**STATEMENT**

**OF**

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**T. ROWE PRICE ASSOCIATES, INC.**

**BEFORE THE**

**US HOUSE OF REPRESENTATIVES**

**COMMITTEE ON FINANCIAL SERVICES**

**SUBCOMMITTEE ON**
**CAPITAL MARKETS, SECURITIES, AND INVESTMENT**

**ON**

# A REVIEW OF FIXED INCOME MARKET STRUCTURE

**JULY 14, 2017**

## EXECUTIVE SUMMARY

- We greatly appreciate the Subcommittee's continuing interest in ensuring the quality and integrity of the fixed income markets. Enhancing the transparency, liquidity, and overall functioning of these markets is critical to the success of millions of American savers who use the types of funds that T. Rowe Price and other ICI members sponsor to gain access to the fixed income markets.

- The fixed income market is a collection of several diverse markets, which differ in terms of the drivers of returns, liquidity characteristics, and the amount of electronic trading that takes place.

- Fixed income products can, and indeed historically have, traded in a variety of ways, and the evolution of market structure in this space has never been—and is not be expected to be—linear. There are ongoing changes in market structure as a function of the market participants and their needs, and tradeoffs with respect to the immediacy of liquidity, depth of that liquidity, and price transparency.

- Fixed income markets provide a critical source of funding to companies and governments. The capital raised in our markets provides growth capital for corporate America to create jobs, fund key infrastructure projects for municipalities to upgrade roads and bridges, and provide a vital funding mechanism for the federal government. The fixed income markets also play a critical role in helping investors achieve important financial goals, as fixed income investments are used by investors to generate returns for pension funds, retirement plans, and college savings.

- Liquidity is a critical element of efficient markets, and is particularly important in the everyday operations of mutual funds like those sponsored by T. Rowe Price. Although liquidity in the fixed income markets can be difficult to measure, it is our opinion that over the past decade, we have seen greater fragmentation, a more bifurcated market, and lower overall liquidity.

- A number of new regulatory requirements, including the Volcker Rule, have limited the incentives for banks to use their balance sheets to engage in market making activities.

- Although there has been no shortage of commentary regarding liquidity risks in the fixed income markets, we maintain a constructive outlook. New technology and other new protocols for trading have given fixed income traders additional tools for sourcing liquidity and, to the extent the markets experience a measured increase in volatility and rise in yields, two-way trading activity may increase.

- With respect to the Treasury market, we generally support the recommendations of the Joint Staff Report on the Treasury flash rally, particularly the utility of enhanced regulatory reporting to help the Department of the Treasury and other stakeholders better ensure an efficient and competitive market for all participants, including funds and other investors.

- Buy-side firms have a range of strong views on transparency and the public dissemination of trading information in the fixed income markets, as well as the utility of existing reporting mechanisms. T. Rowe Price has been and continues to be broadly supportive of greater transparency in fixed income markets, although we recognize risks in this regard. We encourage regulators, both domestic and international, to thoughtfully consider requirements to foster transparency, and then to implement those requirements in phases with regular periods of review and study to minimize any unintended consequences for market participants or market dislocations. This kind of careful approach can produce a transparency regime that appropriately balances the benefits of transparency with the risks to market functioning that may be caused by the public dissemination of sensitive trading information.

- We are excited about the continued development of greater "electronification" in the fixed income markets. Electronic trading ("e-trading") has proven to be most successful in markets that are characterized by an active and diverse set of participants and a smaller set of homogenous securities that allows buyers and sellers to focus their interest, such as for on-the-run Treasuries and Treasury futures trading. E-trading is less advanced in corporate markets, but it continues to grow steadily. T. Rowe Price believes that removing obstacles to further electronification will improve price discovery, facilitate best execution, and enhance capital formation.

## I. INTRODUCTION

Thank you, Chairman Huizenga, Ranking Member Maloney, and members of the Subcommittee for inviting me to testify. My name is Alexander Sedgwick. I am the Head of Fixed Income Market Structure and Electronic Trading at T. Rowe Price, a global investment management organization with $861.6 billion in assets under management as of March 31, 2017.

