Secondary Market Trading and the Cost of New Debt Issuance

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ABSTRACT

We show that secondary market activity impacts the cost of issuing new debt in the primary market. Specifically, firms with existing illiquid debt have higher costs when issuing new debt. We also find that with the improvement in the price discovery process brought about by the introduction of TRACE reporting, firms that became TRACE listed subsequently had a lower cost of debt. Our results indicate that the secondary market functions of liquidity and price discovery are important to the primary market. Overall, the results presented in this paper provide a greater understanding of the connection between the secondary market and the real economy.

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Understanding how financial market activity impacts the real economy is one of the most important topics studied by financial economists. Since firms only raise capital in the primary market it is easy to conclude that trading in the secondary market does not directly affect firm activity, or in turn, the real economy. This potential disconnect leads some to view secondary markets as merely a sideshow to the real economy, an idea that has been debated in the academic literature since at least Bosworth (1975). Recent events have revived and added new dimensions to this debate.[1] The discussion that is now taking place in both the academic literature and the popular press indicates that that this question remains both prevalent and ever changing.

To contribute to this debate, we consider whether two important benefits of secondary markets, liquidity and price discovery, impact the primary market. To this end, we empirically investigate two questions: 1. do firms with illiquid bonds face higher costs when issuing new debt, and 2. does price discovery in the secondary bond market impact a firm's cost of issuing new debt? By answering these questions, we seek to address the broader question: how does secondary market activity affect the real economy?

The view that secondary markets impact the real economy begins with the argument that access to capital is an important determinant of growth. The results in the literature consistently indicate that this relation holds at the country, industry, and firm levels. This question has been examined in numerous studies, including the seminal paper by Rajan and Zingales (1996). The literature has evolved to the point where we now better understand the channels that connect growth and access to capital. Empirical evidence, for example, indicates that access to financing is important for firm investment (Stein (2003); Chava and Roberts (2008); Campello and Graham (2013)). Surveys of corporate decision makers also support this view. For

[1] Some examples include: bailouts given during the financial crisis and the resulting "Main Street" versus "Wall Street" debate arising from the Occupy Wall Street protests (Kuziemko, Norton, Saez, and Stantcheva (2015)), questions regarding the relation between economic growth and equity returns (Ritter (2005); Ritter (2012)), and questions related to the controversial practice of using corporate repurchases to prop up firm growth (Driebusch and Eisen, "Buybacks Pump Up Stock Rally," *The Wall Street Journal*, 7/13/2016, Section C1).

example, after surveying 1,050 Chief Financial Officers (CFOs), Campello, Graham, and Harvey (2010) report that firms facing financial constraints reduce their investment in both technology and fixed capital and also reduce employment.

Based on the theoretical and empirical evidence provided in the literature, we begin with the view that access to capital affects firm activity. From this, we argue that frictions affecting firm access to capital may impact the real economy. The channels we focus on are secondary market liquidity and price discovery. If, for example, an increase in secondary market illiquidity raises a firm's cost of capital or prevents a firm from accessing capital all together, then we can conclude that secondary market illiquidity could hamper a firm's growth.[2]

As Maureen O'Hara discusses in her AFA Presidential Address (O'Hara (2003)), liquidity and price discovery are two of the most important functions of a market. The precise roles that liquidity and price discovery play are still being explored in the literature, with many papers logically focusing on whether secondary market liquidity and price discovery affect trading in the secondary market. For example, when framing the question, O'Hara (2003) focuses on the importance of liquidity and price discovery for asset pricing. These questions are clearly important to the literature, and would likely be important regardless of whether there is a connection between the primary and secondary markets. However, if frictions that arise in the secondary market impact the primary markets as well, then questions of liquidity and price discovery take on an additional level of importance. As Morck, Shleifer, and Vishny (1990) argue, if the secondary market is in fact a sideshow, then any inefficiencies that arise in the secondary market solely represent wealth transfers amongst secondary market participants. While we by no means intend to trivialize the understanding of what could be "wealth transfers" and believe that understanding the trading process is important for its own sake, it is also important

[2] There is some evidence that greater liquidity can actually be detrimental to the real activities of a firm. Fang, Tian, and Tice (2014), for example, find that greater liquidity can actually impede firm innovation. The authors attribute the relation to an increase in liquidity leading to an increase chance of a hostile takeover and a decrease in monitoring by institutional investors. Given the question raised by Fang, et al. (2014), understanding precisely how secondary market liquidity impacts a firm's cost of debt is important.

to note that connecting this process to the primary market may significantly change the scope of inquiry.

We thus examine whether liquidity and price discovery in the corporate bond market impact the primary market for new debt issues. Mauer and Senbet (1992) and Ellul and Pagano (2006) argue that the secondary market affects pricing in the primary market for IPOs. The latter, for example, suggests that greater expected after-market illiquidity results in greater IPO underpricing. While liquidity and price discovery are important elements of all markets, as Green, Li, and Schürhoff (2010) argue, they are especially important in less liquid markets. In the corporate bond market, for example, Chen, Lesmond, and Wei (2007), Bao, Pan, and Wang (2011), Friewald, Jankowitsch, and Subrahmanyam (2012), and Dick-Nielsen, Feldhütter, and Lando (2012) show that bond illiquidity is positivity related to the cross-section of bond returns. As the evidence in the literature indicates that illiquidity impacts expected returns, there is an implied argument that secondary market illiquidity influences a firm's cost of raising new capital (Amihud and Mendelson (1986)). Fundamental to this argument is the view that expected equity returns and bond yields are proxies for a firm's cost of capital.[3] While this view implies that secondary market illiquidity and the cost of raising new capital are linked, we look to test this conjecture directly.

Using the laboratory of publicly traded debt, we examine the effects of secondary market illiquidity and price discovery on the primary market. Using publicly traded debt in our study is advantageous because firms frequently enter, and often revisit, the bond market. While firms can reenter the equity market using SEOs, this activity is comparatively limited: firms tend to enter the bond market with greater frequency. Moreover, firms frequently have multiple bond issues outstanding, and may issue new bonds before the existing bonds mature. Because some firms have

[3] There is a debate in the literature that raises questions as to whether ex post returns are a precise proxy for a firm's cost of capital. As Chen, Chen, and Wei (2011) discuss, ex post returns may reflect other information than a firm's cost of capital, such as grown opportunities and changes in investors' risk preferences (Stulz (1999); Hail and Leuz (2009)), and are also susceptible to questions with respect to the selection of asset pricing model (Fama and French (1997)).

multiple bonds simultaneously trading in the secondary market, we are able to measure the expected illiquidity of a new issue before it begins trading using the illiquidity of the firm's outstanding bonds as a proxy for anticipated illiquidity. By doing so, we can examine the relation between the actual cost of debt and expected market illiquidity, rather than the relation between the expected cost of capital and actual market illiquidity. With varying maturities, coupon structures, and credit risk, the degree of heterogeneity amongst bonds, as well as the cross-sectional differences in bond risks and characteristics, produce cross-sectional variation in bond liquidity.[4] Our empirical approach also allows us to determine if firms with more liquid bonds are disproportionally able to access the debt markets during periods of distress, such as the financial crisis. If secondary market liquidity affects access to capital, then a regulatory objective designed to improve market liquidity will impact a firm's ability to raise new funds. Understanding this channel is generally important, but may be particularly relevant during a liquidity crisis.[5]

Additionally, the staggered implementation of the Trade Reporting and Compliance Engine (TRACE) and the subsequent release of all bond trading data through the Enhanced TRACE files provides us with a unique setting for testing the impact of secondary market price discovery on the primary market. As TRACE now provides two data files, one containing information that was disseminated at the time and one that backfills additional data, we are able to examine the impact of trading when prices are not disseminated to the public – an important component of price discovery. Because TRACE was implemented in 2002, we now have a sufficient time series available to conduct empirical tests. The available data also allows us to

[4] Chen, et al. (2007), Bao, et al. (2011), Friewald, et al. (2012), and Dick-Nielsen, et al. (2012) each not only examine the relation between expected returns and bond illiquidity, but also consider the characteristics that impact this relation.

[5] As many papers have shown (Amihud (2002), for example), both individual security illiquidity and aggregate market illiquidity change over time. Furthermore, both managers and regulators can institute changes that directly influence market liquidity. Managers, for example, can alter secondary market liquidity and price discovery by changing the information environment (disclosure) and changing their exchange listing. The results of this paper also offer important implications for changes in regulation. If channels exist that connect the real economy to the secondary market, then regulations intended to improve secondary market transparency have implications for the real economy.

circumvent many of the objections raised in the literature regarding the estimation of a firm's cost of capital (Fama and French (1997)).

In total, our results suggest a direct relation between the secondary market illiquidity of existing bonds and the cost of new debt issued by the same firm in the primary market. Furthermore, we find evidence that greater illiquidity is a significant predictor of a firm's ability to issue new debt. Thus, not only is issuing new debt costlier for firms with illiquid debt, but firms with illiquid debt may have difficulty accessing credit markets altogether. We also find that TRACE-reported bonds experience lower underwriting costs relative to bonds that were not immediately subject to TRACE-reporting requirements. As the staggered implementation of TRACE provides us a way to capture the benefits of secondary market price discovery for primary market participants, we conclude that a more efficient price discovery process also leads to lower costs in the primary market for new debt issuances. The evidence presented in this paper supports theory suggesting that secondary market activity affects the real economy. Efforts to improve liquidity and price discovery, such as changes in disclosure and the implementation of TRACE, serve to not only improve the secondary market trading environment, but also to provide firms with better access to capital. Better access to capital, in turn, provides firms with better investment options and could potentially improve employment prospects.

