platform. The number of active participants on our platform has increased by over 90% since 2013. We believe that the continued expansion of our client base will lead to even further increases in the liquidity available on our platform. We expect that the increased liquidity on our platform and our ability to innovate and efficiently add new functionality and product offerings will also help us deepen our market share with our existing clients across our product suite. The number of clients trading three or more products on our platform has increased by 67.0% from 509 in 2014 to 850 in 2018. Last, we will seek to increase our international presence by increasing the number of firms located outside the U.S. that access our platform through our venues in Europe, Asia and Latin America, increasing the number of local currencies available for trading on our platform; and, subject to regulatory requirements, increasing the number of countries in which we can offer our platform.

Enhance the Liquidity of Securities Traded on Our Platform by Leveraging our Client Network and Open Trading Protocols

We aim to increase the secondary market liquidity on our trading platform by deploying innovative technology solutions designed to increase the number of potential trading counterparties on our platform and to address different trade sizes, bond liquidity characteristics and trading preferences. Our Open Trading protocols exponentially increase the potential trading counterparties by allowing broker-dealers and institutional investors to interact in an all-to-all trading environment. During 2018, our clients executed approximately 1.1 million trades using our Open Trading solutions, representing 22.0% of the total trading volume on our platform. In recent years, we have also significantly increased the number of participants that provide bond prices to our platform via an algorithm, which has helped increase the number of price responses on our platform by 142.1% from 2015 to 2018. We intend to continue to improve the liquidity of bonds on our platform by increasing the number of connections we have with algorithmic trading firms. We also believe that the combination of Open Trading and our vast client network provides the basis for MarketAxess to deliver meaningful cross-border liquidity or enter into new markets where liquidity is scarcer, such as municipal bonds.

Continue to Develop Innovative Next-Generation Technologies that will Allow Our Clients to Further Automate and Improve the Performance of their Trading Desks

We believe that the increased adoption of next-generation trading technologies by both dealer and investor clients will create improved liquidity, enhanced trading efficiencies and the ability to identify trends within the bond market. In recent years, we have launched a number of innovative technologies that rely on machine-learning, automation and algorithms that are designed to improve the trading decisions and workflows of our clients, while reducing trading inefficiencies and human errors. For example, clients can use our rules-based auto-execution technology with both our traditional RFQ protocol and Open Trading to automatically execute trades meeting defined parameters with diverse sources of liquidity. Our Composite+ pricing algorithm uses machine-learning to generate near real-time prices for over 25,000 corporate bonds based on a variety of data inputs, and our Like Bonds product uses a data-driven methodology to help clients find liquid, tradable alternatives to illiquid bonds. We intend to continue to invest in and develop advanced technologies such as these that will make MarketAxess an increasingly valuable part of our clients' trading decisions and workflows.

Expand and Strengthen our Trade-Related Service, Data and Analytical Offerings Throughout the Trading Cycle

We plan to expand and strengthen our existing service, data and analytical offerings throughout the trading cycle so that MarketAxess is more fully integrated into the workflow of our broker-dealer and institutional investor clients. In the pre-trade period, we intend to continue to enhance the value of our information and analytical offerings, including the content and capabilities of BondTicker®, Axess All® and Composite+. We plan to enhance and expand the usage of LiquidityBridge®, our execution management system (EMS) service that allows users to manage and facilitate the complex liquidity flows across multiple trading platforms, including the MarketAxess system. We also intend to augment our post-trade matching and regulatory reporting services provided by our Trax® brand in Europe that enable our clients to comply with their heightened obligations pursuant to MiFID II. As the use of our pre- and post-trade services and products grow, we believe that MarketAxess will become further entrenched as a value-added resource to our clients at each stage of the trading cycle, which we believe will further increase the attractiveness and use of our trading platform.

Pursue Select Acquisitions and Strategic Alliances

We continually evaluate opportunities to supplement our internal growth by entering into strategic alliances, or acquiring businesses or technologies, that will enable us to enter new markets, provide new products or services, or otherwise enhance the value of our platform and existing trade-related services to our clients. In recent years, we entered into, and expanded, a strategic alliance with BlackRock, Inc. (“BlackRock”) to combine BlackRock’s order flow with our Open Trading solution to improve the range of trading connections available to global credit market participants.

Key Products and Services

MarketAxess offers the following key products and services to its clients:

Key Products Traded on our Platform

U.S. High-Grade Corporate Bonds

Our U.S. high-grade corporate bond business consists of U.S. dollar-denominated investment-grade debt issued by corporations for distribution in the U.S. Over 100 broker-dealers utilize our platform to trade U.S. high-grade corporate bonds, including all of the top 20 broker-dealers as ranked by underwriting volume of newly-issued U.S. high-grade corporate bonds in 2018. Our broker-dealer clients accounted for approximately 97.7% of the underwriting of newly-issued U.S. high-grade corporate bonds in 2018. More than 950 active domestic and foreign institutional investor firms use our platform to trade U.S. high-grade corporate bonds. Our 2018 trading volume in the U.S. high-grade corporate bond market was $928.2 billion.

Emerging Markets Bonds

Over 100 of our broker-dealer clients and more than 900 active institutional investor firms use our platform to trade emerging markets bonds. The emerging markets countries whose bonds were most frequently traded on our platform in 2018 were Mexico, Brazil, Argentina, South Africa and Turkey. In 2018, our clients were able to trade corporate and sovereign debt denominated in over 25 local market currencies on our platform. Our 2018 trading volume in the emerging market bond market was $378.3 billion.

U.S. Crossover and High-Yield Bonds

Over 100 of our broker-dealer clients and more than 850 active institutional investor firms use our platform to trade crossover and high-yield bonds. Trading in crossover and high-yield bonds uses many of the same features available in our U.S. high-grade corporate bond offering. We also offer leveraged loan trading for our clients that trade high-yield bonds. Our 2018 trading volume in the high-yield bond market was $177.6 billion.

Eurobonds

We offer secondary trading functionality in U.S. dollar- and Euro-denominated European corporate bonds to our broker-dealer and institutional investor clients. We also offer our clients the ability to trade in other European high-grade corporate bonds, including bonds issued in British Pounds Sterling, floating rate notes, European government bonds and bonds denominated in non-core currencies. We offered the first platform in Europe with a multi-dealer disclosed counterparty trading capability for corporate bonds.

In the Eurobond credit market, defined as including European high-grade, high-yield and government bonds, approximately 50 broker-dealers utilize our platform, including 19 of the top 20 broker-dealers as ranked by 2018 European corporate new-issue underwriting volume. More than 450 active institutional investor firms use our platform to trade European bonds. Our 2018 trading volume in the Eurobond bond market was $166.6 billion.

U.S. Agency Bonds

Over 40 of our broker-dealer clients and more than 300 active institutional investor firms use our platform to trade U.S. agency bonds. Trading in U.S. agency bonds uses many of the same features available in our U.S. high-grade corporate bond offering. Our 2018 trading volume in the U.S. agency bond market was $49.1 billion.

Municipal Bonds

Over 70 broker-dealer clients and over 300 institutional investor clients use our platform to trade municipal bonds. We offer trading for both taxable and non-taxable municipal bonds. Our 2018 trading volume in the U.S. municipal bond market was $5.9 billion.

Credit Derivatives

We offer a range of functionality for electronic trading of CFTC-regulated credit derivatives instruments on our SEF in compliance with the CFTC’s requirements. This includes an RFQ system that allows participants to send anonymous or disclosed RFQs, as well as an order book, which enables market participants to trade anonymously with all other market participants. Approximately 40 active market participants use our SEF to trade credit derivative indices and credit options. Our 2018 credit derivatives trading volume was $93.4 billion.

Open Trading Functionality

We offer a series of Open Trading protocols that allows our broker-dealer and institutional investor clients to interact in an all-to-all trading environment. Our Market List functionality provides our Open Trading participants with the ability to display live requests for bids and offers anonymously to the entire MarketAxess trading community, thereby creating broader visibility of their inquiry among market participants and increasing the likelihood that the request results in a completed trade. Public Axes™ is an order book-style price discovery process that gives clients the ability to view anonymous or disclosed indications of interest from the inventory on our platform. Through the aggregated indication of interest inventory, clients can search for bonds of interest and engage in electronic transactions. For block-sized trades, clients may use our Private Axes® functionality, a protocol that allows participants to anonymously negotiate round lots (greater than $1.0 million) and block trades to minimize information leakage. We offer Open Trading protocols for all of our key trading products, including corporate, municipal and emerging market bonds. Bond trades executed pursuant to any of our anonymous Open Trading protocol are conducted with MarketAxess on a matched principal basis.

Post-Trade Reporting, Publishing and Matching Services

In Europe, all firms regulated as “investment firms” under MiFID II are required to submit complete and accurate details of qualifying transactions to their national regulator no later than the close of the working day following the date of the transaction. This process is known as transaction reporting. Pursuant to MiFIR, the number of fields and the complexity of the information that must be reported to regulators was significantly enhanced. Firms may either report directly to the regulator or use an entity that is licensed as an ARM, such as our Trax® ARM, to validate and submit such reports. In the U.K., covered transactions are reported to the FCA.

In addition, under MiFIR, all regulated investment firms are required to comply with pre- and post-trade transparency requirements pursuant to which quotes and trades must be made public subject to a system of waivers and deferrals. Firms are required to utilize an APA, such as our Trax® APA, to comply with the post trade transparency requirement and, although optional, many firms also utilize a third party provider, such as Trax®, to satisfy the pre trade transparency requirement. The Trax® Transparency Solution and the Trax® APA trade reporting solution are available through the Trax Insight™ platform, offering our clients a pre- and post-trade transparency solution, including APA trade reporting, quote publication, SI determination and instrument liquidity classification. Trax® also offers a commodity position reporting service to assist firms in compliance with the commodity derivative position limit reporting requirements of MiFID II.

Trade matching enables counterparties to agree on the terms of a trade shortly after execution, reducing the risk of trade errors and fails during settlement. Trax® Match is our near real-time post-trade matching and exception management tool which covers a broad range of securities, including fixed-income and equities. Trax® Match helps our clients to mitigate their operational risk, improve STP and efficiency, address the complexities of MiFID II and the Central Securities Depositories Regulation and confirm all economic details within minutes of execution.

Trax® has over 170 clients, including broker-dealers, hedge funds and investment banks. The Trax® platform processed approximately 0.9 billion transactions in 2018.

Information Services

In the pre-trade period, our platform assists our participants by providing them with value-added services, such as real time and historical trade price information, intelligent Composite+ pricing, BondTicker®, liquidity and turnover analytics, bond reference data and trade order matching alerts. The information and analytical tools we provide to our clients help them make investment and trading decisions. Our electronic trading platform allows institutional investors to compile, sort and use information to discover investment opportunities that might have been difficult or impossible to identify using a manual information-gathering process or other electronic services.

Our Composite+ pricing algorithm generates near real-time prices for over 25,000 corporate bonds based on a variety of data inputs, including feeds from our trading platform, our Trax® post-trade service and TRACE. Composite+ is used by clients as a pre-trade reference price to enhance trading outcomes and transaction cost analysis. Composite+ can be combined with our auto-execution service, providing clients with an alert if a response is “off market”.

Through our Trax® brand, we provide a range of information solutions for financial services firms, utilizing quotes contributed by market participants and leveraging data from our post-trade services business. Axess All®, the first intra-day trade tape for the European fixed-income market, is sourced from over 30,000 bond transactions processed daily by Trax® and includes aggregated volume and pricing for the most actively traded European fixed-income instruments. We also provide market participants with access to pricing, liquidity and volume data on over 40,000 unique fixed-income securities and securities reference data for approximately 300,000 fixed-income securities.

BondTicker® provides real-time TRACE data and enhances it with MarketAxess trade data and analytical tools in order to provide professional market participants with a comprehensive set of corporate bond price information with associated analytical tools that are not otherwise available. The data includes trade time and sales information, including execution prices, as well as MarketAxess-estimated spread-to-Treasuries, for trades disseminated by the TRACE system. The data also includes actual execution prices and spread-to-Treasury levels for U.S. high-grade corporate bond trades executed on the MarketAxess platform. BondTicker® is currently the source of corporate bond trading information for The Wall Street Journal in the U.S.

BondTicker® allows institutional investors to search for and sort bonds based upon specific criteria, such as volume, time/date of transaction, spread change, issuer or security. This search function allows institutional investors to compile information relating to potential securities trades in a fraction of the time that it takes to manually compile this information from disparate sources or other electronic databases, including direct TRACE feeds and European pricing information provided by Trax’s end-of-day pricing feed.

BondTicker® is integrated directly into the MarketAxess electronic trading platform and can be seamlessly accessed, either when viewing securities inventory or when launching an inquiry. BondTicker® is also available through the internet for non-trading professional market participants, including, among others, research analysts and rating agencies, who can log in and access the information via a browser-based interface.

We also offer a set of tools that analyze credit trading activity for institutional investor clients. These tools utilize extensive amounts of market data and have a flexible interface to run and save in a variety of formats, depending on the business purpose. Further, we provide extensive client-specific reports that measure trading performance on our electronic trading platform, including reports for the value of price discovery from multiple dealers, the cost savings generated from Open Trading participation and transaction cost analysis.

LiquidityBridge® is our execution management system (“EMS”) service that allows users to manage and facilitate the complex liquidity flows across multiple trading platforms, including the MarketAxess system. LiquidityBridge® brings together real-time comparison and execution of bond prices across multiple sectors allowing users to rapidly react to trading opportunities. Clients can also automatically generate custom pricing and distribute inventory to any destination. By using a library of standard adaptors, LiquidityBridge® can be deployed across a variety of fixed-income markets.

Straight-Through Processing and APIs

Straight-through processing refers to the integration of systems and processes to automate the trade process from end-to-end — trade execution, confirmation and settlement — without the need for manual intervention. We provide our broker-dealer and institutional investor clients with a range of tools that facilitate straight-through processing, including order upload, easy-to-use online allocation tools and pre- and post-trade messaging features that enable our clients to communicate electronically between their front- and back-office systems. Our straight-through processing tools can be customized to meet specific needs of our clients and allow them to integrate their order, portfolio management and accounting systems in real time. We continue to build industry partnerships to assist our clients in creating connectivity throughout the trade cycle. Through these partnerships, we are increasingly providing solutions that can quickly be deployed within our clients' trading operations.

Usage of our straight-through processing tools increased significantly during the last several years. We maintained over 1,100 STP connections as of December 31, 2018. In addition, many of our clients use our Application Programming Interface ("API") services for pre-trade, trade negotiation and post-trade services to improve efficiency and reduce errors in processing.

Sales and Marketing

We promote our products and services using a variety of direct and indirect sales and marketing strategies. Our sales force is responsible for client acquisition activity and for increasing use of our trading platform and information and post-trade services by our existing clients. Their goal is to train and support existing and new clients on how to use our system and to educate them as to the benefits of utilizing an electronic fixed-income trading platform. We employ various strategies, including advertising, direct marketing, promotional mailings, and participation in industry conferences and media engagement, to increase awareness of our brand and our electronic trading platform. For example, we have worked with The Wall Street Journal to establish BondTicker® as the source of information for its daily corporate bond and high-yield tables. A similar process also exists for our Trax® post-trade business, employing both direct and indirect sales methods.

Competition

The industry that we participate in is highly competitive and we expect competition to intensify in the future. We face four main areas of competition:

- Telephone and Direct Electronic Communications — We compete with bond trading business conducted over the telephone, e-mail or instant messaging between broker-dealers and their institutional investor clients. Institutional investors have historically purchased fixed-income securities by telephoning or otherwise communicating via e-mail or instant messaging with bond sales professionals at one or more broker-dealers and inquiring about the price and availability of individual bonds. This remains the manner in which the majority of corporate bond volumes are still traded between institutional investors and broker-dealers.
- Other electronic trading platforms — There are numerous other electronic trading platforms currently in existence, including several that have only commenced operations in the last few years. Among others, Bloomberg and Tradeweb operate multi-dealer to institutional investor trading platforms for both fixed-income securities and derivatives. Several registered alternative trading systems ("ATSs"), including two ATSs recently acquired by Intercontinental Exchange, also offer exchange-style trading for corporate and municipal bonds, particularly for smaller trade sizes. In addition, some broker-dealers and institutional investors operate, or have invested in, proprietary electronic trading systems or information networks that enable institutional investors to trade directly with a broker-dealer, and/or with other institutional investors over an electronic medium. As we expand our business into new products, we will likely come into more direct competition with other electronic trading platforms or firms

offering traditional services.

- Market data and information vendors — Several large market data and information providers currently have a data and analytics relationship with virtually every institutional firm. Some of these entities, including Bloomberg and Intercontinental Exchange, currently offer varying forms of electronic trading of fixed-income securities. Some of these entities have announced their intention to expand their electronic trading platforms or to develop new platforms. These entities are currently direct competitors to our information services business and already are or may in the future become direct competitors to our electronic trading platform.
- Other approved regulatory mechanisms — We compete with other approved regulatory mechanisms in Europe that have the FCA's ARM and APA designations, such as the London Stock Exchange's UnaVista and Tradeweb, to provide post-trade matching and regulatory transaction reporting and transparency services to European clients.

Competitors, including companies in which some of our clients have invested, have developed electronic trading platforms or have announced their intention to explore the development of electronic trading platforms that compete or will compete with us. Furthermore, some of our clients have made, and may in the future continue to make, investments in or enter into agreements with other businesses that directly or indirectly compete with us.

In general, we compete on the basis of a number of key factors, including:

- broad network of broker-dealer and institutional investor clients using our electronic trading platform;
- liquidity provided by the participating broker-dealers and, to a growing extent, by other institutional investors;
- magnitude and frequency of price improvement;
- enhancing the quality and speed of execution;
- compliance benefits;
- total transaction costs;
- technology capabilities, including the reliability, security, and ease of use of our electronic trading platform; and
- range of products, protocols and services offered.

We believe that our ability to grow volumes and revenues will largely depend on our performance with respect to these factors.

Our competitive position is also enhanced by the familiarity and integration of our broker-dealer and institutional investor clients with our electronic trading platform and other systems. We have focused on the unique aspects of the credit markets we serve in the development of our platform, working closely with our clients to provide a system that is suited to their needs.

Our broker-dealer clients have invested in building API's with us for inventory contributions, electronic trading, government bond benchmark pricing and post-trade messaging. We believe that we have successfully built deep roots with our broker-dealer clients, increasing our level of service to them while at the same time increasing their commitment to use our services; however, the contractual obligations of such clients are non-exclusive. See the Risk Factor captioned "We are dependent on our broker-dealer clients, who are not restricted from using their own proprietary or third-party platforms to transact with our institutional investor clients."

Furthermore, a significant number of our institutional investor clients have built interfaces to enable them to communicate electronically between our platform and their order, portfolio management and accounting systems. We believe that this increases the reliance of these institutional investor clients on our services and creates significant competitive barriers to entry.