In addition to T. Rowe Price, I am also appearing at this hearing as a member of the Investment Company Institute ("ICI"), a leading global association of regulated funds.[1] ICI's members manage total assets of $19.9 trillion in the United States, serving more than 95 million US shareholders, and $5.6 trillion in assets in other jurisdictions.

We greatly appreciate the Subcommittee's continuing interest in ensuring the quality and integrity of the fixed income markets. The types of funds that T. Rowe Price and other ICI members sponsor play a critical part in capital formation in the United States by investing in the fixed income markets on behalf of millions of retail investors saving for their long-term financial goals. And as such, the fixed income markets play an important role in helping the young invest for their first home, helping parents invest so that their children might attend college, helping in the preparation for retirement, and helping current retirees meet the challenges of retirement. Fixed income market dynamics and factors relevant to trade execution affect our ability to deliver on our investment mandates and, in turn, help our investors achieve those financial investment goals. Enhancing the transparency, liquidity, and overall functioning of these markets is thus critical to the success of millions of American savers.

In the sections that follow, I provide a brief outline on the evolution of the fixed income markets and T. Rowe Price's role in them, discuss the current state of liquidity in the fixed income markets, and provide T. Rowe Price's recommendations for enhancing market efficiency. I also discuss some of the promising developments in the electronification of fixed income trading.

## II. Background on the Fixed Income Markets and T. Rowe Price

### a. Evolution of Market Structure

The history of the government bond market provides a helpful illustration of the evolution of fixed income market structure as it speaks to several important points:

- Fixed income investments can, and indeed historically have, traded according to diverse market conventions.

- Changes in market structure result in tradeoffs, reflecting the relative importance of features like immediacy of liquidity, depth of that liquidity, and price transparency.

[1] Regulated funds include mutual funds, exchange-traded funds ("ETFs"), closed-end funds, and unit investment trusts in the United States and similar funds offered to investors in jurisdictions worldwide. ICI seeks to encourage adherence to high ethical standards, promote public understanding, and otherwise advance the interests of funds, their shareholders, directors, and advisers.

- The evolution in market structure of any fixed income asset class is not linear—rather it is influenced by the needs and constraints of all market participants, including issuers, buyers, sellers and liquidity providers, over time.

- Perhaps most importantly, the participants themselves and their needs are not static but have changed over time.

The evolution of organized fixed income markets in the United States began in 1792 when the New York Stock Exchange was founded primarily as a government bond exchange. Since then, US Treasuries have moved from trading on an exchange to trading over-the-counter ("OTC") and back several times, largely depending on which market structure best reflected the current needs of investors.

War funding precipitated many of the changes in Treasury market structure. First, the dramatic increase in the funding needs for the Civil War incentivized private firms to act as sales agents, and also provide OTC secondary markets for their customers. Later, the issuance of exchange-listed Liberty loans to fund World War I increased the volumes on the exchange.

This trend reversed in the mid-1920s due to a number of factors: (i) the retirement of war debt; (ii) the growing concentration of new Treasury issues in non-exchange listed securities; and (iii) increased institutional buying from an emerging financial sector. Further gravitation to OTC markets resulted in 1925 when, at the suggestion of the Federal Reserve Bank of New York, Treasury stopped executing its open market operations via the exchange. Moreover, the introduction of the Treasury bill in 1929 as the dominant liquidity instrument of the money market cemented the importance of the OTC market, as only marketable Treasury bonds remained exchange listed. By 1958, trading in government securities on the exchange totaled only $100,000, compared with $2.9 billion in 1919.[2]

As this brief history shows, the evolution of the fixed income market has not been—and should not be expected to be—linear. Moreover, fixed income market structure tends to be a reflection of the changing needs of its participants, the evolution of technology, and underlying financial conditions at the time.

