When does peer information matter?

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ABSTRACT: This paper examines whether information about peer firms affects the cost of capital for related firms in an industry and when such effects are more significant. We focus on a sample of private firms that raise public debt for the first time because such firms are opaque prior to their bond issuance but become significantly more transparent following their issuance. We predict and find that in the initial year of the bond issuance, when information about the capital raising firm is scarce, peer information is negatively associated with the issuing firm's cost of capital. This effect shrinks over time as the amount of publicly available information about the firm increases and substitutes for peer information. In economic terms, peer information lowers bond yields by 16.6% for first-time bond issuers in the year of issuance, but by 4.4% in the third year after issuance. We corroborate our inference by examining the effect of peer information on the cost of equity capital during equity offerings. This paper provides novel evidence that the positive externalities arising from information about peer firms vary over time.

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1. Introduction

We examine whether information about peer firms (henceforth, peer information) affects the cost of capital for related firms in an industry and whether the importance of this effect depends on the amount of information available directly from the related firm (henceforth, firm information). Specifically, we hypothesize that peer information has a larger economic effect on a firm's cost of capital when firm information is scarce, and that these externalities reduce when the amount of firm information increases and substitutes for peer information.[1] Recent research finds evidence that a firm's disclosure has important economic consequences for its peers. For example, a firm's disclosure influences peer firms' (i) stock prices, (ii) stock liquidity, and (iii) investment decisions (e.g., Foster, 1981; Bushee and Leuz, 2005; Badertscher et al., 2013). We extend this literature by examining temporal changes in the importance of peer effects from when firms are newly public with limited firm information to when firms have a longer history of public disclosure and relatively more firm information.

Our hypothesis is based on the idea that firms in an industry are affected by similar economic forces (e.g., common demand/supply shocks). Thus, peer disclosures have spillover effects that reduce information asymmetry between managers and investors, as well as among investors, for all firms operating in that industry. Such reductions in information asymmetry can reduce financing costs (in both debt and equity markets), as illustrated in corporate finance models with adverse selection (Leland and Pyle, 1977; Myers and Majluf, 1984; Rock, 1986) and in asset pricing models with imperfect competition (Lambert et al., 2012).

To the extent peer information affects information asymmetry and financing costs, we predict that such externalities vary over time as a function of the amount of firm information available to investors. Our intuition is similar to that presented in other streams of literature. For example, models in the executive compensation literature (e.g., Banker and Datar, 1989) show that

[1] We use the term externalities to mean economic effects that extend to other firms beyond the disclosing firm.

the weights placed on different performance evaluation signals are proportional to relative "signal-to-noise" ratios. In our setting, we expect investors to put less weight on peer information (the "noisy" signal) as more information becomes available directly from the disclosing firm (the "precise" signal).[2] Nevertheless, ex ante there are several reasons why firm disclosures might not substitute for peer information. For example, firm disclosures are often affected by managerial incentives to manipulate them, which can make them noisy and potentially less reliable than peer information (Section 2 expands on these arguments).

We begin by testing our hypothesis using a sample of private firms that raise public debt for the first time. We focus on the public debt issuances of private firms for two main reasons: First, since private firms are not subject to SEC reporting requirements until they raise public capital, there is (i) relatively little firm information available in the public domain prior to the debt issuance and (ii) a large increase in the amount of publicly available firm information in the years immediately following the debt issuance. Thus, this setting is especially powerful for studying the substitution between peer information and firm information, since the amount of peer information stays relatively constant as the amount of firm information significantly increases. Second, focusing on public debt allows us to observe bond yields (a measure of the cost of the debt) at the time of issuance as well as over time in the years subsequent to the issuance. Proxies for the cost of debt (such as bond yields) are relatively less subject to measurement error concerns than proxies for the cost of equity capital, which are notoriously noisy (Elton, 1999; Easton and Monahan, 2005). Nevertheless, we recognize that there are disadvantages to the public debt setting (e.g., a small sample of first-time bond issuers) and thus we also test our prediction in the context of firms raising equity capital.

[2] Prior research argues that firms are the lowest cost producers of corporate information (e.g., Coffee, 1984; Easterbrook and Fischel, 1984; Diamond, 1985) and thus a firm's disclosures about itself arguably have a lower signal-to-noise ratio with respect to its own valuation than the disclosures provided by its peers. This intuition is also available in other settings. For example, Lang (1991) develops an earnings response coefficient model in which uncertainty about firm value declines as investors observe a longer time-series of earnings realizations; Pastor and Veronesi (2003) develop a similar argument in an asset pricing framework.

Drawing from the theoretical models of disclosure externalities (e.g., Dye, 1990; Admati and Pfleiderer, 2000), we construct our measure of peer information to capture: (i) the relevance of peer firms' disclosures to non-disclosing firms and (ii) the aggregate amount of information available about peer firms. We proxy for the *relevance* of peer information within an industry using the degree of earnings synchronicity in the industry. Our intuition is that firms in industries with greater earnings synchronicity are more likely to be economically linked and therefore information about one firm's future prospects is more likely to convey information about peer firms' prospects. We proxy for the aggregate *amount* of industry information available about peer firms using two proxies: Our first proxy is the percentage of public firms (relative to the total number of firms, public plus private) operating in the industry (Badertscher et al., 2013). Since publicly owned firms disclose both mandatory and voluntary information to the public and are analyzed by information intermediaries, there is an extensive amount of public information about these firms that is not available for private firms. Therefore, the composition of public and private firms in an industry affects the information environment in that industry. Our second proxy for aggregate industry information is the analyst coverage for firms in the industry (measured as the average number of forecasts per firm). Prior research finds that analysts not only supply information about firm prospects but also demand a greater quantity and quality of information from the firms they cover (see Beyer et al., 2010 for a review of the literature), thereby improving the industry information environment.

We find that peer information is negatively associated with bond yields at the time of issuance, but this association gradually declines over time.[3] Specifically, a one standard deviation increase in our proxy for peer information lowers bond yields by 16.6% in the first year of issuance.

[3] As we discuss in more detail in Section 4.4.3, all of the bonds in our sample are initially issued to institutional investors as private placements under Rule 144A but are subsequently traded on public debt markets following SEC registration. In our main test, we measure bond yields at the time the bond is traded publicly (after its SEC registration) because this is when firms begin complying with the SEC's disclosure requirements and adverse selection concerns manifest. We then exploit the private placement window in an additional test (described below).

The effect declines to 4.4% in the third year after the bond issuance. Similarly, when we break down our data into quarterly, rather than annual, observations, we observe a gradual decline in the relation between peer information and bond yields over the 12 quarters following the bond issuance. These results are consistent with our prediction that peer information lowers the cost of capital for other firms in the industry when firm information is scarce and this effect declines as firm information increases.

Next, we conduct two cross-sectional tests to further validate our inference that peer information and firm information serve as substitutes. Specifically, we examine whether the effect of peer information on bond yields is smaller for firms with richer initial firm-specific information environments. We proxy for the amount of firm information using (i) the level of disaggregation in firms' income statements immediately before the bond issuance (Chen et al., 2015), and (ii) bond trading volume in the first quarter of its issuance, which proxies for the amount of private information aggregated into prices via the trading process (e.g., Grossman and Stiglitz, 1980; Kyle, 1985). Consistent with our prediction that peer information serves as a substitute for firm information, we find that the effect of peer information on bond yields is smaller when firms have richer firm-specific information environments.

There are two primary concerns with our analyses thus far. First, our proxy for peer information, which is constructed at the industry-year level, could be picking up industry characteristics (besides peer information) that affect the cost of capital. For example, earnings synchronicity (a component of our proxy for peer information) is plausibly correlated with industry risk, which could affect our results. Second, our analyses focus on endogenous capital raising events, and thus our proxy for peer information might capture time-variation in the cost of capital in an industry (e.g., related to the industry's growth opportunities), which may threaten our inference. For example, if firms are more likely to go public when the cost of capital is low, there could be an association between the percentage of public firms in an industry (an input into the

construction of our measure) and the bond yields of firms in that industry. While the above argument is less likely to explain the decay in the relation between peer information and the cost of capital, it could explain the relation between peer information and bond yields in the initial year of the bond issuance. We conduct three additional tests to mitigate endogeneity concerns.

First, we compare the effect of peer information on bond yields for our sample of private firms to that observed for a matched sample of public firms that issue bonds in the same industry-year, thereby holding peer information constant. Since public firms have richer information environments due to SEC disclosure requirements, voluntary disclosures, and information intermediary coverage, the importance of peer information to public firms is likely to be lower than that for observably similar private firms. Consistent with this prediction, we find that peer information has an insignificant effect on the yields of bonds issued by public firms, but a significant effect on the yields of bonds issued by private firms.

Second, we focus on a subsample of private firms that simultaneously issue both public bonds and bank loans. Unlike bond markets, bank financing is characterized by relationships between lenders and borrowers, where lenders have significant access to (hard and soft) non-public information about the borrowing firm (e.g., Diamond, 1984; Boot, 2000). As a result, peer information is likely less-relevant to pricing private debt than to public debt. This is precisely what we find: peer information is not related to the cost of private debt but is related to the cost of public debt, holding the borrower and year constant.

Third, we exploit an institutional feature of our sample which consists of bonds issued under Rule 144A. Bonds issued under Rule 144A are initially marketed to institutional investors as private placements and are only subsequently registered with the SEC. As a result, firms issuing bonds under Rule 144A are not required to comply with SEC disclosure requirements until they register the bond with the SEC. If the temporal change in the relation between peer information and bond yields is due to changes in the amount of firm information available to investors (as we

predict), we should not observe a decay in the relation between peer information and bond yields between the time of the bond's issuance and its SEC registration. Rather, the decay in this relation should occur only *after* the bond is registered with the SEC. Consistent with this prediction, we find that the effect of peer information on bond yields begins to fade only following SEC registration.

We further validate our inferences by examining private firms that issue public equity for the first time. Similar to the bond setting, initial public offering (IPO) firms are also subject to SEC disclosure requirements only after their equity issuance and, as a result, experience a substantial increase in firm information post-IPO. We document four results that parallel the findings above: First, we find that peer information is negatively associated with bid-ask spreads (our proxy for the adverse selection component of the cost of capital) in the first year of a firm's IPO, but that this relation monotonically decreases over time in the three years subsequent to the IPO. Second, the effect of peer information on bid-ask spreads in the first year of a firm's IPO is smaller in the cross-section of IPOs with richer initial firm-specific information environments (albeit insignificantly in one of the two tests). Third, analogous to our test comparing private firms issuing bonds to public firms issuing bonds, we predict and find that peer information affects the bid-ask spreads of IPO firms (and that this effect decays over time), but there is no such effect for a matched sample of seasoned equity offering (SEO) firms.

Finally, we test whether the effect of peer information *increases* as firm information *decreases*. The Securities Act of 1933 restricted firms from disclosing information prior to their equity offering, which is popularly known as "gun-jumping" regulation.[4] Consistent with this regulation affecting disclosure behavior, prior research finds that firms reduce their voluntary

[4] Section 5(c) of the Securities Act of 1933 prohibits firms from making any "offer" to sell a security prior to filing a registration statement with the SEC (the restriction period is known as the 'quiet period'). The definition of "offer" has grown to include *any* act that might "contribute to conditioning the public mind or arousing public interest in the issuer" (SEC release no. 3844), which is perceived as encompassing forward-looking voluntary disclosures such as management forecasts. Consistent with this perception, prior research documents a decrease in voluntary disclosures prior to SEOs (e.g., Frankel et al., 1995; Lang and Lundholm, 2000; Shroff et al., 2013).

disclosure activity before SEOs (i.e., during the SEO quiet period) and bid-ask spreads increase during this period (e.g., Shroff et al., 2013). We predict and find that the increase in bid-ask spreads during SEO quiet periods documented in prior research is significantly smaller for firms with richer peer information environments. Importantly, the effect of peer information on bid-ask spreads during the quiet period disappears after the SEC relaxed quiet period disclosure restrictions with the Securities Offering Reform in 2005.

This paper contributes to the literature on the presence of externalities or peer effects of disclosure. Early evidence documents the presence of intra-industry information transfers (i.e., instances where one firm's disclosures affect the stock prices of other, related firms). For example, prior studies document information transfers arising from news contained in earnings announcements (Foster, 1981), management forecasts (Baginski, 1987; Han et al., 1989), and transfers between buyers and suppliers in the same supply chain (Olsen and Dietrich, 1985; Pandit et al., 2011). More recent studies tackle the question of whether disclosures generate positive or negative externalities related to financing and investment decisions (see e.g., Gleason et al., 2008; Durnev and Mangen, 2009; Badertscher et al., 2013; Beatty et al., 2013; Chen et al., 2013; Shroff et al., 2014). Our paper builds on prior research by focusing on a specific idea that has been overlooked by prior research. Specifically, we hypothesize and show that the importance of externalities from peer-firm disclosures varies over time and is a function of the relative amounts of firm-specific vs. peer information available to investors. This focus on dynamic effects is in contrast to prior research, which assumes that the economic importance of externalities is constant over time. In addition, our analyses shed light on the substitutive nature of firm vs. peer information, which leads to changes in peer effects over time.[5]

2. Hypothesis development

[5] In related work, Arif and De George (2016) find evidence consistent with a substitutive relation between firm- and peer-information. They find that European firms that report on a semi-annual basis have greater information transfers from their U.S. peers during (European firms') non-reporting quarters than during their reporting quarters.

Our hypothesis is predicated on three arguments: (i) adverse selection concerns influence financing costs, (ii) peer information reduces adverse selection costs, and (iii) firm information is more informative than peer information with respect to valuing a company. We discuss each of these arguments in more detail below to motivate our hypothesis but note that insofar as any of them are untrue, we might not find evidence supporting our hypothesis.

The idea that adverse selection affects financing costs is well founded in the corporate finance literature. In the context of IPOs, Beatty and Ritter (1986) and Rock (1986) show that information asymmetry among investors creates uncertainty that is priced in equilibrium and increases financing costs. In a similar vein, Myers and Majluf (1984) show that adverse selection affects financing costs in secondary offerings as well as in debt offerings. Subsequent work shows that information asymmetry can also raise the cost of capital in an "asset pricing" model with multiple securities. For example, Lambert et al. (2012) show that in imperfectly competitive settings, information asymmetry between investors creates adverse selection costs, which increase expected returns. These theoretical arguments are supported by numerous empirical papers (see Beyer et al. (2010) and Dechow et al. (2010) for reviews of the literature).

The second argument underlying our hypothesis is that peer information reduces the adverse selection costs of *related firms*. The idea is that, to the extent that firms in an industry are affected by similar economic forces, greater disclosure by peer firms can have spillover effects for all firms operating in that industry. For example, Dye (1990) and Admati and Pfleiderer (2000) develop analytical models that show positive externalities in the form of liquidity spillovers in capital markets. Specifically, they show that if firm values and cash flows are correlated, the disclosures of one firm is useful to investors in valuing other firms and increases investors' demand for shares in other firms.[6] Overall, prior analytical studies provide evidence that peer information

[6] Lambert et al. (2007) make a similar point in the context of estimation risk. Specifically, they show that each firm's disclosure has an impact on investors' assessed covariances for other firms, which in turn lowers other firms' estimation risk and cost of capital. Lambert et al. (2007) argue that while these effects are likely to be small individually, they could be large across all firms in the market or economy.

helps reduce information asymmetry in other firms, suggesting that it can have positive capital market effects.