Technology

The design and quality of our technology products are critical to our growth and our ability to execute our business strategy. Our electronic trading platform has been designed with secure, scalable client-server architecture that makes broad use of distributed computing to achieve speed, reliability and fault tolerance. The platform is built on industry-standard technologies and has been designed to handle many multiples of our current trading volume.

All critical server-side components, primarily our networks, application servers and databases, have backup equipment running in the event that the main equipment fails. This offers fully redundant system capacity to maximize uptime and minimize the potential for loss of transaction data in the event of an internal failure. We also seek to minimize the impact of external failures by automatically recovering connections in the event of a communications failure. The majority of our broker-dealer clients and a significant number of our institutional investor clients have redundant dedicated high-speed communication paths to our network in order to provide fast data transfer. Our security measures include industry-standard communications encryption.

We have designed our application with an easy-to-use, Windows-based interface. Our clients are able to access our electronic trading platform through a secure, single sign-on. Clients are also able to execute transactions over our platform directly from their order management systems. We provide users an automatic software update feature that does not require manual intervention.

Intellectual Property

We rely upon a combination of copyright, patent, trade secret and trademark laws, written agreements and common law to protect our proprietary technology, processes and other intellectual property. Our software code, elements of our electronic trading platform, website and other proprietary materials are protected by copyright laws. We have been issued 13 patents covering our most significant trading protocols and other aspects of our trading system technology.

The written agreements upon which we rely to protect our proprietary technology, processes and intellectual property include agreements designed to protect our trade secrets. Examples of these written agreements include third party nondisclosure agreements, employee nondisclosure and inventions assignment agreements, and agreements with customers, contractors and strategic partners. Other written agreements upon which we rely to protect our proprietary technology, processes and intellectual property take many forms and contain provisions related to patent, copyright, trademark and trade secret rights.

We have obtained U.S. federal registration of the MarketAxess® name, and our new logo is pending registration in the U.S. The same mark and logo have been registered or are pending registration in several foreign jurisdictions. In addition, we have obtained U.S. federal registration for the marks AutoSpotting®, FrontPage®, Actives®, DealerAxess®, Trax®, Trade ON®, LiquidityBridge®, BondTicker®, Axess All®, Private Axes®, and associated designs and have a number of other registered trademarks and service marks. Open Trading™, MarketAxess Bid-Ask Spread Index (BASI)™, Mid-Hedging™ and Now You're In The Market™ are trademarks we use, but they have not been registered or are pending registration in the U.S.

In addition to our efforts to register our intellectual property, we believe that factors such as the technological and creative skills of our personnel, new product and service developments, frequent enhancements and reliability with respect to our services are essential to establishing and maintaining a technology and market leadership position.

Government Regulation

The securities industry and financial markets in the U.S. and elsewhere are subject to extensive regulation. As a matter of public policy, regulatory bodies in the U.S. and the rest of the world are charged with safeguarding the integrity of the securities and other financial markets and with protecting the interests of investors participating in those markets. Our active broker-dealer and regulated venue subsidiaries fall within the scope of their regulations.

Regulation of the U.S. Securities Industry and Broker-Dealers

In the U.S., the SEC is the governmental agency responsible for the administration of the federal securities laws. One of our U.S. subsidiaries, MarketAxess Corporation, is registered with the SEC as a broker-dealer and also has a SEC-registered alternative trading system. MarketAxess Corporation is also a member of FINRA and registered with the MSRB, self-regulatory organizations that regulate broker-dealers in the U.S. In addition, MarketAxess Corporation is a member of the Securities Investor Protection Corporation, which provides certain protection for clients' accounts in the event of a liquidation of a broker-dealer to the extent any such accounts are held by the broker-dealer.

Additionally, MarketAxess Corporation is registered with certain states and the District of Columbia as a broker-dealer. The individual states and the District of Columbia are responsible for the administration of their respective "blue sky" laws, rules and regulations.

MarketAxess SEF Corporation, our wholly-owned U.S. subsidiary, operates as a SEF for the trading of certain credit derivatives subject to the CFTC's jurisdiction, including certain index swaps subject to the CFTC's 'made available for trade' determination that are required to be executed on a SEF or regulated exchange.

Various rules promulgated since the financial crisis have adversely affected our bank-affiliated broker-dealer clients' ability to make markets in a variety of fixed-income securities, which could negatively impact the level of liquidity and pricing available on our trading platform. For example, while the Volcker Rule does not apply directly to us, the

Volcker Rule bans proprietary trading by banks and their affiliates. In addition, enhanced leverage ratios applicable to large banking organizations in the U.S. and Europe require such organizations to strengthen their balance sheets and may limit their ability or willingness to make markets on our trading platform. We cannot predict the extent to which these rules or any future regulatory changes may adversely affect our business and operations.

Regulation of the Non-U.S. Securities Industries and Investment Service Providers

The securities industry and financial markets in the U.K., the European Union (“E.U.”) and elsewhere are subject to extensive regulation. Our principal regulator in the U.K. is the FCA. MarketAxess Europe Limited is authorized and regulated by the FCA to operate a Multilateral Trading Facility (“MTF”), and is also authorized as a foreign platform in Switzerland, Hong Kong and Singapore. MarketAxess Capital Limited, which acts as matched principal counterparty for Open Trading transactions on the MTF, is authorized and regulated by the FCA as an investment firm. Xtrakter Limited (“Xtrakter”) is authorized and regulated as a Data Reporting Service Provider with the FCA and the Netherlands Authority for the Financial Markets (“AFM”), which allows it to operate as the Trax® ARM and APA.

The securities industry in the member states of the E.U. is regulated by agencies in each member state. E.U. measures provide for the mutual recognition of national regulatory agencies and their supervision of investment firms, which makes it possible for the grant of a single authorization to be valid throughout the E.U. Currently, both MarketAxess Europe Limited and Xtrakter provide regulated services to European firms outside of the U.K. in reliance on a cross-border services passport under MiFID. However, in March 2017, the U.K. notified the European Council of its intention to leave the E.U. (commonly referred to as “Brexit”). By invoking Article 50 of the Lisbon Treaty, the U.K. is currently set to leave the E.U. on March 29, 2019. Following Brexit, our U.K. subsidiaries will not be able to rely on the existence of a “passporting” regime that allows immediate access to the single E.U. market. Current discussions between the U.K. and the E.U. regarding a withdrawal agreement envisage a temporary continuation of the existing passporting rights during a limited period following March 29, 2019. However, we are not able to predict with any certainty if, or when, the U.K. and the E.U. will sign the withdrawal agreement. Accordingly, we have established new subsidiaries in the E.U. in order to provide our trading platform and certain post-trade services to clients in the E.U. following Brexit. See the Risk Factor captioned “The U.K. exit from the European Union could materially adversely impact our business, clients, financial condition, results of operations and prospects.”

Similar to the U.S., regulatory bodies in Europe have recently implemented new rules for the fixed-income markets. MiFID II and MiFIR were implemented in 2018 and introduced significant changes in market structure designed to: (i) enhance pre- and post-trade transparency for fixed-income instruments with the scope of requirements calibrated for liquidity, (ii) increase and enhance post-trade reporting obligations with a requirement to submit post-trade data to ARMs, (iii) ensure trading of certain derivatives occurs on regulated trading venues and (iv) establish a consolidated tape for trade data. MiFID II has caused us to expend significantly more compliance, business and technology resources, to incur additional operational costs and has created additional regulatory exposure for our trading and post-trade businesses. While we generally believe the net impact of the rules and regulations will be positive for our businesses, unintended consequences of the rules and regulations may adversely affect us in ways yet to be determined.

Our Singapore subsidiary, MarketAxess Singapore Pte. Limited, is authorized to operate as a Recognized Market Operator (“RMO”) and is also a registered platform in Switzerland and Hong Kong. Our Canadian subsidiary, MarketAxess Canada Company, is registered as an Alternative Trading System dealer under the Securities Act of Ontario and is a member of the Investment Industry Regulatory Organization of Canada. Our Brazilian subsidiary, MarketAxess Plataforma De Negociacao Ltda., is authorized to provide our platform in Brazil under the jurisdiction of the Securities and Exchange Commission and Central Bank in Brazil. We also provide our platform in other countries pursuant to exemptions from registration under the laws of such countries.

Employees

As of December 31, 2018, we had 454 employees, 272 of whom were based in the U.S. and 182 of whom were based outside of the U.S., principally in the U.K. None of our employees are represented by a labor union. We consider our relationships with our employees to be good and have not experienced any interruptions of operations due to labor disagreements.

Company Information

MarketAxess was incorporated in Delaware in April 2000. Our internet website address is www.marketaxess.com. Through our internet website, we will make available, free of charge, the following reports as soon as reasonably practicable after electronically filing them with, or furnishing them to, the SEC: our annual report on Form 10-K; our quarterly reports on Form 10-Q; our current reports on Form 8-K; and amendments to those reports filed or furnished pursuant to Section 13(a) of the Securities Exchange Act of 1934, as amended. Our Proxy Statements for our Annual Meetings are also available through our internet website. Our internet website and the information contained therein or connected thereto are not intended to be incorporated into this Annual Report on Form 10-K. You may also obtain copies of our reports without charge by writing to:

MarketAxess Holdings Inc.

55 Hudson Yards

New York, NY 10001

Attn: Investor Relations

Our Board of Directors has standing Audit, Compensation, Nominating and Corporate Governance, Risk, Mergers and Acquisitions and Investment Committees. Each of these committees has a written charter approved by our Board of Directors and our Board of Directors has also adopted a set of Corporate Governance Guidelines. Copies of the committee charters and the Corporate Governance Guidelines are also posted on our website.

The SEC maintains an internet website that contains annual, quarterly and current reports, proxy and information statements and other information that issuers (including the Company) file electronically with the SEC. The SEC's internet website is www.sec.gov.

Item 1A. Risk Factors.

Risks Related to Our Business Generally

Risks Related to Global Economic and Market Conditions

Global economic, political and market factors beyond our control could reduce demand for our services, and our profitability and business could suffer.

The global financial services business is, by its nature, risky and volatile and is directly affected by many national and international factors that are beyond our control. Any one of these factors may cause a substantial decline in the U.S. and/or global financial services markets, resulting in reduced trading volume. These events could have a material adverse effect on our business, financial condition and results of operations. These factors include:

- economic and political conditions in the United States, Europe and elsewhere;
- adverse market conditions, including unforeseen market closures or other disruptions in trading;
- broad trends in business and finance;
- consolidation or contraction in the number of broker-dealers;
- actual or threatened acts of war or terrorism or other armed hostilities;
- concerns over inflation and weakening consumer confidence levels;
- the availability of cash for investment by mutual funds, exchange traded funds and other wholesale and retail investors;
- the level and volatility of interest rates, the difference between the yields on corporate securities being traded and those on related benchmark securities and foreign currency exchange rates;
- the effect of Federal Reserve Board monetary policy, increased capital requirements for banks and other financial institutions, and other regulatory requirements and political impasses;
- credit availability and other liquidity concerns;
- concerns over credit default or bankruptcy of one or more sovereign nations or corporate entities; and
- legislative and regulatory changes, including changes to financial industry regulations and tax laws.

Any one or more of these factors may contribute to reduced activity and prices in the securities markets generally. Our revenues and profitability are likely to decline significantly during periods of stagnant economic conditions or low trading volume in the U.S. and global financial markets.

The U.K. exit from the European Union could materially adversely impact our business, clients, financial condition, results of operations and prospects.

In March 2017, the U.K. notified the European Council of its intention to leave the E.U. By invoking Article 50 of the Lisbon Treaty, the U.K. is currently set to leave the E.U. on March 29, 2019. In its negotiations with the E.U., the U.K. is not seeking to maintain continued access to the E.U. single market following Brexit, which will lead to the loss of the “passporting” rights for regulated financial services firms to automatically operate throughout the E.U. This future loss of the existing passport right to the E.U. will affect us and many of our clients. For us, it means we will no longer be able to conduct business in the E.U. through our U.K. subsidiaries following Brexit.

Current discussions between the U.K. and the E.U. regarding a withdrawal agreement, however, envisage a temporary continuation of the existing passporting rights during a limited period following March 29, 2019. We are not able to predict with any certainty if, or when, the U.K. and the E.U. will sign the withdrawal agreement. Accordingly, we have established new subsidiaries in the E.U. in order to provide our trading platform and certain post-trade services to clients in the E.U. following Brexit. In addition, our preparation for Brexit involves making changes to the technology underlying out trading platform, obtaining regulatory approvals and onboarding of clients to our new E.U. platform. In the event that the U.K. leaves the E.U. without a withdrawal agreement in place or our preparations for Brexit are insufficient or late, the trading system and post-trade services that we provide to our clients in the U.K. and the E.U. could be significantly disrupted and, as a result, our businesses, financial condition and results of operations could be adversely affected.

Brexit is expected to significantly affect the fiscal, monetary and regulatory landscape in both the U.K. and E.U., and could have a material impact on their economies and the future growth of various industries. In particular, the ecosystem of the E.U. financial services industry in which we operate, which prior to Brexit has been heavily centered in London, will become more decentralized. The exit of the U.K., together with the protracted negotiations around the terms of the exit, could significantly impact the business environment in which we and our clients operate, increase the cost of conducting business in both the E.U. and the U.K., and introduce significant new uncertainties with respect to the legal and regulatory requirements to which we and our clients are subject. As we currently conduct business in Europe primarily through our U.K. subsidiaries, we will face new regulatory and operational costs and challenges associated with the establishment of new subsidiaries in the E.U and the management of a less centralized customer and employee base. We could also be adversely affected by reduced growth and greater volatility in the Pound Sterling and the U.K. economy.

Changes to U.K. immigration policy are likewise expected occur as a result of Brexit and our access to, and our ability to compete for and hire, skilled employees in both the U.K. and the E.U. is expected to become more constrained. In addition, Brexit could lead to legal uncertainty and potentially divergent national laws and regulations as the U.K. determines which E.U. laws to replace or replicate. Accordingly, the cost and complexity of operating across increasingly divergent regulatory regimes could increase following Brexit.

Although it is not possible at this point in time to predict fully the effects of an exit of the U.K. from the E.U., or the substance or timeline for any transitional period, any of the foregoing factors could have a material adverse effect on our business, financial condition and results of operations. In addition, Brexit may impact our ability to comply with the extensive government regulation to which we are subject.

Risks Related to Operating in the Electronic Fixed-Income Trading Markets

Decreases in trading volumes in the fixed-income markets generally or on our platform would harm our business and profitability.

We have experienced significant decreases in overall market volumes in the past and may experience similar decreases in market volumes in the future. Declines in the overall volume of fixed-income securities trading and in market liquidity generally, as well as declines in interest rate volatility, could result in lower revenues from commissions for trades executed on our electronic trading platform and fees generated from related activities.

Likewise, decreases in our share of the segments of the fixed-income trading markets in which we operate, or shifts in trading volume to segments of clients which we have not penetrated, could result in lower trading volume on our platform and, consequently, lower commissions and revenue. During periods of increased volatility in credit markets, the use of electronic trading platforms by market participants may decrease dramatically as institutional investors may seek to obtain additional information during the trade process through conversations with broker-dealers. In addition, during rapidly moving markets, broker-dealers are less likely to post prices electronically. Our market share of the fixed-income trading markets is also impacted by a variety of other factors, including the amount of new issuances of corporate debt, the level of bond fund inflows or outflows, the percentage of volumes comprised of Rule 144A transactions, the percentage of volumes comprised of larger trades known as ‘block trades’ and whether the prevalent market environment is an “offer wanted” or “bid wanted” environment.

A decline in overall market volumes, trading volumes on our platform or in our platform's market share for any reason would negatively affect our commission revenue and may have a material adverse effect on our business, financial condition and results of operations.

Because we operate in a rapidly evolving industry, it is difficult to evaluate our business and prospects.

We face risks and difficulties frequently experienced by companies operating in rapidly evolving industries, such as the electronic financial services industry. These risks and difficulties include, but are not limited to, our ability to:

- attract and retain broker-dealers and institutional investors on our platform on a cost-effective basis;
- expand and enhance reliable and cost-effective product and service offerings for our clients;
- respond effectively to competitive pressures;
- respond effectively to the loss of any of our significant broker-dealer or institutional investor clients, including due to merger, consolidation, bankruptcy, liquidation or other cause (including, among other things, the collection of any amounts due from such clients);
- diversify our sources of revenues;

- maintain adequate control of our expenses;
- operate, support, expand and develop our operations, technology, website, software, communications and other systems;
- defend our trading platform and other systems from cybersecurity threats;
- manage growth in personnel and operations;
- increase awareness of our brand or market positioning;
- expand our sales and marketing programs;
- take advantage of acquisitions, strategic alliances and other opportunities; and
- respond to regulatory changes or demands.

If we are unsuccessful in addressing these risks or in executing our business strategy, our business, financial condition and results of operations may suffer.

We may not be able to introduce enhanced versions of our electronic trading platform, new services and/or service enhancements in a timely or acceptable manner, which could harm our competitive position.

Our business environment is characterized by rapid technological change, changing and increasingly sophisticated client demands and evolving industry standards. Our future will depend on our ability to develop and introduce new features to, and new versions of, our electronic trading platform. For example, we have responded to the reduction in fixed-income secondary market liquidity that has been experienced since the credit crisis by, among other things, introducing a number of all-to-all trading options for our institutional investor and broker-dealer clients. The success of new features and versions depends on several factors, including the timely completion, introduction and market acceptance of the feature or version. In addition, the market for our electronic trading platform may be limited if prospective clients require customized features or functions that we are unable or unwilling to provide. We cannot assure you that any new features and versions will become or remain successful. If we are unable to anticipate and respond to the demand for new services, products and technologies and develop new features and enhanced versions of our electronic trading platform that achieve widespread levels of market acceptance on a timely and cost-effective basis, it could have a material adverse effect on our business, financial condition and results of operations.

U.S. federal income tax reform could have an adverse impact on the issuance of new debt in the U.S.

In December 2017, the Tax Cuts and Jobs Act (“Tax Act”) was enacted into law and introduced significant changes to U.S. tax and related laws. In addition to a reduction in the U.S. federal tax rate, the Tax Act caps interest deductibility and reduces the incentives for U.S. companies to keep foreign cash outside the U.S. and, as such, may reduce the levels of new corporate debt issuance in the U.S.

Prior to the Tax Act, federal tax laws generally provided a strong incentive for U.S. companies to finance their operations with debt rather than equity, primarily due to the deductibility of interest on debt financing. The Tax Act limits the deduction for interest expense to 30% of an issuer’s adjusted taxable income for taxable years beginning after December 31, 2017 (initially generally keyed to EBITDA and later to EBIT for taxable years beginning after December 31, 2022, possibly resulting in a further increase in the disallowance of interest expense). Debt incurred prior to the passage of the Tax Act is not grandfathered. While issuers may still consider debt financing a viable funding option, the initial reaction to the limitation on interest expense deductibility may be for issuers to consider debt to be less attractive. In addition, because of the cap on interest expense deductibility in the U.S., issuers may be incentivized to issue debt overseas, where an interest deduction may continue to be available and beneficial. A decrease in the issuance of new debt by U.S. issuers could, over time, reduce the size of the secondary market for U.S.

bond trading in which we operate.