### b. T. Rowe Price's Role in the Fixed Income Markets

T. Rowe Price provides a broad array of mutual funds, subadvisory services, and separate account management for individual and institutional investors, retirement plans, and financial intermediaries using a disciplined, risk-aware investment approach that focuses on diversification, style consistency, and fundamental research. T. Rowe Price sponsors over 175 mutual funds, including over 50 fixed income funds and approximately 40 retirement/target date funds.

[2] *See* "Treasury-Federal Reserve Study of the Government Securities Market" (1959), available at https://fraser.stlouisfed.org/title/317.

Accordingly, we are a significant participant in the fixed income markets. On behalf of our clients, we participate across a range of investment strategies and fund types. As of March 31, 2017, over $123 billion of our total $861.6 billion in assets under management are attributable to fixed income portfolios. Fixed income investments can also play an important role in other types of portfolios managed by the firm, such as target date funds and other asset allocation portfolios.[3] Overall, as of March 31, 2017, T. Rowe Price managed over $195 billion in fixed income investments.

### c. The Importance of Fixed Income Markets to Capital Formation

Fixed income markets provide a critical source of funding to companies and governments. The capital raised in our markets provides growth capital for corporate America to create jobs, fund key infrastructure projects for municipalities to upgrade roads and bridges, and provides a vital funding mechanism for the federal government.

The structure of the fixed income markets is more complex than the equity markets because each issuer can issue an array of instruments with varying maturities, debt structures, and covenants.

That diversity of fixed income instruments is an important factor in how T. Rowe Price manages portfolios. The wide variety of bond characteristics including return profiles, maturities, ratings and individual issuers, provides a robust universe of potential investments. Importantly, these characteristics play a prominent role in how we prudently manage risks associated with our investments and how we gain desired exposure. A diverse set of bond characteristics ensures that we can appropriately position a portfolio with the desired credit risk, duration, and industry exposures we need in order to match the investment goals of our clients.

This diverse market structure for debt issuance also provides flexibility to corporate borrowers. It ensures that borrowers can manage their capital structure and debt maturity profile in a flexible manner while also raising capital at attractive interest rates. While the market may over time gravitate to a more standardized structure, we believe any change in this regard would need to balance the needs of issuers with those of investors and should not create an undue preference for secondary market liquidity over the ability of issuers to access capital.

## III. Liquidity Considerations in the Fixed Income Markets

The Subcommittee has expressed interest in the current state of liquidity in the fixed income markets and the impact of the domestic and international regulatory regime.

[3] As of March 31, 2017, T. Rowe Price manages $255.2 billion in asset allocation portfolios, of which $202.6 billion relates to target date retirement portfolios.

Liquidity is a critical element of efficient markets, and is particularly important in the everyday operations of mutual funds like those sponsored by T. Rowe Price and other ICI members, which typically offer their shares on a continuing basis and are required by the Investment Company Act of 1940 ("Investment Company Act") to issue "redeemable securities."[4] Mutual funds must have efficient, orderly markets to invest new cash when investors purchase fund shares or when the fund sells portfolio securities, either in pursuit of the funds' investment strategies or to meet investor redemption requests. Accordingly, our portfolio managers carefully consider liquidity when making investment decisions, particularly in the fixed income markets. If we are concerned about the possibility that the liquidity of particular instruments could deteriorate in the future, we may need to factor this into portfolio construction.

That said, measuring the liquidity of a market is a challenge. The sections below discuss liquidity in the US Treasury markets and corporate bond markets, and consider the impact of recent regulatory developments in this regard.

### a. US Treasury Liquidity

There are a number of common metrics used to measure liquidity in the fixed income market, including the bid-ask spread, depth of market, average trade size and the market impact of trading. The bid-ask spread represents the difference between where a market maker will buy or sell a security. Spreads are typically narrower in frequently traded, liquid securities. The depth of market and average trade size measure the amount that may be traded at the best price and the average size of a trade in the market—in both cases, higher numbers suggest more liquid markets. Finally, the market impact measures the expected market movement associated with a trade and in liquid markets this value is typically small, indicating investors can transact in size without materially altering price.