The final argument underlying our hypothesis is that the relative importance of peer information is a function of the amount of firm information available to help reduce adverse selection costs. In the context of firm information, Lang (1991) shows that as investors observe a longer time-series of earnings (i.e., "more firm information" in the parlance of our paper), uncertainty about future earnings is reduced and investors respond more strongly to firm information. To the extent that firm information and peer information are substitutes, we expect the importance of peer information to decrease as the amount of firm information increases. This argument is similar in spirit to the relative signal-to-noise ratio of the performance measures established in the compensation literature (Banker and Datar, 1989). Specifically, we argue that with respect to assessing a firm's future prospects, disclosures directly provided by a firm have a higher signal-to-noise ratio than does peer information and, as a result, investors would rely less on peer information as the amount of firm information increases.

Our hypothesis, motivated by the discussion above, is as follows:

H: Peer information is negatively associated with the cost of capital when firm information is scarce and this negative association weakens as the amount of firm information increases.

Notwithstanding the above discussion, whether peer information affects the cost of capital of related firms and whether this association decays as the amount of firm information increases is ultimately an empirical question. First, a large literature finds that firm disclosures can be affected by managerial incentives to increase stock prices and their compensation (see Dechow et al. (2010) for a review of the literature). Thus, even in the presence of a rich firm-specific disclosure environment, peer information could help reduce adverse selection costs since they are unlikely to be affected by the managerial incentives of related firms in the industry. Second, while we assume that firm information and peer information are substitutes, it is also conceivable that they are complements and help reinforce each other. As mosaic theory describes, many individual

information items that might not be particularly relevant individually can, when joined together, be especially valuable to analysis. Specifically, Pozen (2005, p. 639) states that "the significance of one item of information may frequently depend upon knowledge of many other items of information." Likewise, peer information can provide additional context for evaluating firm information, which can make these two sources of information complements rather than substitutes. The use of benchmarking in investment valuation exercises is an example consistent with the idea that firm and peer information might be complements.

3. Research setting, sample selection and research design

3.1. Research setting

We use two settings to test our predictions. Our main setting examines the public debt issuances of private firms before they begin complying with the SEC's ongoing disclosure requirements. There are two main reasons for this choice. First, private firms are not required to publicly disclose any information in the U.S. As a result, little is known about the operations and performance of private firms before they raise public capital.[7] However, once a private firm decides to raise public capital (debt or equity), it is required to comply with the SEC's mandatory disclosure requirements, such as 10-K, 10-Q and 8-K filings, which contain enormous amounts of information about firms and their operating environments. In addition, public capital is typically traded on secondary markets and the trading process transmits private information acquired by traders for their own speculative trading into market prices (Grossman and Stiglitz, 1980; Glosten and Milgrom, 1985; Kyle, 1985). The idea that market prices are a useful source of information goes back to Hayek (1945), who suggests that stock prices aggregate diverse pieces of information

[7] However, firms raising public debt are required to file three (two) years of audited income statements (balance sheets), and footnote disclosures as part of their capital raising prospectus, similar to firms issuing equity. Yet, the amount of firm information significantly increases subsequent to the bond issuance date. Appendix B provides descriptive statistics on the increase in the number of SEC filings, the level of disaggregation in the financial statements, and 10-K size around the bond issuance time. Further, as we discuss below, the trading process is an important source of firm information that does not exist prior to the bond issuance (and registration with the SEC).

from different traders that might even be informative to managers. As a result, the amount of publicly available firm-specific information about a private firm significantly increases following its public debt issuance, thereby serving as a powerful setting for testing the changing role of peer information in mitigating information asymmetry and adverse selection costs. Second, compared to the cost of capital measures available for equities, the debt market setting allows us to employ a relatively clean and observable measure of the cost of capital: bond yields. Easton and Monahan (2005) evaluate a number of proxies for the cost of equity capital and conclude that most available proxies are unreliable and typically do not have a positive association with realized returns, even after controlling for the bias and noise in returns.

Nevertheless, one potential drawback of the above setting is that there are relatively few instances of private firms raising public debt. Thus, our second setting focuses on firms raising equity capital for the first time via initial public offerings (IPOs). Similar to the public debt setting, IPO firms are relatively opaque prior to their capital raising event but their transparency significantly increases in the years following their IPO (Lang, 1991; Pastor and Veronesi, 2003). A benefit of this setting is that IPOs occur far more frequently compared to public debt issuances by private firms, and thus allows for greater generalizability of our inferences.

Figure 1 provides a graphical representation of our research setting. We expect peer information to be relatively constant around public capital issuances but the amount of firm information to significantly increase in the years following a firm's first public debt/equity offering (see Panel A). Our prediction (depicted in Panel B of the figure) is that the effect of peer information on the cost of capital (the "Peer Effect") is stronger when firm information is scarce and gradually declines as the amount of firm information increases. Our research setting then exploits cross-sectional variation in peer information across industries, as well as cross-sectional and time-series variation in firm information to isolate these effects. Appendixes A and B provide evidence supporting our premise that peer information is fairly stable over time and firm

information increases following firms' first capital raising events (Sections 3.4 and 3.5 discuss the evidence in the appendixes).

3.2. Sample selection

Our bond sample consists of private firms that issue public debt between 1995 and 2012. We begin our sample selection in 1995 because the process we use to identify private firms that have public bonds requires data from EDGAR; we end our sample in 2012 because our tests of changes in externalities over time uses three years of market data post-bond issuance and 2012 is the latest year with three years of subsequent market data. Following the procedure in Katz (2009), we construct a sample of 517 private firms that issued 1,044 public bonds between 1995 and 2012 (Table 1 provides a detailed outline of the sample selection procedure). Requiring observations to have non-missing data for the variables used in our analyses further reduces our sample to 316 private firms that issue 578 public bonds.[8]

We obtain daily bond yields from the Bloomberg terminal. Requiring Bloomberg data leaves us with a sample of 165 private firms and 278 bonds with traded yield data.[9] Since our primary interest is in firms raising capital for the first time (when firm information is scarce), we retain only those bonds issued within the first filing period of the firm. That is, we retain the bonds issued by a firm before its first annual filing with the SEC. This further reduces the sample to 165 private firms and 209 bonds. Finally, our tests of the temporal changes in the association between peer information and bond yields require three consecutive years of traded bond yields following the bond issuance. This requirement reduces our final sample to 210 bond-year observations and

[8] We supplement Compustat data by hand collecting data from Capital IQ for as many private firms as possible. Capital IQ obtains data on Rule 144A bond issuances from the bond prospectus issued at the time of SEC registration. In principle, these data should be on Compustat but they are missing in some instances, leading us to collect the missing data from Capital IQ.

[9] Data on bond yields are also available on TRACE. However, TRACE coverage begins only in 2005 and thus is not suitable for the analyses in this paper.

70 traded bonds. By restricting our sample to bonds with three consecutive years of yield data, we ensure that changes in the sample composition over time and survivorship biases do not affect our inferences. Table 1, Panel A outlines our sample selection procedure in detail and Table 2 shows the distribution of bonds by year and by industry.[10]

Table 1, Panel B explains the sample selection for our tests using IPOs. We collect a sample of IPOs from 1995 to 2009 from the Thomson Financial Securities Data Corporation (SDC) new issues database and follow Loughran and Ritter's (2004) sample selection criteria. Our IPO sample ends in 2009 because we use the marginal effective spread using TAQ data, and we could obtain this measure only through 2012. Since we require three years of spread data following the IPO, we end our IPO sample in 2009. For our SEO sample selection (for the quiet period analyses), we follow Shroff et al. (2013) and focus on the three year periods centered on the 2005 Securities Offering Reform (see Table 1, Panel C).

3.3. Research design

We estimate the following regression to test our prediction:

$$Bond\ Yield_{i,t+k} = \alpha_t + \alpha_{ind} + \beta_1\ Peer\ Info_{i,t+k-1} \times Year\ 1_{i,t} + \beta_2\ Peer\ Info_{i,t+k-1} \times Year\ 2_{i,t} + \beta_3\ Peer\ Info_{i,t+k-1} \times Year\ 3_{i,t} + \beta_4\ Year\ 1_{i,t} + \beta_5\ Year\ 2_{i,t} + \gamma' X + \epsilon_{i,t+k.} \quad (1)$$

where *i*, *t*, and *ind* index firms, years, and industries, respectively; α_t and α_{ind} are year and (1-digit NAICS) industry fixed effects. The subscript *k* equals zero, one or two and represents the number of years since the capital raising event. *Bond Yield* is the excess of a bond's yield-to-maturity over that of a matched Treasury bond with similar remaining time-to-maturity and coupon rate (Bharath et al., 2008; Mansi et al., 2011). We use the average traded yield in year '*t*' to compute *Bond Yield*$_t$. *Peer Info* is our proxy for peer information and *X* is a vector of control variables based on prior research (e.g., Bharath et al., 2008; Guedhami and Pittman, 2008;

[10] Table 2 shows that a large number of firms in our sample are in the manufacturing industry. Thus, we verify that our main inferences are valid in both manufacturing and non-manufacturing industries (untabulated).

Saunders and Steffen, 2011) and described in detail in the Variable Appendix. *Year 1* (*Year 2*, *Year 3*) is an indicator variable that equals one for the first (second, third) year following the bond issuance.[11] Note that these indicator variables are unique to the bond and thus are not subsumed by year fixed effects. The intuition for including them in our regressions is to capture systematic changes in bond yields in the years following its issuance (e.g., to capture any market timing associated with bond issuances). The main effect of *Year 3* cannot be included in the model because it is perfectly collinear with *Year 1* and *Year 2*. We cluster standard errors at the 3-digit NAICS industry level. All continuous variables are winsorized at the 2.5% and 97.5% levels.

Equation 1 is used to test the change in the effect of peer information on the cost of debt over time. The variables of interest in equation 1 are *Peer Info* × *Year 1*, *Peer Info* × *Year 2*, and *Peer Info* × *Year 3*, and our prediction is that the coefficient for the first variable will be larger than that for the second, which will be larger than that for the third (i.e., $|\beta_1| > |\beta_2| > |\beta_3|$), implying that the relation between *Peer Info* and the cost of capital decays over time. We also predict that the coefficient on *Peer Info* × *Year 1* will be negative, implying that an increase in *Peer Info* is associated with a decrease in the cost of capital in the first year of bond issuance.

3.4. Peer information

Drawing from the theoretical models on disclosure externalities (e.g., Dye, 1990; Admati and Pfleiderer, 2000), we construct our measure of peer information to capture: (i) the relevance of peer firms' disclosures to non-disclosing firms, and (ii) the amount of information disclosed by peer firms in aggregate as well as the amount of peer information produced by information intermediaries. Specifically, we measure peer information (*Peer Info*) by taking the average values of (i) the earnings synchronicity in an industry (*Earnings Sync*) (ii) the percentage of public firms

[11] Equation 1 is estimated such that we cannot include a main effect for *Peer Info*. Rather, the coefficient for *Peer Info* × *Year 1* should be interpreted as the *total* (not incremental) effect of *Peer Info* on *Bond Yield* in Year 1. *Peer Info* × *Year 2* and *Peer Info* × *Year 3* should be interpreted as total effects.

operating in the industry (*%Public*) and (iii) the average analyst coverage for firms in the industry (*#Analysts*).

We measure *Earnings Sync* as the average adjusted R-squared obtained from estimating time-series regressions of a firm's quarterly earnings on the aggregate quarterly earnings in its NAICS 3-digit industry. We use sixteen quarters of earnings data to estimate these regressions (the Variable Appendix provides a detailed description of the computation of this proxy). This proxy is based on the premise that a firm's earnings will be more synchronous with the earnings of other firms in the industry when they are affected by similar economic forces. Since a firm's earnings is not only affected by economic events idiosyncratic to a firm but also by industry- and market-wide economic events, greater earnings synchronicity in an industry indicates a greater influence of industry-/market-wide factors in determining a firm's earnings. Thus we use the average earnings synchronicity in an industry to capture the strength of the economic ties among firms operating in the industry and the relevance of peer disclosures to non-disclosing firms.

We measure *%Public* following Badertscher et al. (2013). We obtain data on the total number of firms within each 3-digit NAICS industry from the Census Bureau, and proxy for the number of public firms in each industry using Compustat. Thus, our definition of private firms is any firm that is not subject to SEC disclosure requirements, which we proxy for using firms not on Compustat. *%Public* is the number of public firms scaled by the total number of firms within an industry. The intuition behind this measure is that the composition of private and public firms in an industry affects the industry's information environment because public firms are subject to numerous mandatory disclosure requirements (and also have voluntary disclosure incentives) but private firms are not subject to such disclosure requirements (and do not share the same disclosure incentives). As a result, industries composed of a greater percentage of public firms have a richer

and more transparent information environment than industries composed of a smaller percentage of public firms.[12]

We measure *#Analysts* as the average number of analyst forecasts for each public firm-year in an NAICS 3-digit industry in a year. We focus on analyst forecasts (rather than a count of the number of analysts) to ensure that our analyst coverage proxy picks up only analysts that are "active" in their coverage of firms. Firms without coverage in I/B/E/S are assumed to have no analyst coverage (Badertscher et al., 2013; Shroff et al., 2014). Financial analysts serve a monitoring role where they demand disclosures from firms as well as an information role where they process and disseminate firm disclosures (see Beyer et al. 2010 for a literature review). Prior research finds that analyst coverage is associated with better earnings and disclosure quality (Lang and Lundholm, 1996; Lang et al., 2004), lower uncertainty (Zhang, 2006), greater industry-wide information transfer (Piotroski and Roulstone, 2004) and lower information asymmetry (Kelly and Ljungqvist, 2012). Prior research also finds that equity analysts help inform debt market participants and that equity analyst coverage affects the cost of debt. For example, Cheng and Subramanyam (2008) find that analyst coverage is positively associated with firms' credit ratings and Mansi et al. (2011) find that analyst earnings forecast characteristics affect firms' bond yields. Thus, greater analyst coverage of firms in an industry is likely to translate into a richer information environment for all firms in that industry.

We convert all three variables, *Earnings Sync*, *%Public*, and *#Analysts* into quintile ranks (re-scaled to range from zero to one) by year. We then average the quintile ranks of *Earnings Sync*, *%Public*, and *#Analysts* to construct our proxy for peer information (*Peer Info*).[13] Appendix A

[12] A potential concern with the manner in which we proxy for public firm presence is that many of the private firms used to compute *%Public* are likely to be small and thus individually irrelevant for the larger firms that raise public debt/equity. To mitigate the concern that some private firms are very small and thus not truly "peers" of the firms in our sample, we verify the robustness of our results to value weighting *%Public* by sales. We do not use value-weighted *%Public* in our tests tabulated in the paper because Census data on aggregate sales for private and public firms is available only beginning 1997 and is updated only once every five years. However, we find that the correlation between sales-weighted *%Public* and equal-weighted *%Public* is 0.65.

[13] Our main results are robust to using decile ranks and high/low indicator to transform the components of *Peer Info*.

provides descriptive information about *Peer Info* and its individual components. Panel A provides average values by 2-digit NAICS industries and Panel B tabulates pair-wise correlations. Panel C shows the transition matrix for *Peer Info* from year *t*-1 to year *t* and well as the first order autocorrelation. Consistent with our depiction of the research setting in Figure 1, we find that *Peer Info* is fairly stable over time with a first-order autocorrelation coefficient of 0.88. The transition matrix shows, for example, that 75% (0%) of the industries in the first quintile of *Peer Info* remain in (move to) the first (fifth) quintile of *Peer Info* from year *t*-1 to year *t*. Finally, Panel D provides the descriptions of industries with the highest and lowest values of *Peer Info* and its components. Industries such as metal manufacturing and air transportation have richer peer information environments. Examples of firms in such industries are: Alcoa Inc., American Airlines, and Delta. Industries such as repair and maintenance and social assistance have low levels of peer information. Examples of firms in these industries are: Monro Muffler Brake Inc. and Bright Horizons Family Solutions.