Prior to the passage of the Tax Act, earnings of U.S. companies accumulated offshore were generally subject to U.S. tax only when repatriated, with an allowance for foreign taxes previously paid. The Tax Act reduced the U.S. corporate tax rate by 40% and created a territorial system of taxation in which most foreign income is permanently exempt from U.S. tax. The Tax Act's territorial regime removes the "lockout" on overseas earnings of a U.S.-parented group, allowing redeployment or repatriation of those earnings to be utilized for investments (in the US. or other parts of the world), debt repayment, share buybacks, dividends and acquisitions. The ability for U.S. companies to efficiently deploy overseas earnings in the U.S. may reduce the need for such companies to issue new debt in the U.S., which could, over time, reduce the size of the secondary market for U.S. bond trading in which we operate.

The Tax Act could have an adverse impact on the issuance of new debt in the U.S., which could impact the amount of secondary trading volumes in the U.S. bond market. While we are unable to ascertain the exact impact of the Tax Act on new bond issuance compared to other contributing factors, U.S. high-grade and U.S. high-yield new issuance declined by 10.2% and 42.9%, respectively, in 2018 compared to 2017. Any material decline in secondary trading volumes in the U.S. bond market would have a material adverse effect on our business, financial condition, results of operations and prospects.

Risks Related to Competition

We face substantial competition that could reduce our market share and harm our financial performance.

The fixed-income securities industry generally, and the electronic financial services markets in which we operate in particular, are highly competitive, and we expect competition to intensify in the future. We will continue to compete with bond trading conducted directly between broker-dealers and their institutional investor clients over the telephone or electronically. In addition, our current and prospective competitors are numerous and include:

- other multi-party trading companies;
- market data and information vendors;
- securities and futures exchanges;
- inter-dealer brokerage firms;
- electronic communications networks;
- technology, software, and information services or other companies that have existing commercial relationships with broker-dealers or institutional investors; and
- other electronic marketplaces that are not currently in the securities business.

Many of our current and potential competitors are more established and substantially larger than we are and have substantially greater market presence, as well as greater financial, technical, marketing and other resources. These competitors may aggressively reduce their pricing to enter into, or otherwise compete in, market segments in which we provide services, potentially subsidizing any losses with profits from trading in other fixed-income or equity securities or other business operations. In addition, many of our competitors offer a wider range of services, have broader name recognition and have larger customer bases than we do. Some of them may be able to respond more quickly to new or evolving opportunities, technologies and customer requirements than we can and may be able to undertake more extensive promotional activities.

Any combination of our competitors may enter into joint ventures or consortia to provide services similar to those provided by us. Current and new competitors can launch new platforms at a relatively low cost. Others may acquire the capabilities necessary to compete with us through acquisitions. We expect that we will potentially compete with a variety of companies with respect to each product or service we offer. If we are not able to compete successfully in the future, our business, financial condition and results of operations would be adversely affected.

Our operations also include the sale of information and analytical tools under our BondTicker® and Trax® brands and post-trade services, such as pre-settlement trade matching and transaction reporting and transparency services for the European markets. There is a high degree of competition in data, pricing and post-trade products and services and such businesses may become more competitive in the future as new competitors emerge. Our information products and post-trade and services lines may be threatened by new regulations, market trends or technologies that reduce their value. If we are not able to compete successfully in the future, our revenues could be adversely impacted and, as a result, our businesses, financial condition and results of operations would be adversely affected.

Risks Related to our Future Levels of Business, Profitability and Growth

Neither the sustainability of our current level of business nor any future growth can be assured. Even if we do experience growth, we cannot assure you that we will grow profitably.

The success of our business strategy depends, in part, on our ability to maintain and expand the network of broker-dealer and institutional investor clients that use our electronic trading platform. Our business strategy also depends on increasing the use of our platform by these clients for a wide range of fixed-income products and trade sizes. Individuals at broker-dealers or institutional investors may have conflicting interests, which may discourage their use of our platform. We cannot assure you that the growth of electronic means of trading securities that we have experienced in recent years will continue.

Our growth may also be dependent on our ability to diversify our revenue base. We currently derive approximately 49.8% of our revenues from secondary trading in U.S. high-grade corporate bonds. Our long-term business strategy includes expanding our service offerings and increasing our revenues from other fixed-income products and other sources. We cannot assure you that our efforts will be successful or result in increased revenues or continued profitability. We have experienced significant growth in trading volumes, revenues and profitability in recent years. We cannot assure you that our business will continue to grow at a similar rate, if at all.

We may enter into new fee plans, the impact of which may be difficult to evaluate; past trends in commissions are not necessarily indicative of future commissions.

From time to time, we may introduce new fee plans for the market segments in which we operate. Any new fee plan may include different fee structures or provide volume incentives. We cannot assure you that any new fee plans will result in an increase in the volume of transactions executed over our platform or that our revenues will increase as a result of the implementation of any such fee plans. It is possible that our broker-dealer or institutional investor clients could respond to a new fee plan by either reducing the amount of their business conducted on our platform or terminating their contractual relationship with us, which could have an adverse impact on our fees and otherwise have a material adverse effect on our business, financial condition and results of operations.

In addition, under certain of our fee plans, our fees are designated in basis points in yield (and, as a result, are subject to fluctuation depending on the duration of the bond traded) or our fees vary based on trade size or maturity. We anticipate that our average fees per million may vary in the future due to changes in yield, years-to-maturity and nominal size of bonds traded on our platform. Consequently, past trends in commissions are not necessarily indicative of future commissions.

If we experience significant fluctuations in our operating results or fail to meet revenue and earnings expectations, our stock price may fall rapidly and without advance notice.

Our revenues and operating results may fluctuate due to a number of factors, including:

- the unpredictability of the financial services industry;
- difficulty in quickly adjusting our expense base if revenues fall short of expectations;
- our ability to retain existing broker-dealer and institutional investor clients and attract new broker-dealer and institutional investor clients;
- our ability to drive an increase in the use of our electronic trading platform by new and existing broker-dealer and institutional investor clients;
- changes in our fee plans;
- the introduction of new features on our electronic trading platform;
- the effectiveness of our sales force;
- new product and service introductions by us or our competitors;
- fluctuations in overall market trading volume or our market share for our key products;
- technical difficulties or interruptions in our service;
- general economic conditions in our geographic markets;
- additional investment in our services or operations; and
- new regulations that limit or affect how our electronic trading platform can operate or which increase our regulatory compliance costs.

As a result, our operating results may fluctuate significantly on a quarterly basis, which could result in decreases in our stock price.

As we enter new markets, we may not be able to successfully attract clients and adapt our technology and marketing strategy for use in those markets.

Our strategy includes leveraging our electronic trading platform to enter new markets, such as our recent entry into the municipal bond and leveraged loan markets. However, we cannot assure you that we will be able to successfully adapt our proprietary software and technology for use in these and other markets. Even if we do adapt our software and technology, we cannot assure you that we will be able to attract clients and compete successfully in any such new markets. We cannot assure you that our marketing efforts or our pursuit of any of these opportunities will be successful. If these efforts are not successful, we may realize less than expected earnings, which in turn could result in a decrease in the market value of our common stock. Furthermore, these efforts may divert management attention or inefficiently utilize our resources.

Risks Related to our Geographic and Customer Concentration

Our businesses are geographically concentrated and could be significantly affected by an adverse change in the regions in which we operate.

Historically, our business operations have been substantially located in the U.S. and the U.K. While we are expanding our businesses to new geographic areas, we are still highly concentrated in these areas. Accordingly, our businesses are exposed to adverse regulatory and competitive changes, economic downturns and changes in political conditions in these two countries, such as Brexit. Moreover, due to the concentration of our operations in these areas, such operations are less diversified and, accordingly, are subject to greater regional risks than those of some of our competitors. If we are unable to identify and successfully manage or mitigate these risks, our businesses, financial condition, results of operations and prospects could be materially adversely affected.

We are dependent on our broker-dealer clients, who are not restricted from using their own proprietary or third-party platforms to transact with our institutional investor clients.

We rely on our broker-dealer clients to provide liquidity on our electronic trading platform by posting bond prices on our platform for bonds in their inventory and responding to institutional investor client inquiries. The contractual obligations of our broker-dealer clients to us are minimal, non-exclusive and terminable by such clients. Our broker-dealer clients buy and sell fixed-income securities through traditional methods, including by telephone and e-mail messaging, and through other electronic trading platforms. Some of our broker-dealer clients have developed electronic trading networks that compete with us or have announced their intention to explore the development of such electronic trading networks, and many of our broker-dealer and institutional investor clients are involved in other ventures, including other electronic trading platforms or other distribution channels, as trading participants and/or as investors. These competing trading platforms may offer some features that we do not currently offer. Accordingly, there can be no assurance that such broker-dealers' primary commitments will not be to one of our competitors.

In the U.S., the Volcker Rule section of the Dodd-Frank Act bans proprietary trading by banks and their affiliates, which has adversely affected our bank-affiliated broker-dealer clients' ability to make markets in a variety of fixed-income securities. If bank-affiliated entities reduce their trading activity and that activity is not replaced by other market participants, the level of liquidity and pricing available on our trading platform would be negatively impacted, which could adversely affect our operating results. In addition, over the past several years, there has been significant consolidation among firms in the banking and financial services industries and several of our large broker-dealer clients have reduced their sales and trading businesses in fixed-income products. Further consolidation, instability, and layoffs in the financial services industry could result in a smaller client base and heightened competition, which may lower volumes.

Any reduction in the use of our electronic trading platform by our broker-dealer clients could reduce the volume of trading on our platform, which could, in turn, reduce the use of our platform by our institutional investor clients. The occurrence of any of the foregoing may have a material adverse effect on our business, financial condition and results of operations.

We could lose significant sources of revenue and trading volume if we lose any of our significant institutional investor clients.

We rely on our institutional investor clients to launch inquiries over our trading platform and, increasingly, to provide liquidity through our Open Trading protocols. A limited number of such clients can account for a significant portion of our trading volume. The obligations of our institutional investor clients to us under our standard contractual agreements are minimal, non-exclusive and terminable by such clients. Our institutional investor clients also buy and sell fixed-income securities through traditional methods, including by telephone and e-mail messaging, and through other electronic trading platforms.

There can be no assurance that we will be able to retain our major institutional investor clients or that such clients will continue to use our trading platform. The loss of a major institutional investor client or any reduction in the use of our electronic trading platform by such clients could have a material adverse effect on our business, financial condition and results of operations.

Credit and Market Risks

We are exposed to risks in connection with certain transactions in which we act as a matched principal intermediary.

In connection with our anonymous Open Trading protocols, we execute certain bond transactions between and among institutional investor and broker-dealer clients on a matched principal basis by serving as counterparty to both the buyer and the seller in trades which are then settled through a third-party clearing broker. Settlement typically occurs within one to two trading days after the trade date. Cash settlement of the transaction occurs upon receipt or delivery of the underlying instrument that was traded.

We are exposed to credit and performance risks in our role as matched principal trading counterparty to our clients executing Open Trading trades on our platform, including the risk that counterparties that owe us money or securities will not perform their obligations. These parties may default on their obligations to us due to bankruptcy, lack of liquidity, operational failure or other reasons. Adverse movements in the prices of securities that are the subject of these transactions can increase our risk. In connection with Open Trading or other anonymous protocols, we expect that the number of transactions in which we act as a matched principal will increase.

In the process of executing matched principal transactions, miscommunications and other errors by our clients or us can arise that involve substantial risks of liability. These risks include, among others, potential liability from disputes over the terms of a trade, the settlement of the trade, or claims that we resolved an error trade dispute incorrectly or that a system malfunction or delay caused monetary loss to a client. In addition, because of the ease and speed with which trades can be executed on our electronic platform, clients can lose substantial amounts by inadvertently entering trade instructions or by entering trade orders inaccurately. A significant error trade or a large number of error trades could result in participant dissatisfaction and a decline in participant willingness to trade on our electronic platform. Although we maintain error trade policies designed to protect our Open Trading participants and enable us to manage the risks attendant in acting as a matched principal counterparty, depending on the cause, number and value of the trades that are the subject of an alleged error or dispute, such trades have the potential to have a material adverse effect on our financial condition and results of operations. In addition, if we are required to hold a securities position as a result of an error, there may also be financing costs or regulatory capital charges required to be taken by us.

We have policies and procedures in place to identify and manage our credit risk. In connection with the recent growth of our Open Trading protocols, we have implemented additional automated controls to help us manage our credit risk exposure. There can be no assurance that the policies, procedures and automated controls we use to manage this credit risk will effectively mitigate our credit risk exposure. Some of our risk management procedures are reliant upon the evaluation of information regarding the fixed- income markets, our clients or other relevant matters that are publicly available or otherwise acquired from third party sources. Such information may not be accurate, complete, up-to-date or properly assessed and interpreted by us. If our risk management procedures fail, our business, financial condition and results of operations may be adversely affected. Furthermore, our insurance policies are unlikely to provide coverage for such risks.

We cannot assure you that our compliance and risk management methods will be effective and our financial condition and results of operations may be materially and adversely affected if they fail.

The fixed-income products that can be traded through our Open Trading functionality, as well as our investments in fixed and variable rate debt financial instruments, are subject to significant interest-rate and foreign currency exchange rate risks. To manage these and the risks inherent in our business, we must maintain effective policies, procedures and systems that enable us to identify, monitor and control our exposure to financial, legal, regulatory, operational and market risks. Our risk-management methods are based on internally developed controls, observed historical market behavior and what we believe to be industry practices. Our risk-management methods may prove to be ineffective because of their design, their implementation or the lack of adequate, accurate or timely information. Our risk management methods may also fail to identify a risk or understand a risk that might result in losses. If our risk-management policies and efforts are ineffective, we could suffer losses that could have a material adverse effect on our financial condition and operating results.

We must rely upon our analysis of information regarding markets, personnel, clients or other matters that is publicly available or otherwise accessible to us. That information may not in all cases be accurate, complete, up-to-date or properly analyzed. Furthermore, we rely on a combination of technical and human controls and supervision that are subject to error and potential failure, the challenges of which are exacerbated by the 24-hour-a-day, global nature of our business.

Our success in complying with complex and changing laws and navigating risks in various jurisdictions and markets depends on our maintenance of compliance, auditing and reporting systems and risk management procedures, as well as our ability to recruit and retain qualified compliance and risk management personnel. While we have developed policies and procedures to identify, monitor and manage our legal, regulatory, operational and market risks, we cannot assure you that our systems will always be effective in monitoring or evaluating the risks to which we are exposed.

Technology and IT Systems Risks

Rapid market or technological changes may render our technology obsolete or decrease the attractiveness of our products and services to our broker-dealer and institutional investor clients.

We must continue to enhance and improve our electronic trading platform. The electronic financial services industry is characterized by significant structural changes, increasingly complex systems and infrastructures, changes in clients' needs and preferences and new business models. If new industry standards and practices emerge and our competitors release new technology before us, our existing technology, systems and electronic trading platform may become obsolete or our existing business may be harmed. Our future success will depend on our ability to:

- enhance our existing products and services;
- develop and/or license new products and technologies that address the increasingly sophisticated and varied needs of our broker-dealer and institutional investor clients and prospective clients;
- continue to attract highly-skilled technology personnel; and
- respond to technological advances and emerging industry standards and practices on a cost-effective and timely basis.

Developing our electronic trading platform and other technology entails significant technical and business risks. We may use new technologies ineffectively or we may fail to adapt our electronic trading platform, information databases and network infrastructure to broker-dealer or institutional investor client requirements or emerging industry standards. If we face material delays in introducing new services, products and enhancements, our broker-dealer and institutional investor clients may forego the use of our products and use those of our competitors.

Further, the adoption of new internet, networking, telecommunications or blockchain technologies may require us to devote substantial resources to modify and adapt our services. We cannot assure you that we will be able to successfully implement new technologies or adapt our proprietary technology and transaction-processing systems to client requirements or emerging industry standards. We cannot assure you that we will be able to respond in a timely manner to changing market conditions or client requirements.

We depend on third-party suppliers for key products and services.

We rely on a number of third parties to supply elements of our trading, information and other systems, as well as computers and other equipment, and related support and maintenance. We cannot assure you that any of these providers will be willing and able to continue to provide these services in an efficient, cost-effective manner, if at all, or that they will be able to adequately expand their services to meet our needs. If we are unable to make alternative arrangements for the supply of critical products or services in the event of a malfunction of a product or an interruption in or the cessation of service by an existing service provider, our business, financial condition and results of operations could be materially adversely affected.

In particular, we depend on third-party vendors for our bond reference databases and the clearing and settlement of our Open Trading transactions. Disruptions in the services provided by those third-parties to us, including as a result of their inability or unwillingness to continue to license products or provide services that are critical to the success of our business, could have a material adverse effect on our business, financial condition and results of operations.

We also rely, and expect in the future to continue to rely, on third parties for various computer and communications systems, such as telephone companies, online service providers, data processors, cloud computing and software and hardware vendors. Other third parties provide, for instance, our data center, telecommunications access lines and significant computer systems and software licensing, support and maintenance services. Any interruption in these or other third-party services or deterioration in their performance could impair the quality of our service. We cannot be certain of the financial viability of all of the third parties on which we rely.

We license software from third parties, much of which is integral to our electronic trading platform and our business. We also hire contractors to assist in the development, quality assurance testing and maintenance of our electronic trading platform and other systems. Continued access to these licensors and contractors on favorable contract terms or access to alternative software and information technology contractors is important to our operations. Adverse changes in any of these relationships could have a material adverse effect on our business, financial condition and results of operations.

We attempt to negotiate favorable pricing, service, confidentiality and intellectual property ownership or licensing and other terms in our contracts with our third-party service providers. These contracts usually have multi-year terms. However, there is no guarantee that these contracts will not terminate and that we will be able to negotiate successor agreements or agreements with alternate service providers on competitive terms. Further, the existing agreements may bind us for a period of time to terms and technology that become obsolete as our industry and our competitors advance their own operations and use of technology.

Our success depends on maintaining the integrity and capacity of our electronic trading platform, systems and infrastructure.

In order to be successful, we must provide reliable, secure, real-time access to our electronic trading platform for our clients. If our electronic trading platform is hampered by slow delivery times, unreliable service or insufficient capacity, our clients may decide to stop using our platform, which would have a material adverse effect on our business, financial condition and results of operations.