These common metrics paint a mixed picture on the state of liquidity in the Treasury market. For example, in 2015, staff at the Federal Reserve Bank of New York observed that post crisis bid-ask spreads have been narrow and stable by historical standards. Order depth has varied more over time, recovering after the crisis but declining during both the 2013 "taper tantrum" and the 2014 flash rally. As of 2015, it was not unusually low by historical standards. The same report also found that measures of price impact rose during the same periods of declining market depth indicating periods of lower liquidity. Over this same period, the author noted that trade sizes have decreased. Overall the study concluded that average market liquidity is generally in line with historical standards though there may be reasons to be concerned about liquidity risk—or how resilient liquidity is during periods of stress.[5]

[4] *See* Section 2(a)(32) of the Investment Company Act (generally defining "redeemable security" as "any security . . . under the terms of which the holder, upon its presentation to the issuer or to a person designated by the issuer, is entitled . . . to receive approximately his proportionate share of the issuer's current net assets, or the cash equivalent thereof.").

[5] *See* "Has U.S. Treasury Market Liquidity Deteriorated", available at http://libertystreeteconomics.newyorkfed.org/2015/08/has-us-treasury-market-liquidity-deteriorated.html.

We are encouraged by the efforts of regulators—including those who contributed to the Joint Staff Report[6] on the 2014 flash rally—to study these market structure issues. We agree with the Joint Staff Report's recommendations to strengthen the monitoring and surveillance of this market while promoting inter-agency coordination and data sharing. We would also echo the qualification noted in the Joint Staff Report that many of the statistics cited in it and the Federal Reserve Bank of New York report were derived from data collected by inter-dealer trading platforms because a comprehensive data set for the entire market does not currently exist. This lack of a comprehensive, real time data repository undoubtedly delayed the issuance of the Joint Staff Report, which acknowledges:

> There are several aspects of the U.S. Treasury and broader U.S. fixed income market that are not represented in this data. For, example cash Treasury market data do not include the large dealer-to-customer market, in which dealers transact—either through voice or electronic means—with their customers.

This "dealer-to-customer market" referenced above is the portion of the market that T. Rowe Price trades in. We would caution that the metrics from the inter-dealer market alone may provide a skewed and incomplete picture of the overall Treasury market, as there are significant differences in the participants transacting in the inter-dealer and dealer-to-customer markets. For example, according to a study[7] done by the Federal Reserve, the inter-dealer market constitutes approximately 45% of total Treasury trading volumes and approximately 72% of the inter-dealer trading volumes are executed by principal trading firms ("PTFs") with the balance traded by dealers. Of the top 10 liquidity providers on BrokerTec during a period of months in 2015, only two were traditional dealers. In contrast, dealers continue to provide the vast majority of the liquidity in the client-to-dealer market.

This leads us to two comments on the market structure for Treasuries:

- The Joint Staff Report notes that the proliferation of PTF trading in the inter-dealer market "raises questions about the evolving risks" in this market. T. Rowe Price recommends a review of the regulatory framework that governs liquidity providers in this market, but asks that regulators resist the temptation to import rules or regulations designed for other markets without tailoring them appropriately.

- Both T. Rowe Price and ICI are supportive of the efforts of FINRA to require regulatory reporting of Treasury trades. This reporting requirement, however, applies only to FINRA members – broker-dealers – and not to PTFs, and therefore will provide the official sector with only partial information about the Treasury market. Until regulators are able to obtain a more complete view of market activity, we caution them against using

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[6] *Joint Staff Report: The US Treasury Market on October 15, 2014* (July 13, 2015), available at https://www.treasury.gov/press-center/press-releases/Documents/Joint_Staff_Report_Treasury_10-15-2015.pdf.

[7] *See* "Primary Dealer Participation in the Secondary U.S. Treasury Market", available at http://libertystreeteconomics.newyorkfed.org/2016/02/primary-dealer-participation-in-the-secondary-us-treasury-market.html.

the data obtained through this reporting requirement to make more fundamental changes to Treasury market structure.