3.5. Firm information

We test our prediction using a sample of firms that raise public capital, assuming that the amount of firm information increases over time from a firm's first year of capital issuance to the subsequent years. To validate this assumption, we examine whether there is an increase in the number of SEC filings, the size of 10-K filings, and the level of disaggregation of accounting data in firms' income statements following firms' capital issuances. Fig. A in Appendix B plots the number of SEC filings of companies in the year before and the two years after their initial bond issuances and IPOs. Both figures show a steady increase in the amount of firm information over time following firms' capital raising events. Fig. B breaks down the trend in the number of SEC filings by category. The figure shows that the number of 10-Ks and 10-Qs are stable over time (as expected) and the number of 8-Ks and Form 3s/4s increase over time. Fig. C shows that there is a sharp increase in the 10-K file sizes following firms' bond and equity issuances, which we interpret

as firms providing more information. Fig. D plots the level of disaggregation in firms' income statements (following Chen et al., 2015) around the time of public capital issuances, which we refer to as *Firm Info*. Again, the figure shows a steady increase in the number of income statement line items disclosed following both initial bond issuances and IPOs. Finally, Fig. E in the appendix shows that the average analyst coverage received by firms over time significantly increases in both years following their IPOs. The private firms raising public debt (in our sample) do not receive any bond or equity analyst coverage.

Overall, the figures in Appendix B show that there is a steady increase in the amount of firm-specific information following a firm's initial bond issuance and IPO. It is also worth noting that aside from information disclosed by firms via SEC filings, the amount of firm-specific information also increases because the bonds/equity issued by firms are traded in secondary markets. Secondary market trading incentivizes traders to acquire private information that is eventually aggregated in the price of the security.

4. Results

4.1. Descriptive statistics

Table 3 presents the descriptive statistics for the variables used in our analyses. Panel A presents descriptive statistics for the sample of 70 bonds with three years of yield data in each of their first three years of public trading. The average (median) firm has total assets of $2.2 (0.8) billion, a leverage ratio (long-term debt scaled by total assets) of 0.65 (0.64), and a tangible asset ratio of 0.40 (0.29). Further, the average firm in our sample is fairly profitable with an EBITDA to sales ratio of 0.15 (0.13), and a growth rate of 9% (6%) in sales.[14] Finally, the average *Bond Yield* in our sample is 751 basis points over a matched sample of Treasury yields, the average bond has a maturity of 103 months, and the average loan amount is $341 million. These characteristics

[14] Katz (2009) and Badertscher et al. (2014) report descriptive statistics for ROA, not EBITDA over sales. The average ROA for our sample firms is 0.00 (untabulated), which is similar to the ROA reported in their papers.

are largely consistent with those found in prior research examining private firms with public debt, such as Katz (2009), Givoly et al. (2010), and Badertscher et al. (2014). Panel B presents the correlation matrix. The Pearson (Spearman) correlation between *Bond Yield* and *Peer Info* is -0.07 (-0.30), indicating that peer information is negatively associated with the cost of debt capital, consistent with our expectation.

4.2. Temporal changes in the relation between peer information and the cost of debt

Table 4 presents the results from regressions of bond yields on peer information and control variables (equation 1). To facilitate comparison of the coefficients, we standardize all the independent variables to have a mean of zero and a standard deviation of one. As a result, the estimated coefficients represent the change in bond yield for a standard deviation change in a given variable. We present results where we proxy for peer information using the combined proxy, *Peer Info*, as well as its three individual components – *Earnings Sync*, *%Public*, and *#Analysts*. The coefficients for *Peer Info Proxy* × *Year 1* is negative and statistically significant at 10% level or better irrespective of the proxy we use for peer information. This result is consistent with our prediction that peer information lowers the cost of capital of related firms in the industry when firm information is scarce. Importantly, the coefficient estimate for *Peer Info Proxy* monotonically decreases from *Year 1* to *Year 3* in all but one of the regressions presented. For example, the coefficient for *Peer Info* × *Year 1* (*Peer Info* × *Year 2*; *Peer Info* × *Year 3*) is -1.25 (-1.02, -0.33) in column 4. An F-test shows that the coefficient for *Peer Info* × *Year 1* and *Peer Info* × *Year 3* are statistically different than each other (*p*-value=0.08). These results are robust to controlling for the amount of information disclosed by the capital raising firm, which we proxy for using the level of disaggregation in a firm's income statements (*Firm Info*; Chen et al., 2015). The table also shows that the relation between *Firm Info* and *Bond Yield* is negative and significant, consistent with firm disclosures lowering the cost of capital. The coefficients for the other control variables

are also largely consistent with prior research (e.g., larger, more profitable and cash rich firms have lower yields).[15]

In terms of economic magnitude, the coefficient of -1.25 for *Peer Info* × *Year 1* implies that a one standard deviation increase in *Peer Info* is associated with a 125 basis point decrease in bond yield in the first year of its issuance (which equals 16.6% of the average yield in our sample), and this association fades to 33 basis points (or 4.4% of the average yield) by the third year following the bond issuance. To put these results in perspective, we note that firms in our sample are very opaque and risky. For example, the average bond spread in our sample of private firms is 751 basis points in excess of treasury, more than 85% of these bonds have below investment grade ratings and 9% are unrated. The economic magnitude of the peer-firm effect is smaller than that of size and profitability, and comparable to that of other variables such as cash holdings. Further, the economic magnitudes we document are similar to those in Badertscher et al. (2015), who show that the cost of debt for private firms issuing bonds is 147 basis points higher than for public firms issuing bonds.

To provide more granularity in our dynamic tests, we repeat our analyses using quarterly data. Figure 3 presents estimates of the relation between *Peer Info* and *Bond Yield* in the first 12 quarters following firms' bond issuances. Panel A shows that the relation between peer information and bond yields is initially negative and significant but approaches zero over the 12 quarters following a private firm's first bond issuance. This pattern is confirmed in Panel B, which plots the relation between *Peer Info* and *Bond Yield* along with a linear trend line.

Overall, the results in Table 4 and Figure 3 support our hypothesis that peer information affects the cost of capital when firm information is scarce but this effect declines as the amount of firm information increases. Since firm information significantly increases from the time a firm

[15] In untabulated analyses, we more explicitly examine the substitution between firm- and peer-information. Specifically, we examine whether the importance of firm information changes from *Year 1* to *Year 3* by allowing the coefficient for *Firm Info* to change over this period. We find weak evidence that the effect of *Firm Info* on *Bond Yield* increases over time, which is consistent with a substitutive relation between peer and firm information.

initially raises public debt to the subsequent years post-issuance (as discussed in Section 3.5), we attribute the decay in the relation between peer information and bond yields to the increase in firm information.

4.3. Cross-sectional tests of the relation between peer information and the cost of debt

Our hypothesis is that the decay in the relation between peer information and bond yields is due to increases in firm information over time. In this section, we conduct two cross-sectional tests to explore the validity of this inference. Specifically, we examine whether the relation between peer information and bond yields depends on the amount of firm information available at the issuance time and predict that peer information has a smaller effect on the cost of debt for the cross-section of firms with richer firm-specific information environments.

We exploit cross-sectional variation in two primary sources of firm information at the time of a private firm's bond issuance: (i) disclosures in firms' SEC filings and (ii) information aggregated in the firm's bond price via trading. Specifically, we partition firms into two groups based on the level of disaggregation in income statements at the time of the bond issuance, and the trading volume in a firm's bond in the first quarter of its issuance (based on the idea that bond prices are more informative when there is greater trading in the bond (Kyle, 1985)).

Table 5 presents the results from regressions estimating equation 1 after partitioning the sample into two groups based on amount of disclosure disaggregation at the time of bond issuance (Low vs. High *Firm Info*) and based on the volume of trade in the firm's bond in the first quarter of its issuance (Low vs. High *Trade Volume*). The table shows that the coefficient for *Peer Info* × *Year 1* is larger for firms with low disclosure disaggregation than for firms with high disclosure disaggregation (p-value=0.09). Similarly, the coefficient for *Peer Info* × *Year 1* is significantly larger for firms with low *Trade Volume* than that for firms with high *Trade Volume* (p-value<0.01). These results are consistent with our hypothesis that peer information has a large effect on adverse selection costs for firms with less firm information.

4.4. Endogeneity

There are two potential endogeneity concerns with our analyses thus far that could bias our inferences. First, since our proxy for peer information is constructed at the industry-year level, it is plausible that our results are affected by other industry characteristics that are correlated with the cost of debt. For example, Amiram et al. (2016) find that industry-level characteristics such as growth, sensitivity to external shocks and industry structure affect debt pricing through risk premiums. To the extent our proxy for peer information is correlated with such industry characteristics, our inferences could be biased. Second, since our research setting is firms raising capital (by issuing public debt/equity) and the timing of such capital raising events is not exogenous to the cost of capital, a potential concern with our analyses is that our proxy for peer information is correlated with the changes in the cost of capital or growth opportunities in the industry. If so, our results could be attributed to a time-varying industry characteristic rather than peer information.

We conduct three tests to mitigate these endogeneity concerns. First, we compare the effect of peer information on the cost of capital for our sample of private firms issuing bonds to a matched sample of public firms issuing bonds in the same industry and year. Second, we compare the effect of peer information on debt pricing for a subset of private firms in our sample that simultaneously raise both public debt (by issuing bonds) and private debt (from banks). Finally, we compare the effect of peer information on debt pricing of bonds when they are initially issued as a private placement to institutional investors under Rule 144A to when they are subsequently registered with the SEC and begin public trading. These tests are described in more detail below but the overarching theme in the following analyses is that we examine the effect of peer information on the cost of debt capital by (i) holding the industry and year constant, (ii) holding the firm and year constant, and (iii) holding the security issued by the firm constant. The takeaway from the tests

below is that peer information helps lower adverse selection costs when firm information is scarce but not in counterfactual samples where firm information is more abundant.

4.4.1. Peer information and cost of debt for public vs. private firms

We first compare the relation between peer information and the cost of debt for our sample of private firms that issue bonds to two matched samples of public firms that issue bonds. We predict that peer information has a weaker effect on the bond yields of public firms because they have significantly richer firm-specific information environments. Public firms are subject to significant mandatory disclosure requirements, they disclose information voluntarily, and are often followed by information intermediaries. As a result, peer information is likely to have a significantly smaller role in reducing the adverse selection costs for public firms, relative to private firms that raise public capital for the first time (because these private firms have no history of public disclosure as well as no secondary market trading in their securities).

To test our prediction, we identify two matched samples of public firms that also issue bonds. We use two matching techniques: entropy balanced matching and propensity score matching. Entropy balancing reweights observations in the control sample such that the moments of the distributions of the matching variables for the reweighted control sample are indistinguishable from the moments of the distributions of these variables for the treatment sample (Hainmueller, 2012; McMullin and Schonberger, 2015). That is, each observation in the control sample receives a weight such that the mean, variance, and skewness of the distribution for each matched variable in the control sample is similar to its counterpart in the treatment sample. Designating our sample of 70 private firm bonds as the treated group, we use entropy balancing to reweight a sample of 5,120 public firm bonds (the control group). We match firms on peer information (*Peer Info*), size (*Log(Assets)*), *Profitability* (measured as EBITDA scaled by sales), cash holdings (*Log(Cash)*), *Tangible Assets*, the loan amount (*Log(Loan Amount)*), loan maturity

(*Log(Maturity)*) and an index for the bond rating.[16] Our choice of matching variables follows prior research (e.g., Saunders and Steffen, 2011; Gao et al., 2013; Badertscher et al., 2015). Table 6, Panel A shows that the matching procedure results in the treatment and control groups having almost identical distributions for the matching variables.

We also employ propensity score matching to identify control firms that are observably similar to our treatment firms. We match each private firm bond issuance to a public firm bond issuance in the same 3-digit NAICS industry and year. That is, within each industry and year, we match our sample of private firms that issue bonds to public firms that issue bonds. To construct propensity scores, we estimate a probit regression where the dependent variable is an indicator equal to one (zero) for private (public) firms issuing bonds, and the independent variables are the same as that used for the entropy balancing approach (except for *Peer Info*, which is identical for treatment and control firms by construction because we estimate propensity scores *within each industry-year*). We use nearest neighbor matching within caliper (set at 0.10). Table 6, Panel B shows that the matching procedure results in no significant difference in any of the matching variables between the treatment and control samples.

Table 6, Panel C presents the regression results. The table shows that irrespective of the matching procedure employed, *Peer Info* is negatively associated with *Bond Yield* for the bonds issued by private firms. In contrast, *Peer Info* is not significantly associated with *Bond Yield* in the sample of public firms that issue bonds. For example, the coefficient for *Peer Info* is -0.89 in the sample of private firms issuing bonds, which contrasts with a coefficient of 0.08 for the entropy balanced control sample of public firms issuing bonds. Further, the difference in the coefficients for *Peer Info* for the private and public firm samples are statistically significant at the 5% level or better.

[16] We verify that our main results are robust to using entropy balanced matching within each industry and within each year. A drawback of this approach is that the control sample size is much smaller in these subgroups and thus the matching does not yield as close a distribution of the matching variables as in our main analyses.

4.4.2. Peer information and cost of public vs. private debt

Next, we examine whether peer information has a differential effect on the pricing of public and private debt. A defining feature of private debt markets is that lenders, typically commercial banks, have access to confidential information about borrowing firms because private debt markets are not subject to securities regulation. Lenders in the private debt market establish relationships with borrowing firms such that the lender gains extensive hard and soft information about the borrower's operations and develops private channels of communication with firms (see Boot (2000) for a review of the literature). For example, lenders gain access to private information about borrowers such as their financial projections, covenant compliance data, loan amendments, waiver requests, acquisition plans, as well as significant soft information related to the management teams' ability and trustworthiness. Given this characteristic of private debt markets, peer information is likely to be less relevant for the pricing of private loans when compared to public debt, which is based on arm's length transactions and features almost no private communication between bondholders and firms.

We predict that peer information lowers the cost of capital in public debt issuances but not private debt issuances, holding constant the firm and year. To test our prediction, we examine a subset of 50 firms in our sample of private firms that raise capital from the public and private debt markets in the same fiscal period. Following prior research (e.g., Bharath et al., 2008; Saunders and Steffen, 2011), we proxy for the cost of private debt using the all-in-spread-drawn (*Loan Spread*), which is the annual cost to a borrower for drawn funds, inclusive of all fees. The all-in-spread-drawn is defined as a mark-up over LIBOR. Table 7 presents the results from regressions of *Loan Spread* and *Bond Yield* on *Peer Info* for the subset of firms that raise both public and private debt. The table shows that *Peer Info* is not significantly associated with *Loan Spread* irrespective of whether we include or exclude year fixed effects. In contrast, *Peer Info* is negatively

associated with *Bond Yield* for the same sample of firm-years, in both regression specifications presented (i.e., including and excluding year fixed effects).