As our operations grow in both size and scope, we will need to continually improve and upgrade our electronic trading platform and infrastructure to accommodate potential increases in order message volume and trading volume, the trading practices of new and existing clients, regulatory changes and the development of new and enhanced trading platform features, functionalities and ancillary products and services. The expansion of our electronic trading platform and infrastructure has required, and will continue to require, substantial financial, operational and technical resources. These resources will typically need to be committed well in advance of any actual increase in trading volumes and order messages. We cannot assure you that our estimates of future trading volumes and order messages will be accurate or that our systems will always be able to accommodate actual trading volumes and order messages without failure or degradation of performance. Furthermore, we use new technologies to upgrade our established systems, and the development of these new technologies also entails technical, financial and business risks. We cannot assure you that we will successfully implement new technologies or adapt our existing electronic trading platform, technology and systems to the requirements of our broker-dealer and institutional investor clients or to emerging industry standards. The inability of our electronic trading platform to accommodate increasing trading volume and order messages would also constrain our ability to expand our business.

Our computer systems may suffer failures and business interruptions that could increase our operating costs and cause us to lose clients.

We cannot assure you that we, or our third-party service providers, will not experience systems failures. Our electronic trading platform, computer and communication systems and other operations are vulnerable to damage, interruption or failure as a result of, among other things:

- irregular or heavy use of our electronic trading platform during peak trading times or at times of unusual market volatility;
- power, internet or telecommunications failures, hardware failures or software errors;
- human error;
- computer viruses, acts of vandalism or sabotage (and resulting potential lapses in security), both internal and external;
- natural disasters, fires, floods, widespread health emergencies or other acts of God;
- acts of war or terrorism (including cyberterrorism) or other armed hostility;
- cybersecurity breaches; and
- loss of support services from third parties, including those to whom we outsource aspects of our computer infrastructure critical to our business.

In the event that any of our systems, or those of our third-party providers, fail or operate slowly, it may cause any one or more of the following to occur:

- unanticipated disruptions in service to our clients;
- distribution of untimely or inaccurate market data to customers who rely on this data for their trades;
- slower response times or delays in our clients’ trade execution;
- incomplete or inaccurate accounting, recording or processing of trades;
- financial losses and liabilities to clients;

- litigation or other claims against us, including formal complaints to industry regulatory organizations; and
- regulatory inquiries, proceedings or sanctions.

Any system failure that causes an interruption in service or decreases the responsiveness of our service could damage our reputation, business and brand name and lead our clients to decrease or cease their use of our electronic trading platform.

In these circumstances, if we were unable to execute our disaster recovery plans, or our redundant systems and disaster recovery plans proved insufficient for the particular situation, it could have a material adverse effect on our business. Similarly, although many of our contracts with our service providers require them to have disaster recovery plans, we cannot be certain that these will be adequate or implemented properly. In addition, our business interruption insurance may not adequately compensate us for losses that may occur.

It is also a risk that we will not have sufficient personnel to properly respond to all such system problems. Our disaster recovery plans are heavily reliant on the availability of the internet and mobile phone technology, so any disruption of those systems would likely affect our ability to recover promptly from a crisis situation.

We internally support and maintain many of our computer systems and networks, including those underlying our electronic trading platform. Our failure to monitor or maintain these systems and networks or, if necessary, to find a replacement for this technology in a timely and cost-effective manner would have a material adverse effect on our business, financial condition and results of operations.

Cybersecurity Risks

Malicious cyber-attacks and other adverse events affecting our operational systems or infrastructure, or those of third parties, could disrupt our businesses, result in the disclosure of confidential information, damage our reputation and cause losses or regulatory penalties.

The operation of our electronic trading platform relies on the secure processing, storage and transmission of a large amount of transactional data and other confidential sensitive data (including confidential client and personal information). Although we take protective measures such as security-related software programs, firewalls and similar technology to maintain the confidentiality, integrity and availability of our and our customers' information, and endeavor to modify these protective measures as circumstances warrant, the nature of cyber threats continues to evolve. As a result, our computer systems, software and networks may be vulnerable to unauthorized access, loss or destruction of data (including confidential and personal customer information), unavailability or disruption of service, computer viruses, acts of vandalism, or other malicious code, cyber-attack and other adverse events that could have an adverse security impact. Despite the defensive measures we have taken, we are subject to threats, which may come from external factors such as governments, organized crime, hackers, and other third parties such as infrastructure-support providers and application developers, or may originate internally from an employee or service provider to whom we have granted access to our computer systems. If our security measures are breached as a result of third-party action, employee error, malfeasance or otherwise, and, as a result, someone obtains unauthorized access to trading or other confidential or personal information, our reputation could be damaged, our business would suffer and we could incur material liability. Any such breach could compromise our networks and the information stored there could be accessed, publicly disclosed, lost or stolen. Because techniques used to obtain unauthorized access or to sabotage computer systems change frequently and generally are not recognized until launched against a target, we may be unable to anticipate these techniques or to implement adequate preventive measures.

We also face the risk of operational disruption, failure or capacity constraints of any of the third party service providers that facilitate our business activities, including clients, clearing agents and network or data providers. Such parties could also be the source of a cyber-attack on or breach of our operational systems, data or infrastructure.

There have been an increasing number of cyber-attacks in recent years in various industries, including ours, and cyber-security risk management has been the subject of increasing focus by our regulators. If one or more cyber-attacks occur, it could potentially jeopardize the confidential, proprietary and other information processed and stored in, and transmitted through, our computer systems and networks, or otherwise cause interruptions or malfunctions in our, as well as our customers' or other third parties', operations, which could result in reputational damage, financial losses, customer dissatisfaction and/or regulatory penalties, which may not in all cases be covered by insurance. Any such cyber incidents involving our computer systems and networks, or those of third parties important to our businesses, could have a material adverse effect on our businesses, financial condition, results of operations and prospects.

Our regulators in recent years have increased their examination and enforcement focus on matters relating to cybersecurity threats, including the assessment of firms' vulnerability to cyber-attacks. In particular, regulatory concerns have been raised about firms establishing effective cybersecurity governance and risk management policies, practices and procedures; protecting firm networks and information; identifying and addressing risks associated with clients, vendors, and other third parties; preventing and detecting unauthorized activities; adopting effective mitigation and business continuity plans to address the impact of cybersecurity breaches; and establishing protocols for reporting cybersecurity incidents. While any insurance that we may have that covers a specific cybersecurity incident may help to prevent our realizing a significant loss from the incident, it would not protect us from the effects of adverse regulatory actions that may result from the incident or a finding that we had inadequate cybersecurity controls, including the reputational harm that could result from such regulatory actions.

Our remediation costs and lost revenues could be significant if we fall victim to a cyber-attack. If an actual, threatened or perceived breach of our security occurs, the market perception of the effectiveness of our security measures could be harmed and could cause our clients to reduce or stop their use of our electronic trading platform. We may be required to expend significant resources to repair system damage, protect against the threat of future security breaches or to alleviate problems, including reputational harm, loss of clients and revenues and litigation, caused by any breaches. We may be found liable to our clients for any misappropriated confidential or personal information. Although we intend to continue to implement industry-standard security measures, we cannot assure you that those measures will be sufficient.

Intellectual Property Risks

We may not be able to protect our intellectual property rights or technology effectively, which would allow competitors to duplicate or replicate our electronic trading platform or any of our other current or future products or services. This could adversely affect our ability to compete.

Intellectual property is critical to our success and ability to compete, and if we fail to protect our intellectual property rights adequately, our competitors might gain access to our technology. We rely primarily on a combination of patent, copyright, trademark and trade secret laws in the United States and other jurisdictions, as well as license agreements, third-party non-disclosure and other agreements and other contractual provisions and technical measures to protect our intellectual property rights. We attempt to negotiate beneficial intellectual property ownership provisions in our contracts and also require employees, consultants, advisors and collaborators to enter into confidentiality agreements in order to protect the confidentiality of our proprietary information. We have been issued 13 patents covering aspects of our technology and/or business, but can give no assurances that any such patents will protect our business and processes from competition or that any patents applied for in the future will be issued. Additionally, laws and our contractual terms may not be sufficient to protect our technology from use or theft by third parties. For instance, a third party might reverse engineer or otherwise obtain and use our technology without our permission and without our knowledge, thereby infringing our rights and allowing competitors to duplicate or replicate our products. Furthermore, we cannot assure you that these protections will be adequate to prevent our competitors from independently developing technologies that are substantially equivalent or superior to our technology.

We may have legal or contractual rights that we could assert against illegal use of our intellectual property rights, but lawsuits claiming infringement or misappropriation are complex and expensive, and the outcome would not be certain. In addition, the laws of some countries in which we now or in the future provide our services may not protect software and intellectual property rights to the same extent as the laws of the United States.

Defending against intellectual property infringement or other claims could be expensive and disruptive to our business. If we are found to infringe the proprietary rights of others, we could be required to redesign our products, pay royalties or enter into license agreements with third parties.

In the technology industry, there is frequent litigation based on allegations of infringement or other violations of intellectual property rights. As the number of participants in our market increases and the number of patents and other intellectual property registrations increases, the possibility of an intellectual property claim against us grows. Although we have never been the subject of a material intellectual property dispute, we cannot assure you that a third party will not assert in the future that our technology or the manner in which we operate our business violates its intellectual property rights. From time to time, in the ordinary course of our business, we may become subject to legal proceedings and claims relating to the intellectual property rights of others, and we expect that third parties may assert intellectual property claims against us, particularly as we expand the complexity and scope of our business, the number of electronic trading platforms increases and the functionality of these platforms further overlaps. Any claims, whether with or without merit, could:

- be expensive and time-consuming to defend;
- prevent us from operating our business, or portions of our business;
- cause us to cease developing, licensing or using all or any part of our electronic trading platform that incorporates the challenged intellectual property;
- require us to redesign our products or services, which may not be feasible;
- result in significant monetary liability;
- divert management's attention and resources; and
- require us to pay royalties or enter into licensing agreements in order to obtain the right to use necessary technologies, which may not be possible on commercially reasonable terms.

We cannot assure you that third parties will not assert infringement claims against us in the future with respect to our electronic trading platform or any of our other current or future products or services or that any such assertion will not require us to cease providing such services or products, try to redesign our products or services, enter into royalty arrangements, if available, or engage in litigation that could be costly to us. Any of these events could have a material adverse effect on our business, financial condition and results of operations.

Risks Related to Possible Transactions or Investments

If we acquire or invest in other businesses, products or technologies, we may be unable to integrate them with our business, our financial performance may be impaired or we may not realize the anticipated financial and strategic goals for any such transactions.

We have in the past and may in the future acquire or invest in companies, products or technologies that we believe are strategic. Despite our efforts, we may not be able to identify, negotiate or finance any future acquisition or investment successfully. If we do succeed in acquiring or investing in a business, product or technology, such acquisitions and investments may involve a number of risks, including:

- we may find that the acquired company or assets do not further our business strategy, or that we overpaid for the company or assets, or the economic conditions underlying our acquisition decision may change;
- we may have difficulty integrating the acquired technologies or products with our existing electronic trading platform, products and services;
- we may have difficulty integrating the operations and personnel of the acquired business, or retaining the key personnel of the acquired business;
- there may be client confusion if our services overlap with those of the acquired company and we may have difficulty retaining key customers, vendors and other business partners of the acquired business;
- our ongoing business and management’s attention may be disrupted or diverted by transition or integration issues and the complexity of managing geographically or culturally diverse enterprises;
- entry into markets in which we have limited experience and where competitors hold stronger market positions;
- potential failure of the due diligence processes to identify significant problems, liabilities or other challenges of an acquired company or product; and
- exposure to litigation or other claims in connection with, or inheritance of claims or litigation risk as a result of, an acquisition, including but not limited to, claims from terminated employees, customers, former stockholders or other third parties.

These factors could have a material adverse effect on our business, financial condition, results of operations and cash flows, particularly in the case of a larger acquisition or multiple acquisitions in a short period of time. From time to time, we may enter into negotiations for acquisitions or investments that are not ultimately consummated. Such negotiations could result in significant diversion of management time, as well as out-of-pocket costs.

The consideration paid in connection with an investment or acquisition also affects our financial results. If we were to proceed with one or more significant acquisitions in which the consideration included cash, we could be required to use a substantial portion of our available cash to consummate any acquisition. To the extent we issue shares of capital stock or other rights to purchase capital stock, including options or other rights, existing stockholders may be diluted and earnings per share may decrease. In addition, acquisitions may result in the incurrence of debt, large one-time write-offs, such as of acquired in-process research and development costs, and restructuring charges.

Our investments in expanding our information and post-trade services businesses may not produce substantial revenue or profit.

With respect to our information services and post-trade services businesses, we may incur substantial development, sales and marketing expenses and expend significant management effort to create a new product or service. Even after incurring these costs, we ultimately may not sell any or sell only small amounts of these products or services. Consequently, if revenue does not increase in a timely fashion as a result of these expansion and development initiatives, the up-front costs associated with them may exceed the related revenue and reduce our working capital and income.

We may be required to recognize impairments of our goodwill or other intangible assets, which could adversely affect our results of operations or financial condition.

The determination of the value of goodwill and other intangible assets requires management to make estimates and assumptions that affect our consolidated financial statements. We test for impairment of goodwill on an annual basis, at year-end, or more frequently if there are changed circumstances. We assess intangible assets for impairment when events or circumstances indicate the existence of a possible impairment.

Determining the fair value of certain assets acquired and liabilities assumed is judgmental in nature and requires management to use significant estimates and assumptions, including assumptions with respect to future cash flows, discount rates, growth rates and asset lives. Any future acquisition may result in goodwill and other intangible assets that are subject to impairment tests, which could result in future impairment charges.

Risks Related to Key Personnel and Employees

We are dependent on our management team, and the loss of any key member of this team may prevent us from implementing our business plan in a timely manner.

Our success depends largely upon the continued services of our executive officers and other key personnel, particularly Richard M. McVey, Chief Executive Officer and Chairman of our Board of Directors. The terms of Mr. McVey’s employment agreement with us do not require him to continue to work for us and allow him to terminate his employment at any time, subject to certain notice requirements and forfeiture of non-vested equity compensation awards. We do not maintain “key person” life insurance on any of our executive officers and other key personnel. Any loss or interruption of Mr. McVey’s services or that of one or more of our other executive officers or key personnel for any reason, as well as any negative market or industry perception arising from such loss or interruption, could result in our inability to manage our operations effectively and/or pursue our business strategy.

Because competition for our employees is intense, we may not be able to attract and retain the highly skilled employees we need to support our business.

We strive to provide high-quality services that will allow us to establish and maintain long-term relationships with our broker-dealer and institutional investor clients. Our ability to provide these services and maintain these relationships, as well as our ability to execute our business plan generally, depends in large part upon our employees. We must attract and retain highly qualified personnel. Competition for these personnel is intense, especially for software engineers with extensive experience in designing and developing software and internet-related services, hardware engineers, technicians, product managers and senior sales executives.

The market for qualified personnel has become increasingly competitive as an increasing number of existing and new competitors focus on the electronic trading of credit products.   Many of these competitive ventures are interested in hiring our experienced technology personnel and our qualified sales staff. Additionally, highly innovative technology firms may offer attractive employment opportunities to our technology personnel. Many of these firms have greater resources than we have and are able to offer more lucrative compensation packages. In addition, in making employment decisions, particularly in the internet, high-technology and financial services industries, job candidates often consider the total compensation package offered, including the value of the stock-based compensation they are to receive in connection with their employment. Significant volatility in the price of our common stock may adversely affect our ability to attract or retain key employees. We cannot assure you that we will be successful in our efforts to recruit and retain the required personnel. The failure to attract new personnel or to retain and motivate our current personnel may have a material adverse effect on our business, financial condition and results of operations.

Regulatory Risks

We operate in a highly regulated industry and we may face restrictions with respect to the way we conduct certain of our operations.

Our business is subject to increasingly extensive governmental and other regulations. These regulations are designed to protect public interests generally rather than the interests of our stockholders. The SEC, FINRA, the CFTC and other agencies extensively regulate the United States financial services industry, including most of our operations in the United States. Much of our international operations are subject to similar regulations in their respective jurisdictions, including regulations overseen by the FCA in the United Kingdom, the AFM in the Netherlands, the Swiss Financial Market Supervisory Authority in Switzerland, the Monetary Authority of Singapore, the Hong Kong Securities and Futures Commission, the Investment Industry Regulatory Organization of Canada and provincial regulators in Canada, and the Securities and Exchange Commission and Central Bank in Brazil. In addition, Xtrakter is registered as an ARM and APA with the FCA and the AFM.

As a matter of public policy, these regulatory bodies are responsible for safeguarding the integrity of the securities and other financial markets and protecting the interests of investors in those markets. These regulatory bodies have broad powers to promulgate and interpret, investigate and sanction non-compliance with their laws, rules and regulations.

Most aspects of our broker-dealer and other licensed subsidiaries are highly regulated, including:

- the way we deal with our clients;
- our capital requirements;
- our financial and regulatory reporting practices;
- required record-keeping and record retention procedures;
- the licensing of our employees; and
- the conduct of our directors, officers, employees and affiliates.

We cannot assure you that we and/or our directors, officers and employees will be able to fully comply with these laws, rules and regulations. If we fail to comply with any of these laws, rules or regulations, we may be subject to censure, fines, cease-and-desist orders, suspension of our business, suspensions of personnel or other sanctions, including revocation of our membership in FINRA and registration as a broker-dealer.

Certain of our regulated subsidiaries, including our registered broker-dealer and MTF, are subject to U.S. or foreign regulations which prohibit repayment of borrowings from us or our affiliates, paying cash dividends, making loans to us or our affiliates or otherwise entering into transactions that result in a significant reduction in regulatory net capital or financial resources, without prior notification to or approval from such subsidiary’s principal regulator. MarketAxess SEF Corporation is registered with the CFTC as a SEF and is required, among other things, to maintain sufficient financial resources to cover operating costs for at least one year.

Our authority to operate our platform in a jurisdiction is dependent on continued registration or authorization in that jurisdiction or the maintenance of a proper exemption from such registration or authorization. Our ability to comply with all applicable laws and rules is largely dependent on our compliance, credit approval, audit and reporting systems and procedures, as well as our ability to attract and retain qualified compliance, credit approval, audit and risk management personnel. Our systems and procedures may not be sufficiently effective to prevent a violation of all applicable rules and regulations. In addition, the growth and expansion of our business may create additional strain on our compliance systems, procedures and personnel and has resulted, and we expect will continue to result, in increased costs to maintain and improve these systems.

In addition, because our industry is heavily regulated, regulatory approval may be required in order to continue or expand our business activities and we may not be able to obtain the necessary regulatory approvals on a timely basis, if at all. Even if approvals are obtained, they may impose restrictions on our business or we may not be able to continue to comply with the terms of the approvals or applicable regulations. The implementation of unfavorable regulations or unfavorable interpretations of existing regulations by courts or regulatory bodies could require us to incur significant compliance costs or cause the development or continuation of business activities in affected markets to become impractical. For a further description of the regulations which may limit our activities, see "Item 1. Business—Government Regulation."

Some of our subsidiaries are subject to regulations regarding changes in control of their ownership. These regulations generally provide that regulatory approval must be obtained in connection with any transaction resulting in a change in control of the subsidiary, which may include changes in control of MarketAxess. As a result of these regulations, our future efforts to sell shares or raise additional capital may be delayed or prohibited in circumstances in which such a transaction would give rise to a change in control as defined by the applicable regulatory body.