In this regard, our analysis contributes to the growing literature that explores connections between secondary market trading and the real economy.[6] In his AFA

[6] As this question is important to the academic literature, it takes on many forms. Aslan and Kumar (2016), for example, show that hedge fund activism in a given firm can impact rival firms' product market performance. Grullon, Michenaud, and Weston (2015) show that short selling constraints impact a firm's ability to access capital and thus impact firm investment. Using the conversion of non-tradable to tradable stocks in China, Campello, Ribas, and Wang (2014) show, how secondary market trading can directly impact corporate activity. And, as McLean and Zhao (2014) discuss, the recent financial crisis not only emphasizes the importance of understanding the connection between financial markets and the real economy, but also provides a laboratory for assessing the extent of the connection. While all of these papers examine different channels, the important underlying commonality is that they all contribute to a better understanding of connections between primary and secondary market activity.

Presidential Address (Zingales (2015)): Does Finance Benefit Society? Luigi Zingales states (p. 1337): "To this day, empirical measures of the benefits of an efficient market are fairly elusive." By directly examining the link between two defining features of the secondary market, liquidity and price discovery, and the real economy, we seek to identify and quantify just such a benefit.

I. Overview of New Corporate Bond Issuances

A. *The underwriting process*

We begin by describing the underwriting process and primary market for new debt issuances. The underwriting process motivates our examination of the link between secondary market activity and the cost of new issues in the primary market.

When a firm decides to raise capital through the issuance of new bonds, it will seek an investment banker to underwrite the new issue and act as an intermediary between the firm and investors. The choice of a lead underwriter(s) is critical to the bond's success. An underwriter's ability, experience, reputation, and strength of relationships with investors are all considered in the selection process (Fang (2005)). Potential underwriters will submit an initial prospectus detailing pricing, strategies, and underwriter compensation. Once chosen, a lead underwriter may form an underwriting syndicate to spread the risk of the new issue and improve the likelihood of selling all of the securities.[7] The underwriter(s) typically has a prearranged group of institutional investors interested in the new debt issue. Underwriters must balance the preferences of these institutional clients with a debt structure (i.e. bond maturity, coupon, and price) that meets the needs of the issuing firm. Satisfying both institutional investors and the issuing firms requires adjusting the bond's yield.

Underwriters make known the firm's intention to issue new debt, help the issuer prepare disclosure documents and prospectuses, and accept indications of interest from investors. Unlike new equity issuances, bond issues typically forego the lengthy roadshow and conference call process. As a result, the time between the

[7] The underwriter may also employ a selling group to assist in selling shares to investors.

announcement and when the bond begins to trade varies from a few hours to days.[8] Even though the timeline for the bookmaking process may vary, many of the details of the issue are not set until the end of the process. Consequently, issuers maintain some flexibility in issue size as well as which orders, if any, to fill. The underwriting process concludes by setting the coupon and initial issue price.

The underwriter not only provides expertise throughout the process, but may also agree to buy a portion or even the entirety of the bond issue until the securities are resold to the public or broker-dealers. The difference between the underwriter's purchase price and the price at which the bonds are sold to investors is known as the underwriting spread or underwriting discount. While the initial bond price may be set at par, or at a premium or discount to par value, the pricing structure itself does not affect the underwriter's compensation. The underwriter's compensation is based on the discount it pays relative to the markup on the initial issuance.[9]

The underwriting spread will depend on a variety of factors including the size and type (public or private) of the issue, as well as demand for the new issue at the initial offering price.[10] In this paper, we examine whether underwriters similarly consider the secondary market illiquidity of existing bonds when pricing new issues by the same firm. We also examine whether the price discovery process aids in the pricing of new debt issuances. We hypothesize that with illiquid securities and barriers to price discovery, underwriter fees, and thus the issuing firm's cost of capital, will increase. While the gross underwriting spread is a function of an underwriter's ability to place a security, it is not immediately clear, however, that secondary market illiquidity or price discovery will influence underwriting costs. If, for example, an issue is purchased entirely by a small number of large institutions,

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[8] Some participants complain that this condensed process does not allow enough time to reliably evaluate the issue, its structure, or the issuing firm's financial position.

[9] The gross underwriting spread consists of fees paid the lead underwriter, the syndicate and the selling group.

[10] The firm must also choose whether to issue bonds in the public or private market. Public issues will not only appeal to a larger group of investors, but may also help firms gain visibility in the marketplace. A firm that obtains financing through private placements will avoid some of the costs associated with a public offering, including the costs of registering the securities with the SEC and complying with GAAP. Private placements are typically less conventional, marketed to a smaller group of investors, and are inherently riskier.

such investors may intend to hold the bonds until maturity. Accordingly, an active secondary market for the firm's other bond issues may not sway an institution's willingness to buy.

B. Underwriting statistics in our sample

To provide context to our discussion of the issuance process in the above section, we include descriptive data that highlights the frequency and magnitude of new corporate debt issues. As reported in Table I, beginning with the start of TRACE coverage in January 2002, through December 2012, 1,231 firms issued over $4.95 trillion in new debt. Many of these firms frequently revisited the debt market and issue new bonds. Our sample of 1,231 firms initiated 21,247 new debt placements during the sample period, an average of over 17 issues per firm. The subsequent issuances by firms with outstanding debt allows us to measure the costs of new issues resulting from prior illiquidity. The 21,247 issues consist of 10,687 investment grade issues, 1,299 speculative grade issues, and 9,261 unrated issues. From Figure 1, which displays the issuance size characteristics, the average firm raises approximately $200 million with each new debt issue.

< Table I >

< Figure 1 >

In Figure 2, we document the aggregate amount of outstanding debt for each year during the sample period. Approximately $1.80 trillion in total corporate debt was outstanding in 2002, of which $1.15 trillion stemmed from unrated corporate bond issues, $560 billion from investment grade debt, and $92 billion from speculative grade bonds. By the end of our sample period in 2012, the amount of outstanding corporate debt ballooned to $3.54 trillion, comprised of $2.06 trillion in investment grade bonds, $1.50 trillion in unrated debt, and $354 billion in speculative grade bonds.[11]

< Figure 2 >

[11] While firms raised over $4.95 trillion in new debt during the sample period, we report only $3.54 trillion outstanding at the end of the sample. The difference is largely due to bonds that mature during the sample period. The median term to maturity for bonds in our sample is 7 years.

Figure 3 highlights the number and volume of new issues during the sample period. Although time series fluctuations are evident, new issues have increased over time. Even during the financial crisis, firms were able to raise capital through the issuance of investment grade debt. However, the number of unrated bonds decreased, and speculative grade issues were almost nonexistent during this time. From the figures described above, it is apparent that the size and scale of the bond market continues to grow. We believe these results highlight both the importance of our empirical analysis as well as the implications of our study for managers, investors, and regulators alike.

< Figure 3 >

II. Data and Sample

The primary data used in our analysis comes from the Mergent FISD database, which includes information for all debt issuances. The FISD database includes the issue size, initial yield, coupon rate, credit rating at issuance, difference between the yield and the Treasury rate at issuance, underwriting fees paid, as well as many other characteristics of newly issued corporate bonds. We augment the Mergent database with bond trading data from the Trade Reporting and Compliance Engine (TRACE) database. Corresponding with TRACE coverage, our sample contains all new corporate bond issuances from July 2002 through December 2012. Last, for the subset of firms in our sample that are public companies, we collect cash flow, leverage, and firm size measures from Compustat. The final merged database contains information on all new corporate bond issues, including underwriting costs, coupons, and credit ratings, as well as information on subsequent trading that occurs after a bond is issued. The data allows us to determine the costs and characteristics of new issues in the primary market, as well as the capability to calculate secondary market illiquidity measures once the bonds begin trading. In addition to examining the characteristics of new issues, we are also able to account for the features of a firm's previously issued bonds.

< Table II >

We present descriptive statistics of the issuance characteristics in Table II. For the new issues in our sample, the average and median coupon rates are 4.48% and 4.89% respectively. The average (median) years to maturity is 9.89 (7.05) years. Last, 34% of the bonds in our sample are callable, while 1% of the bonds are convertible.

A. Cost of New Debt Variables

In this paper, we use two measures to identify the costs associated with issuing new bonds: the Treasury spread and the gross underwriting spread. The Treasury spread is defined as the difference between the yield to maturity and the yield of a duration-matched Treasury security at the time of issuance. We believe the Treasury spread is a more suitable measure of a firm's cost of debt than the yield to maturity at issuance. Because our sample runs through the financial crisis, the yield on corporate bonds varies significantly over the 11-year period our sample covers. As we also control for credit risk in our analysis, the Treasury spread provides a more stable measure of cost than the yield to maturity at issuance. While the Treasury yield spread will be small on safer bonds issued by large firms, investors typically demand higher returns on smaller, riskier bonds, which results in a higher Treasury spread.

Similar to Butler (2008), we also use the gross underwriting spread as a measure of underwriting costs. While the Treasury spread is intended to account for the costs incurred by secondary market traders, our second cost measure here captures revenues to underwriters. When a corporation issues new debt, the immediate cost that the corporation bares is the gross underwriting spread, which is direct compensation to the underwriter.

We present summary statistics for the above cost measures in Panel A of Table III. As expected, investment grade bonds have lower yields and smaller underwriting spreads than those of speculative grade bonds. During our sample period, newly issued bonds have an average yield to maturity of 4.89%, which is, on average, 1.94% higher than the related Treasury security. New issues pay a gross spread of 11.94%.

Management fees are also higher for more speculative bond issues. In dollar terms, this implies that the average debt issue of $200 million produces approximately $23 million in underwriting fees.

< Table III >

B. Illiquidity Variables

We use the illiquidity of a firm's existing bonds as a proxy for the future expected illiquidity of a new issue. This approach allows us to calculate expected illiquidity measures prior to a bond's initial trading. We compute multiple measures of secondary market illiquidity. The first measure of secondary market illiquidity, $PNT_{i,t}$, is the percentage of days in month t that security i does not trade. It is calculated as:

$$PNT_{i,t} = \frac{Zero\ Volume\ Trading\ Days_{i,t}}{Trading\ Days\ in\ Month\ t} \times 100.$$

$PNT_{i,t}$ measures an investors ability to trade a bond at all, which is especially relevant in the highly illiquid bond market. Higher values of $PNT_{i,t}$ imply greater bond illiquidity.