4.4.3. Peer information and cost of debt in the 144A market vs. secondary market

Finally, we exploit an institutional feature of the bond market setting to further examine whether the association between peer information and bond yields is indeed a function of the amount of firm information available to investors. Specifically, in 1990, the SEC approved Rule 144A, a reform allowing firms to raise capital from "Qualified Institutional Buyers" (QIBs) without requiring registration of the securities and compliance with SEC disclosure requirements. One of the primary benefits of this rule is that firms issuing securities under Rule 144A are not required to comply with the SEC's ongoing disclosure requirements. Since the rule's passage, the vast majority of bonds have been initially issued as private placements via Rule 144A to QIBs but are subsequently registered with the SEC to facilitate public trading (Fenn, 2000).[17] We find that our entire sample of bond issuances first takes place in the 144A market and are subsequently registered with the SEC (typically six months after the initial issuance; see Figure 2 for a timeline of events).[18]

We exploit this feature of the bond market setting by comparing the effect of peer information on bond yields when the bond is initially issued on the 144A market to when it is subsequently re-issued to the public following its SEC registration. Since firms issuing Rule 144A bonds are not required to comply with SEC disclosure requirements until they register with the SEC, the amount of firm information available to investors is largely unchanged between the date of issuance and the subsequent registration date. Thus, if the dynamic effect of peer information on bond yields is due to changes in the amount of firm information, as we hypothesize, we should

[17] For example, Fenn (2000) and Livingston and Zhou (2002) find that over 97% of their sample of U.S. 144A bond issues are accompanied by simultaneous application for SEC registration rights.

[18] Prior research (e.g., Livingston and Zhou, 2002) suggests that firms issue bonds under Rule 144A because it allows greater speed to market (relative to SEC registration) and lowers issue costs through a more streamlined placement to a smaller group of buyers.

not observe a decline in the relation between peer information and bond yields between the date of issuance on the 144A market and the time of SEC registration. In addition, only large financial institutions and accredited investors that are classified as QIBs can participate in the 144A market, and the SEC argues that such investors can "fend for themselves" in obtaining and processing information about a firm (Chaplinsky and Ramchand, 2004). Thus, adverse selection costs stemming from information asymmetry among market participants are likely to be lower in the 144A market. If so, peer information could even have a smaller effect on bond yields at the time of issuance on the 144A market compared to that in the public market post-SEC registration.

We present results from regressions testing the above prediction in Table 8. The first column in Table 8 shows that the coefficient for *Peer Info* × *Issue Date* is negative but statistically insignificant (coef.=-0.27; t-stat.=-0.76) but the coefficient for *Peer Info* × *Year 1* is negative and statistically significant (coef.=-1.07; t-stat.=-1.96).[19] These coefficients are consistent with both predictions discussed above: (i) peer information does not have a significant effect on bond yields at the time of the 144A issuance, which is consistent with the 144A market having lower adverse selection costs as a result of the sophistication and expertise of the investors in that market; and (ii) the relation between peer information and bond yields does not decay from the time of initial issuance on the 144A market to the subsequent re-issuance on the public market post-SEC registration, which we interpret to be because firm information does not increase from the time the bond is issued privately to the time of the SEC registration.

Column two in Table 8 expands our initial regression from the first column by including additional variables to capture the effect of *Peer Info* on *Bond Yield* in the second and third years after the bond is registered with the SEC. Consistent with our results up to this point, we find that: (i) peer information is not significantly associated with yields when the bond is issued on the 144A

[19] Trading data for 144A bonds are not publicly available until the bond's SEC registration. Thus, *Bond Yield* at the *Issue Date* is based on the initial price at which the bond is sold to QIBs rather than the average yield from the time of issuance until the time of SEC registration.

market, (ii) peer information is negatively associated with bond yields in the first year following the bond's SEC registration, and (iii) the effect of peer information on bond yields decays from the first to the third year following the bond's SEC registration (*p*-value=0.09).

4.5. Peer effects in the equity market

Thus far, our tests focus on the relation between peer information and the cost of capital in a bond market setting. To further validate our inferences and increase the generalizability of our results, we re-test our hypothesis using a sample of private firms raising public equity capital (IPO firms). As before, our analyses focus on private firms for whom the amount of firm information significantly increases subsequent to the IPO. We predict that peer information is negatively associated with the cost of equity capital in the first year following a firm's IPO and that this association fades over time as the amount of firm information increases. We proxy for the cost of capital using the effective bid-ask spread. Following prior research (e.g., Daske et al., 2013), we control for the natural log of assets, price, volume, and return variability. However, since we examine firms in the first year after their IPO, we control for the contemporaneous values of these variables rather than the lagged values. We also control for the amount of information disclosed by the capital raising firm using the Chen et al. (2015) proxy, *Firm Info*. Details on the construction of the variables can be found in the Variable Appendix.

Table 9 presents the results of our analyses. We find that the coefficient for *Peer Info* monotonically declines from *Year 1* to *Year 3*. For example, the coefficient for *Peer Info* × *Year 1* is negative and statistically significant at the 5% level (coef.=-0.05; t-stat.=-2.13) and larger than the coefficient for *Peer Info* × *Year 3* (coef.=-0.01; t-stat.=-0.40). These coefficients suggest that peer information helps lower bid-ask spreads in the initial year following an IPO but this effect declines over the subsequent two years.

Columns 2 to 5 in Table 9 present regressions where we partition the IPO sample into two groups based on the level of disaggregation in income statements at the time of the IPO (Low vs.

High *Firm Info*), and the trading volume in a firm's equity in the first quarter of its IPO (Low vs. High *Trade Volume*). These cross-sectional tests parallel the tests in the bond setting (which are tabulated in Table 5). Consistent with our prediction, we find that the coefficient for *Peer Info* × *Year 1* is larger for firms with low disclosure disaggregation than for firms with high disclosure disaggregation (*p*-value=0.06). Similarly, the coefficient for *Peer Info* × *Year 1* is larger (albeit insignificantly) for firms with low *Trade Volume* than that for firms with high *Trade Volume* (*p*-value=0.17). These results are consistent with our hypothesis that peer information has a large effect on adverse selection costs for firms with less firm information.

Figure 4 plots the coefficient estimates for *Peer Info* from regressions of *Bid-Ask Spread* using quarterly data following the IPO. Panel A shows that the negative relation between peer information and bid-ask spreads converges to zero over the 12 quarters following an IPO. As in the bond setting, this figure shows that during the first four quarters of year 1 (when firm information is poor) peer information has a negative effect on bid-ask spreads. In contrast, by the last four quarters in year 3 (when firm information is relatively richer) peer information is not associated with bid-ask spread. Panel B confirms this trend by plotting the relation between *Peer Info* and *Bid-Ask Spread* along with a linear trend line.

To mitigate concerns that the above results are confounded by unobserved industry conditions that affect our proxy for peer information and the cost of equity capital, we benchmark the association between peer information and the cost of capital (and its deterioration over time) for IPO firms that have relatively poor firm information environments to a matched sample of SEO firms that have significantly richer information environments. Similar to our analyses in the bond setting, we use both entropy balanced matching and propensity score matching. For the entropy balancing analyses, we match firms on *Peer Info*, *Log(Assets)*, *Log(Price)*, *Log(Volume)*, and *Log (Ret Variability)*, and for the propensity score matching analysis, we match IPO and SEO firms within each 3-digit NAICS industry and year on all the above variables except *Peer Info* (which is

identical for these firms because we match within industry-year). Table 10, Panel A shows that the IPO and entropy-matched SEO firms have almost identical means, variances, and skewness along the matching dimensions. Table 10, Panel B shows that the IPO and propensity-score matched SEO firms are statistically indistinguishable along all the matching dimensions, indicating that our matching procedure is effective.

Table 10, Panel C presents the regression results. We find that the coefficient for *Peer Info* in the IPO sample is negative and statistically significant in *Year 1* and gradually declines in *Year 2* and *Year 3* irrespective of our matching procedure. In contrast, we observe no such association for SEO firms following their offering in both matched samples. Specifically, the coefficients for all three variables *Peer Info* × *Year 1*, *Peer Info* × *Year 2*, and *Peer Info* × *Year 3* are statistically insignificant in both the entropy balanced control sample and propensity score matched control sample. We interpret these results are being consistent with our main hypothesis that peer information affects the cost of capital when firm information is scarce but this effect is lower when firm information is higher.

4.5.1. Peer information and the cost of capital during SEO quiet periods

Our tests thus far examine private firms around the time they raise public capital for the first time because in this setting, firms initially have poor firm information environments but are subsequently subject to additional disclosure requirements, leading to a large improvement in their firm-specific information environment. In our final analysis, we examine public firms that have rich firm information environments but a regulation causes a temporary reduction in the amount of firm-specific disclosure available to investors. In contrast to our previous settings, here we examine whether the importance of peer information *increases* as the amount of firm information *decreases*.

To test this prediction, we examine firms raising additional equity capital via an SEO that were subject to disclosure restrictions in the period immediately preceding their SEO. Specifically,

Congress included rules (known as gun-jumping laws) in Section 5(c) of the Securities Act of 1933 that significantly restricted firms' disclosure activity prior to an equity offering (i.e., during the quiet period). Quiet periods prior to SEOs naturally promote private information acquisition, leading to information asymmetry among investors. Prior research finds that SEO firms reduce their voluntary disclosures during the quiet period (e.g., Frankel et al., 1995; Lang and Lundholm, 2000; Shroff et al., 2013), which leads an increase in information asymmetry (Shroff et al., 2013).

Such SEO quiet periods are potentially one circumstance where the disclosures of peer firms can help lower the cost of capital for SEO firms that otherwise have rich firm-specific information environments. Specifically, we predict that the effect of peer information on SEO firms' bid-ask spreads will be stronger during the quiet period than during neighboring periods immediately before and after the quiet period. Further, we note that these quiet period disclosure restrictions were significantly relaxed in 2005 with the passage of the Securities Offering Reform (Shroff et al., 2013; Clinton et al., 2014). Thus, we predict that the association between peer information and bid-ask spreads during the quiet periods exists only for SEOs in the pre-Reform period and not for SEOs in the post-Reform period.

We define the SEO quiet period as the 180-day window leading up to the SEO announcement date. We compare the effect of peer information on bid-ask spreads during this 180-day window to their effect during neighboring windows – i.e., the 365 days leading up to the quiet period and the 365 days following the issuance date (see Figure 5). We collect a sample of 209 SEOs in the three years prior to the Reform and after SOX (i.e., 2003 to 2005), and 135 SEOs in three years after the Reform.

Table 11 presents the results from regressions of the average effective bid-ask spreads on peer information around the SEO quiet period. The first column shows the results prior to the 2005 Reform. The coefficient for *SEO Quiet Period* is positive and significant (coef.=0.075; t-stat=4.01), suggesting that bid-ask spreads increase by 10.3% during the quiet period (i.e., a 0.075

point increase from a mean value of 0.73), consistent with Shroff et al. (2013). Further, the coefficient for *Peer Info* is insignificant (coef.= 0.018; t-stat=0.87), suggesting that peer information does not affect the bid-ask spreads of SEO firms outside the SEO quiet period (which is similar to that observed in Table 10). Most importantly, the coefficient for *Peer Info* × *SEO Quiet Period* is negative and significant (coef.=-0.044; t-stat=-2.04), which is consistent with our prediction that peer information lowers the bid-ask spreads of SEO firms during their quiet periods when gun-jumping regulation restricted their disclosure.

To provide further support that the above results are not spurious, we repeat the above regression for the SEOs occurring in the three-year period following the 2005 Securities Offering Reform, which significantly relaxed quiet period disclosure restrictions. The second column in Table 11 shows that the coefficients for *SEO Quiet Period*, *Peer Info* and *Peer Info* × *SEO Quiet Period* are statistically insignificant. These coefficients imply that, after the 2005 Reform, bid-ask spreads of SEO firms do not increase during SEO quiet periods and that peer information is unrelated to the bid-ask spreads of SEO firms (both during SEO quiet periods and the neighboring periods). These results support our prediction that peer information lowers the cost of capital when there is a reduction in firm information.

5. Conclusion

In this paper, we study whether and when information about peer firms affects the cost of capital for related firms in an industry. Specifically, we predict that peer information has larger economic effects on a firm's cost of capital when firm information is scarce, but that these externalities decline as the amount of firm information increases and substitutes for peer information.

We test our predictions in two settings where firms raise public debt and equity capital for the first time. By doing so, our analyses focus on private firms that are opaque prior to their capital raising event and that gradually become more transparent as they comply with the SEC's ongoing

disclosure requirements and via the aggregation of information in their stock/bond price from the trading process. As a result, our setting helps us identify the changing role of peer information in mitigating information asymmetry and adverse selection costs as the amount of firm information increases.

We find that peer information has a strong effect on bond yields and bid-ask spreads in equity markets when firm information is scarce (e.g., when private firms issue public capital for the first time). However, this effect becomes less important over time as the amount of firm information available to investors increases. Our results are robust to a variety of tests and they do not hold in settings where firms have rich firm information environments. Nevertheless, we acknowledge that we cannot rule out the possibility that industry characteristics affect our inferences. This limitation is fundamental to our research question and we hope future research provides additional evidence of externalities from other settings.

Our findings contribute to the literature on the peer effects of disclosure. A novel insight from our paper is that such peer effects change over time. Specifically, peer information is particularly important when firm information is scarce, but its importance dissipates as firm information becomes more prevalent. To our knowledge, we are the first to make such an argument and provide supporting empirical evidence. Further, evidence of such dynamic externality effects informs the debate on the merits of financial reporting regulation because externalities are one of the primary rationales for disclosure regulation.

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Appendix A
Descriptive information on peer information (*Peer Info*)

This appendix provides a number of descriptive details about the properties of the peer information proxy and its components – earnings synchronicity (*Earnings Sync*), public presence (*%Public*), and analyst coverage (*#Analysts*). Panel A provides average values of our proxy for peer information and its components. Panel B tabulates the correlations between peer information and its components. Panel C shows the average persistence in peer information and its components. Finally, Panel D provides descriptions of industries with the highest and lowest values of peer information and its components.

Panel A: Average values of Peer Info and its components by 2-digit NAICS industries

NAICS 2-Digit Industry	***Industry Description***	***Peer Info***	***Earnings Sync***	***%Public***	***%Public (sales weighted)***	***#Analysts***
11	Agriculture, Forestry, Fishing and Hunting	0.520	0.510	0.02%	9.08%	3.24
21	Mining, Quarrying, and Oil and Gas Extraction	0.732	0.163	1.47%	66.02%	5.56
22	Utilities	0.746	0.164	1.66%	39.90%	4.70
23	Construction	0.306	0.124	0.03%	17.52%	2.96
31-33	Manufacturing	0.480	0.099	1.29%	57.00%	2.83
42	Wholesale Trade	0.345	0.123	0.06%	12.27%	3.26
44-45	Retail Trade	0.539	0.193	0.07%	47.41%	6.33
48-49	Transportation and Warehousing	0.658	0.311	1.62%	53.34%	4.96
51	Information	0.473	0.067	0.87%	65.20%	2.96
52	Finance and Insurance	0.511	0.102	2.31%	75.62%	2.46
53	Real Estate and Rental and Leasing	0.329	0.069	0.77%	31.70%	1.46
54	Professional, Scientific, and Technical Services	0.196	0.029	0.05%	23.94%	2.30
55	Management of Companies and Enterprises	…	…	…	…	…
56	Administrative and Support and Waste Management and Remediation Services	0.348	0.080	0.32%	32.77%	2.50
61	Educational Services	0.417	0.085	0.04%	19.27%	5.35
62	Health Care and Social Assistance	0.402	0.129	0.22%	9.78%	3.76
71	Arts, Entertainment, and Recreation	0.346	0.090	0.04%	12.14%	2.86
72	Accommodation and Food Services	0.402	0.078	0.07%	40.27%	4.45
81	Other Services (except Public Administration)	0.269	0.150	0.03%	13.60%	2.32
92	Public Administration	…	…	…	…	…
99	Unclassified	…	…	…	…	…
All		0.488	0.147	0.83%	46.26%	3.73

Notes: Industry descriptions are obtained from: http://www.census.gov/cgi-bin/sssd/naics/naicsrch?chart=2012. *%Public (sales weighted)* is the aggregate sales of all firms in Compustat divided by the aggregate sales of all firms in the Census, computed at the industry-year level. All other variable definitions are provided in the Variable Appendix.