Our business and the trading businesses of many of our clients are subject to increasingly extensive government and other regulation, which may affect our trading volumes and increase our cost of doing business.

The financial services industry, in general, is heavily regulated. Proposals for legislation further regulating the financial services industry are continually being introduced in the United States Congress, in state legislatures and by foreign governments. The government agencies that regulate us continuously review legislative and regulatory initiatives, may adopt new or revised laws and regulations and have broad powers to investigate and enforce compliance and punish noncompliance with their rules, regulations and industry standards of practice. In light of recent conditions in the global financial markets and economy, regulators have increased their focus on the regulation of the financial services industry. We are unable to predict which of these proposals will be implemented or in what form, or whether any additional or similar changes to statutes or regulations, including the interpretation or implementation thereof, will occur in the future. Any such action could affect us in substantial and unpredictable ways and could have an adverse effect on our business, financial condition and results of operations.

Our business and that of our clients are also affected by the policies adopted by the Federal Reserve and international central banking authorities, which may affect the credit quality of our customers or increase the cost for our customers to trade the instruments on our platform. In addition, such changes in monetary policy may directly impact our cost of funds for capital raising and investment activities and may impact the value of financial instruments we hold. Changes in domestic and international monetary policy are beyond our control and are difficult to predict.

In addition, regulatory bodies in Europe have recently developed new rules for the fixed-income markets. MiFID II and MiFIR were implemented in January 2018 and introduced significant changes in market structure designed to: (i) enhance pre- and post-trade transparency for fixed-income instruments with the scope of requirements calibrated for liquidity, (ii) increase and enhance post-trade reporting obligations with a requirement to submit post-trade data to ARMs, (iii) ensure trading of certain derivatives occurs on regulated trading venues and (iv) establish a consolidated tape for trade data. MiFID II has caused us to expend significantly more compliance, business and technology resources, incur additional operational costs and create additional regulatory exposure for our trading and post-trade businesses. There is also increasing public concern regarding data privacy and data protection and many jurisdictions have passed laws in this area, such as the European Union General Data Protection Regulation, and other jurisdictions are considering imposing additional restrictions. These laws and regulations are increasing in complexity and number, change frequently and increasingly conflict among the various countries in which we operate. We cannot predict the extent to which any of these new regulations or future regulatory changes will impact our European business and operations, but they may increase our compliance risk and cost, and have an adverse effect on our business, financial condition and results of operations.

Any changes in laws or regulations or in governmental policies could have a material adverse effect on our business, financial condition and results of operations. Our industry has been and is subject to continuous regulatory changes and may become subject to new regulations or changes in the interpretation or enforcement of existing regulations, which could require us to incur significant compliance costs or cause the development and growth of impacted markets to become impractical. For example, the Volcker Rule section of the Dodd-Frank Act bans proprietary trading by banks and their affiliates, which negatively impacts the level of liquidity and pricing available on our trading platform. Other regulatory initiatives include Basel III, a global regulatory standard on bank capital adequacy designed to strengthen bank capital requirements and liquidity in most of the world’s major economies. These rules restrict the ability of our bank-affiliated broker-dealer clients to raise additional capital or use existing capital for trading purposes, which might cause them to trade less on our platform. In addition, as we expand our business into new markets, it is likely that we will be subject to additional laws, rules and regulations. We cannot predict the extent to which any future regulatory changes may adversely affect our business and operations.

Our disclosed trading system has not been subjected to regulation as an alternative trading system under Regulation ATS. A determination by the SEC to treat our disclosed trading platform as an alternative trading system subject to Regulation ATS would subject us to additional reporting obligations, compliance and operational costs and other limitations on the conduct of our business, many of which could be material. If we offer a trading methodology subject to oversight under Regulation ATS in the future, such as a central limit order book for the trading of bonds or other similar automated matching services, these protocols would likely be regulated as an alternative trading system subject to Regulation ATS, which could increase our compliance and operational costs and create additional regulatory exposure for our businesses.

The activities and consequences described above may result in significant distractions to our management and could have a material adverse effect on our business, financial condition and results of operations.

The extensive regulation of our business means we have ongoing exposure to potentially significant costs and penalties.

Our businesses are subject to regulation by governmental and self-regulatory organizations in the jurisdictions in which we operate around the world. Many of these regulators, including U.S. and non-U.S. government agencies and self-regulatory organizations, as well as state securities commissions in the U.S., are empowered to bring enforcement actions and to conduct administrative proceedings and examinations, inspections, and investigations, which may result in costs, penalties, fines, enhanced oversight, additional requirements, restrictions, or limitations, and censure, suspension, or expulsion. Self-regulatory organizations such as FINRA and the National Futures Association (“NFA”), along with statutory bodies such as the SEC, the CFTC, and the FCA, and other international regulators, require strict compliance with their rules and regulations.

Firms in the financial services industry have experienced increased scrutiny in recent years, and penalties, fines and other sanctions sought by regulatory authorities, including the SEC, the CFTC, FINRA, the NFA, state securities commissions and state attorney generals in the U.S., and the FCA in the U.K. and other international regulators, have increased accordingly. Accordingly, we face the risk of regulatory intervention, investigations and proceedings, any of which could involve extensive scrutiny of our activities and result in significant fines and liability. Any of these developments would require significant time and financial resources and could adversely affect our reputation, financial condition and operating results.

Legal Risks

In the event of employee error or misconduct, our business may be harmed.

Employee misconduct or error could expose us to significant liability, financial losses, regulatory sanctions and reputational harm. Misconduct or error by employees could include engaging in improperly using our confidential information or the confidential or personal information of our clients or engaging in improper or unauthorized activities or transactions.

Our employees could carry out improper activities on behalf of our clients, or use proprietary client or company information for personal or other improper or illegal uses. Employee errors also expose us to the risk of material loss until such errors are detected and unauthorized transactions or improper activities are reversed.

Errors and misconduct by our current or former employees could cause us to suffer financial losses, regulatory sanctions and reputational harm. The precautions we take to monitor and prevent employee errors and misconduct may not be effective in all cases.

We are subject to the risks of litigation and securities laws liability.

Many aspects of our business, and the businesses of our clients, involve substantial risks of liability. Dissatisfied clients may make claims against us regarding quality of trade execution, improperly settled trades, resolution of trade error claims, system failures, failure to protect their confidential or personal information, mismanagement or even fraud. We may become subject to these claims as the result of delays, failures or malfunctions of our electronic trading platform and the services provided by us. We could incur significant legal expenses defending claims, even those without merit. An adverse resolution of any lawsuits or claims against us could have a material adverse effect on our business, financial condition and results of operations.

Risks Related to Growing our U.S. and International Operations

We may face increasing economic and regulatory challenges in our growing international operations that we may not be able to meet in the future.

We operate an electronic trading platform in Europe, Latin America and Asia and we may further expand our operations throughout these and other regions. We have invested significant resources in our foreign operations and the increasing globalization of our platform and services. However, there are certain risks inherent in doing business in international markets, particularly in the financial services industry, which is heavily regulated in many jurisdictions. These risks include:

- difficulty in obtaining the necessary regulatory approvals for planned expansion, if at all, and the possibility that any approvals that are obtained may impose restrictions on the operation of our business;
- the inability to manage and coordinate the various regulatory requirements of multiple jurisdictions that are constantly evolving and subject to unexpected change;
- difficulties in staffing and managing foreign operations;
- less developed technological infrastructures and generally higher costs, which could result in lower client acceptance of our services or clients having difficulty accessing our trading platform;

- fluctuations in exchange rates;
- reduced or no protection for intellectual property rights;
- seasonal reductions in business activity; and
- potentially adverse tax consequences.

Our international operations are also subject to the legal, economic and market risks associated with geopolitical uncertainties in other regions of the world, including but not limited to the risk of war, inter and intra national conflict, economic crises and terrorism.

In addition, we must comply with the laws, regulations and registration rules of foreign governments and regulatory bodies for each country in which we conduct business. For example, MiFID II and MiFIR were implemented by regulatory bodies in Europe in January 2018. We cannot predict the extent to which any of these new regulations or future regulatory changes may impact our European business and operations, but they may cause us to expend significantly more compliance, business and technology resources, incur additional operational costs and create additional regulatory exposure.

We cannot predict what future actions that the regulatory bodies that supervise our business might take, or the impact that any such actions may have on our business. In addition, Brexit could lead to legal uncertainty and potentially divergent national laws and regulations as the U.K. determines which E.U. laws to replace or replicate. Our compliance with these changing laws and regulations may be costly and time-consuming and may have a material adverse effect on our clients' trading activities on our platform.

Further, we may face unexpected challenges in our international operations due to global competitors, established local markets, and economic and political instability. Our inability to manage these risks effectively could adversely affect our business and limit our ability to expand our international operations, which could have a material adverse effect on our business, financial condition and results of operations.

Our growth initiatives may place significant strain on management and other resources.

We have significantly expanded our business activities and operations over the last several years. Continued growth, both domestic and international, will require further investment in management and new personnel, infrastructure and compliance systems. The expansion of our international operations involves risks that may have an adverse effect on our business and operations, such as the challenge of effectively managing and staffing our international operations, complying with increased and varied regulatory requirements and entering new markets. In addition, we may incur substantial development, sales and marketing expenses and expend significant management effort to create a new product or service, and the period before the product or service is successfully developed, introduced and adopted may extend over many months or years. Even after incurring these costs, our clients may determine that they do not need or prefer the product or service.

We may not be able to manage our growth efficiently, which could result in our expansion costs increasing at a faster rate than our revenues and distracting management from our core business and operations. If we cannot successfully implement the necessary processes to support and manage new initiatives, our business, financial condition and results of operations may suffer.

Fluctuations in foreign currency exchange rates may adversely affect our financial results.

We conduct operations in several different countries outside the U.S., most notably the U.K., and substantial portions of our revenues, expenses, assets and liabilities are denominated in non U.S. dollar currencies. Since our consolidated financial statements are presented in U.S. dollars, we must translate revenues, income and expenses, as well as assets and liabilities, into U.S. dollars at exchange rates in effect during or at the end of each reporting period. Accordingly, increases or decreases in the value of the U.S. dollar against the other currencies will affect our net operating revenues, operating income and the value of balance sheet items denominated in foreign currencies.

Although we have entered into foreign currency forward contracts to hedge our net investment in our U.K. subsidiaries and may enter into additional hedging transactions in the future to help mitigate our foreign exchange risk exposure, these hedging arrangements may not be effective, particularly in the event of inaccurate forecasts of the levels of our non-U.S. denominated assets and liabilities. Accordingly, if there are adverse movements in exchange rates, we may suffer significant losses, which would adversely affect our operating results and financial condition.

Liquidity and Funding Risks

We cannot predict our future capital needs or our ability to obtain additional financing if we need it.

Our business is dependent upon the availability of adequate funding and regulatory capital under applicable regulatory requirements. Although we believe that our available cash resources and borrowing capacity under our credit agreement are sufficient to meet our presently anticipated liquidity needs and capital expenditure requirements for at least the next 12 months, we may in the future need to raise additional funds to, among other things:

- support more rapid growth of our business;
- develop new or enhanced services and products;
- fund operating losses;
- respond to competitive pressures;
- acquire complementary companies or technologies;
- enter into strategic alliances;
- increase the regulatory net capital necessary to support our operations; or
- respond to unanticipated or changing capital requirements.

The growth of our Open Trading protocols, in particular, is dependent on the willingness of our customers and counterparties to engage in transactions with us and any perceived issues with our capital levels or access to funding could have a material adverse effect on business. In addition, our liquidity could be impaired due to circumstances that we may be unable to control, such as a general market disruption or an operational problem that affects our trading customers or counterparties, other third parties or us.

All or part of any debt financing would likely be pursuant to the terms of our credit agreement with JPMorgan Chase & Co., which includes restrictive covenants with respect to dividends, issuances of additional capital and other financial and operational matters related to our business. For a detailed discussion of the risks associated with our credit agreement, see the Risk Factor captioned “Our credit agreement contains restrictive and financial covenants that could limit our operating flexibility, and we may incur additional debt in the future that may include similar or additional restrictions.”

In the future, we may not be able to obtain additional financing, if needed, in amounts or on terms acceptable to us, if at all. If sufficient funds are not available or are not available on terms acceptable to us, our ability to fund our expansion, take advantage of acquisition opportunities, develop or enhance our services or products, or otherwise respond to competitive pressures would be significantly limited. These limitations could have a material adverse effect on our business, financial condition and results of operations.

Our credit agreement contains restrictive and financial covenants that could limit our operating flexibility, and we may incur additional debt in the future that may include similar or additional restrictions.

We are party to a credit agreement with JPMorgan Chase & Co. that provides for revolving loans and letters of credit up to an aggregate of $100.0 million. Subject to the satisfaction of certain specified conditions, we are permitted to upsize the borrowing capacity of the credit agreement by an additional $50.0 million. Our credit agreement contains certain covenants that, among other things, restrict our ability to take certain actions, even if we believe them to be in our best interests. These covenants restrict or prohibit, among other things, our ability to:

- incur or guarantee additional debt;
- create or incur liens;
- change our line of business;
- sell or transfer assets;

- make certain investments or acquisitions;
- pay dividends or distributions, redeem or repurchase our equity or make certain other restricted payments;
- consummate a merger or consolidation;
- enter into certain swap, derivative or similar transactions;
- enter into certain transactions with affiliates; and
- incur restrictions on our ability to grant liens or, in the case of subsidiaries, pay dividends or other distributions.

We are also required by our credit agreement to maintain a maximum consolidated leverage ratio, a minimum consolidated interest coverage ratio and a minimum consolidated adjusted EBITDA level. We cannot assure you that we will be able to meet these requirements or satisfy these covenants in the future. A breach of any of these covenants or the inability to comply with the required financial covenants could result in an event of default under the credit agreement. If any such event of default occurs, the lender under the credit agreement could elect to declare all amounts outstanding and accrued and unpaid interest under the credit agreement to be immediately due and payable, and could foreclose on the assets securing the credit agreement. The lender would also have the right in these circumstances to terminate any commitments it has to provide further credit extensions. We may incur other indebtedness in the future that may contain financial or other covenants more restrictive than those applicable to the credit agreement.

Risks Related to our Internal Controls

As a public company, we are subject to certain financial and corporate governance requirements that may be difficult for us to satisfy and may divert management's attention from our business.

We are subject to the requirements of Section 404 of the Sarbanes-Oxley Act of 2002 ("SOX") and the related SEC rules and regulations that call for our management to conduct an annual assessment and report on the effectiveness of our internal controls over financial reporting. Our independent registered public accounting firm must also issue an annual report addressing the operating effectiveness of our internal controls over financial reporting.

While our internal controls over financial reporting currently meet the standards set forth in SOX, failure to maintain an effective internal control environment could have a material adverse effect on our business, financial condition and results of operations. We cannot be certain of our ability to continue to comply with the requirements of SOX. If we are unable to continue to comply with the requirements of SOX in an efficient manner, we may be subject to regulatory action. In addition, in the event that we identify a material weakness, there can be no assurance that we would be able to remediate such material weakness in an efficient manner. Moreover, if we are unable to assert that our internal control over financial reporting is effective in any future period (or if our auditors are unable to issue an opinion on the effectiveness of our internal controls), we could suffer reputational harm and incur significant expenses to restructure our internal controls over financial reporting, which may have a material adverse effect on us.

Risks Related to Our Common Stock

Market volatility and future sales of our shares by significant stockholders may cause our stock price and the value of your investment to decline.

The market price of our common stock may be significantly affected by volatility in the markets in general. The market price of our common stock likely will continue to fluctuate in response to factors including the following:

- the other risk factors described in this Annual Report on Form 10-K;
- prevailing interest rates;
- the market for similar securities;
- changes in the nature of our stockholder base;
- additional issuances of common stock;
- general economic conditions; and
- our financial condition, performance and prospects, including our ability or inability to meet analyst expectations.

Most of these factors are beyond our control. In addition, the stock markets in general, including the NASDAQ Global Select Market, have experienced and continue to experience significant price and volume fluctuations. These fluctuations have resulted in volatility in the market prices of securities for companies such as ours that often has been unrelated or disproportionate to changes in the operating performance of the affected companies. These broad market and industry fluctuations may affect adversely the market price of our common stock regardless of our operating performance.

In addition, future sales of our common stock, or the perception of potential future sales, may adversely impact the market price of our common stock. If any one or more of our existing stockholders were to sell a large number of shares, the market price of our common stock could be negatively affected. Also, if we issue a large number of shares of our common stock in connection with a public offering, future acquisition, strategic alliance, third-party investment and private placement or otherwise, the market price of our common stock could decline considerably. Furthermore, our stockholders may be diluted by such future sales.

We may decrease or cease paying dividends on our common stock in the future.

We initiated a regular quarterly dividend on our common stock in 2009. However, there is no assurance that we will continue to pay any dividends to holders of our common stock in the future or, if we continue paying dividends, that such dividends will be paid at the rate at which they were paid in prior periods. If we were to decrease the dividend rate or cease paying dividends, investors may need to rely on the sale of their common stock after price appreciation, which may never occur, as the primary or only way to realize any future gains on their investment.

If securities analysts do not publish research or reports about our business or if they downgrade our common stock, the price of our common stock could decline.

The trading market for our common stock relies in part on the research and reports that industry or financial analysts publish about us or our business. These analysts work independently of us. If one or more analysts who cover us downgrade our stock, our stock price could decline rapidly. If one or more of these analysts cease coverage of our company, we could lose visibility in the market, which in turn could cause our stock price to decline.

Provisions in our organizational documents and Delaware law might discourage, delay or prevent a change of control of our company or changes in our management, and therefore, depress the trading price of our common stock.

Provisions of our certificate of incorporation and bylaws may make it substantially more difficult for a third party to acquire control of us and may prevent changes in our management, including provisions that:

- prevent stockholders from calling special meetings;
- allow the directors to amend the bylaws without stockholder approval; and
- set forth advance notice procedures for nominating directors and submitting proposals for consideration at stockholders’ meetings.

Provisions of Delaware law may also inhibit potential acquisition bids for us or prevent us from engaging in business combinations. In addition, we have a severance agreement with one employee and a change of control severance plan that could require an acquirer to pay a higher price. Either collectively or individually, these provisions may prevent holders of our common stock from benefiting from what they may believe are the positive aspects of acquisitions and takeovers, including the potential realization of a higher rate of return on their investment from these types of transactions.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Our corporate headquarters and principal U.S. offices are located at 55 Hudson Yards in New York, New York, where we lease approximately 83,000 square feet under a lease expiring in August 2034. We also collectively lease approximately 22,000 square feet for our other office locations in the U.S., United Kingdom, Brazil, the Netherlands, Hong Kong and Singapore under various leases expiring between January 2019 and January 2027.

Item 3. Legal Proceedings.