### b. Credit Market Liquidity

In contrast with exchange-traded products like equities, buyers and sellers in over-the-counter fixed income markets frequently access the market at different times. Historically, broker-dealers have been a necessary intermediary providing liquidity, often on demand, for end investors by purchasing bonds from asset managers and other buy-side firms wanting to sell. They would hold these securities for a period of time—which could range from a few hours to several weeks—until they could locate a counterparty to take the other side of the trade, earning a bid-ask spread as compensation for taking risk onto their balance sheets. When markets become more volatile, bank dealers widen their spreads or reduced the size of the trades they were willing to perform to reflect the increased risk and/or reduced price transparency.

At their pinnacle in late 2007, primary dealers' net inventories of corporate bonds exceeded $235 billion. These positions declined by nearly three-quarters during the credit crisis as banks shed risk and wrote down assets. Inventories then stabilized for a time before declining further as more stringent post crisis banking regulations, including the Dodd-Frank Act and Basel III Accord, increased banks' cost of capital and disincentivized the warehousing of risk. In today's market structure, dealers are still responsible for the majority of corporate bond trading volume and connecting buyers with sellers. However, due to increased regulation, dealers have less incentive to hold securities on their balance sheets for extended periods thereby reducing liquidity. As a result, dealers are increasingly acting in an agency capacity for their customers.

Greater market fragmentation[8] has also impaired liquidity. A low interest rate environment has encouraged debt issuance, and many companies issued bonds for the first time. Although a flurry of activity from issuers who are new to the fixed income market is indicative of a healthy credit market, it may skew common measures of liquidity. In the secondary market, institutional investors tend to gravitate toward larger more liquid issues in a given capital structure.

Secondary trading volumes have actually been resilient, increasing since the financial crisis despite banks' retreat from market making. However, the overall market grew at an even more rapid clip, leading to greater market fragmentation. Turnover—the ratio of trading activity relative to total market size—in both the investment-grade and high yield markets has dropped to levels below those achieved during the 2008 credit crisis.[9]

However, liquidity is bifurcated. The 1,000 most actively traded bonds have relatively high and consistent average turnover rates (about 150% annually). But excluding these popular, benchmark-names, the rest of the market has much lower average turnover (about 37%

[8] In equity market structure discussions, "market fragmentation" often refers to the proliferation of trading venues and routing requirements. We use the term here to mean the volume of new issuances and diversity of bond offerings.

[9] *See* MarketAxess Research available at http://www.marketaxess.com/research/market-insights/turnover_hghy_usa.php.

annually). This larger, less-liquid market segment has grown significantly with the surge in new issuance, explaining the decline in overall turnover.

Another notable development in the post-crisis environment is a marked decline in the average size of trades. This is attributable to several factors. In the low-rate, low-volatility environment that prevailed in recent years, there have been fewer large, conviction-driven trades. With dealers less inclined to use their balance sheets to broker trades, institutional investors like T. Rowe Price are being more strategic about trade execution, splitting up large trades into smaller ones and executing with a greater number of counterparties. As we will discuss, investors are increasingly utilizing electronic trading platforms, where average trade sizes are lower.

In a liquid market of any sort, there are multiple buyers and sellers looking to exchange a particular asset for cash at a given time. This enables rapid execution and clear, competitive pricing. However, this situation rarely occurs in fixed income markets, which are fragmented into a number of distinct sectors. Within each sector, there are thousands of individual bonds, each with unique characteristics—yield, duration, quality, subordination level, etc.—that appeal to different types of investors. Some long-term investors buy and hold to maturity, removing bonds from circulation after issuance.

Only a fraction of the corporate market trades on a daily basis. In the U.S. high-grade market, on any given day only about a quarter of the approximately 20,000 bonds outstanding traded on at least one side of the market (i.e., bought or sold) last year. As trade size increases, the number of bonds with daily liquidity shrinks. Looking at trades exceeding $1 million, a common size for institutional investors, on an average day only 431 index-eligible bonds—less than 7% of the investable universe—were bought and sold.