Appendix A (continued)
Descriptive information on peer information (*Peer Info*)

Panel B: Pairwise correlations between Peer Info and its components

	Peer Info	*Earnings Sync*	*%Public*	*#Analysts*
Peer Info	…	0.61	0.41	0.71
Earnings Sync	0.61	…	-0.17	0.23
%Public	0.43	-0.18	…	-0.03
#Analysts	0.71	0.25	-0.04	…

Notes: This table presents the Spearman (Pearson) correlations between *Peer Info* and its individual components above (below) the diagonal. All variable definitions are provided in the Variable Appendix.

Panel C: Transition matrix of Peer Info from t-1 to t

		***Peer Info* in t**					
		Quintile 1	*Quintile 2*	*Quintile 3*	*Quintile 4*	*Quintile 5*	Sum
***Peer Info* in t-1**	*Quintile 1*	75%	18%	5%	2%	0%	100%
	Quintile 2	24%	40%	25%	9%	1%	100%
	Quintile 3	9%	20%	46%	21%	4%	100%
	Quintile 4	2%	10%	29%	39%	20%	100%
	Quintile 5	0%	1%	8%	19%	72%	100%

Notes: This table presents the transition matrix of *Peer Info* from year *t-1* to year *t*. In an untabulated test, we find that the average first order autocorrelation of the yearly values of *Peer Info* is 0.88. All variable definitions are provided in the Variable Appendix.

Appendix A (continued)
Descriptive information on peer information (*Peer Info*)

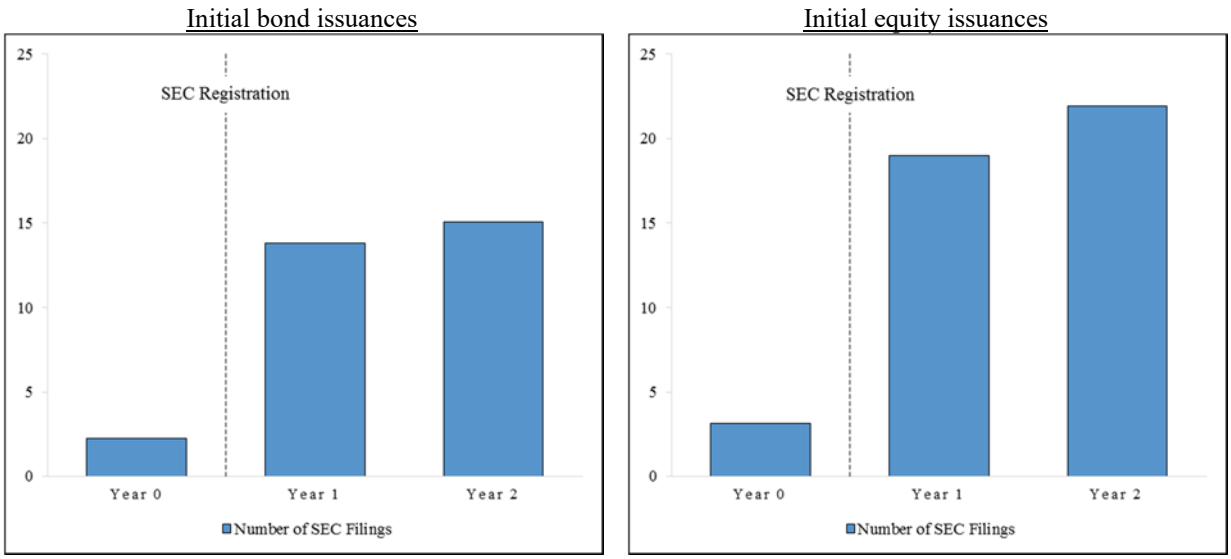
Panel D: Industries with the highest and lowest values of Peer Info and its components along with examples of companies in each industry

Disclosure Proxy	Industry Description	Examples of Companies in the Industry
Descriptive Information for Top Three Industries by Peer Info and its Components		
Peer Info	Primary metal manufacturing	Alcoa Inc; United States Steel Corp; Nucor Corp
	Air transportation	American Airlines Group Inc; Delta Air Lines Inc; Southwest Airlines Co
	Utilities	Southern California Edison; Consolidated Edison Inc; American Water Co
Earnings Sync	Air transportation	American Airlines Group Inc; Delta Air Lines Inc; Southwest Airlines Co
	Transit and ground passenger transportation	Landstar System Inc; Old Dominion Freight Line Inc; Knight Transportation Inc
	Building material and garden equipment and supplies dealers	Home Depot Inc; Lowe's Companies Inc; Fastenal Co
%Public	Pipeline transportation	Energy Transfer Equity; Sunoco Logistics Partners; Targa Resources Corp
	Chemical manufacturing	Procter & Gamble Co; Pfizer Inc; Dow Chemical
	Computer and electronic product manufacturing	Apple Inc; Intel Corp; Cisco Systems Inc
#Analysts	Furniture and home furnishing stores	Bed Bath & Beyond Inc; Williams-Sonoma Inc; Pier 1 Imports Inc
	Support activities for mining	Halliburton Co; Baker Hughes Inc; Oceaneering International
	Petroleum and coal products manufacturing	Exxon Mobil Corp; Chevron Corp; Phillips 66
Descriptive Information for Bottom Three Industries by Peer Info and its Components		
Peer Info	Repair and maintenance	Monro Muffler Brake Inc; Car Charging Group Inc; Midas Inc
	Social assistance	Bright Horizons Family Solution; National Mentor Holdings Inc; American Learning Corp
	Professional, scientific, and technical services	IBM Corp; Electronic Data Systems Corp; Lucent Technologies Inc
Earnings Sync	Lessors of nonfinancial intangible assets	Dolby Laboratories Inc; Interdigital Inc; Iconic Brand Group Inc
	Professional, scientific, and technical services	IBM Corp; Electronic Data Systems Corp; Lucent Technologies Inc
	Food services and drinking places	McDonald's Corp; Yum Brands Inc; Aramark Corp
%Public	Gasoline stations	Murphy USA Inc; CST Brands Inc; Clean Energy Fuels Corp
	Social assistance	Bright Horizons Family Solution; National Mentor Holdings Inc; American Learning Corp
	Miscellaneous store retailers	Staples Inc; Office Depot Inc; 1-800-Flowers.com
#Analysts	Electrical equipment, appliance, and computer manufacturing	Rockwell Automation; HRG Group Inc; Hubbell Inc
	Warehousing and storage	Iron Mountain Inc; Capital Properties Inc; Total Logistics Inc
	Textile mills	Unifi Inc; International Textile Group Inc; Culp Inc

Appendix B
Trend in firm information environments around initial bond and equity issuances

This appendix plots changes in the amount of information about a firm following its capital raising event. In all figures, *Year 0* captures the average amount of firm information disclosed from 365 days before SEC registration up until (and including) the date of SEC registration. Similarly, period *Year 1* (*Year 2*) reflects the average amount of firm information disclosed from the date of SEC registration up until 365 (730) days following the SEC registration date. Fig. A plots the number of SEC filings in EDGAR in the year before and the two years following a firm's capital raising event. Fig. B plots the trend in the types of SEC filings (10-Ks, 10-Qs, 8-Ks, Form 3, 4, Miscellaneous filings such as Definitive Proxy and Information Statements (DEF 14A, 14C), Schedules filed to report acquisition of beneficial ownership of more than 5% of a class of equity securities (SC 13D), and Registration Statements for securities to be offered to employees pursuant to employee benefit plans (S-8s), and Form 424, S-1s, & S-4s) in EDGAR in the year before and the two years following a firm's capital raising event. Fig. C plots the firms' 10-K document file sizes in the year before and the two years following the firms' registration with the SEC, following Loughran and McDonald (2014). Fig. D plots the level of disaggregation in firms' income statements, *Firm Info*, following Chen et al. (2015) in the year before and the two years following a firm's capital raising event. Fig. E plots the level of equity analyst coverage in the year before and the two years following a firm's IPO. None of the private firms issuing bonds in our sample receive (bond or equity) analyst coverage.

Fig. A: Number of SEC filings in the year before and two years after bond issuances (left) and IPOs (right)



Appendix B (continued)
Trend in firm information environments around initial bond and equity issuances

Fig. B: Types of SEC filings in the year before and two years after bond issuances (left) and IPOs (right)

Initial bond issuances

Initial equity issuances

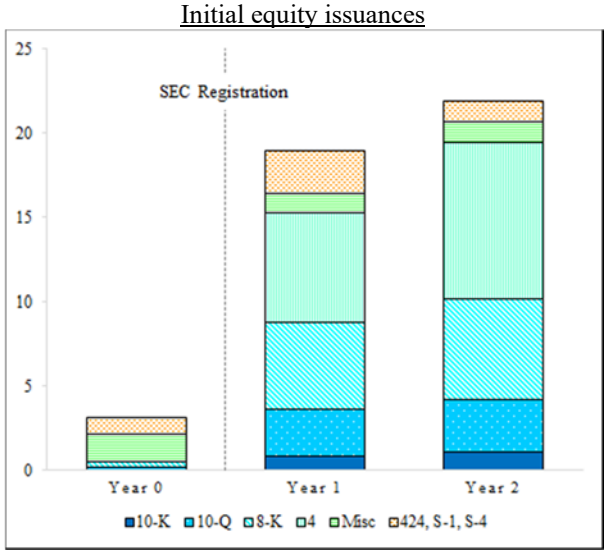
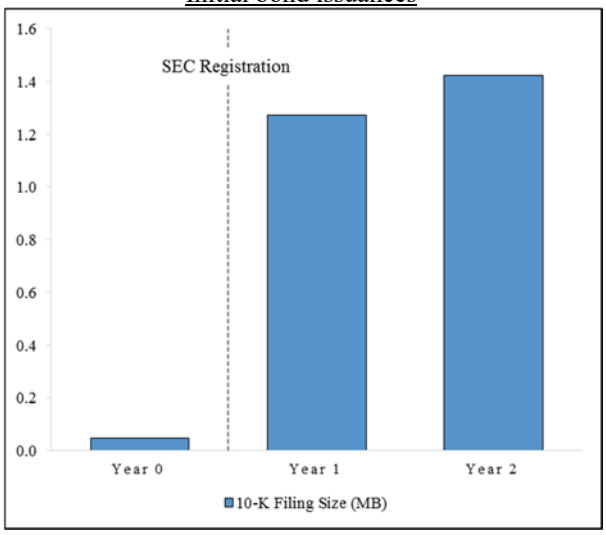
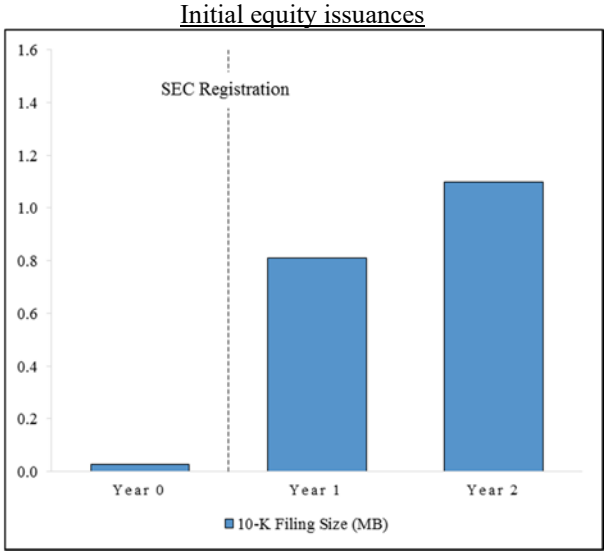


Fig. C: Size of 10-Ks filed in the year before and two years after bond issuances (left) and IPOs (right)

Initial bond issuances



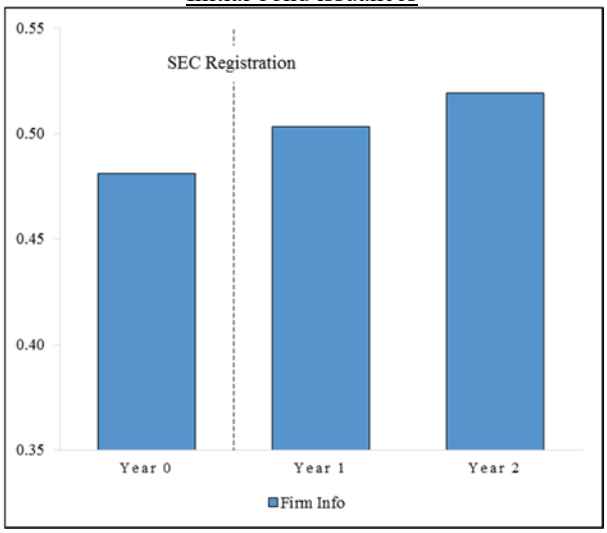
Initial equity issuances



Appendix B (continued)
Trend in firm information environments around initial bond and equity issuances

Fig. D: Level of disaggregation in firms' income statements (Firm Info) in the year before and two years after bond issuances (left) and IPOs (right)

Initial bond issuances



Initial equity issuances

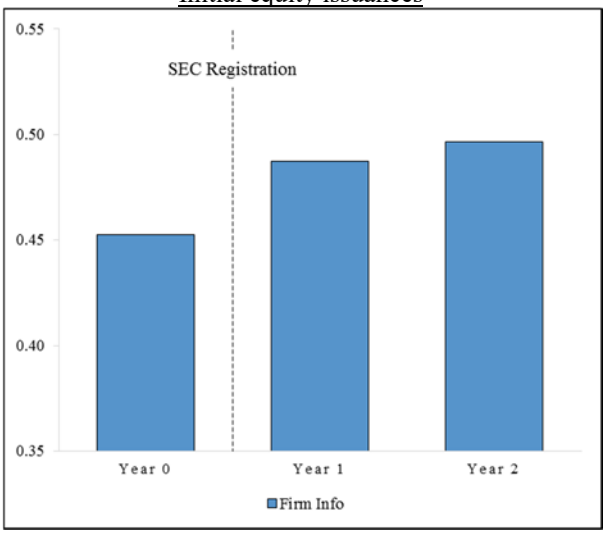
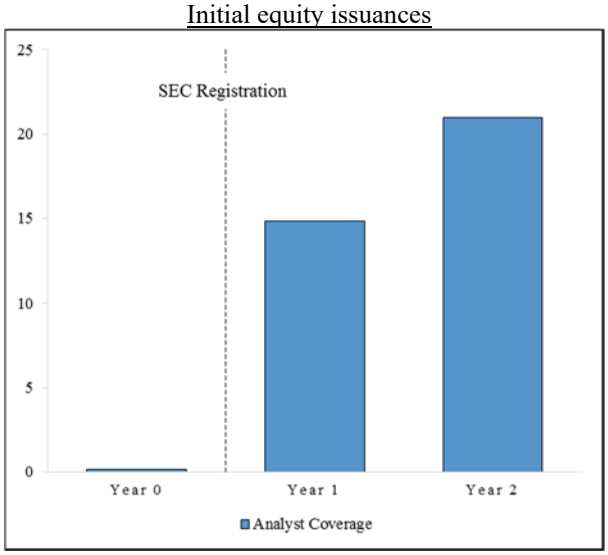


Fig. E: Analyst coverage in the year before and two years after equity IPOs

The private firms with publicly traded bonds in our sample do not receive any analyst coverage

Initial equity issuances



Variable Appendix
Detailed definitions of all variables used in our empirical analyses

This table provides a detailed description of the procedures used to compute each variable used in our analyses. Our data are obtained either through Compustat, CRSP, SDC Platinum, I/B/E/S, Mergent FISD, DealScan, TAQ, Capital IQ, or the Bloomberg database. All continuous variables are winsorized at 2.5% and 97.5% of the distribution. The variables are listed according to alphabetical order.