Our second measure of bond illiquidity is the Kyle and Obizhaeva (*KO*) measure of price impact. This metric is constructed from the illiquidity measure presented in Kyle and Obizhaeva's (2011) model of market microstructure invariance. The measure is calculated using the variance of monthly bond returns, scaled by the dollar volume traded within the month. Dollar volume is calculated as the final trade price of each day multiplied by daily volume, then summed to aggregate the monthly totals. We compute the return variance using all TRACE reported transactions for each month.

$$Kyle\ Obizhaeva\ Illiquidity_{i,t} = \left(\frac{Return\ Variance_{i,t}}{Price_{i,t} * Volume_{i,t}}\right)^{\frac{1}{3}} \cdot 10^6.$$

Because a large return variance for smaller dollar volumes indicates greater illiquidity, larger values of the *KO* measure specify greater bond illiquidity.

Our third measure of bond illiquidity is the Amihud (2002) illiquidity measure, given by:

$$Amihud\ Illiquidity = \frac{1}{D_{i,t}} \sum_{n=1}^{D_{i,t}} \frac{\left|Ret_{i,t,n}\right|}{Price_{i,t,n} * Volume_{i,t,n}} \cdot 10^6 ,$$

where $D_{i,t}$ is the number of observations for security i in month t. We use TRACE reported transactions to identify the return, price, and volume for each bond. Similar to the *KO* measure above, the intuition behind the *Amihud* ratio is that larger returns per dollar of trading volume provides an indication of greater bond illiquidity.

Our last measure of bond illiquidity, $AdjTurnover_{i,t}$, is from Liu (2006). This adjusted turnover measure is similar in construction to one proposed by Lesmond, Ogden, and Trzcinka (1999), and is computed for security i in month t as follows:

$$AdjTurnover_{i,t} = \#\ Zero\ Volume\ Trading\ Days_{i,t} + \frac{\frac{1}{turnover_{i,t}}}{Deflator} \times \frac{21}{\#\ Trading\ Days}.$$

$\#ZeroVolumeTradingDays_{i,t}$ is the number of trading days on which the bond did not trade; $turnover_{i,t}$ is the quotient of the total number of bonds traded per month and the total number of outstanding bonds. Following Liu (2006), we use a deflator of 480,000 that allows $0 < \frac{1/turnover_{i,t}}{Deflator} < 1$. Last, we standardize the number of trading days from one month to the next using $\frac{21}{\#\ Trading\ Days}$. The $AdjTurnover_{i,t}$ illiquidity metric is similar to $PNT_{i,t}$, but distinguishes between two bonds with similar zero volume trading days. This measure is increasing in illiquidity.

One additional benefit of measuring turnover is that it may provide insight into the price discovery process. Although turnover is typically used as a liquidity measure, Barinov (2014) suggests that turnover may more appropriately measure firm-specific uncertainty or investor disagreement surrounding the trading process. In this light, turnover may capture elements of the price discovery process, whereby information is incorporated into prices through the interaction of market participants.

In Panel B of Table III, we present summary statistics for the four measures described above. The average bond in our sample trades 5.40 days per month. Bonds in our sample trade, on average, 148 times per month, which generates over $283

million in trading volume. When partitioning the sample by credit rating, we find that the average speculative grade bond trades more frequently than investment grade bonds as well as bonds that are not rated. Median levels of the *KO* and *Amihud* illiquidity measures are smaller than their respective means.[12]

III. The Economic Effects of Secondary Market Illiquidity in the Primary Market

In this section, we seek to identify an economic link between the primary and secondary debt markets. We conjecture that the two principal functions of the secondary market, liquidity and price discovery, each have a direct impact on the cost of issuing new debt in the primary market. We begin by examining the effects, if any, of secondary market liquidity on the primary market. Then, in the subsequent section, we study the significance of secondary market price discovery in the primary market for new issues.

A. Tests of secondary market illiquidity and the cost of new debt issues

We begin by identifying corporate bonds issued between 2002 and 2012. We then link each newly issued bond with existing bonds issued by the same firm. Since we are interested in whether secondary market illiquidity affects the cost of new issues, we require firms to have outstanding bonds issued after 1975. From this set of prior issues, we eliminate those that mature more than three years prior to the new issues. Bond characteristics may not only change over time, but the market's perception of a new issue may not incorporate the characteristics of bonds that have already matured. We also exclude prior issues that originated within the previous month, since there is insufficient data to measure illiquidity.

For each previously issued bond, we calculate the four illiquidity measures described in Section II, for each month of the sample period. To aid our

[12] Because there is a great deal of skewness in the illiquidity measures, we winsorize our data at the 1% and 99% levels.

understanding of how prior illiquidity affects the cost of new debt, we average the monthly illiquidity variables from all prior issues over the previous year. Should a firm have multiple prior issues, we weight our illiquidity measure by prior issue size.[13]

In our first set of empirical tests, we investigate how the illiquidity of prior-issues affects the cost to issue new debt. We consider the full sample of public and private corporate debt issues from 2002 through 2012. To determine if prior illiquidity influences future underwriting costs, we regress our cost measures, the Treasury spread and gross underwriting spread, on each of the four illiquidity measures. To isolate the effects of prior illiquidity on the underwriting costs of new issues, we control for the heterogeneous characteristics of bonds by including variables for the new issues' term to maturity, duration, size, as well as for the issuers' outstanding debt. We also include indicator variables that identify whether the issue is callable, convertible, senior/junior, privately placed, asset-backed, and if the bond is a 144A bond. To control for credit ratings, we include an indicator variable for each possible rating (AAA, AA+, AA, AA-, etc.), as well as indicator variables that identify if the credit rating of the new issue is higher or lower relative to the most recent issue. For the subset of firms that are publicly traded (for which data is readily available), we include controls for firm characteristics that could influence a firm's cost of debt. These variables include *Cash Flow*, *Leverage*, and *Firm Size* for the year end prior to the new issue. *Cash Flow* is the firm's operating income before depreciation divided by total assets; *Leverage* is the percentage of total financing represented by debt; and *Firm Size* is the log of the sum of debt and stockholder equity. All regressions include firm-year fixed effects.

We report the coefficient estimates of our cross-sectional regression tests in Table IV. In Panel A, we report results using the Treasury spread as the dependent variable. Our findings suggest that the illiquidity of previously issued, outstanding

[13] To address concerns that investors may place more emphasis on recent issues (since these bond characteristics may be similar to the current issue), we repeat all of our analyses using only prior issues that originated within five years of the current issue. The results presented in this paper are robust to this alternative specification.

bonds is directly related to the yield placed on new bond issues by the same firm. Because larger Treasury spreads on new issues are typically associated with greater risk, the positive coefficients on the *KO* and *Amihud* measures indicate that the secondary market illiquidity of existing bonds likely captures the potential illiquidity risks associated with the new issues. This result implies that investors purchasing new issues demand a premium for the expected illiquidity of the bonds. In turn, these costs are directly passed to the issuing firm. Economically, our findings demonstrate that each one percent increase in the *KO* (*Amihud*) measure of illiquidity corresponds to a four (two) basis point increase in the bond yield beyond the maturity-matched Treasury security. The coefficient on $AdjTurnover_{i,t}$ is also positive and significant, specifying that the uncertainty surrounding the trading process, another dimension of illiquidity, affects the cost of new issues as well. The coefficients of *Years to Maturity* and *Issue Size* are positive as well, suggesting that investors require a larger yield for longer maturity bonds as well as for larger debt issuances. Because new debt offerings affect a firm's capital structure, larger bond issues increase the default risk of the issuer.

In columns (5) through (8), we consider the subset of public firms and include additional variables that potentially impact a firm's cost of debt financing. We partition our results to address concerns that more illiquid private debt might be driving our results. The subsample also allows us to control for other firm characteristics that may influence a firm's cost of debt (e.g., *Cash Flow*, *Leverage*, and *Firm Size*). Here, we find a similar outcome as before when considering the full sample: a one percent increase in the *KO* (*Amihud*) illiquidity measure is associated with a five (three) basis point increase in the yield paid at issuance. Our results imply that investors view new publicly-traded debt offered by firms with illiquid outstanding issues as riskier, and thus demand higher yields in return. In sum, our findings are robust to the type of debt (i.e. public or private) issued.

In Panel B of Table IV, we report the coefficients resulting from regressions of underwriter fees on illiquidity. While our approach as presented in Panel A is designed to isolate costs associated with secondary market trading, the results in

Panel B should capture the costs levied by underwriters. While we, again, find a direct relation between the illiquidity of existing bonds and the costs of new issues in the primary market, our results offer added insight into a different dimension of illiquidity charged by underwriters. Our results indicate that underwriters are less concerned about secondary market transactions costs, as seen in the insignificant coefficients of the *KO* and *Amihud* price impact measures, but are more attentive to the ability to trade a bond at all. As seen in the positive and significant coefficients of $PNT_{i,t}$ and $AdjTurnover_{i,t}$, firms incur higher costs on new issues if their previously issued bonds trade on fewer days of the month. From the underwriting process description presented in Section I, underwriters may agree to buy bonds that cannot be sold to investors. Given the consequences of being unable to place new issues, underwriters place a premium on new issues with higher levels of expected illiquidity. Specifically, a one percent increase in the number of days that existing debt does not trade is associated with a 1.65% increase in the underwriting spread paid to the syndicate. Similarly, we find that a one percent increase in $AdjTurnover_{i,t}$ is associated with a 14 basis point increase in the underwriting spread. In dollar terms, these results suggest that for the average issue of $200 million, a one percent increase in illiquidity is associated with an increase in underwriting fees of between $280,000 and $3,300,000.

We also find that *Issue Size* is negatively related to the gross underwriting spread. The sign of this coefficient is in sharp contrast to the same variable presented in Panel A, when considering the Treasury spread. One potential explanation of this result is that because investment banks collect a portion of the total debt issued as compensation, underwriters may be more willing to offer a quantity discount for larger issues. In total, the results in Table IV offer compelling evidence that secondary market illiquidity leads to higher underwriting costs for firms issuing new debt.