In the normal course of business, we and our subsidiaries included in the consolidated financial statements may be involved in various lawsuits, proceedings and regulatory examinations. We assess liabilities and contingencies in connection with outstanding legal proceedings, if any, utilizing the latest information available. Based on currently available information, the outcome of our outstanding matters is not expected to have a material adverse impact on our financial position. It is not presently possible to determine our ultimate exposure to these matters and there is no assurance that the resolution of the outstanding matters will not significantly exceed any reserves accrued by us. See Note 12 to the Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K for a discussion of our commitments and contingencies.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

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

Our common stock trades on the NASDAQ Global Select Market under the symbol "MKTX".

On February 15, 2019, the last reported closing price of our common stock on the NASDAQ Global Select Market was $229.51.

Holders

There were 22 holders of record of our common stock as of February 15, 2019.

Recent Sales of Unregistered Securities

None.

Securities Authorized for Issuance Under Equity Compensation Plans

Please see the section entitled "Equity Compensation Plan Information" in Item 12.

Issuer Purchases of Equity Securities

During the three months ended December 31, 2018, we repurchased the following shares of common stock:

Period	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans and Programs	Dollar Value of Shares That May Yet Be Purchased Under the Plans and Programs (In thousands)
October 1, 2018 - October 31, 2018	11,730	$191.03	11,300	$ 72,739
November 1, 2018 - November 30, 2018	10,500	$211.54	10,500	$ 70,518
December 1, 2018 - December 31, 2018	8,306	$216.54	8,306	$ 68,720
	30,536	$205.02	30,106	

During the three months ended December 31, 2018, we repurchased 30,536 shares of common stock. The repurchases included 30,106 shares repurchased in connection with our share repurchase program and 430 shares surrendered by employees to us to satisfy the withholding tax obligations upon the exercise of stock options and vesting of restricted shares.

In September 2017, our Board of Directors authorized a fifteen-month share repurchase program for up to $100.0 million commencing in October 2017. The expiration date was subsequently extended to March 31, 2019. In January 2019, our Board of Directors authorized a new two-year share repurchase program for up to $100.0 million of our common stock, commencing in April 2019. Shares repurchased under each program will be held in treasury for future use.

STOCK PERFORMANCE GRAPH

The following graph shows a comparison from December 31, 2013 through December 31, 2018 of the cumulative total return for (i) our common stock, (ii) the NASDAQ Composite Index and (iii) the Dow Jones US Financial Services Index. The performance graph and related information shall not be deemed “soliciting material” or to be “filed” with the SEC, nor shall such information be incorporated by reference into any future filing under the Securities Act of 1933 or the Securities Exchange Act of 1934, each as amended, except to the extent that the we specifically incorporate it by reference into such filing.

The figures in this graph assume an initial investment of $100 in our common stock and in each index on December 31, 2013, and that all quarterly dividends were reinvested. The returns illustrated below are based on historical results during the period indicated and should not be considered indicative of future stockholder returns.

Item 6. Selected Financial Data.

The selected statements of operations data for each of the years ended December 31, 2018, 2017 and 2016 and the selected balance sheet data as of December 31, 2018 and 2017 have been derived from our audited financial statements included elsewhere in this Annual Report on Form 10-K. The selected statements of operations data for the years ended December 31, 2015 and 2014, and the balance sheet data as of December 31, 2016, 2015 and 2014 have been derived from our audited financial statements not included in this Annual Report on Form 10-K.

	Year Ended December 31,				
	2018	2017	2016	2015	2014
	(In thousands, except per share amounts)				
Statements of Operations Data:					
Revenues					
Commissions (1)	$390,834	$355,282	$332,307	$266,221	$221,138
Information services (2)	28,227	25,806	23,269	22,585	24,895
Post-trade services (3)	15,346	11,090	10,812	11,648	13,489
Other (4)	1,158	1,244	1,342	1,739	1,772
Total revenues	435,565	393,422	367,730	302,193	261,294
Expenses					
Employee compensation and benefits	109,117	102,313	96,625	83,856	74,995
Depreciation and amortization	23,080	19,274	17,838	18,542	17,379
Technology and communications	23,866	20,048	17,275	15,916	17,685
Professional and consulting fees	21,521	19,367	17,175	13,043	14,375
Occupancy	14,176	6,125	4,681	4,685	4,381
Marketing and advertising	12,114	9,762	8,934	6,148	5,769
Clearing costs (5)	7,754	5,797	6,060	3,313	1,329
General and administrative	11,353	11,121	9,157	9,261	7,895
Total expenses	222,981	193,807	177,745	154,764	143,808
Operating income	212,584	199,615	189,985	147,429	117,486
Other income (expense)					
Investment income	6,112	3,619	2,137	905	543
Other, net (6)	(610)	(1,466)	(520)	(434)	507
Total other income	5,502	2,153	1,617	471	1,050
Income before income taxes	218,086	201,768	191,602	147,900	118,536
Provision for income taxes	45,234	53,679	65,430	51,863	43,730
Net income	$172,852	$148,089	$126,172	$96,037	$74,806
Net income per common share					
Basic	$4.68	$4.02	$3.42	$2.62	$2.03
Diluted	$4.57	$3.89	$3.34	$2.55	$1.97
Cash dividends declared per common share	$1.68	$1.32	$1.04	$0.80	$0.64

Weighted average number of shares of common stock outstanding:					
Basic	36,958	36,864	36,844	36,690	36,930
Diluted	37,855	38,038	37,738	37,637	37,889

	As of December 31,				
	2018	2017	2016	2015	2014
Balance Sheet Data:	(In thousands)				
Cash, cash equivalents and investments	$486,427	$406,535	$362,647	$284,434	$233,787
Working capital (7)	477,632	410,248	363,787	283,383	226,854
Total assets	695,539	581,232	528,042	439,041	379,884

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(1) Commissions include monthly distribution fees and trading commissions.
(2) Information services revenues include data licensed to our broker-dealer clients, institutional investor clients and data-only subscribers, as well as professional consulting services, technology software licenses and maintenance and support services.
(3) Post-trade services revenues include revenue from trade matching and regulatory transaction reporting services.
(4) Other revenues consist primarily of telecommunications line charges to broker-dealer clients.
(5) Clearing costs consist of fees charged by third-party clearing brokers for the clearing and settlement of matched principal trades.
(6) Other, net consists of unrealized gains or losses on trading security investments, realized gains and losses on investments, foreign currency transaction gains or losses, investment advisory fees and other miscellaneous revenues and expenses.
(7) Working capital is defined as current assets minus current liabilities. Current assets consist of cash and cash equivalents, investments, accounts receivable and prepaid and other expenses (excludes cash provided as collateral). Current liabilities consist of accrued employee compensation, income and other tax liabilities, deferred revenue, and accounts payable, accrued expenses and other liabilities.

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

You should read the following discussion and analysis of our financial condition and results of operations in conjunction with “Selected Financial Data” and our consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K. In addition to historical information, this discussion and analysis contains forward-looking statements relating to future events and the future performance of MarketAxess that are based on our current expectations, assumptions, estimates and projections about us and our industry. These forward-looking statements involve risks and uncertainties. Our actual results and timing of various events could differ materially from those anticipated in such forward-looking statements as a result of a variety of factors, as more fully described in this section, in “Item 1A. Risk Factors” and elsewhere in this Annual Report on Form 10-K. Except as may be required by applicable law, we undertake no obligation to update publicly any forward-looking statements for any reason, even if new information becomes available or other events occur in the future.

Executive Overview

MarketAxess operates a leading electronic trading platform that enables fixed-income market participants to efficiently trade corporate bonds and other types of fixed-income instruments using our patented trading technology. Over 1,500 institutional investor and broker-dealer firms are active users of our trading platform, accessing global liquidity in U.S. high-grade corporate bonds, emerging markets and high-yield bonds, European bonds, U.S. agency bonds, municipal bonds, credit default swaps and other fixed-income securities. Through our Open Trading protocols, we execute bond trades between and among institutional investor and broker-dealer clients in an all-to-all anonymous trading environment in which we act as the matched principal counterparty. We also offer a number of trading-related products and services, including: Composite+ pricing and other market data products to assist clients with trading decisions; auto-execution and other execution services for clients requiring specialized workflow solutions; connectivity solutions that facilitate straight-through processing; and technology services to optimize trading environments. Through our Trax® division, we also offer a range of pre- and post-trade services, including trade matching, trade publication, regulatory transaction reporting and market and reference data across a range of fixed-income and other products.

Our platform’s innovative technology solutions are designed to increase the number of potential trading counterparties on our electronic trading platform and create a menu of solutions to address different trade sizes and bond liquidity characteristics. Our traditional RFQ model allows our institutional investor clients to simultaneously request competing, executable bids or offers from our broker-dealer clients and execute trades with the broker-dealer of their choice from among those that choose to respond. Our Open Trading protocols complement our request-for-quote model by increasing the number of potential counterparties and improving liquidity by allowing all participants to interact anonymously in an all-to-all trading environment. Clients can use our auto-execution technology with both our traditional RFQ and Open Trading protocols, thereby using rules-based execution to connect to diverse sources of liquidity while reducing trading inefficiencies and human errors. Our platform also provides our broker-dealer clients a solution that enables them to efficiently reach our institutional investor clients for the distribution and trading of bonds.

We derive revenue from commissions for trades executed on our platform, information services, post-trade services and other revenues. Our expenses consist of employee compensation and benefits, depreciation and amortization, technology and communication expenses, professional and consulting fees, occupancy, marketing and advertising, clearing costs and other general and administrative expenses.

Our objective is to provide the leading global electronic trading platform for fixed-income securities, connecting broker-dealers and institutional investors more easily and efficiently, while offering a broad array of information, trading and technology services to market participants across the trading cycle. The key elements of our strategy are:

- to use our broad network of over 1,500 active institutional investor and broker-dealer participants to drive more clients to our leading electronic fixed-income trading platform;
- to increase the secondary market liquidity on our trading platform by deploying innovative technology solutions, such as our Open Trading protocols, to increase the number of potential trading counterparties on our platform and to address different trade sizes, bond liquidity characteristics and trading preferences;
- to continue to develop innovative next-generation technologies that will allow our clients to further automate and improve the performance of their trading desks through increased liquidity, enhanced trading efficiencies and the ability to identify trends within the bond market;
- to expand and strengthen our existing service, data and analytical offerings throughout the trading cycle so that we are more fully integrated into the workflow of our broker-dealer and institutional investor clients; and
- to increase and supplement our internal growth by entering into strategic alliances, or acquiring businesses or technologies that will enable us to enter new markets, provide new products or services, or otherwise enhance the value of our platform to our clients.

Critical Factors Affecting Our Industry and Our Company

Economic, Political and Market Factors

The global fixed-income securities industry is risky and volatile and is directly affected by a number of economic, political and market factors that may result in declining trading volume. These factors could have a material adverse effect on our business, financial condition and results of operations. These factors include, among others, credit market conditions, the current interest rate environment, including the volatility of interest rates and investors' forecasts of future interest rates, economic and political conditions in the United States, Europe and elsewhere, and the consolidation or contraction of our broker-dealer and institutional investor clients.

In 2018, our business faced a mix of trading environments that impacted our market share and trading volumes. In the first quarter, the trading environment was generally supportive of our business due to a number of factors, including increased volatility resulting from the end of quantitative easing in the U.S. and Europe, higher interest rates and a reduced trading emphasis on new bond issues in favor of the secondary markets in which we operate. In the second and third quarters, however, overall trading conditions were less favorable as credit spreads narrowed, volatility declined and there was an increase in the issuance of new high-grade corporate bond issues. Trading conditions improved considerably in September and the fourth quarter as credit spreads widened and credit spread volatility increased. New issue activity was lighter than normal, and investment managers experienced significant outflows, resulting in increased secondary trading volumes. In addition, the increase in yields and flattening of the yield curve in 2018 resulted in lower duration of bonds traded on the platform, which negatively impacted our fee capture rate.

Our results of operations are also impacted by the overall level of activity in our core products. In 2018, market volumes in the U.S. high-grade market increased 5% compared to 2017 driven by the increased market volatility, trade war tensions and the year-over-year decline of U.S. high-grade new issuance of 10%. International demand for U.S. high-grade bonds also declined in 2018 as a result of an increase in foreign exchange hedging costs. Estimated secondary markets trading volumes for U.S. high-yield bonds, emerging market bonds and Eurobonds, however, declined compared to 2017 as a slowing global economy lead to wider credit spreads and a greater emphasis on risk reduction. As a result, secondary market liquidity was tighter, which contributed to the year-over-year market volume decline for these products.

Competitive Landscape

The global fixed-income securities industry generally, and the electronic financial services markets in which we engage in particular, are highly competitive, and we expect competition to intensify in the future. Sources of competition for us will continue to include, among others, bond trading conducted directly between broker-dealers and their institutional investor clients over the telephone or electronically and other multi-dealer or all-to-all trading platforms. Competitors, including companies in which some of our broker-dealer clients have invested, have developed or acquired electronic trading platforms or have announced their intention to explore the development of electronic platforms or information networks that may compete with us.

In general, we compete on the basis of a number of key factors, including, among others, the liquidity provided on our platform, the magnitude and frequency of price improvement enabled by our platform, total transaction costs and the quality and speed of execution. We believe that our ability to grow volumes and revenues will largely depend on our performance with respect to these factors.

Our competitive position is also enhanced by the familiarity and integration of our broker-dealer and institutional investor clients with our electronic trading platform and other systems. We have focused on the unique aspects of the credit markets we serve in the development of our platform, working closely with our clients to provide a system that is suited to their needs.

Regulatory Environment

Our industry has been and is subject to continuous regulatory changes and may become subject to new regulations or changes in the interpretation or enforcement of existing regulations, which could require us to incur significant costs.

Following the global financial crisis and other recent events in the financial industry, governments and regulators in both the United States and Europe called for increased regulation and transparency in the over-the-counter markets. As a result, the Dodd-Frank Act was enacted in 2010 and, among other things, mandated the clearing of swaps through regulated central clearing organizations and mandatory trading of those instruments through either regulated exchanges or SEFs, in each case, subject to certain key exceptions.

Various rules promulgated since the financial crisis have adversely affected our bank-affiliated broker-dealer clients' ability to make markets in a variety of fixed-income securities, which could negatively impact the level of liquidity and pricing available on our trading platform. For example, while the Volcker Rule does not apply directly to us, the Volcker Rule bans proprietary trading by banks and their affiliates. In addition, enhanced leverage ratios applicable to large banking organizations in the U.S. and Europe require such organizations to strengthen their balance sheets and may limit their ability or willingness to make markets on our trading platform.

Since the presidential election in November 2016, however, the U.S. has pursued a path of financial deregulation and has rolled back certain provisions of the Dodd-Frank Act. There has also been a growing focus on U.S. capital markets regulations as the U.S. Department of the Treasury issued a report with recommendations to improve corporate bond liquidity and the regulations that implement the Volcker Rule. In 2017, the SEC established a Fixed Income Market Structure Advisory Committee in order to provide the SEC with diverse perspectives on the structure and operations of the U.S. fixed-income markets, as well as advice and recommendations on matters related to fixed-income market structure.

In Europe, MiFID II and MiFIR were implemented in January 2018 and introduced significant changes in market structure designed to: (i) enhance pre- and post-trade transparency for fixed-income instruments with the scope of requirements calibrated for liquidity, (ii) increase and enhance post-trade reporting obligations with a requirement to submit post-trade data to an ARM, (iii) ensure trading of certain derivatives occurs on regulated trading venues and (iv) establish a consolidated tape for trade data. MiFID II has caused us to expend significantly more compliance, business and technology resources, incur additional operational costs and create additional regulatory exposure for our trading and post-trade services businesses. While we generally believe the net impact of the rules and regulations may be positive for our businesses, unintended consequences of the rules and regulations may adversely affect us in ways yet to be determined.

In March 2017, the U.K. notified the European Council of its intention to leave the E.U. (commonly referred to as "Brexit"). By invoking Article 50 of the Lisbon Treaty, the U.K. is currently set to leave the E.U. in March 2019. Following Brexit, our U.K. subsidiaries will not be able to rely on the existence of a "passporting" regime that allows immediate access to the single E.U. market. Although current discussions between the U.K. and the E.U. regarding a transitional period following March 2019 envisage a temporary continuation of the existing passporting rights during such period, we have established new subsidiaries in the E.U. in order to provide our trading platform and certain post-trade services to clients in the E.U. following Brexit.

Rapid Technological Changes

We must continue to enhance and improve our electronic trading platform. The electronic financial services industry is characterized by increasingly complex systems and infrastructures and new business models. Our future success will depend on our ability to enhance our existing products and services, develop and/or license new products and technologies that address the increasingly sophisticated and varied needs of our existing and prospective broker-dealer and institutional investor clients and respond to technological advances and emerging industry standards and practices on a cost-effective and timely basis. We have been issued 13 patents covering our most significant trading protocols and other aspects of our trading system technology.

Trends in Our Business

The majority of our revenues are derived from commissions for transactions executed on our platform between and among our institutional investor and broker-dealer clients and monthly distribution fees. We believe that there are five key variables that impact the notional value of such transactions on our platform and the amount of commissions and distribution fees earned by us:

- the number of participants on our platform and their willingness to originate transactions through the platform;
- the number of institutional investor and broker-dealer clients on the platform and the frequency and competitiveness of the price responses they provide on our platform;
- the number of markets for which we make trading available to our clients;
- the overall level of activity in these markets; and
- the level of commissions that we collect for trades executed through the platform.

We believe that overall corporate bond market trading volume is affected by various factors including the absolute levels of interest rates, the direction of interest rate movements, the level of new issues of corporate bonds and the volatility of corporate bond spreads versus U.S. Treasury securities. Because a significant percentage of our revenue is tied directly to the volume of securities traded on our platform, it is likely that a general decline in trading volumes, regardless of the cause of such decline, would reduce our revenues and have a significant negative impact on profitability.

Commission Revenue

Commissions are generally calculated as a percentage of the notional dollar volume of bonds traded on our platform and vary based on the type, size, yield and maturity of the bond traded. Under our disclosed trading transaction fee plans, bonds that are more actively traded or that have shorter maturities are generally charged lower commissions, while bonds that are less actively traded or that have longer maturities generally command higher commissions.

For trades that we execute between and among institutional investor and broker-dealer clients on a matched principal basis by serving as counterparty to both the buyer and the seller, we earn our commission through the difference in price between the two trades.

U.S. High-Grade Corporate Bond Commissions. Our U.S. high-grade corporate bond fee plans generally incorporate variable transaction fees and fixed distribution fees billed to our broker-dealer clients on a monthly basis. Certain dealers participate in fee programs that do not contain monthly distribution fees and instead incorporate additional per transaction execution fees and minimum monthly fee commitments. Under these fee plans, we electronically add the transaction fee to the spread quoted by the broker-dealer client. The U.S. high-grade transaction fee is generally designated in basis points in yield and, as a result, is subject to fluctuation depending on the duration of the bond traded. The average U.S. high-grade fees per million may vary in the future due to changes in yield, years-to-maturity and nominal size of bonds traded on our platform. Distribution fees include any unused monthly fee commitments under our variable fee plans.