Variable	Definition
#Analysts	The average number of analyst forecasts (data NUMEST) per firm within each 3-digit NAICS industry-year, drawn from I/B/E/S. We convert this value into a quintile rank, comparing *#Analysts* across all 3-digit NAICS industries within each year.
Bid-Ask Spread	The relative effective spread, computed using intraday trades and quotes from the TAQ database similar to Ng et al. (2008). We compute each effective spread by matching each intraday trade to an intraday quote using the Lee and Ready (1991) algorithm. For each trade-matched quote at time *s* for firm *i*, we compute the intraday relative effective spread, $IntraESpread_{i,s}$, as: $$IntraESpread_{i,s} = \frac{2\left\lvert trade\ price_{i,s} - \frac{bid\ price_{i,s} + ask\ price_{i,s}}{2}\right\rvert}{trade\ price_{i,s}}$$ where $ask\ price_{i,s}$ ($bid\ price_{i,s}$) is the ask price (bid price) for the quote at time *s* for firm *i*, and $trade\ price_{i,s}$ is the trade price at which the trade is executed at time *s* for firm *i*. We compute the daily relative effective spreads by size-weighting the intraday relative effective spreads.
Bond Rating Index	A variable set equal to zero if the bond is not rated, equal to one if the bond has a below investment grade rating, and equal to two if the bond has an investment grade rating. Ratings are drawn from Mergent FISD (data RATING) and include ratings from Standard & Poor's, Moody's Investors Services, and Fitch Ratings. We convert each rating into a numerical score from 1 to 22 (Avramov et al., 2007). Numerical ratings of 10 or below are considered investment grade, and ratings of 11 or higher are labeled below investment grade. For bonds with multiple ratings, we equally weight the numerical ratings and label the bond as investment grade if the weighted average is 10 or below, and below investment grade otherwise.
Bond Yield	The excess of the bond's yield-to-maturity over that of a matched Treasury bond that has (1) a remaining time-to-maturity of within six months of the remaining time-to-maturity of the sample bond, and (2) a coupon rate closest to that of the sample bond. Bond maturity (data MATURITY) and coupon rate (data COUPON) are drawn from Mergent FISD. Daily bond yields are collected from the Bloomberg database.
Earnings Sync	*Earnings Sync* is the synchronicity in earnings of firms within each 3-digit NAICS industry. Every quarter, we compute each firm's quarterly ROA (data IBQ scaled by data ATQ) as well as the aggregate quarterly ROA for all firms in the same 3-digit NAICS industry (the sum of IBQ scaled by the sum of ATQ for all firms in the same 3-digit NAICS industry). Using sixteen quarters of earnings data (and requiring a minimum of eight quarters), we estimate the following model: $$ROA_{i,m,t} = \alpha + \beta_1 ROA_{m,t} + \epsilon_{i,m,t}$$ where *i* , *m*, and *t* represent firm *i* operating in industry *m*, in year *t*. $ROA_{i,m,t}$ is firm *i*'s quarterly earnings scaled by assets and $ROA_{m,t}$, is industry *m*'s aggregate quarterly earnings scaled by aggregate assets. We retain the adjusted r-squared from this regression for each firm *i*, and compute *Earnings Sync* as the mean adjusted r-squared for all firm *i* in industry *m* (in year *t*). This provides a measure of the average earnings synchronicity within each industry-year. We convert this value into a quintile rank by year to construct the variable *Earnings Sync*.

Firm Info	A measure of disaggregation of line items within a firm's income statement, calculated following Chen et al. (2015). It is measured as of the fiscal year preceding the dependent variable measurement date.
Growth	The percentage change in sales (data SALE) as of the fiscal year preceding the dependent variable measurement date.
Issue Date	An indicator variable that equals one for the date on which the bond is placed with Qualified Institutional Buyers under Rule 144A.
Leverage	The ratio of long-term debt (data DLTT) to total assets (data AT) as of the fiscal year preceding the dependent variable measurement date.
Loan Spread	The all-in-spread-drawn (data AllInDrawn) from DealScan. All-in-spread-drawn is defined as the amount the borrower pays in basis points over the London Interbank Borrowing Rate (LIBOR) or the LIBOR equivalent for each dollar drawn down.
Log(Assets)	The natural log of a company's total assets (data AT). It is measured as of the fiscal year preceding the dependent variable measurement date.
Log(Cash)	The natural log of a company's cash and cash equivalents (data CHE). It is measured as of the fiscal year preceding the dependent variable measurement date.
Log(Int. Coverage)	The natural log of one plus a company's interest coverage ratio. The interest coverage ratio is the ratio of earnings before interest and taxes (data EBIT) to interest expense (data XINT) if EBIT is greater than zero. Otherwise the ratio is set equal to zero. It is measured as of the fiscal year preceding the dependent variable measurement date.
Log(Loan Amount)	The natural log of one plus the bond (loan) offering amount obtained from Mergent FISD (DealScan). Item OFFERING_AMT (FacilityAmt) in Mergent FISD (DealScan).
Log(Maturity)	The natural log of one plus the bond (loan) maturity obtained from Mergent FISD (DealScan), measured in months. Item MATURITY (Maturity) in Mergent FISD (DealScan).
Log(Price)	The natural log of the stock price at the end of the fiscal year (data PRCC_F).
Log(Ret Variability)	The natural log of the stock's average monthly volatility over the year.
Log(Volume)	The natural log of the stock's average monthly trading volume over the year.
Peer Info	Our measure of peer information, measured at the 3-digit NAICS industry-year level. Computed as the sum of the *Earnings Sync* quintile rank, the *%Public* quintile rank, and the *#Analysts* quintile rank, and scaled to be between zero and one.
Profitability	The ratio of earnings before interest, taxes, depreciation, and amortization (data EBITDA) to sales (data SALE). It is measured as of the fiscal year preceding the dependent variable measurement date.
%Public	The percentage of public firms within each 3-digit NAICS industry-year following Badertscher et al. (2013). Computed as the ratio of the number of public firms to the number of total firms (public plus private) within each industry. We proxy for the number of public firms in the industry using the number of firms in Compustat, and we obtain data on the total number of firms operating in the industry from the Census Bureau. During our sample period, the Census Bureau data is available for 1992, and then annually beginning in 1997. For years 1993 through 1996, we use the values available in 1992 and 1997 to interpolate the number of total firms for the intervening years. For years 1998 forward, the census data is available by 6-digit NAICS industry, but for years 1992 and 1997 the census data is grouped by 4-digit SIC industry. Thus for years 1992 to 1997, we first convert the census data from 4-digit SIC industries to 6-digit NAICS industries using the SIC-to-NAICS mapping file provided on the Census Bureau website. After constructing the proportion of

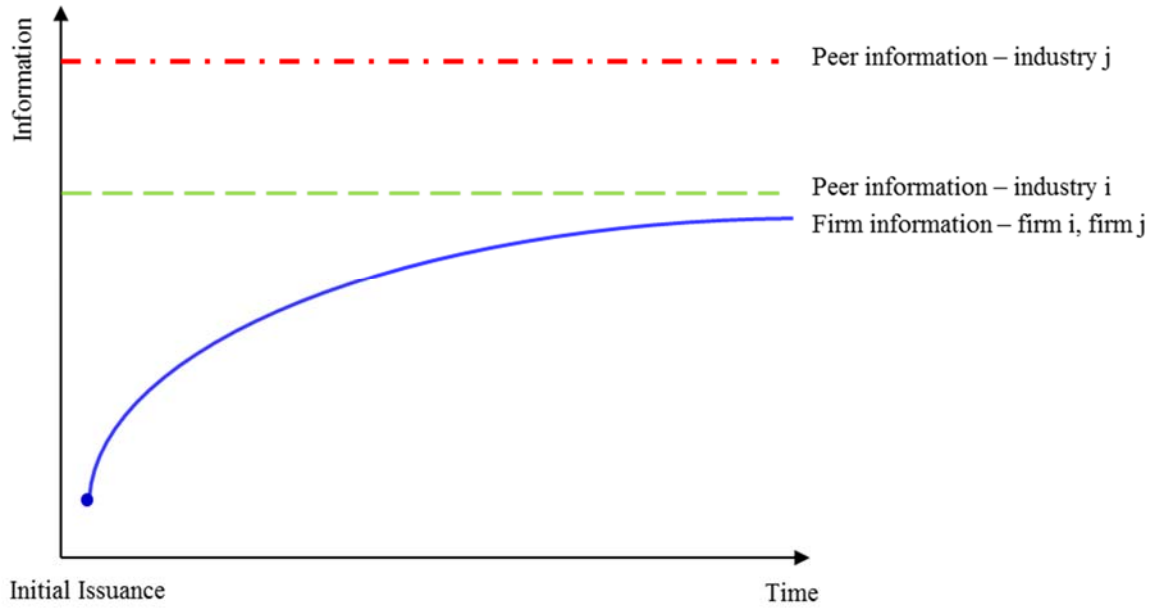
	public firms within each 3-digit NAICS industry-year (*%Public*), we convert this value into a quintile rank by comparing this proportion across industries within each year.
SEO Quiet Period	An indicator variable that equals one for the 180-day window leading up to the SEO announcement date (known as the SEO quiet period). Equal to zero for the surrounding windows – the 365 days prior to the quiet period and the 365 days following the issuance date (Shroff et al., 2013).
Tangible Assets	Ratio of tangible fixed assets (data PPENT) to lagged total assets (data AT). It is measured as of the fiscal year preceding the dependent variable measurement date.
Trade Volume	The number of days on which the bond is traded during the first quarter following SEC registration (see Table 5). For the IPO test (in Table 9), the total number of shares traded during the first quarter following the IPO.
Year 1	An indicator variable that equals one for the 365 days following the date of SEC registration (or IPO/SEO date in the case of the IPO and SEO tests), and zero otherwise.
Year 2	An indicator variable that equals one for the period of 366 to 730 days following the date of SEC registration (or IPO/SEO date in the case of the IPO and SEO tests), and zero otherwise.
Year 3	An indicator variable that equals one for the period of 731 to 1095 days following the date of SEC registration (or IPO/SEO date in the case of the IPO and SEO tests), and zero otherwise.

Figure 1
Graphical illustration of our research setting

The graph in Panel A below shows that industry j has a richer peer information environment than industry i, and the peer information environment is constant over time within an industry. Firm i and firm j operate in industries i and j, respectively. The graph shows that both firms have less firm information at the time of their initial capital issuance (debt/equity), and experience a rapid increase in the amount of firm information over time.

The graph in Panel B below depicts our prediction of the effect of peer information on the cost of capital. Upon the initial issuance of debt/equity when firm information is scarce, peer information will have a larger effect on the cost of capital and this effect decays over time. In the figure below, firm j would benefit from a lower cost of capital than firm i because peer information is richer in industry j. The graphs show that our identification comes from cross-sectional variation in peer information across industries, and time-series and cross-sectional variation in the amount of firm information.

Panel A: Graphical depiction of our research setting



Panel B: Graphical depiction of our hypothesis

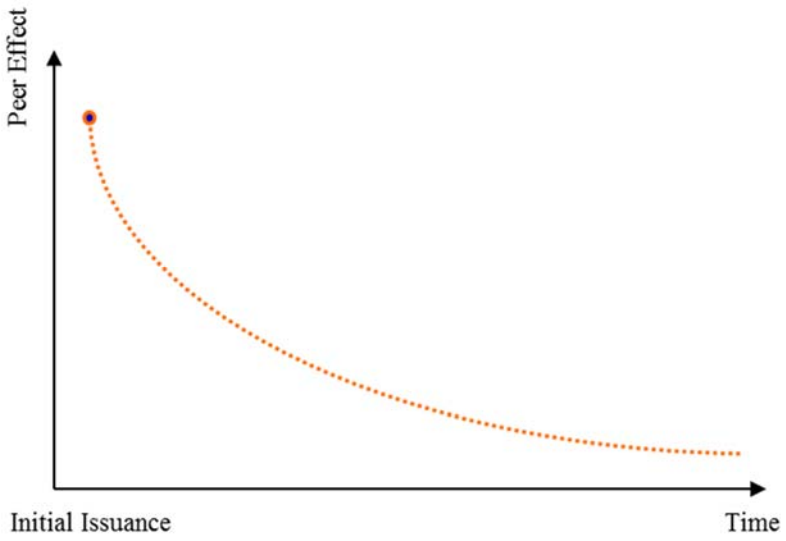
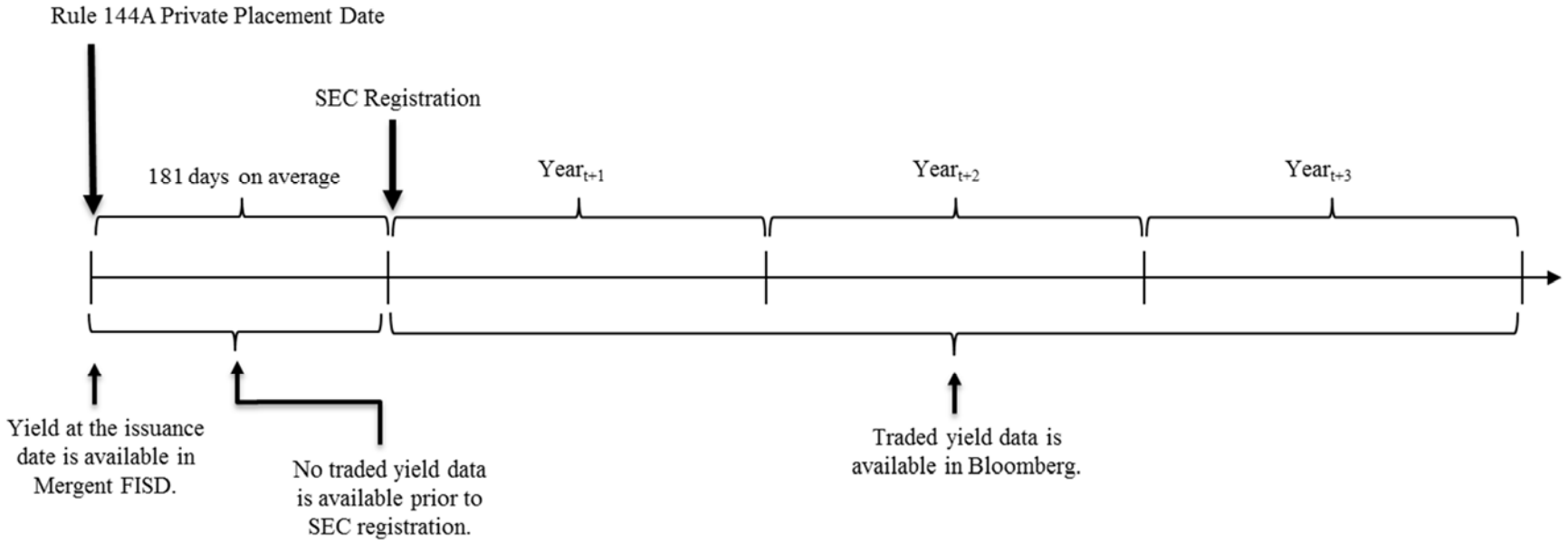


Figure 2
Bond issuance timeline

The figure below depicts the timeline of bond issuance for our sample. Each bond is first issued in the 144A market and privately placed with Qualified Institutional Buyers (QIBs) without registration of the securities or compliance with SEC disclosure requirements. Each bond is subsequently registered with the SEC, a process which typically takes six months. During this time, the trading of such bonds is restricted to QIBs, and traded yield data is not publicly available. Following SEC registration, the bond is re-issued to the public, at which point traded yields become available. On the date of the 144A private placement, each bond's initial yield is available in the Mergent FISD database. To our knowledge, traded yield data is not available between the 144A issuance date and the date of SEC registration. Following SEC registration, traded yields are available in the Bloomberg database. Following SEC registration, we measure our dependent variable as the average traded yield of each bond over years *t+1*, *t+2*, and *t+3*, where *t* is the SEC registration date. Control variables are measured as of the firm's most recent fiscal year-end prior to the start of each year in which the bond yield is measured.