<Table IV>

As discussed in Yasuda (2005), underwriters consider first-time issuances more difficult to market, relative to bonds offered by seasoned and frequent issuers.

Because first-time issuers have no historical track record, their new placements exhibit high "informational sensitivity," and consequently, may be charged a premium by underwriters. We consider a subsample of second offerings by first-time debt issuers. By removing seasoned firms with greater debt exposure, and instead study the second debt offering of these first-time issuers, we believe that we are able to isolate the effects of prior illiquidity on the costs of a new issue. The initial bonds issued by the firms in our study have varying degrees of secondary market illiquidity. Accordingly, if both underwriters and investors have limited information regarding the first-time issuers, we expect the illiquidity premium to be even more pronounced for firms with more illiquid debt outstanding.

As reported in Panel A of Table V, we identify 948 firms that first issue debt during our sample window. We examine the relation between the secondary market illiquidity of the initial issue and the costs associated in 597 second issues by the same firm. As reported in Panel B, these firms return to the debt market, on average, 1.83 years later, and typically raise more money in the second issue relative to the first.

< Table V >

We report the results of our multivariate analysis in Table VI. Our approach in this portion of our investigation is similar to that presented in Table IV. However, in Table VI, we consider the marginal change in issuing costs between the first and second issue, and not the costs associated with any other subsequent issues. In addition to years to maturity and the size of the issue, we include controls for whether the bonds are rated, as well as controls for the time between the debt offerings. Given that debt offerings by first-time issuers are more challenging to underwrite than subsequent offerings by frequent and seasoned issuers, including these control variables allows us to isolate the illiquidity effects on the costs of a subsequent issue.

In our test of first time issuers, we find that the cost of a second debt offering is higher than the costs of the first issue for firms whose initial issue is illiquid. When considering the credit spread results in Panel A, we find that $PNT_{i,t}$ and $AdjTurnover_{i,t}$ are priced into the cost of new issues by the same firm. Similarly, in

Panel B, we find that an increase in the *KO* and *Amihud* price impact measure, as well as the $PNT_{i,t}$ and $AdjTurnover_{i,t}$ metrics increase the gross underwriting spread beyond what was paid in the first issue. A one percent increase in price impact and turnover is associated with an incremental increase of 3 basis points beyond what was paid in the first issue. A one percent increase in the number of days a bond doesn't trade is associated with a 28 basis point marginal increase beyond the cost of the first issue. These results confirm that underwriters account for expected secondary market illiquidity when determining their compensation structure. For the average size of a second issue of $536 million, the findings in Table VI suggest that a firm will pay an additional $160,000 to $1,500,000 in underwriting fees for every one percent increase in illiquidity. In total, the results in Table VI suggest that both investors and underwriters demand higher premiums to compensate for the potential illiquidity risks associated with new debt offerings, costs directly incurred by the issuing firms.

< Table VI >

B. Secondary market illiquidity and access to debt

The results in the previous section demonstrate that illiquidity can alter a firm's cost of debt. In turn, secondary market illiquidity influences a firm's access to capital. The results indicate that firms pay a premium for issuing new debt when their previously issued debt is comparatively illiquid. Our tests to this point, however, are predicated on firms being able to access credit markets at all. In our next set of tests, we further explore this relation by determining whether secondary market illiquidity for a firm forecasts the issuance of new credit.

If illiquidity results in a higher cost of debt for firms, as our prior results indicate, then, on the margin, this relation will affect the set of profitable projects available to a firm. Firms with a higher cost of debt may forgo valuable projects that they could have otherwise undertaken. Note, too, that difficulties in raising new capital may be driven by both firm-specific factors as well as market events. Thus, firms may experience changes in their access to capital if either firm-level or market-

level illiquidity changes. Understanding how aggregate market conditions and macroeconomic factors impact a firm's access to capital is also an important question (Erel, Julio, Kim, and Weisbach (2012)).

We begin this portion of our analysis by considering firms with outstanding bonds trading in the secondary market. We compare this total with the number of firms that actually issue new debt in that year. We present descriptive statistics of firms that issue debt, as well as statistics for firms that do not issue debt during the same period, in Table VII. We partition the sample based on credit rating. In 2008, for example, 28 percent of firms with outstanding debt issued new bonds during the year, whereas 21% (30%) of firms with speculative grade debt (debt that is not rated) are able to return to the debt markets during 2008. However, during 2012, 40%, 54%, and 68% of firms with investment-grade debt, speculative-grade debt, and debt that is not rated, respectively, issue new bonds.

< Table VII >

To determine if prior illiquidity poses a hurdle that firms must overcome when issuing new debt securities, we report the results of cross-sectional probit tests in Table VIII. The dependent variable is an indicator variable equal to one if a firm issues debt in the current year (year *t*). The independent variable of interest is the average monthly illiquidity measures for the same firm in year *t-1*. We include the total dollar volume of current debt outstanding in order to control for a firm's need for new debt. Given that the financial crisis provided a market-wide shock, we also include an indicator variable for the years 2008 and 2009, as well as an interaction between illiquidity and the recession-year indicator variables. As a final control, we include indicator variables for the median credit rating of each firm's outstanding bonds.

As seen in Table VIII, the negative and significant coefficients on three out of the four illiquidity measures indicate that prior year illiquidity provides predictive power to identify firms that subsequently issue new debt. We believe these results imply that firm-specific illiquidity represents an impediment to accessing credit.

Firms with comparatively illiquid debt may find it more difficult to fund or expand operations, even after accounting for system wide shocks to liquidity.

Overall, the results in Tables IV, V, and VI suggest that firms with illiquid bonds experience higher costs of new issues. The results in Table VIII indicate that illiquidity also serves as a predictor of a firm's ability to access public credit markets entirely. Our results offer practical implications for managers as they indicate that secondary market trading provides real economic benefits. Collectively, our results indicate that illiquidity improvements are not only associated with the potential to lower a firm's cost of debt, but also indicate that illiquidity improvements might affect the ability of a firm to access debt financing at all.

< Table VIII >

IV. The Economic Effects of Secondary Market Price Discovery in the Primary Market

In the previous section, we provide evidence that the illiquidity of existing bonds has a significant economic impact on the underwriting costs incurred by firms when issuing new bonds. As previously discussed, however, liquidity is only one major function provided by secondary markets. The other important role of secondary markets is to provide the opportunity for price discovery, the process by which new information is assimilated into prices. In this section, we explore whether the price discovery process that occurs in the secondary market also has an economic impact on underwriting costs incurred by firms in the primary market.

One difficulty in determining the effects of liquidity and price discovery is that the two are often indistinguishable in empirical tests. An improvement in one typically produces an improvement in the other. The corporate bond market allows us a novel approach to disentangle the two effects. The staggered implementation of the Trade Reporting and Compliance Engine (TRACE) and the subsequent release of all bond trading data through the Enhanced TRACE files provides us a way to test the effects of secondary market price discovery on the primary market.

TRACE is the vehicle that requires mandatory transaction reporting for corporate bonds. Prior to the implementation of TRACE, investors did not have access to real-time information on transaction sizes and prices. While traders were still able to find liquidity in the pre-TRACE period, investors were forced to transact with an information set that included only stale prices. Consequently, the price discovery process was severely inhibited prior to the implementation of TRACE. Because TRACE allows traders to see prices in real-time, the price discovery process was much more efficient for TRACE-reported bonds than for bonds that were not TRACE reported.

Not all new debt offerings issued in 2002 were immediately TRACE-reported. As presented in Table IX, only 26% of all new debt issuances were TRACE-reported. This percentage increases every year until 2006, the year in which all new issues are TRACE-reported and thereby provide real-time transparency to traders.[14] The staggered implementation of TRACE allows us to examine the impact of trading when prices are not yet disseminated to the public. Specifically, we compare the cost of new bond issues that are TRACE-reported to the costs of new bond issues that were not yet subject to TRACE reporting. Greater price discovery in a firm's outstanding bonds should benefit underwriters when pricing new issues.

< Table IX >

[14] As reported in the TRACE fact book: During Phase I, effective on July 1, 2002, public transaction information was disseminated immediately upon receipt for the larger and generally higher credit quality issues: (1) Investment-Grade debt securities having an initial issue of $1 billion or greater; and (2) 50 Non-Investment-Grade (High-Yield) securities disseminated under FIPS that were transferred to TRACE. Under these criteria, FINRA disseminated information on approximately 520 securities by the end of 2002. Phase II, fully effective on April 14, 2003, expanded public dissemination to include transactions in smaller Investment-Grade issues: (1) all Investment Grade TRACE-eligible securities of at least $100 million par value (original issue size) or greater rated A3/A- or higher; and (2) a group of 120 Investment-Grade TRACE-eligible securities rated Baa/BBB and 50 Non-Investment-Grade bonds. As Phase II was implemented, the number of disseminated bonds increased to approximately 4,650 bonds. In Phase III, fully effective on February 7, 2005, approximately 99 percent of all public transactions and 95 percent of par value in the TRACE-eligible securities market were disseminated immediately upon receipt by the TRACE System. However, transactions over $1 million in certain infrequently traded Non-Investment-Grade securities were subject to dissemination delays, as were certain transactions immediately following the offering of TRACE-eligible securities rated BBB or below.

To determine if firms with TRACE-reported bonds experience lower costs in the primary market, we perform a similar analysis to that presented in Tables IV and VI. In this model, we include an indicator variable specifying whether outstanding bonds issued by the same firm are TRACE reported. We include, but do not report, the same control variables presented in previous tables. To disentangle the effects of price discovery from that of liquidity, we also control for illiquidity using each of the four illiquidity measures reported in our analysis to this point.