### c. Impact of Regulation on the Fixed Income Markets

A number of new regulatory requirements have limited the ability of banks to use their balance sheets to engage in market making activities. This includes the Volcker Rule, which seeks to restrict banks from using their own resources to trade for purposes unrelated to serving clients and address perceived conflicts of interest in certain transactions or relationships.[10]

After the financial crisis and the ensuing regulatory reform, the role of dealers has changed, with resulting effects on the fixed income markets. The Volcker Rule, for example, has compelled large banks to spin off or wind down their proprietary trading operations. These "prop desks" used their bank's capital to profit from short-term market dislocations. Although speculative traders rather than pure market makers, prop desks frequently served as a source of uncorrelated demand when buy-side investors needed to sell particular securities. Today their role is diminished, and remaining investors often find themselves on the same side of the market.

[10] To accomplish these goals, the Volcker Rule prohibits banks and their affiliates and subsidiaries (referred to as "banking entities") from engaging in "proprietary trading." There are exclusions for "permitted activities," such as market making, as defined in the statute and implementing regulations. The Volcker Rule also generally prohibits banking entities from sponsoring or investing in hedge funds, private equity funds, or other similar funds (referred to as "covered funds").

The role of dealers more generally has changed as well, with dealers reducing inventory and acting more in an agency capacity for their customers. Dealers may have chosen to reduce their holdings of corporate bonds for a number of reasons, including the Volcker Rule and other regulatory requirements. Given the central role that dealers have played in providing liquidity in a principal capacity in the corporate bond markets, these changes have led to a shift in the fixed income trading environment.

### d. T. Rowe Price's Outlook on Fixed Income Market Liquidity Risk

There has been no shortage of commentary regarding liquidity risks in the fixed income markets. However, we see several reasons for having a more constructive outlook.

Dealers are making more efficient use of their smaller balance sheets through technology, and institutional investors have responded in kind. It is still too early to tell which of the new trading protocols will gain traction, and e-trading will not be a panacea for liquidity shortfalls at times when risk aversion is high and buyers are scarce. That being said, it is positive to see new ideas being tested, and our fixed income traders are taking advantage of having more tools at their disposal for sourcing liquidity.

As noted above, stricter regulations have made bond trading less profitable for banks. In addition, an environment of low volatility, yields, and credit spreads has also reduced incentives for banks to make markets. It is difficult to assess whether stricter regulations or the market environment has had a greater impact in discouraging banks from trading more. In any case, if there is a moderate increase in volatility as the Fed gradually tightens monetary policy, bid-ask spreads could widen from today's tight levels, enticing market makers to allocate more capital to facilitate secondary market trading.

An uptick in volatility also should encourage market participants to develop differing views of value, which is critical for creating more vibrant markets with a diverse pool of buyers and sellers. In the recent environment, trading activity has been highly correlated, and compelling relative value opportunities have been harder to find. A measured increase in volatility and rise in yields should foster an increase in two-way trading activity as investors' assessments of a bond's fundamental value diverge.

An increase in rates would likely pull investors with substantial buying power—such as insurers, pensions, and sovereign wealth funds—off the sidelines. As evidence, when Treasury yields rose sharply in mid-2013 during the "taper tantrum," we witnessed a surge in trading flows into the long end of the curve, which helped to calm the bond sell-off that followed. Dislocations in certain market segments may also attract crossover and speculative investors, such as hedge funds, into sectors that they normally ignore.

Finally, in recent years it has been relatively easy for institutional investors to gain credit exposure through the primary market. The flood of new supply made secondary trading less essential. However, if rates start to rise and companies become less keen on raising new capital in the credit market, we expect renewed focus on secondary market trading.

While liquidity risk is always a consideration in investment decisions, we should note that less liquid markets can also work to the advantage of long-term investors and create excess-return opportunities. We believe that managers who are diligent with risk management, emphasize in-depth fundamental analysis, and hold sufficient liquid assets in portfolios—to both meet redemptions and benefit from security mispricings—may be able to profit from less liquid conditions. To this end, T. Rowe Price fixed income managers continually engage with the firm's trading specialists, credit analysts, and quantitative analysts to assess market conditions and valuations, evaluate potential risks for portfolios, and identify opportunities to both source and supply the market with liquidity.