Time Periods for Tables:

Tables 4 & 5 – From SEC Registration to end of Year$_{t+3}$

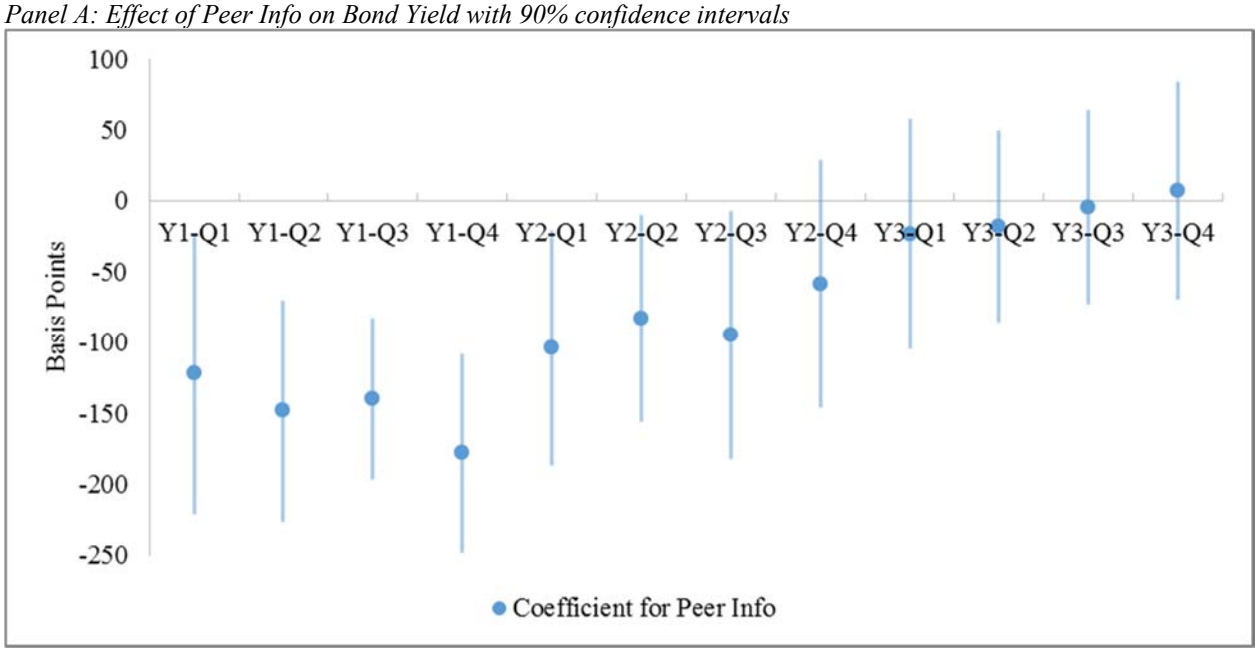
Tables 6 & 7 – From SEC Registration to end of Year$_{t+1}$

Table 8 – From Rule 144A Private Placement Date to end of Year$_{t+3}$

Figure 3
Effect of peer information on bond yield in the first twelve quarters after bond issuance

In the figure below, the x-axis represents time (number of quarters since a bond's registration with the SEC) and the y-axis represents the marginal effect of *Peer Info* on *Bond Yield* in basis points (the regression coefficients from Eq. (2), with the data broken down into quarters multiplied by 100). The sample consists of 70 bonds issued by private firms that are traded over the course of 12 quarters. Quarterly bond yields are calculated as the average yield during the quarter. In cases where the bond is not traded during a quarter, the average yield for the quarter is assumed to be the most recent observable traded yield. The figure in Panel A plots the two-tailed 90% confidence interval around each point estimate of the relation between peer-firm/firm information and bond yields.

Panel A: Effect of Peer Info on Bond Yield with 90% confidence intervals



Panel B: Effect of Peer Info on Bond Yield with linear trend line

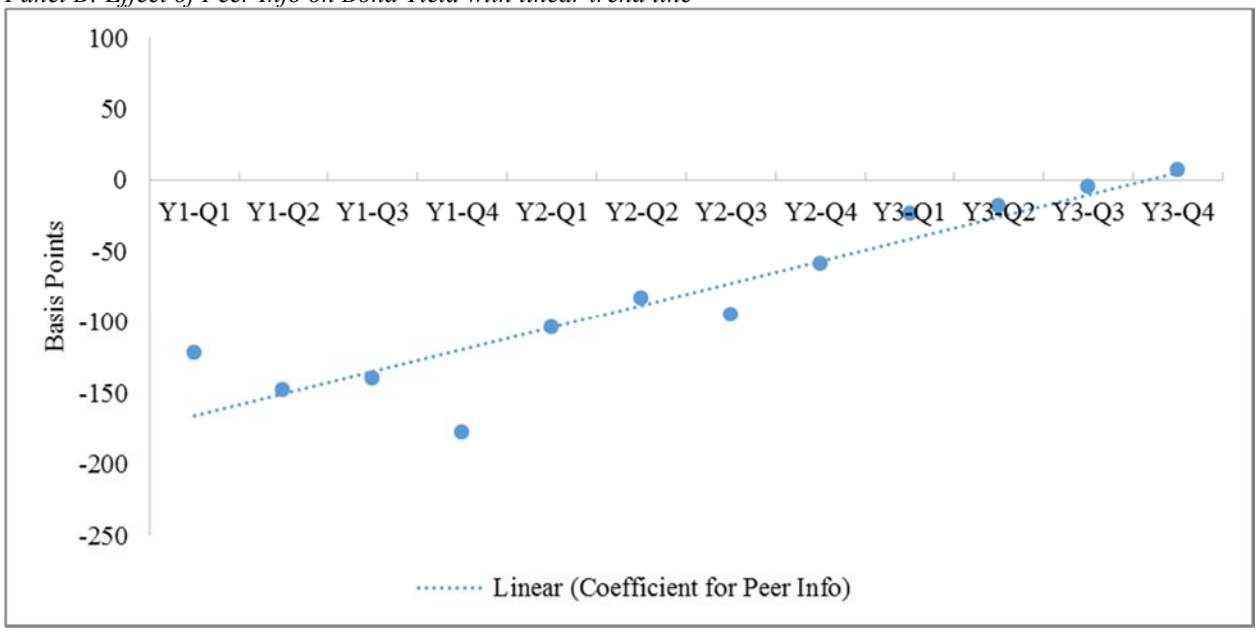
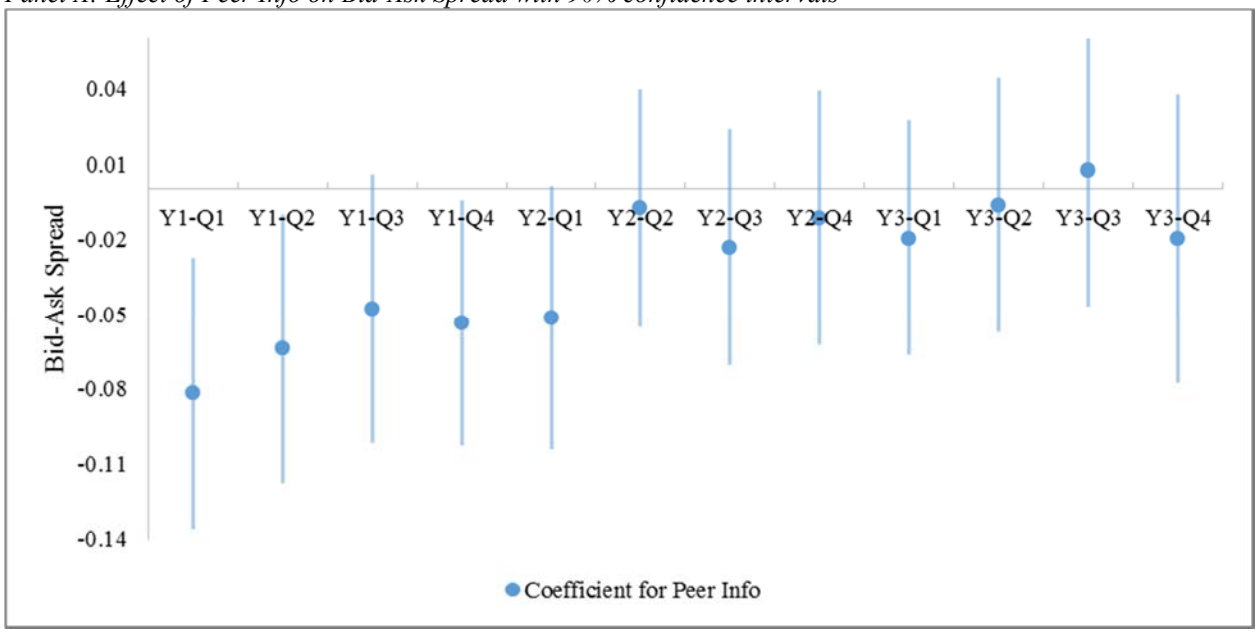


Figure 4
Effect of peer-firm and firm information on bid-ask spreads in the first twelve quarters after IPO

In the figure below, the x-axis represents time (number of quarters since IPO) and the y-axis represents the marginal effect of *Peer Info* on *Bid-Ask Spread* (with the data broken down into quarters). The sample consists of 904 IPOs, and the quarterly bid-ask spreads are calculated as the average spread during the quarter. The figure in Panel A plots the two-tailed 90% confidence interval around each point estimate of the relation between peer-firm/firm information and bid-ask spreads.

Panel A: Effect of Peer Info on Bid-Ask Spread with 90% confidence intervals



Panel B: Effect of Peer Info on Bid-Ask Spread with linear trend line

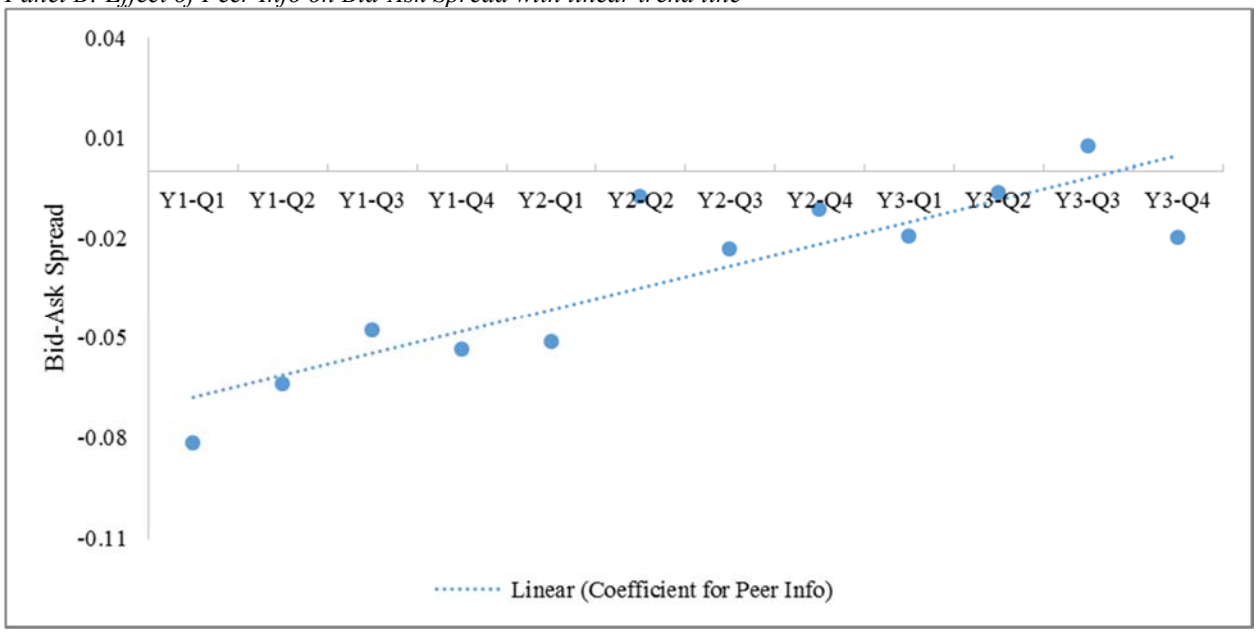


Figure 5
SEO quiet period timeline

In the figure below, *SEO Quiet Period* = 1 for the 180-day pre-SEO window, and *SEO Quiet Period* = 0 for the two neighboring, 365-day windows. This timeline is employed for the analyses in Table 11.

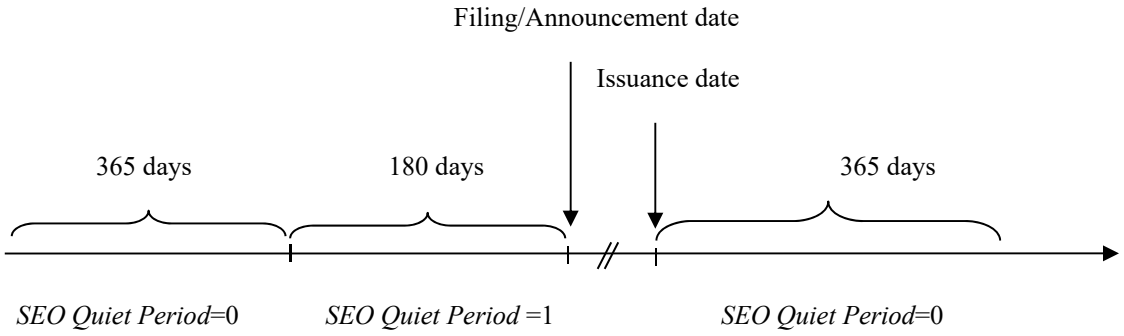


Table 1
Sample selection

Panel A: Private Firms Issuing Public Debt

Description	Table	No. of Firms	No. of Bonds
"Potential" private firms with public debt from 1995 to 2012 (Compustat)*		2,158	
Eliminate firms that:			
1) Are only missing stock price because they are pre-IPO years**		(894)	
2) Are LPs, holding companies of public firms, or subsidiaries of public firms		(350)	
"Potential" private firms with public debt		914	
Fixed-rate, nonconvertible, corporate debentures issued within the US from 1995 to 2012			10,822
Match "potential" private firms to public bond sample		(397)	(9,778)
Private firms with public bonds		517	1,044
Eliminate firms that:			
1) Are missing required data on Compustat or Capital IQ		(201)	(466)
2) Have bonds that are missing daily trading data in Bloomberg		(151)	(300)
Subtotal of private firms with traded public bonds		165	278
Eliminate bonds that:			
Are issued after the first filing period of the firm		(0)	(69)
Private firm bonds issued in the firm's first filing period		165	209
Eliminate bonds missing three consecutive years of trading data in Bloomberg		(106)	(139)
Private firms with three years of trading data in Bloomberg		59	70
Private firms with three years of trading data in Bloomberg × number of years	Tables 4, 5, 6, 7, 8	59	210
Private firms propensity score matched public firms issuing bonds	Table 6	54	64

*Following Katz (2009), the sample of "potential" private firms with public debt consists of all firms on Compustat from 1995 to 2012 that satisfy the following criteria:
(1) the firm's stock price at fiscal year-end is missing,
(2) the firm has total debt as well as total revenue exceeding $1 million,
(3) the firm is a domestic company,
(4) the firm is not a financial institution or in a regulated industry (SIC codes 6000-6999 and 4800-4900).
**Compustat reports three years of historical information for public firms that file for initial public offering. This information is taken from the prospectus.