The results in Table X indicate that firms with TRACE-reported bonds experience lower underwriting costs in the primary market relative to firms who had bonds that were not TRACE reported. After considering both the Treasury spread in Panel A, as well as the underwriting spread in Panel B, we find that bonds with greater transparency and price discovery in the secondary market experience lower costs in the primary market. Specifically, the negative and significant coefficient of the TRACE-reported indicator variable suggests that bonds with greater transparency and price discovery in the secondary market have lower underwriting costs and yield spreads in the primary market. While numerous studies document an improvement in secondary market liquidity with the implementation of TRACE on July 1, 2002 (see, for example, Bessembinder, et al. (2006) and Goldstein, Hotchkiss, and Sirri (2007)), none of these studies look at the effects of TRACE reporting on the costs of new issues in the primary market. We are the first to show that improved price discovery in the secondary market leads to lower costs of new debt in the primary market.

< Table X >

V. Conclusion

Primary markets, where securities are initially purchased from the issuing firm, serve a clear and necessary purpose. Through the issuance of new securities in the primary market, firms are able raise capital to fund or expand operations. After underwriting fees are subtracted, all proceeds from security issuances go directly to the issuing firm. Issuing firms do not, however, receive a direct capital inflow from

transactions occurring in the secondary market, where investors trade with other investors. While issuing firms are unable to directly collect new investment in the secondary market, firms may still indirectly benefit from trading in the secondary market. Greater secondary market liquidity for equity securities, for example, is shown to lower a firm's cost of capital and lead to significant improvements in firm performance (Butler, et al. (2005); Fang, et al. (2009)).

In this paper, we explore whether secondary market liquidity for corporate bonds provides a positive and significant benefit to the issuing firm. Unlike the primary equity markets of IPOs and SEOs, which are accessed infrequently, the sheer volume of bond issues and reissues, along with the scope of firms and entities issuing debt allow us to address a question posed by Zingales (2015) as to whether finance, in this case secondary markets, benefit society.

Our results indicate that the illiquidity of outstanding bonds is priced into new debt issues by the same firm, where firms with current illiquid debt pay higher prices for subsequent debt issues. We also find that greater illiquidity reduces the likelihood that firms return to the debt market during periods of market turmoil. Additionally, our results suggest that a more efficient price discovery process in the secondary market reduces the cost of new issues in the primary market. The practical inference from our results is that secondary markets are not simply a sideshow, but do in fact provide real economic benefit to issuing firms. Our paper contributes to the growing body of research that sheds light on the societal benefits provided by secondary market. We conclude by suggesting that efforts to improve liquidity and price discovery in secondary markets is warranted, not only because they improve secondary market trading, but also because they provide firms better access to capital to fund growth opportunities.

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Table I
Corporate Bond Issues (2002-2012)

This table reports summary statistics for new issues of corporate bonds during the sample period covering 2002 through 2012. Panel A reports the statistics for the entire sample period, while Panel B reports the statistics averaged by year. Statistics are partitioned by investment rating at the time of issue. Number of issuers is the number of unique corporations that issue bonds during the sample period, and number of issues is the total number of unique issues from the issuers in the sample. Total volume is the sum of the issue amount, and average issue size is the average amount issued.

	Investment Grade	Speculative Grade	Not Rated	Full Sample
Panel A: Full Sample				
Number of Issuers	440	99	692	1,231
Number of Issues	10,687	1,299	9,261	21,247
Volume Issued (Millions)	2,645,152	343,210	1,966,952	4,955,313
Avg. issue size	247.51	264.21	212.39	233.22
Panel B: Average per year				
Number of Issuers	40.00	9.00	62.91	111.91
Number of Issues	971.55	118.09	841.91	1,931.55
Volume Issued (Millions)	240,468	31,201	178,814	450,483
Avg. issue size	360.56	542.65	292.53	335.91

Table II
Corporate Bond Characteristics at Issuance

In this table, we present the characteristics of newly issued corporate bonds. Major characteristics include the coupon paid to investors, the time in years until the bond matures as a percent of par. We also include the proportion of new issues that are callable and convertible. We report means and medians. Characteristics of bonds are partitioned according to investment rating at the time of issue.

	Investment Grade	Speculative Grade	Not Rated	All
Mean				
Coupon	4.40	5.54	4.42	4.48
Years to Maturity	9.97	11.28	9.61	9.89
Offer Yield	4.86	5.64	4.83	4.89
Offering Price of Par	99.87	99.86	99.85	99.86
Proportion Callable	0.32	0.42	0.34	0.34
Proportion Convertible	0.01	0.01	0.02	0.01
Median				
Coupon	4.88	5.68	4.75	4.89
Years to Maturity	7.02	9.99	7.54	7.05
Offer Yield	5.00	5.65	5.00	5.03
Offering Price of Par	100.00	100.00	100.00	100.00
Total New Issues (2002-2012)	10,687	1,299	9,261	21,247

Table III
Liquidity and Cost of Newly Issued Corporate Bonds

In this table, we report the main variables used to identify illiquidity and the cost of issuing bonds. In Panel A, we report the principal costs of issuing bonds, which includes the yield to maturity at issue, the gross spread paid to the underwriting syndicate, the management fee, the reallowance fee, and the difference between the Treasury yield and the bond's yield to maturity at issuance. In Panel B, we report the average issue illiquidity variables, which include the number of days in a month that a bond is traded, the dollar volume traded in a month, the number of trades in a month, the Kyle-Obizhaeva (2011) illiquidity measure, and the Amihud (2002) illiquidity measure.

	Investment Grade	Speculative Grade	Not Rated	All
Panel A: Cost of Issuing Descriptive Statistics				
Mean				
YTM at issuance	4.86	5.64	4.83	4.89
Credit spread	1.72	2.97	2.07	1.94
Bond issue gross spread	11.09	12.76	12.79	11.94
Management Fee	4.96	6.95	7.91	6.64
Reallowance Fee	2.19	2.18	2.47	2.34
Median				
YTM at issuance	5.00	5.65	5.00	5.03
Credit Spread	1.45	2.63	1.52	1.50
Bond issue gross spread	8.75	10.00	10.00	9.75
Management fee	4.00	4.00	5.00	4.00
Reallowance fee	2.50	2.50	2.00	2.00
Panel B: Illiquidity Statistics				
Mean				
Monthly Trading Days	5.35	6.00	5.37	5.40
Monthly $ Volume per issue	266,134,012	667,601,291	249,713,397	283,521,628
Monthly trades per issue	144.44	182.11	147.72	148.17
Kyle-Obizhaeva illiquidity	3.36	3.62	3.35	3.37
Amihud Bond illiquidity	3.27	3.04	3.65	3.45
Adjusted Turnover illiquidity	15.42	15.03	15.87	15.61
Median				
Monthly Trading Days	4.00	4.00	4.00	4.00
Monthly $ Volume per issue	3,671,000	6,291,000	4,150,060	4,000,000
Monthly trades per issue	18.00	32.00	23.00	21.00
Kyle-Obizhaeva Liquidity	1.40	1.35	1.73	1.52
Amihud Bond Liquidity	1.06	1.35	1.42	1.24
Adjusted Turnover	17.00	16.80	17.35	17.18
Total New Issues (2002-2012)	10,687	1,299	9,261	21,247

Table IV
The Cost of Issuing Illiquid Bonds

In this table, we report cross-sectional regression tests of the costs of new issues on prior illiquidity of outstanding bonds. The sample includes new public and private corporate bond issues during the period from 2002 to 2012. To measure secondary market illiquidity, each bond is required to have at least one other debt issuance prior to the current new issue. When computing the liquidity of existing debt, we use the average monthly liquidity of all outstanding bonds for the year prior to the new issue, weighted by issue size. The illiquidity variables include the percentage of days in a month that a bond does not trade, the Kyle-Obizhaeva (2011) measure of price impact, the Amihud (2002) measure of price impact, and Liu's (2006) adjusted turnover measure. The dependent variable in all specifications is a form of issuing costs, including the difference between the yield to maturity and the Treasury yield at issuance (Panel A), and the gross spread paid to the underwriter (Panel B). The independent variables include the years to maturity, log of the new issue size, log of prior outstanding issues, and the duration of the issue. For public firms where the data is available, we include the leverage ratio, cash flow, and log of firm size. Other control variables include indicators for convertible, callable, senior, junior, 144A eligible, privately placed, and asset-backed issues, as well as indicators for credit upgrades and downgrades since the last issue. All regressions include firm and year fixed effects. Robust test-statistics are reported in parentheses, where ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

Panel A: Credit Spread

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	PNT	KO	Amihud	Adj. TO	PNT	KO	Amihud	Adj. TO
	All Corporate Debt Issues				Corporate Debt Issues of Public Firms			
Illiquidity	0.04	0.04***	0.02**	0.01**	0.05	0.05***	0.03**	0.01
	(0.42)	(2.59)	(2.53)	(1.99)	(0.31)	(3.06)	(2.44)	(1.52)
Years to Maturity	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***
	(2.80)	(2.76)	(2.70)	(2.79)	(2.73)	(2.66)	(2.61)	(2.73)
Log Issue Size	0.08***	0.08***	0.08***	0.08***	0.07***	0.07***	0.07***	0.07***
	(6.86)	(6.84)	(6.76)	(6.82)	(4.55)	(4.53)	(4.44)	(4.49)
Log Outstanding Debt	0.06	0.07	0.07	0.06	-0.03	-0.02	-0.03	-0.03
	(0.89)	(0.98)	(0.88)	(0.89)	(-0.26)	(-0.21)	(-0.29)	(-0.25)
Duration	-0.02	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03	-0.03
	(-1.09)	(-1.08)	(-0.99)	(-1.09)	(-1.24)	(-1.19)	(-1.10)	(-1.24)
Cash Flow					-3.22**	-3.30**	-3.37**	-3.24**
					(-1.97)	(-2.03)	(-2.03)	(-1.98)
Leverage					-0.02	-0.02	-0.04	-0.01
					(-0.03)	(-0.03)	(-0.07)	(-0.01)
Log Firm Size					-0.00	-0.00	-0.01	-0.00
					(-0.12)	(-0.07)	(-0.17)	(-0.11)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm and Year Fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj-R^2	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
N	919	919	918	919	731	731	730	731
Observations	11,364	11,364	11,281	11,364	7,793	7,793	7,768	7,793