## IV. Transparency

Buy-side firms have a range of strong views on transparency and the public dissemination of trading information in the fixed income markets, as well as the utility of existing reporting mechanisms. T. Rowe Price, for example, has been and continues to be broadly supportive of greater transparency in fixed income markets. We believe that greater pre-trade price information supports the price formation process, ensuring that buyers and sellers can negotiate a mutually agreeable trading price, and consequently supports liquidity. Moreover, greater market transparency supports the ability of fund managers to provide more granular information to the public about the performance of their investments and the costs of transacting in the market.

At T. Rowe Price, as we look at transparency efforts across the globe, we continue to advocate for an approach similar to that taken by FINRA in the introduction of the TRACE system. The introduction of TRACE included a phased-in approach with regular periods of review and study. Further, as the system has been extended to other asset classes, the level of transparency and the specific information disseminated has been adjusted based on the nuances of each market and individual transactions. We see this as a careful approach that has produced a transparency regime which is helpful to regulators and market participants alike.

Greater transparency in the OTC markets also may raise risks, however. Some have expressed concerns that the public dissemination of trading data may reduce liquidity and impair market quality to the detriment of the markets and their participants.

Regulators need to appropriately balance the benefits of transparency with the risks to market functioning that may be caused by public dissemination of sensitive trading information in an effort to ensure efficient and competitive OTC markets for all participants, including funds and other investors. To that end, we encourage regulators, both domestic and international, to take a thoughtful and measured approach to transparency in the fixed income markets, with careful analysis of data over an extended period of time including a variety of market conditions.

## V. Electronification and Technology Across Markets

Because of the challenges of directly matching buyers and sellers of bonds, developing alternatives to the traditional dealer-centric model to enhance liquidity is not a simple task. Nonetheless, there have been some promising technological developments in the form of new e-trading platforms.

The more established systems debuted in the early 2000s. These multi-dealer platforms essentially applied technology to add scale to the traditional request-for-quote model: investors place a trade request, dealers respond with prices, and investors decide whether to accept the best offer. More recently, several new entrants have experimented with less conventional protocols, including auctions; dark pools; and "all-to-all" systems that seek to cross trades between any interested party, whether on the buy side or sell side.

E-trading is less advanced in corporate markets, but it has grown steadily. According to a recent report from Greenwich Associates, 19% of investment-grade corporate trading volume was executed electronically in 2017. E-trading accounted for just 11% of volume in the high yield market, where bond structures and covenants are more tailored to issuer-specific credit risk, and liquidity can be especially constrained for distressed names or smaller and less frequent issuers. But the report predicts that high yield will be a growth area, with several new trading platforms focusing on less liquid securities.

E-trading has proven to be most successful in markets that are characterized by an active and diverse set of participants and a smaller set of homogenous securities that allows buyers and sellers to focus their interest. For example, there has been a high level of adoption for on-the-run Treasuries and Treasury futures trading, as many different market participants use U.S. government instruments for a variety of purposes, including for hedging and collateral. Foreign exchange is another market where electronic trading has been very effective, as there is widespread demand for specific currency exposures and hedges.

It is T. Rowe Price's view that greater transparency naturally fosters electronification, which improves price discovery, facilitates best execution, and enhances capital formation. We would encourage regulators to consider requirements that would increase transparency as a way to encourage greater use of e-trading. In addition, given the proliferation of e-trading platforms, regulators might consider standardized reporting for trading volumes, which would help market participants evaluate which platform may meet their needs for a set of transactions.

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I appreciate the opportunity to share these views with the Subcommittee. As I said at the outset, the fixed income markets play an important role in helping millions of Americans save and invest, and enhancing the transparency, liquidity, and overall functioning of these markets is critical to their success. We greatly appreciate the Subcommittee's continuing interest in these issues.