Other Credit Commissions. Other credit includes Eurobonds, emerging markets bonds, high-yield bonds and municipal bonds. Commissions for other credit products generally vary based on the type of the instrument traded using standard fee schedules. During the third quarter of 2017, we changed our high-yield fee plan structure. Similar to our U.S. high-grade fee plans, certain dealers now participate in a high-yield fee plan that incorporates a variable transaction fee and fixed distribution fee, while other dealers participate in a plan that does not contain monthly distribution fees and instead incorporates additional per transaction execution fees and minimum monthly fee commitments. The average other credit fees per million may vary in the future due to changes in product mix or trading protocols.

Liquid Products Commissions. Liquid products includes U.S. agency, European government bonds and credit derivatives. Commissions for liquid products generally vary based on the type of the instrument traded using standard fee schedules.

We anticipate that average fees per million may change in the future. Consequently, past trends in commissions are not necessarily indicative of future commissions.

Information Services

We generate revenue from data licensed to our broker-dealer clients, institutional investor clients and data-only subscribers; professional consulting services; technology software licenses; and maintenance and support services. These revenues are either for subscription based services transferred over time or one-time services. Revenues transferred over time are recognized ratably over the contract period while revenues for services transferred at a point in time are recognized in the period the services are provided. Information services are invoiced monthly, quarterly, or annually; when billed in advance, information services revenues are deferred and recognized ratably over the contract period.

Post-trade Services

We generate revenue from regulatory transaction reporting, trade publication and trade matching services. Revenues are recognized in the period that the transactions are processed. When billed in advance, revenues are recognized ratably over the contract period. We also generate revenue from one-time implementation fees which are recognized in the period the implementation is complete.

Other Revenue

Other revenue includes revenue generated from telecommunications line charges to broker-dealer clients.

Expenses

In the normal course of business, we incur the following expenses:

Employee Compensation and Benefits. Employee compensation and benefits is our most significant expense and includes employee salaries, stock-based compensation costs, other incentive compensation, employee benefits and payroll taxes.

Depreciation and Amortization. We depreciate our computer hardware and related software, office hardware and furniture and fixtures and amortize our capitalized software development costs on a straight-line basis over three to seven years. We amortize leasehold improvements on a straight-line basis over the lesser of the life of the improvement or the remaining term of the lease. Intangible assets with definite lives, including purchased technologies, customer relationships and other intangible assets, are amortized over their estimated useful lives, ranging from three to 15 years. Intangible assets are assessed for impairment when events or circumstances indicate a possible impairment.

Technology and Communications. Technology and communications expense consists primarily of costs relating to maintenance on software and hardware, our internal network connections, data center hosting costs and data feeds provided by outside vendors or service providers. The majority of our broker-dealer clients have dedicated high-speed communication lines to our network in order to provide fast data transfer. We charge our broker-dealer clients a monthly fee for these connections, which is recovered against the relevant expenses we incur.

Professional and Consulting Fees. Professional and consulting fees consist primarily of accounting fees, legal fees and fees paid to information technology and other consultants for services provided for the maintenance of our trading platform, information and post-trade services products and other services.

Occupancy. Occupancy costs consist primarily of office and equipment rent, utilities and commercial rent tax.

Marketing and Advertising. Marketing and advertising expense consists primarily of print and other advertising expenses we incur to promote our products and services. This expense also includes costs associated with attending or exhibiting at industry-sponsored seminars, conferences and conventions, and travel and entertainment expenses incurred by our sales force to promote our trading platform and information and post-trade services.

Clearing Costs. Clearing costs consist of fees that we are charged by third-party clearing brokers for the clearing and settlement of matched principal trades.

General and Administrative. General and administrative expense consists primarily of general travel and entertainment, board of directors' expenses, charitable contributions, provision for doubtful accounts and various state franchise and U.K. value-added taxes.

Expenses may grow in the future, notably in employee compensation and benefits, primarily due to additional headcount to support investment in new products and geographic expansion. See Item 2 of this Annual Report on Form 10-K for a discussion of our properties. However, we believe that operating leverage can be achieved by increasing volumes in existing products and adding new products without substantial additions to our infrastructure.

Other Income (Expense)

Investment Income. Investment income consists of income earned on our investments.

Other, Net. Other, net consists of unrealized gains or losses on trading security investments, realized gains or losses on investments, foreign currency transaction gains or losses, investment advisory fees and other miscellaneous revenues and expenses.

Critical Accounting Policies and Estimates

This Management's Discussion and Analysis of Financial Condition and Results of Operations discusses our Consolidated Financial Statements, which have been prepared in accordance with accounting principles generally accepted in the United States, also referred to as U.S. GAAP. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the reported amounts of income and expenses during the reporting periods. We base our estimates and judgments on historical experience and on various other factors that we believe are reasonable under the circumstances. Actual results may differ from these estimates under varying assumptions or conditions. Note 2 of the Notes to our Consolidated Financial Statements includes a summary of the significant accounting policies and methods used in the preparation of our Consolidated Financial Statements. Effective January 1, 2018, we adopted Revenue from Contracts with Customers ASU 2014-09 using the modified retrospective approach, which did not have a material impact on our Consolidated Financial Statements. There were no other significant changes to our critical accounting policies and estimates during the year ended December 31, 2018, as compared to those we disclosed in Management's Discussion and Analysis of Financial Condition and Results of Operations included in our Annual Report on Form 10-K, as amended, for the year ended December 31, 2017.

Use of Estimates

On an ongoing basis, management evaluates its estimates and judgments, particularly as they relate to accounting policies that management believes are critical. These accounting policies are most important to the portrayal of our financial condition and results of operations and they require management's most difficult, subjective or complex judgments, often as a result of the need to make estimates about the effect of matters that are inherently uncertain.

Software Development Costs

We capitalize certain costs associated with the development of internal use software, including among other items, employee compensation and related benefits and third party consulting costs at the point at which the conceptual formulation, design and testing of possible software project alternatives have been completed. Once the product is ready for its intended use, such costs are amortized on a straight-line basis over three years. We review the amounts capitalized for impairment whenever events or changes in circumstances indicate that the carrying amounts of the assets may not be recoverable.

Revenue Recognition

For further discussion related to revenue recognition, see the preceding "Trends in Our Business" section and Note 2 of the Notes to our Consolidated Financial Statements.

Stock-Based Compensation

We measure and recognize compensation expense for all share-based payment awards based on their estimated fair values measured as of the grant date. These costs are recognized as an expense in our Consolidated Statements of Operations over the requisite service period, which is typically the vesting period, with an offsetting increase to additional paid-in capital. Effective upon our adoption of ASU 2016-09 on January 1, 2017, "Improvements to Employee Share-Based Payment Accounting" ("ASU-2016-09"), we account for forfeitures as they occur. Prior to the adoption of ASU 2016-09, expected forfeitures were included in determining share-based compensation expense.

Income Taxes

Income taxes are accounted for using the asset and liability method. Deferred income taxes reflect the net tax effects of temporary differences between the financial reporting and tax bases of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when such differences are expected to reverse. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date. A valuation allowance is recognized against deferred tax assets if it is more likely than not that such assets will not be realized in future years. We recognize interest and penalties related to unrecognized tax benefits in general and administrative expenses in our Consolidated Statements of Operations. Effective upon our adoption of ASU 2016-09, all tax effects related to share-based payments are recorded through tax expense in the periods during which the awards are exercised or vest. See Note 7 of the Notes to our Consolidated Financial Statements for further discussion related to income taxes.

Business Combinations, Goodwill and Intangible Assets

Business combinations are accounted for under the purchase method of accounting. The total cost of an acquisition is allocated to the underlying net assets based on their respective estimated fair values. The excess of the purchase price over the estimated fair values of the net assets acquired is recorded as goodwill. Determining the fair value of certain assets acquired and liabilities assumed is judgmental in nature and often involves the use of significant estimates and assumptions, including assumptions with respect to future cash flows, discount rates, growth rates and asset lives.

We operate as a single reporting unit. Subsequent to an acquisition, goodwill no longer retains its identification with a particular acquisition, but instead becomes identifiable with the entire reporting unit. As a result, all of the fair value of the Company is available to support the value of goodwill. An impairment review of goodwill is performed on an annual basis, at year-end, or more frequently if circumstances change. Intangible assets with definite lives, including purchased technologies, customer relationships and other intangible assets, are amortized on a straight-line basis over their estimated useful lives, ranging from three to 15 years. Intangible assets are assessed for impairment when events or circumstances indicate the existence of a possible impairment.

Recent Accounting Pronouncements

See Note 2 to the Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K for a discussion of recent accounting pronouncements.

Segment Results

We operate an electronic multi-party platform for the trading of fixed-income securities and provide related data, analytics, compliance tools and post-trade services. We consider our operations to constitute a single business segment because of the highly integrated nature of these product and services, of the financial markets in which we compete and of our worldwide business activities. We believe that results by geographic region or client sector are not necessarily meaningful in understanding our business. See Note 13 to the Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K for certain geographic information about our business required by U.S. GAAP.

Results of Operations

Year Ended December 31, 2018 Compared to Year Ended December 31, 2017

Overview

Total revenues increased by $42.2 million or 10.7% to $435.6 million for the year ended December 31, 2018 from $393.4 million for the year ended December 31, 2017. This increase in total revenues was primarily due to an increase in commission revenue of $35.6 million. A 2.7% change in the average foreign currency exchange rates of the British Pound Sterling compared to the U.S. dollar for the year ended December 31, 2018 had the effect of increasing revenues by $1.4 million for the year ended December 31, 2018.

Total expenses increased by $29.2 million or 15.1% to $223.0 million for the year ended December 31, 2018 from $193.8 million for the year ended December 31, 2017. This increase was primarily due to higher occupancy of $8.1 million, employee compensation and benefits of $6.8 million, depreciation and amortization of $3.8 million, technology and communication expenses of $3.8 million, marketing and advertising of $2.4 million and professional and consulting fees of $2.2 million. The change in the average foreign currency exchange rates had the effect of increasing expenses by $1.4 million for the year ended December 31, 2018.

Income before taxes increased by $16.3 million or 8.1% to $218.1 million for the year ended December 31, 2018 from $201.8 million for the year ended December 31, 2017. Net income increased by $24.8 million or 16.7 % to $172.9 million for the year ended December 31, 2018 from $148.1 million for the year ended December 31, 2017.

Revenues

Our revenues for the years ended December 31, 2018 and 2017, and the resulting dollar and percentage changes, were as follows:

	Year Ended December 31,					
	2018		2017			
	($ in thousands)					
	$	% of Revenues	$	% of Revenues	$ Change	% Change
Commissions	$390,834	89.7 %	$355,282	90.3 %	$35,552	10.0 %
Information services	28,227	6.5	25,806	6.6	2,421	9.4
Post-trade services	15,346	3.5	11,090	2.8	4,256	38.4
Other	1,158	0.3	1,244	0.3	(86)	(6.9)
Total revenues	$435,565	100.0 %	$393,422	100.0 %	$42,143	10.7 %

Commissions

Our commission revenues for the years ended December 31, 2018 and 2017, and the resulting dollar and percentage changes, were as follows:

	Year Ended December 31,			
	2018	2017	$ Change	% Change
	($ in thousands)			
Variable transaction fees				
U.S. high-grade	$144,642	$137,034	$7,608	5.6 %
Other credit	147,148	140,492	6,656	4.7
Liquid products	2,146	2,277	(131)	(5.8)
Total variable transaction fees	293,936	279,803	14,133	5.1
Distribution fees				
U.S. high-grade	72,135	64,709	7,426	11.5
Other credit	24,077	10,154	13,923	137.1
Liquid products	686	616	70	11.4
Total distribution fees	96,898	75,479	21,419	28.4
Total commissions	$390,834	$355,282	$35,552	10.0 %

Variable Transaction Fees

The following table shows the extent to which the increase in variable commissions for the year ended December 31, 2018 was attributable to changes in transaction volumes and variable transaction fees per million:

	Change from the Year Ended December 31, 2017			
	U.S. High-Grade	Other Credit	Liquid Products	Total
	($ in thousands)			
Volume increase	$17,131	$36,818	$ 4	$53,953
Variable transaction fee per million decrease	(9,523)	(30,162)	(135)	(39,820)
Total increase (decrease) in variable commissions	$7,608	$6,656	$ (131)	$14,133

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Our trading volume for each of the years presented was as follows:

	Year Ended December 31,		$	%
	2018	2017	Change	Change
	($ in millions)			
Trading Volume Data				
U.S. high-grade - fixed rate	$867,518	$791,194	$76,324	9.6 %
U.S. high-grade - floating rate	60,654	33,839	26,815	79.2
Total U.S. high-grade	928,172	825,033	103,139	12.5
Other credit	731,888	579,912	151,976	26.2
Liquid products	53,479	53,383	96	0.2
Total	$1,713,539	$1,458,328	$255,211	17.5 %
Number of U.S. Trading Days	249	250		
Number of U.K. Trading Days	253	252		

For volume reporting purposes, transactions in foreign currencies are converted to U.S. dollars at average monthly rates. The 12.5% increase in our U.S. high-grade volume was principally due to an increase in our estimated market share coupled with growth in estimated overall market volume. Our estimated market share of total U.S. high-grade corporate bond volume increased to 18.1% for the year ended December 31, 2018 from 16.9% for the year ended December 31, 2017. Estimated U.S. high-grade TRACE volume increased by 5.2% to $5.1 trillion for the year ended December 31, 2018 from $4.9 trillion for the year ended December 31, 2017.

Other credit volumes increased by 26.2% for the year ended December 31, 2018 compared to the year ended December 31, 2017, primarily due to increases of 30.7% in Eurobond volume, 26.7% in high-yield bond volume and 23.3% in emerging markets bond volume. Our estimated market share of U.S. high-yield TRACE volume increased to 8.9% for the year ended December 31, 2018 from 6.8% for the year ended December 31, 2017.

Our average variable transaction fee per million for the years ended December 31, 2018 and 2017 was as follows:

	Year Ended December 31,	
	2018	2017
Average Variable Transaction fee per million		
U.S. high-grade - fixed rate	$ 161	$ 170
U.S. high-grade - floating rate	87	65
Total U.S. high-grade	156	166
Other credit	201	242
Liquid products	40	43
Total	172	192

Total U.S. high-grade average variable transaction fee per million decreased to $156 per million for the year ended December 31, 2018 from $166 per million for the year ended December 31, 2017, mainly due to a decrease in the duration of bonds traded and the migration of certain of our broker-dealer clients from an all-variable fee plan to a plan that incorporates a monthly distribution fee. Other credit average variable transaction fee per million decreased to $201 per million for the year ended December 31, 2018 from $242 million for the year ended December 31, 2017, mainly due to Eurobond fee schedule reductions implemented effective January 1, 2018, a decrease in high-yield average variable fee per million as a result of the change in the structure of our high-yield fee plan options implemented in August 2017 and a larger percentage of trading volume in emerging market bonds that command lower fees per million.

Distribution Fees

U.S. high-grade distribution fees increased $7.4 million principally due to the migration of certain of our broker-dealer clients from an all-variable fee plan to a plan that incorporates a monthly distribution fee. The $13.9 million increase in Other credit distribution fees principally relates to distribution fees under the high-yield fee plan structure implemented in August 2017 and a $3.1 million increase in unused monthly fee commitments.

Information Services. Information services revenue increased $2.4 million for the year ended December 31, 2018. The increase is attributable to revenue from new data contracts of $2.0 million and the positive impact of foreign exchange of $0.4 million.

Post-Trade Services. Post-trade services revenue increased $4.3 million for the year ended December 31, 2018 principally due to an increase of $3.7 million in trade publication services revenue and $1.2 million in regulatory transaction reporting services revenue, offset by a decrease of $1.1 million related to MiFID II implementation services and the positive impact of foreign exchange of $0.4 million. Our transaction reporting business processed 0.9 billion transactions for the year ended December 31, 2018 compared to 1.0 billion for the year ended December 31, 2017. Revenue from new customers and services and changes in pricing plans more than offset the decline in revenue related to the decreased number of reported transactions.

Other. Other revenue was $1.2 million for each of the years ended December 31, 2018 and 2017.

Expenses

Our expenses for the years ended December 31, 2018 and 2017, and the resulting dollar and percentage changes, were as follows:

	Year Ended December 31,					
	2018		2017			
	($ in thousands)					
		% of		% of	$	%
	$	Revenues	$	Revenues	Change	Change
Expenses						
Employee compensation and benefits	$109,117	25.1 %	$102,313	26.0 %	$6,804	6.7 %
Depreciation and amortization	23,080	5.3	19,274	4.9	3,806	19.7
Technology and communications	23,866	5.5	20,048	5.1	3,818	19.0
Professional and consulting fees	21,521	4.9	19,367	4.9	2,154	11.1
Occupancy	14,176	3.3	6,125	1.6	8,051	131.4
Marketing and advertising	12,114	2.8	9,762	2.5	2,352	24.1
Clearing costs	7,754	1.8	5,797	1.5	1,957	33.8
General and administrative	11,353	2.6	11,121	2.8	232	2.1
Total expenses	$222,981	51.2 %	$193,807	49.3 %	$29,174	15.1 %

Employee Compensation and Benefits. Employee compensation and benefits increased by $6.8 million primarily due to a $3.1 million increase in salaries, taxes and benefits on higher employee headcount, higher employee incentive compensation of $2.4 million, which is tied to operating performance, and an increase of $1.3 million in stock-based compensation resulting from higher employee equity awards in 2018. The total number of employees increased to 454 as of December 31, 2018 from 429 as of December 31, 2017.

Depreciation and Amortization. Depreciation and amortization increased by $3.8 million primarily due to higher amortization of software development costs of $1.9 million, depreciation of production hardware of $1.0 million and amortization of software licenses of $0.9 million. For the years ended December 31, 2018 and 2017, $35.9 million and $12.1 million, respectively, of equipment purchases and leasehold improvements and $11.7 million and $13.5 million, respectively, of software development costs were capitalized. In 2018, we incurred capital expenditures of $25.1

million related to the build-out of our new headquarters in New York City.

Technology and Communications. Technology and communications expenses increased by $3.8 million primarily due to increases in market data costs of $1.2 million, software as a service costs of $0.9 million, data center hosting of $0.8 million and technology license and maintenance costs of $0.6 million.

Professional and Consulting Fees. Professional and consulting fees increased by $2.2 million primarily due to higher non-IT consulting fees of $1.0 million, increased recruiting fees of $0.6 million and IT consulting fees of $0.4 million.

Occupancy. Occupancy costs increased by $8.1 million due to duplicate rent expense of $7.3 million during the build-out phase of our new headquarters in New York City and an increase of $0.7 million for the lease of additional office space to accommodate our increased headcount. We relocated to our new headquarters in January 2019.

Marketing and Advertising. Marketing and advertising expenses increased by $2.4 million primarily due to higher advertising and promotion costs of $2.1 million.