Panel B: Underwriting Spread								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	PNT	KO	Amihud	Adj. TO	PNT	KO	Amihud	Adj. TO
	All Corporate Debt Issues				Corporate Debt Issues of Public Firms			
Illiquidity	1.65***	0.18	0.00	0.14***	1.21**	0.30*	0.05	0.11**
	(2.80)	(1.55)	(0.04)	(3.27)	(2.11)	(1.91)	(1.19)	(1.98)
Years to Maturity	0.20**	0.19**	0.20**	0.20**	0.27***	0.26***	0.27***	0.27***
	(2.43)	(2.40)	(2.42)	(2.42)	(3.92)	(3.89)	(3.91)	(3.92)
Log Issue Size	-0.85***	-0.87***	-0.87***	-0.87***	-1.10***	-1.11***	-1.11***	-1.11***
	(-5.18)	(-5.18)	(-5.15)	(-5.16)	(-5.88)	(-5.83)	(-5.77)	(-5.81)
Log Outstanding Debt	-0.47*	-0.40	-0.45*	-0.43*	-0.48	-0.46	-0.50	-0.48
	(-1.87)	(-1.52)	(-1.65)	(-1.68)	(-1.27)	(-1.24)	(-1.31)	(-1.25)
Duration	0.77***	0.77***	0.76***	0.77***	0.53***	0.54***	0.53***	0.53***
	(4.19)	(4.17)	(4.13)	(4.16)	(3.20)	(3.22)	(3.18)	(3.20)
Cash Flow					-7.12	-8.20	-7.92	-7.54
					(-1.47)	(-1.54)	(-1.50)	(-1.49)
Leverage					-0.67	-0.84	-0.86	-0.74
					(-0.26)	(-0.32)	(-0.33)	(-0.29)
Log Firm Size					0.22*	0.24*	0.26**	0.22*
					(1.84)	(1.88)	(2.35)	(1.85)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm and Year Fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj-R^2	0.34	0.34	0.34	0.34	0.54	0.54	0.54	0.54
N	943	943	942	943	753	753	752	753
Observations	15,257	15,257	15,153	15,257	10,160	10,160	10,122	10,160

Table V
First time issuers

This table presents summary statistics for first-time bond issuers during the period from 2002 through 2012. This subsample of bond issuers includes firms that potentially have little information regarding the expected risks of the issue. Panel A reports the frequency of first time issuers, including the total number of initial issues, the total number of second issues, as well as the total number of subsequent issues for the remainder of the sample period. In instances where a firm issues two different bonds with differing maturities on the same day, both count as a second issue. Panel B summary statistics of issues by first time issuers.

Panel A: Frequency of New Issuers	
First Time Issuers: 2002-2012	948
First time issuers with a Second Issue: 2002-2012	597
Total subsequent issues: 2002-2012	6,331

Panel B: Summary Statistics of Secondary Issues				
	Mean	Median	Min	Max
Total Subsequent issues per issuer	2.18	1.00	1.00	85.00
Size of Initial Issue	508.83	362.50	0.37	5,000.00
Size of Second Issue	536.72	400.00	0.15	4,625.00
Years between Initial and Second issue	1.83	1.24	0.01	10.70

Table VI
Change in issuing costs following first time issues

This table presents the cross sectional regression tests of marginal underwriting costs on a firm's second bond issue. To be included in the sample, a firm must issue its second bond, where the only other bond issued by the corporation is the initial issue that occurred previously. The dependent variable includes the change in underwriting costs of the second bond issue beyond the first issue by a firm, namely the difference between the initial yield to maturity and the Treasury yield, as well as the underwriting spread paid to the syndicate. The principal independent variable is the average monthly illiquidity of the previously issued bond. Control variables include an indicator variable identifying whether the bond is speculative grade or not rated, the time in years between initial and second issue, years to maturity of the current issue, the log of the issue size, and indicator variables indicating 144A, senior, junior, callable, and convertible issues. Indicator variables also indicate whether the new issue receives a higher or lower grade relative to its previous issue. All specifications include year fixed effects. Robust t-statistics are reported in parentheses, with ***,**, and * indicating significance at the 1%, 5%, and 10% levels respectively.

Panel A: Credit Spread	(1)	(2)	(3)	(4)
	PNT	KO	Amihud	Adj. TO
Illiquidity	0.53**	0.02	0.02	0.03**
	(2.51)	(0.44)	(1.07)	(1.99)
Years to Maturity	0.01	0.01	0.01	0.01
	(0.49)	(0.44)	(0.47)	(0.46)
Log Size of Issue	0.13**	0.13**	0.12**	0.13**
	(2.41)	(2.43)	(2.29)	(2.35)
Time Between Issues	0.00	0.00	0.00	0.00
	(1.32)	(1.26)	(1.25)	(1.31)
Controls	Yes	Yes	Yes	Yes
Firm & Year	Yes	Yes	Yes	Yes
Adj-R^2	0.18	0.18	0.18	0.18
n	386	386	386	386
Observations	2,830	2,830	2,769	2,830
Panel B: Underwriting Spread				
Illiquidity	0.28***	0.03***	0.04***	0.03***
	(3.26)	(2.60)	(4.49)	(3.85)
Years to Maturity	0.06***	0.06***	0.06***	0.06***
	(35.48)	(35.28)	(34.77)	(35.34)
Log Size of Issue	-0.06***	-0.06***	-0.06***	-0.05***
	(-5.96)	(-6.03)	(-5.99)	(-5.85)
Time Between Issues	0.00	-0.00	-0.00	0.00
	(0.24)	(-0.02)	(-0.11)	(0.22)
Controls	Yes	Yes	Yes	Yes
Firm & Year	Yes	Yes	Yes	Yes
Adj-R^2	0.36	0.36	0.36	0.36
n	386	386	386	386
Observations	3,985	3,985	3,904	3,985

Table VII
Proportion of Firms Issuing Bonds by Year

This table reports the number of firms that issue bonds each year of the sample period. For each year, the number of firms eligible to issue debt (Potential Repeat Issuers) is estimated by summing the number of unique firms that have outstanding debt trading in the secondary market. The credit rating for firms that do not issue new debt is estimated using the existing issues. In the instances where current issues have multiple credit ratings, or if multiple ratings differ among agencies, the median credit rating across all issues is used. The trading data comes from TRACE, while the issuing data comes from Mergent FISD.

	Investment Grade			Speculative Grade			Not Rated		
Year	Potential Repeat Issuers	Issuers	%	Potential Repeat Issuers	Issuers	%	Potential Repeat Issuers	Issuers	%
2002	822	213	26	226	39	17	642	299	47
2003	778	236	30	141	43	30	771	353	46
2004	687	158	23	134	42	31	891	257	29
2005	689	172	25	136	32	24	895	246	27
2006	712	228	32	140	61	44	809	253	31
2007	748	269	36	146	70	48	766	277	36
2008	722	202	28	136	29	21	712	215	30
2009	801	297	37	157	61	39	617	341	55
2010	855	259	30	186	78	42	571	270	47
2011	905	298	33	202	60	30	519	232	45
2012	1,020	408	40	218	118	54	435	297	68

Table VIII
Does Illiquidity Impede Access to Capital?

This table reports coefficient results from a cross sectional probit analysis of the determinants of a firm's ability to issue new debt. To understand the firm's choice to issue new debt we regress the following equation:

$$Pr(Issued_{k,t} = 1) = \alpha_0 + \beta_1 Avg\ Illiquidity_{k,t-1} + \beta_2 OutstandingDebt_{k,t-1} + \beta_3 Recession_t + \beta_4 Recession_t * AvgIlliquidity_{k,t} + \varepsilon_{k,t}.$$

The dependent variable is an indicator variable equal to one if a firm k issues new debt in year t, zero otherwise. To be included in the sample the firm must have existing debt that currently trades in the secondary market. The principal independent variable is the average monthly illiquidity of existing bonds issued by the same firm in the year prior. We include as control variables the median credit rating of the existing bonds issued, the log of the outstanding debt issued by the firm at the end of the prior year, an indicator variable that marks the year 2008 and 2009 as crisis years, and an interaction of the firm's illiquidity variable and the recession variable. Robust test statistics are reported in parentheses, with ***,**, and * indicating significance at the 1%, 5%, and 10% levels respectively.

	Probit (Issuer = 1)			
	(1)	(2)	(3)	(5)
	PNT	KO	Amihud	Adj. TO
Intercept	-0.19	-2.24***	-2.69***	-0.58**
	(-0.69)	(-7.22)	(-7.63)	(-2.08)
Prior Year Illiquidity	-0.14**	-0.12***	-0.06***	0.04**
	(-2.02)	(-9.38)	(-8.27)	(2.39)
Prior Year Outstanding Debt	0.00	0.04***	0.06***	0.03**
	(0.12)	(4.28)	(5.83)	(2.51)
Recession	0.21***	-0.20	0.51	-0.03
	(2.97)	(-0.64)	(1.30)	(-0.36)
Recession * Prior Year Illiquidity	-0.36***	-0.02	0.02	0.00
	(-3.57)	(-0.69)	(1.30)	(0.02)
Firm and Credit Fixed Effects	Yes	Yes	Yes	Yes
N	2,473	2,460	2,455	2,473
Observations	17,870	16,179	16,123	17,842

Table IX
TRACE Reporting of New Debt Issuances

This table reports the number and volume of new issues during the years 2002-2006. During this sub-period, FINRA reported trades of bonds in waves depending on issue size and credit rating. We report the average number of new issues that are reported on TRACE at issuance.

	All New Issues		TRACE reported		Not Reported		Percent Trace
	#	Volume	#	Volume	#	Volume	
2002	229	$86,522,700	59	$58,475,000	170	$28,047,700	26%
2003	777	374,147,728	399	266,239,800	378	$107,907,928	51%
2004	546	313,509,987	398	280,635,237	148	$32,874,750	73%
2005	500	294,787,014	478	262,742,014	22	$32,045,000	96%
2006	566	386,532,825	566	386,532,825	0	0	100%
Total	2618	1,455,500,254	1900	1,254,624,876	718	$200,875,378	

Table X
The Real Effect of Price Impact on Issuing Costs

This table presents cross sectional regression results of the impact of TRACE reporting on underwriting costs. The independent variable includes the costs of underwriting, either the difference between the yield to maturity and the Treasury yield at the time of issuance or the gross spread paid to the underwriting syndicate. The principal independent variable is an indicator variable equal to one if the firm's prior issues are TRACE reported, zero otherwise. Control variables include the years to maturity, log of the issue size, the bond's duration, and indicator variables marking whether the bond is callable, convertible, 144A, senior, or a junior issue. We include crediting rating dummy variables, as well as firm fixed effects. Robust test statistics are reported in parentheses, with ***,**, and * indicating significance at the 1%, 5%, and 10% levels respectively.

Panel A: Credit Spread								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	PNT	KO	Amihud	Adj. TO	PNT	KO	Amihud	Adj. TO
	2002-2003				2002-2005			
Illiquidity	-0.21*	0.18***	0.03***	0.02***	0.35	0.31***	0.17***	-0.08
	(-1.91)	(3.52)	(2.68)	(2.69)	(0.72)	(3.04)	(5.01)	(-0.96)
Prior Bonds Trace Reported	-0.12	-0.17**	-0.15*	-0.12	-0.22***	-0.21***	-0.23***	-0.23***
	(-1.33)	(-1.98)	(-1.73)	(-1.26)	(-3.66)	(-3.78)	(-3.78)	(-3.67)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm and Year Fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj-R^2	0.09	0.14	0.09	0.09	0.14	0.18	0.15	0.13
N	280	282	263	308	416	411	414	416
Observations	576	571	571	576	1,085	1,078	1,077	1,085
Panel B: Underwriting Spread								
Illiquidity	2.04***	0.75***	0.37***	-0.26**	1.85***	0.24	0.04	0.19***
	(3.76)	(7.10)	(9.83)	(-1.99)	(2.61)	(1.31)	(0.89)	(2.65)
Prior Bonds Trace Reported	-0.49	-0.34	-0.92***	-0.32	-1.16***	-1.13***	-1.17***	-1.15
	(-1.52)	(-1.11)	(-3.00)	(-0.91)	(-3.97)	(-3.95)	(-4.10)	(-1.57)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm and Year Fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj-R^2	0.47	0.51	0.52	0.47	0.22	0.23	0.23	0.22
N	304	306	285	389	459	453	458	459
Observations	1,119	1,096	1,075	1,119	2,285	2,229	2,212	2,285

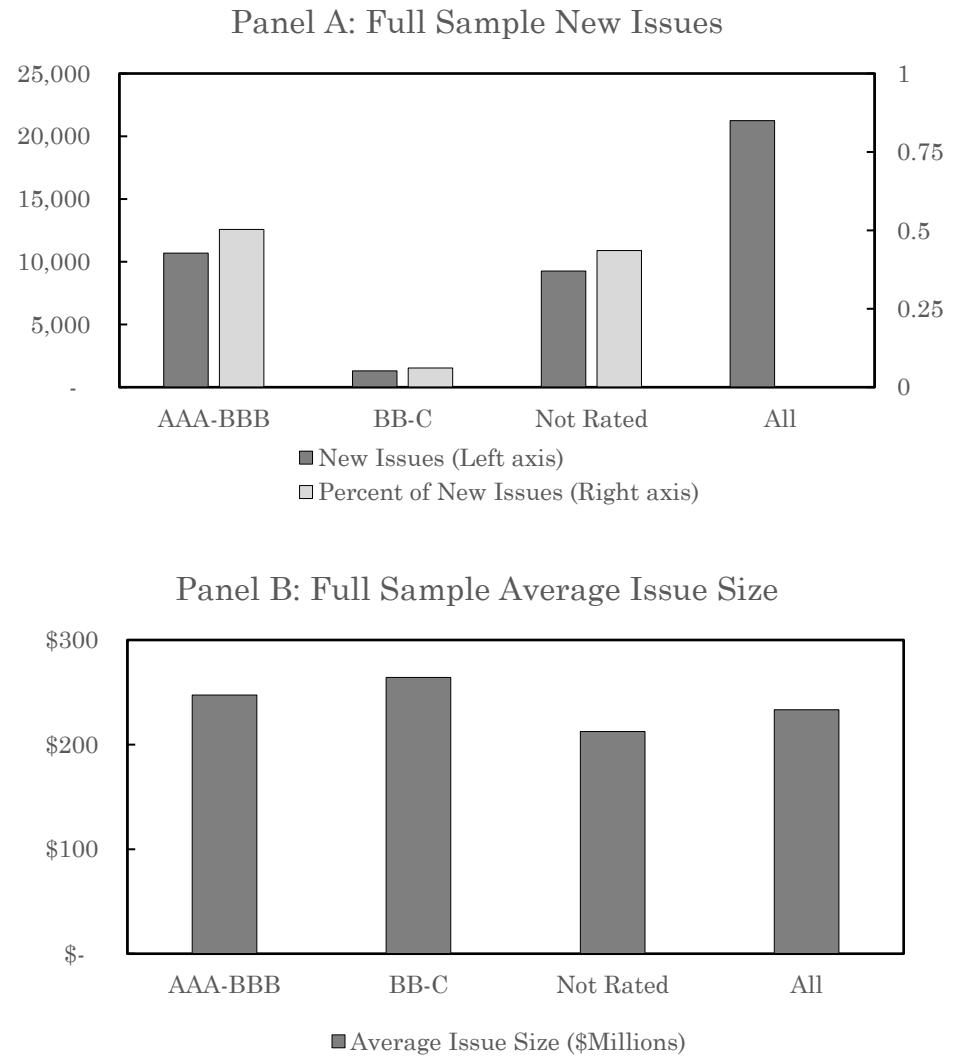

Figure 1. Corporate Bond Issuances (2002-2012)

The figures display primary market activity for corporate bonds issued from 2002 through 2012, partitioned by credit rating at the time of the issue. Panel A reports the total amount of capital raised through corporate bonds, whereas Panel B reports the average issue size. Both figures provide aggregate totals of the full sample of firms issuing bonds.

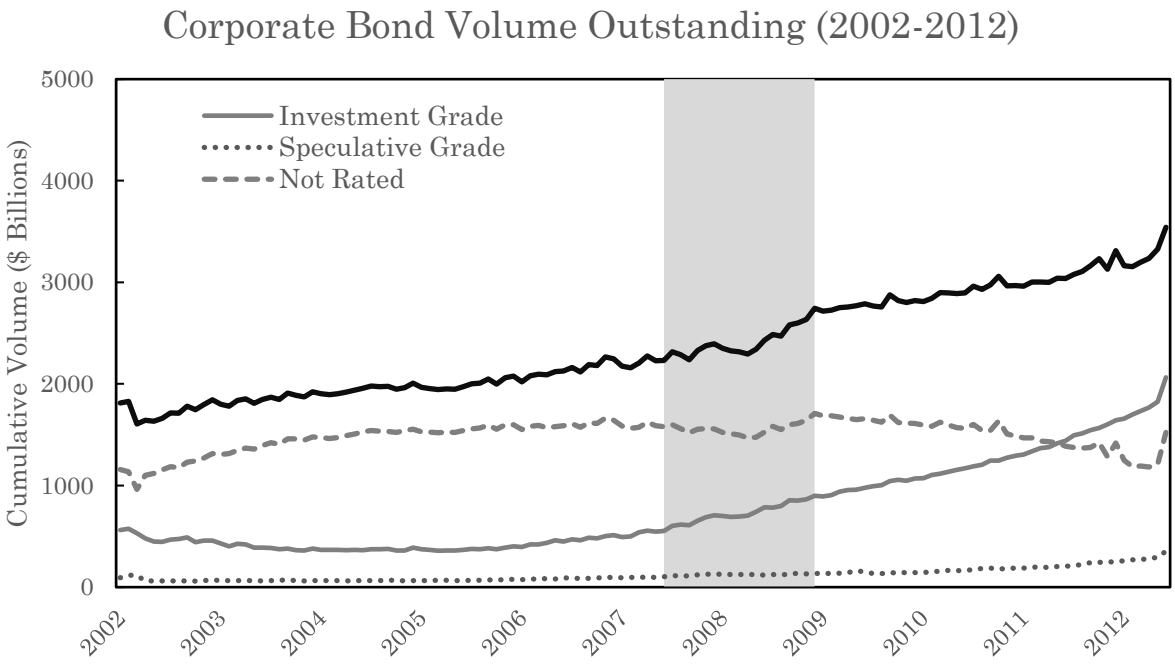

Figure 2. Monthly Corporate Debt Outstanding (2002-2012)
The figure displays the aggregate amount of corporate debt outstanding during the sample period from January 2002 through December 2012.