Clearing Costs. Clearing costs increased by $2.0 million due to higher Open Trading volume. Third-party clearing costs as a percentage of matched principal trading revenue decreased to 11.8% for the year ended December 31, 2018 from 12.7% for the year ended December 31, 2017.

General and Administrative. General and administrative expenses were $11.4 million and $11.1 million for the years ended December 31, 2018 and 2017, respectively.

Other Income (Expense)

Our other income for the three months ended December 31, 2018 and 2017, and the resulting dollar and percentage changes, were as follows:

	Year Ended December 31,					
	2018		2017			
	($ in thousands)					
	$	% of Revenues	$	% of Revenues	$ Change	% Change
Investment income	$6,112	1.4 %	$3,619	0.9 %	$2,493	68.9 %
Other, net	(610)	(0.1)	(1,466)	(0.4)	856	(58.4)
Total other income	$5,502	1.3 %	$2,153	0.5 %	$3,349	155.6 %

Investment income increased by $2.5 million primarily due to higher investment balances and an increase in interest rates in 2018. Other, net increased by $0.9 million primarily due to sales tax refunds of $0.8 million.

Provision for Income Tax. On December 22, 2017, the Tax Act was enacted into law. The Tax Act significantly revised the U.S. corporate income tax regime by, among other things, lowering the U.S. federal corporate income tax rate from 35% to 21%, implementing a territorial tax system and imposing a repatriation tax on deemed earnings of foreign subsidiaries. We recorded a provisional tax charge in 2017 of $11.7 million, composed of $6.7 million to re-measure U.S. deferred tax assets and $5.0 million for the repatriation tax on accumulated undistributed foreign earnings. During the year ended December 31, 2018, we reduced the provisional tax charge by $0.4 million as a result of new regulatory guidance and changes in interpretations and assumptions made by us.

Our consolidated effective tax rate for the year ended December 31, 2018 was 20.7%, compared to 26.6% for the year ended December 31, 2017. The tax provision for the year ended December 31, 2018 reflected a reduction in the federal corporate income tax rate and other changes associated with the Tax Act and $5.6 million of excess tax benefits related to share-based compensation awards that vested or were exercised during the year. The income tax provision for the year ended December 31, 2017 included $26.1 million of excess tax benefits related to share-based compensation awards offset by the provisional tax charge of $11.7 million related to the enactment of the Tax Act. Our consolidated effective tax rate can vary from period to period depending on the geographic mix of our earnings, changes in tax legislation and tax rates and the amount and timing of excess tax benefits related to share-based payments, among other factors.

As of December 31, 2018, we had restricted U.S. federal net operating loss carryforwards of approximately $2.9 million. The utilization of our restricted U.S. federal net operating loss carryforwards is subject to an annual limitation determined by Section 382 of the Internal Revenue Code. See Note 7 of the Notes to our Consolidated Financial Statements for further discussion related to income taxes.

Year Ended December 31, 2017 Compared to Year Ended December 31, 2016

Overview

Total revenues increased by $25.7 million or 7.0% to $393.4 million for the year ended December 31, 2017 from $367.7 million for the year ended December 31, 2016. This increase in total revenues was primarily due to an increase in commission revenue of $23.0 million. A 4.0% change in the average foreign currency exchange rates of the British Pound Sterling compared to the U.S. dollar for the year ended December 31, 2017 had the effect of decreasing revenues by $2.3 million for the year ended December 31, 2017.

Total expenses increased by $16.1 million or 9.0% to $193.8 million for the year ended December 31, 2017 from $177.7 million for the year ended December 31, 2016. This increase was primarily due to higher employee compensation and benefits of $5.7 million, technology and communication expenses of $2.8 million, professional and consulting fees of $2.2 million, general and administrative costs of $2.0 million, occupancy of $1.4 million and depreciation and amortization of $1.4 million. The change in the average foreign currency exchange rates had the effect of decreasing expenses by $2.2 million for the year ended December 31, 2017.

Income before taxes increased by $10.2 million or 5.3% to $201.8 million for the year ended December 31, 2017 from $191.6 million for the year ended December 31, 2016. Net income increased by $21.9 million or 17.4% to $148.1 million for the year ended December 31, 2017 from $126.2 million for the year ended December 31, 2016.

Revenues

Our revenues for the years ended December 31, 2017 and 2016, and the resulting dollar and percentage changes, were as follows:

	Year Ended December 31,					
	2017		2016			
	($ in thousands)					
	$	% of Revenues	$	% of Revenues	$ Change	% Change
Commissions	$355,282	90.3 %	$332,307	90.4 %	$22,975	6.9 %
Information services	25,806	6.6	23,269	6.3	2,537	10.9
Post-trade services	11,090	2.8	10,812	2.9	278	2.6
Other	1,244	0.3	1,342	0.4	(98)	(7.3)
Total revenues	$393,422	100.0 %	$367,730	100.0 %	$25,692	7.0 %

Commissions

Our commission revenues for the years ended December 31, 2017 and 2016, and the resulting dollar and percentage changes, were as follows:

	Year Ended December 31,			
	2017	2016	$ Change	% Change
	($ in thousands)			
Variable transaction fees				
U.S. high-grade	$137,034	$135,295	$1,739	1.3 %
Other credit	140,492	129,976	10,516	8.1
Liquid products	2,277	2,795	(518)	(18.5)
Total variable transaction fees	279,803	268,066	11,737	4.4

Distribution fees				
U.S. high-grade	64,709	58,705	6,004	10.2
Other credit	10,154	4,783	5,371	112.3
Liquid products	616	753	(137)	(18.2)
Total distribution fees	75,479	64,241	11,238	17.5
Total commissions	$355,282	$332,307	$22,975	6.9 %

Variable Transaction Fees

The following table shows the extent to which the increase in variable commissions for the year ended December 31, 2017 was attributable to changes in transaction volumes and variable transaction fees per million:

	Change from the Year Ended December 31, 2016			
	U.S. High-Grade	Other Credit	Liquid Products	Total
	($ in thousands)			
Volume increase (decrease)	$17,495	$18,762	$ (705)	$35,552
Variable transaction fee per million (decrease) increase	(15,756)	(8,246)	187	(23,815)
Total increase (decrease) in variable commissions	$1,739	$10,516	$ (518)	$11,737

Our trading volume for each of the years presented was as follows:

	Year Ended December 31,		$	%
	2017	2016	Change	Change
	($ in millions)			
Trading Volume Data				
U.S. high-grade - fixed rate	$791,194	$704,648	$86,546	12.3 %
U.S. high-grade - floating rate	33,839	25,917	7,922	30.6
Total U.S. high-grade	825,033	730,565	94,468	12.9
Other credit	579,912	506,762	73,150	14.4
Liquid products	53,383	71,375	(17,992)	(25.2)
Total	$1,458,328	$1,308,702	$149,626	11.4 %
Number of U.S. Trading Days	250	250		
Number of U.K. Trading Days	252	253		

For volume reporting purposes, transactions in foreign currencies are converted to U.S. dollars at average monthly rates. The 12.9% increase in our U.S. high-grade volume was principally due to an increase in our estimated market share coupled with growth in estimated overall market volume. Our estimated market share of total U.S. high-grade corporate bond volume increased to 16.9% for the year ended December 31, 2017 from 16.0% for the year ended December 31, 2016. Estimated U.S. high-grade TRACE volume increased by 7.0% to $4.9 trillion for the year ended December 31, 2017 from $4.6 trillion for the year ended December 31, 2016.

Other credit volumes increased by 14.4% for the year ended December 31, 2017 compared to the year ended December 31, 2016, primarily due to a 37.2% increase in emerging markets bond volume offset by decreases of 5.3% in our high-yield bond volume and 4.8% in our Eurobond volume. Liquid products volume (excluding credit derivatives) decreased by 25.2% for the year ended December 31, 2017 compared to the year ended December 31, 2016, due mainly to a 27.5% decrease in U.S. agencies bond market volume as reported by TRACE.

Our average variable transaction fee per million for the years ended December 31, 2017 and 2016 was as follows:

	Year Ended December 31, 2017	Year Ended December 31, 2016
Average Variable Transaction fee per million		
U.S. high-grade - fixed rate	$ 170	$ 191
U.S. high-grade - floating rate	65	39
Total U.S. high-grade	166	185
Other credit	242	256
Liquid products	43	39
Total	192	205

Total U.S. high-grade average variable transaction fee per million decreased to $166 per million for the year ended December 31, 2017 from $185 per million for the year ended December 31, 2016. The decline was mainly due to an increase in the number of larger sized trades, the migration of certain of our broker-dealer clients from an all-variable fee plan to a plan that incorporates a monthly distribution fee and a decrease in the duration of bonds traded. Other credit average variable transaction fee per million decreased to $242 per million for the year ended December 31, 2017 from $256 per million from December 31, 2016, mainly due to a larger percentage of trading volume in emerging market bonds that command lower fees per million, as well as a decrease in high-yield average variable fee per million as a result of the change in the structure of our high-yield fee plan options implemented in August 2017. The decrease in other credit average variable transaction fee per million was partially offset by an increase in Eurobond fees per million as a result of the change in the structure of our Eurobond fee plan that was implemented in the fourth quarter of 2016.

Distribution Fees

U.S. high-grade distribution fees increased $6.0 million principally due to the migration of certain of our broker-dealer clients from an all-variable fee plan to a plan that incorporates monthly a distribution fee. The $5.4 million increase in Other credit distribution fees principally relates to a $8.2 million increase in distribution fees under the high-yield fee plan structure implemented in August 2017 that allows our broker-dealer clients to elect a plan that incorporates a monthly distribution fee. This was offset by a decline of $3.2 million relating to the change in the Eurobond fee plan implemented in the fourth quarter of 2016.

Information Services. Information services revenue increased $2.5 million for the year ended December 31, 2017 due to higher data revenue.

Post-Trade Services. Post-trade services revenue increased $0.3 million for the year ended December 31, 2017 due to a $1.4 million increase in revenues associated with MiFID II implementation services which was offset by a decrease of $1.1 million in transaction reporting revenues. Our transaction reporting business processed approximately 1.0 billion transactions for the year ended December 31, 2017 compared to approximately 1.2 billion for the year ended December 31, 2016.

Other. Other revenue was $1.2 million and $1.3 million for the years ended December 31, 2017 and 2016, respectively.

Expenses

Our expenses for the years ended December 31, 2017 and 2016, and the resulting dollar and percentage changes, were as follows:

	Year Ended December 31,					
	2017		2016			
	($ in thousands)					
		% of		% of	$	%
	$	Revenues	$	Revenues	Change	Change
Expenses						

Employee compensation and benefits	$102,313	26.0	%	$96,625	26.3	%	$5,688	5.9 %
Depreciation and amortization	19,274	4.9		17,838	4.9		1,436	8.1
Technology and communications	20,048	5.1		17,275	4.7		2,773	16.1
Professional and consulting fees	19,367	4.9		17,175	4.7		2,192	12.8
Occupancy	6,125	1.6		4,681	1.3		1,444	30.8
Marketing and advertising	9,762	2.5		8,934	2.4		828	9.3
Clearing costs	5,797	1.5		6,060	1.6		(263)	(4.3)
General and administrative	11,121	2.8		9,157	2.5		1,964	21.4
Total expenses	$193,807	49.3	%	$177,745	48.3	%	$16,062	9.0 %

Employee Compensation and Benefits. Employee compensation and benefits increased by $5.7 million primarily due to a $7.1 million increase in salaries and benefits on higher employee headcount, offset by a lower employee incentive compensation of $1.2 million, which is tied to operating performance. The total number of employees increased to 429 as of December 31, 2017 from 383 as of December 31, 2016.

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Depreciation and Amortization. Depreciation and amortization increased by $1.4 million primarily due to a $1.2 million increase in amortization expense of leasehold improvements and higher amortization of software development costs of $0.6 million offset by a $0.3 million decrease in production hardware depreciation expense. For the years ended December 31, 2017 and 2016, $12.1 million and $6.4 million, respectively, of equipment purchases and leasehold improvements and $13.5 million and $12.1 million, respectively, of software development costs were capitalized.

Technology and Communications. Technology and communications expenses increased by $2.8 million primarily due to increases in software subscription costs of $1.1 million, technology maintenance and support costs of $0.8 million and market data costs of $0.5 million.

Professional and Consulting Fees. Professional and consulting fees increased by $2.2 million primarily due to a $2.7 million increase in fees related to various regulatory initiatives offset by lower risk consulting services of $0.5 million.

Occupancy. Occupancy increased by $1.4 million due to an increase in rent expense of $1.3 million for additional office space to accommodate our increased headcount.

Marketing and Advertising. Marketing and advertising expenses increased by $0.8 million primarily due to higher sales related travel and entertainment costs of $0.6 million and marketing event costs of $0.3 million.

Clearing Costs. Clearing costs decreased by $0.3 million for the year ended December 31, 2017. During the third quarter of 2016, we amended the terms of our agreements with our third-party clearing brokers, which resulted in a reduction in transaction and other clearing costs. Third-party clearing costs as a percentage of matched principal trading revenue decreased from 16.1% for the year ended December 31, 2016 to 12.7% for the year ended December 31, 2017.

General and Administrative. General and administrative expenses increased by $2.0 million principally due to an increase in general travel and entertainment expenses of $0.8 million and an increase of $0.3 million in employee relocation expenses.

Other Income (Expense)

Our other income for the year ended December 31, 2017 and 2016, and the resulting dollar and percentage changes, were as follows:

	Year Ended December 31,					
	2017		2016			
	($ in thousands)					
	$	% of Revenues	$	% of Revenues	$ Change	% Change
Investment income	$3,619	0.9 %	$2,137	0.6 %	$1,482	69.3 %
Other, net	(1,466)	(0.4)	(520)	(0.1)	(946)	181.9
Total other income	$2,153	0.5 %	$1,617	0.4 %	$536	33.1 %

Investment income increased by $1.5 million primarily due to higher investment balances and an increase in interest rates in 2017. Other, net decreased by $0.9 million due to a decrease in foreign currency transaction gains of $0.7 million.

Provision for Income Tax. Our consolidated effective tax rate for the year ended December 31, 2017 was 26.6%, compared to 34.1% for the year ended December 31, 2016. The tax provision for the year ended December 31, 2017 includes excess tax benefits of $26.1 million relating to a new standard for share-based payments accounting (ASU 2016-09) adopted effective January 1, 2017, offset by the provisional tax charge of $11.7 million related to the enactment of the Tax Act. Our consolidated effective tax rate can vary from period to period depending on the geographic mix of our earnings, changes in tax legislation and tax rates and the amount and timing of excess tax benefits related to share-based payments, among other factors.

As of December 31, 2017, we had restricted U.S. federal net operating loss carryforwards of approximately $4.2 million. The utilization of our restricted U.S. federal net operating loss carryforwards is subject to an annual limitation determined by Section 382 of the Internal Revenue Code.

Quarterly Results of Operations

Our quarterly results have varied significantly as a result of:

- changes in trading volume due to market conditions, changes in the number of trading days in certain quarters, and seasonality effects caused by slow-downs in trading activity during certain periods;
- changes in the number of broker-dealers and institutional investors using our trading platform, as well as variation in usage by existing clients;
- expansion of the products we offer to our clients; and
- variance in our expenses, particularly employee compensation and benefits.

The following table sets forth certain unaudited consolidated quarterly income statement data for the eight quarters ended December 31, 2018. In our opinion, this unaudited information has been prepared on a basis consistent with our annual financial statements and includes all adjustments (consisting only of normal recurring adjustments) necessary for a fair statement of the unaudited quarterly data. This information should be read in conjunction with our Consolidated Financial Statements and related Notes included in this Annual Report on Form 10-K. The results of operations for any quarter are not necessarily indicative of results that we may achieve for any subsequent periods.

	Three Months Ended							
	Dec 31, 2018	Sep 30, 2018	Jun 30, 2018	Mar 31, 2018	Dec 31, 2017	Sep 30, 2017	Jun 30, 2017	Mar 31, 2017
	(In thousands, except per share amounts) (unaudited)							
Revenues								
Commissions	$101,436	$90,513	$96,113	$102,772	$87,975	$86,270	$87,015	$94,022
Information services	7,057	7,174	6,930	7,066	6,793	6,331	6,497	6,185
Post-trade services	3,675	3,475	3,620	4,576	3,467	2,678	2,489	2,456
Other	276	281	301	300	325	305	313	301
Total revenues	112,444	101,443	106,964	114,714	98,560	95,584	96,314	102,964
Expenses								
Employee compensation and benefits	27,802	26,282	26,199	28,834	24,225	25,485	25,319	27,284
Depreciation and amortization	5,848	6,173	5,790	5,269	5,208	4,583	4,790	4,693
Technology and communications	6,415	5,879	5,793	5,779	5,606	5,035	4,822	4,585
Professional and consulting fees	5,353	5,685	5,426	5,057	5,455	5,547	4,086	4,279
Occupancy	3,844	3,528	3,467	3,337	1,504	1,795	1,422	1,404
Marketing and advertising	3,534	2,980	3,535	2,065	3,005	2,089	2,782	1,886
Clearing costs	2,257	1,760	2,012	1,725	1,477	1,476	1,517	1,327
General and administrative	3,426	2,744	2,708	2,475	3,243	2,939	2,591	2,348

Total expenses	58,479	55,031	54,930	54,541	49,723	48,949	47,329	47,806
Operating income	53,965	46,412	52,034	60,173	48,837	46,635	48,985	55,158
Other income (expense)								
Investment income	1,926	1,635	1,383	1,168	1,068	964	840	747
Other, net	175	(250)	(207)	(328)	(534)	(382)	(252)	(298)
Total other income	2,101	1,385	1,176	840	534	582	588	449
Income before income taxes	56,066	47,797	53,210	61,013	49,371	47,217	49,573	55,607
Provision for income taxes	10,235	9,203	12,723	13,073	15,898	13,087	11,550	13,144
Net income	$45,831	$38,594	$40,487	$47,940	$33,473	$34,130	$38,023	$42,463
Net income per common share								
Basic	$1.24	$1.04	$1.10	$1.30	$0.91	$0.93	$1.03	$1.15
Diluted	$1.21	$1.02	$1.07	$1.27	$0.88	$0.90	$1.00	$1.11

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The following tables set forth trading volume and average variable transaction fee per million traded for the eight quarters ended December 31, 2018.

	Three Months Ended							
	Dec 31, 2018	Sep 30, 2018	Jun 30, 2018	Mar 31, 2018	Dec 31, 2017	Sep 30, 2017	Jun 30, 2017	Mar 31, 2017
Trading Volume Data	(In millions)							
U.S. high-grade - fixed rate	$223,737	$191,950	$215,308	$236,523	$191,411	$192,092	$195,717	$211,974
U.S. high-grade - floating rate	16,915	14,066	15,211	14,462	9,815	8,734	7,870	7,420
Total U.S. high-grade	240,652	206,016	230,519	250,985	201,226	200,826	203,587	