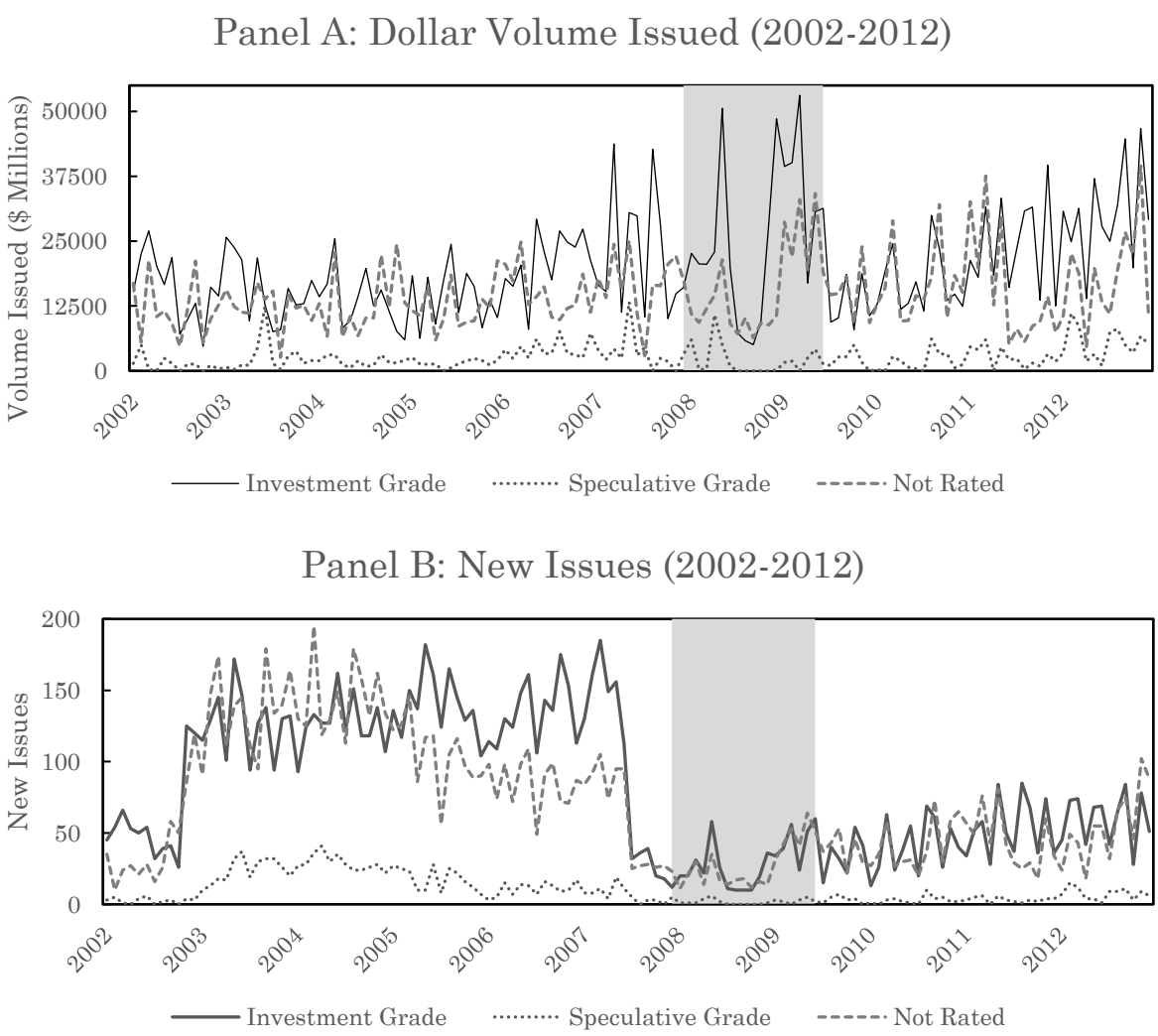

Figure 3. Monthly Corporate Bond Issues (2002-2012)

The figure displays the monthly amount of capital issued through U.S. corporate bonds during the sample period from January 2002 through December 2012. Panel A reports the monthly volume issued. Panel B reports the number of monthly issues.

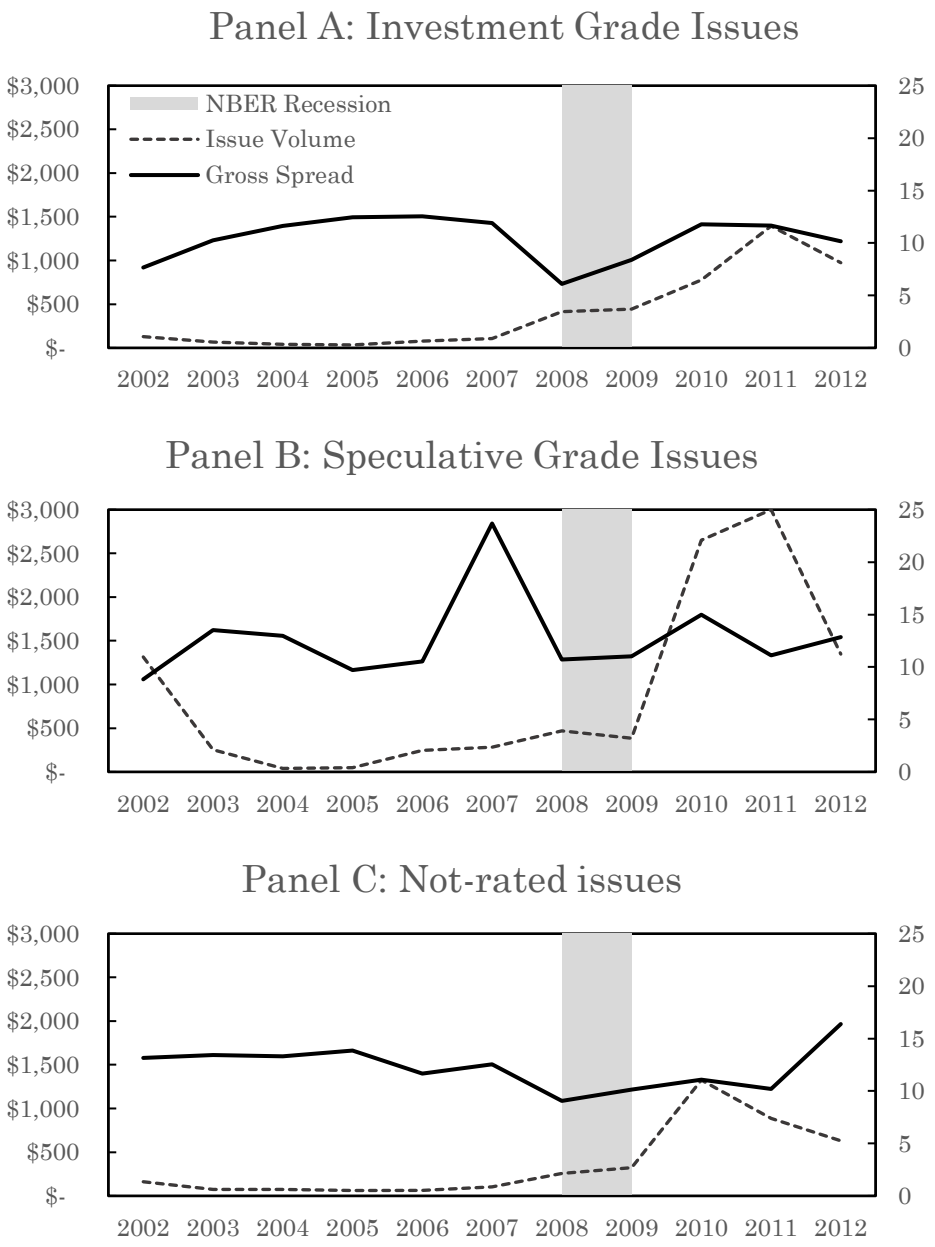

Figure 4. **Bond Trading Volume and fees from 2002-2012**

This figure displays the yearly average trading volume alongside the gross spread, the percentage of the issue amount paid to the underwriting syndicate. Panels A, B, and C report issues for investment grade, speculative grade, and non-rated grade issues respectively. Issue volume and gross spread are averaged by firm and issue.

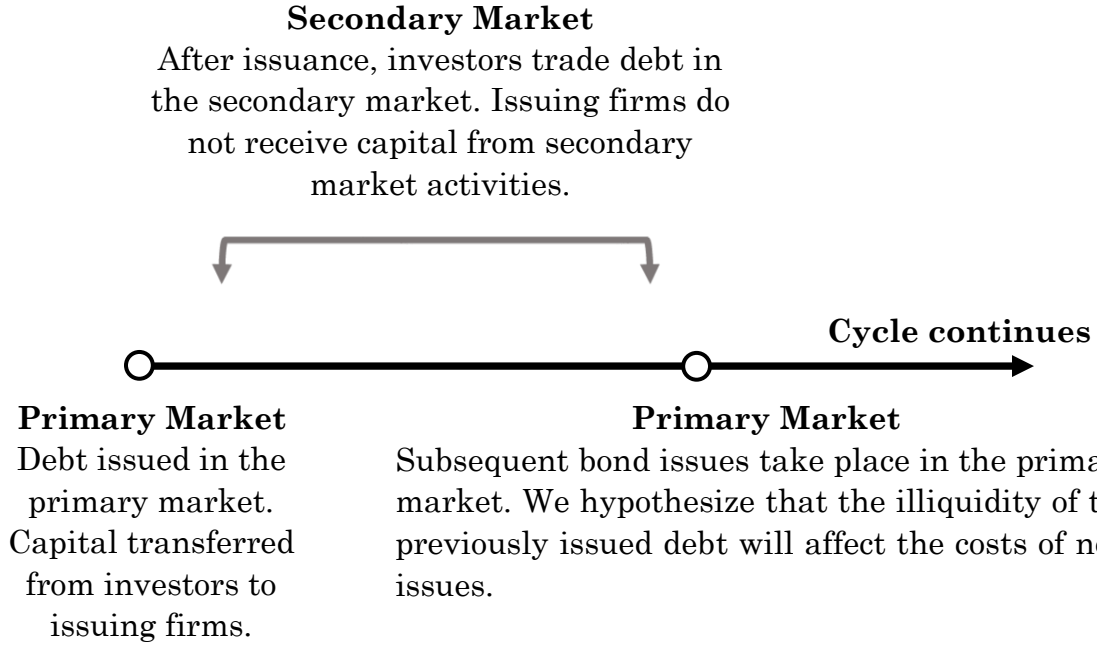

Figure 5. **How Secondary Market Liquidity Affects Underwriting Costs**
This study links secondary market activity with the primary market for new issues. When considering liquidity, this paper postulates that the characteristics of previously issued bonds will influence the fees associated with new issues. Both underwriters and investors estimate the potential risks of new bond issues by examining the past performance of outstanding bonds by the issuing firm.