Panel B: Private Firms Issuing Public Equity

Description	Table	No. of Firms
IPOs in SDC matched to Compustat from 1995-2009*		1,749
Eliminate IPOs unable to match to CRSP and TAQ		(502)
Eliminate IPOs missing three consecutive years of Compustat, CRSP, or TAQ data		(343)
IPOs with three years of bid-ask spreads	Table 9	904
Eliminate IPOs missing a matched SEO in the same industry-year		(507)
IPOs with matched SEO in same industry-year	Table 10	397

*Note that we end the IPO sample in 2009 due to the need for 3 subsequent years of bid-ask spreads, and the fact that the TAQ data ends in 2012.

Panel C: Public Firms Issuing Additional Public Equity

Description	Table	No. of SEOs
SEOs in SDC before the enactment of the Securities Offering Reform: 2003-2005	Table 11	209
SEOs in SDC after the enactment of the Securities Offering Reform: 2006-2008	Table 11	135

Table 2
Distribution of bond issuances and IPOs by year and industry

This table presents the distribution of initial bond and equity issuances by private firms in our sample by year and by industry.

Panel A: Distribution of bond issuances and IPOs by year

Year	Number of Bonds with Three Years of Traded Yields Following Issuance		Number of IPOs with Three Years of Bid-Ask Spread Data Following Issuance	
1995	0	0.0%	105	11.6%
1996	1	1.4%	154	17.0%
1997	2	2.9%	101	11.2%
1998	6	8.6%	55	6.1%
1999	2	2.9%	70	7.7%
2000	2	2.9%	55	6.1%
2001	4	5.7%	13	1.4%
2002	5	7.1%	16	1.8%
2003	6	8.6%	19	2.1%
2004	16	22.9%	83	9.2%
2005	8	11.4%	60	6.6%
2006	1	1.4%	70	7.7%
2007	3	4.3%	77	8.5%
2008	1	1.4%	8	0.9%
2009	6	8.6%	18	2.0%
2010	7	10.0%	0	0.0%
2011	0	0.0%	0	0.0%
2012	0	0.0%	0	0.0%
Total	**70**	**100.0%**	**904**	**100%**

Panel B: Distribution of bond issuances and IPOs by industry

2-Digit NAICS Industry	Number of Bonds with Three Years of Traded Yields Following Issuance		Number of IPOs with Three Years of Bid-Ask Spread Data Following Issuance	
11	0	0.0%	0	0.0%
21	2	2.9%	29	3.2%
22	2	2.9%	1	0.1%
23	0	0.0%	7	0.8%
31-33	34	48.6%	446	49.3%
42	2	2.9%	34	3.8%
44-45	6	8.6%	48	5.3%
48-49	3	4.3%	14	1.5%
51	7	10.0%	146	16.2%
52	0	0.0%	2	0.2%
53	0	0.0%	13	1.4%
54	3	4.3%	71	7.9%
55	0	0.0%	0	0.0%
56	0	0.0%	28	3.1%
61	0	0.0%	14	1.5%
62	2	2.9%	25	2.8%
71	2	2.9%	6	0.7%
72	7	10.0%	15	1.7%
81	0	0.0%	5	0.6%
Total	**70**	**100.0%**	**904**	**100%**

Table 3
Descriptive statistics

Panel A presents the descriptive statistics for all our variables of interest for our private firm bond sample. Panel B presents Pearson and Spearman correlations for the regression variables used in the bond market tests. ***Bond Yield*** is the excess of the yield-to-maturity over that of a duration and coupon rate matched Treasury bond; ***Peer Info*** is the average of *Earnings Sync*, *%Public*, and *#Analysts*; ***Earnings Sync*** is a measure of earnings synchronicity within each 3-digit NAICS industry, calculated as the mean adjusted r-squared from regressions of a firm's quarterly ROA on aggregate industry quarterly ROA using the previous sixteen quarters of data; ***%Public*** is the proportion of firms in each 3-digit NAICS industry that are public; ***#Analysts*** is the average number of analyst forecasts issued per firm within each 3-digit NAICS industry; ***Log(Assets)*** is the natural log of total firm assets; ***Assets*** is total firm assets in thousands; ***Leverage*** is the total long-term debt scaled by total assets; ***Profitability*** is the ratio of earnings before income, taxes, depreciation, and amortization to total revenues; ***Log(Cash)*** is the natural log of cash and cash equivalents; ***Tangible Assets*** is the ratio of net property, plant, and equipment to lagged total assets; ***Log(Int. Coverage)*** is the natural log of one plus earnings before interest and taxes divided by interest expense; ***Growth*** is the percentage change in sales; ***Log(Loan Amount)*** is the natural log of the bond offering amount; ***Log(Maturity)*** is the natural log of the number of months until maturity; ***Bond Rating Index*** is a variable set equal to zero if the bond is not rated, equal to one if the bond has a below investment grade rating, and equal to two if the bond has an investment grade rating; ***Firm Info*** is the number of unique line items in the firm's income statement, calculated following Chen et al. 2015.

Panel A: Sample of private firms issuing bonds with three consecutive years of traded yields

Variables	N	Mean	SD	P25	P50	P75
Bond Yield	210	7.51	6.67	3.64	5.75	8.65
*Peer Info**	210	0.52	0.22	0.33	0.50	0.67
*Earnings Sync**	210	0.37	0.33	0.00	0.25	0.50
*%Public**	210	0.71	0.29	0.50	0.75	1.00
*#Analysts**	210	0.47	0.35	0.25	0.25	0.75
*Log(Assets)**	210	6.99	1.20	6.04	6.67	8.20
*Assets**	210	2,210	2,840	422	788	3,650
*Leverage**	210	0.65	0.22	0.51	0.64	0.76
*Profitability**	210	0.15	0.09	0.09	0.13	0.19
*Log(Cash)**	210	3.44	1.66	2.27	3.37	4.57
*Tangible Assets**	210	0.40	0.29	0.17	0.29	0.62
*Log(Int. Coverage)**	210	0.83	0.41	0.61	0.83	1.08
*Growth**	210	0.09	0.17	0.00	0.06	0.13
*Log(Loan Amount)**	210	12.44	0.62	11.98	12.22	12.77
*Log(Maturity)**	210	4.59	0.20	4.47	4.53	4.75
*Bond Rating Index**	210	0.97	0.38	1.00	1.00	1.00
*Firm Info**	210	0.51	0.10	0.45	0.50	0.58

The * at the end of a variable name indicates that the variable is not standardized in the table above but it is standardized to have a mean of zero and standard deviation of one when it is used as an independent variable in our regressions.

Table 3 (continued)

Panel B: Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 *Bond Yield*	…	-0.30	-0.09	-0.24	-0.36	-0.24	0.23	-0.12	-0.26	-0.19	0.14	0.11	-0.06	-0.30	-0.36	-0.19
2 *Peer Info*	-0.07	…	0.73	0.40	0.66	0.05	-0.20	0.08	0.00	0.14	-0.19	0.01	-0.04	0.08	-0.06	0.12
3 *Earnings Sync*	0.09	0.78	…	-0.10	0.61	-0.06	-0.10	0.10	-0.10	0.09	-0.13	-0.03	-0.03	-0.06	-0.19	-0.10
4 *%Public*	-0.16	0.13	-0.09	…	-0.01	0.18	-0.23	0.12	-0.02	0.11	-0.04	-0.06	0.10	0.04	0.23	0.15
5 *#Analysts*	-0.11	0.71	0.76	-0.05	…	0.16	-0.18	0.05	0.21	0.28	-0.24	0.11	0.11	-0.07	-0.06	0.28
6 *Log(Assets)*	-0.21	0.02	-0.11	0.20	0.07	…	-0.50	-0.12	0.64	0.10	-0.22	-0.03	0.66	-0.10	-0.04	0.34
7 *Leverage*	0.11	-0.17	-0.14	-0.23	-0.20	-0.46	…	0.28	-0.37	-0.07	-0.22	0.08	-0.29	0.03	0.03	-0.14
8 *Profitability*	0.11	0.10	0.04	0.12	-0.03	-0.11	0.35	…	-0.27	0.07	-0.05	-0.02	-0.08	0.01	0.16	-0.10
9 *Log(Cash)*	-0.23	0.00	-0.01	-0.13	0.21	0.64	-0.35	-0.26	…	-0.02	-0.13	-0.09	0.49	-0.10	0.04	0.35
10 *Tangible Assets*	0.02	0.18	0.19	0.20	0.29	0.13	-0.06	0.17	-0.04	…	-0.18	0.17	0.17	0.10	0.03	0.12
11 *Log(Int. Coverage)*	0.25	-0.07	0.03	0.09	-0.06	-0.23	-0.25	0.06	-0.13	-0.15	…	-0.03	-0.19	-0.08	0.16	-0.36
12 *Growth*	0.16	-0.05	-0.03	0.03	0.04	0.04	0.07	-0.09	-0.11	0.26	-0.06	…	-0.01	0.14	-0.03	0.14
13 *Log(Loan Amount)*	-0.04	-0.06	-0.07	0.06	0.05	0.69	-0.31	-0.10	0.41	0.14	-0.13	0.14	…	-0.26	0.04	0.37
14 *Log(Maturity)*	-0.25	0.08	-0.05	0.06	-0.04	-0.14	-0.03	-0.09	-0.10	0.14	-0.06	-0.04	-0.23	…	0.16	-0.12
15 *Bond Rating Index*	-0.24	-0.01	-0.05	0.04	-0.03	-0.06	-0.01	0.15	0.02	0.09	0.25	-0.02	0.01	0.18	…	0.02
16 *Firm Info*	-0.24	0.05	-0.12	0.02	0.12	0.38	-0.12	-0.07	0.36	0.10	-0.32	0.19	0.34	-0.10	0.03	…

Table 4
Effect of peer information on bond yields

This table presents the results from regressing bond yields on peer information and other determinants of bond yield. All variables are defined in the Variable Appendix. We standardize all the independent variables to facilitate comparison of the coefficients. All specifications include year and NAICS 1-digit industry fixed effects. The standard errors are clustered at the NAICS 3-digit industry level and are robust to heteroskedasticity. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed *t*-test.

Dependent Variable:		*Bond Yield*			
Peer Info Proxy:	Pr. Sign	*Earnings Sync*	*%Public*	*#Analysts*	*Peer Info*
Peer Info Proxy × Year 1	-	-0.853*	-0.906*	-1.304**	-1.249**
		(-1.98)	(-1.94)	(-2.12)	(-2.22)
Peer Info Proxy × Year 2		-0.732	-0.925*	-0.896**	-1.022**
		(-1.65)	(-1.76)	(-2.54)	(-2.67)
Peer Info Proxy × Year 3		0.215	-0.606	-0.726**	-0.332
		(0.58)	(-0.81)	(-2.07)	(-0.88)
Year 1		-2.076**	-2.026**	-1.817**	-1.909**
		(-2.50)	(-2.40)	(-2.08)	(-2.31)
Year 2		-0.311	-0.272	-0.218	-0.206
		(-0.76)	(-0.64)	(-0.55)	(-0.55)
Log(Assets)		-1.629**	-1.356**	-1.465**	-1.524**
		(-2.67)	(-2.29)	(-2.38)	(-2.50)
Leverage		-0.176	-0.192	-0.230	-0.271
		(-0.37)	(-0.39)	(-0.53)	(-0.61)
Profitability		-1.375***	-1.112**	-1.422***	-1.365***
		(-3.50)	(-2.51)	(-3.42)	(-3.37)
Log(Cash)		-1.054***	-1.134***	-0.924**	-1.040***
		(-3.30)	(-3.18)	(-2.65)	(-2.93)
Tangible Assets		-0.632	-0.614	-0.563	-0.486
		(-1.63)	(-1.55)	(-1.68)	(-1.40)
Log(Int. Coverage)		-0.268	-0.363	-0.351	-0.301
		(-0.80)	(-1.18)	(-1.09)	(-0.99)
Growth		0.241	0.249	0.258	0.215
		(0.92)	(0.92)	(0.98)	(0.80)
Log(Loan Amount)		-0.190	-0.189	-0.393	-0.344
		(-0.44)	(-0.45)	(-0.97)	(-0.82)
Log(Maturity)		-0.601*	-0.605	-0.468	-0.528
		(-1.74)	(-1.63)	(-1.27)	(-1.44)
Bond Rating Index		-1.034*	-0.977*	-1.086**	-1.073*
		(-1.92)	(-1.91)	(-2.08)	(-1.97)
Firm Info		-0.645**	-0.519*	-0.702**	-0.598**
		(-2.48)	(-1.94)	(-2.49)	(-2.39)
p -Value: *|Peer Info Proxy × Year 1| >= |Peer Info Proxy × Year 3|*		0.03	0.32	0.18	0.08
No. of Observations		210	210	210	210
No. of Unique Bonds		70	70	70	70
Adj. R-Squared		54.2%	53.4%	55.0%	55.3%

Table 5
Cross-sectional differences in the effect of peer information on bond yields

This table presents the results from regressing bond yields on peer information after partitioning the sample into firms with high vs. low firm information, and high vs. low trading volume in the first quarter of bond issuance. All variables are defined in the Variable Appendix. We standardize all the independent variables to facilitate comparison of the coefficients. All specifications include year and NAICS 1-digit industry fixed effects. The standard errors are clustered at the NAICS 3-digit industry level and are robust to heteroskedasticity. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed *t*-test.

Dependent Variable:		*Bond Yield*			
Cross-Sectional Partition:	Pr. Sign	Low Firm Info	High Firm Info	Low Trade Volume	High Trade Volume
Peer Info × Year 1	-	-1.884*	-0.934	-2.512***	-0.257
		(-2.07)	(-1.11)	(-3.69)	(-0.69)
Peer Info × Year 2		-1.335***	-0.857	-1.451*	-0.537
		(-3.32)	(-0.98)	(-1.99)	(-1.48)
Peer Info × Year 3		-0.484	0.099	-0.564	-0.004
		(-0.84)	(0.10)	(-0.76)	(-0.01)
Year 1		-1.167	-2.637**	-1.950**	-0.323
		(-0.73)	(-2.64)	(-2.02)	(-0.56)
Year 2		-0.755	0.037	0.537	-0.070
		(-1.35)	(0.08)	(0.63)	(-0.14)
Log(Assets)		-1.549	-0.883	-1.842**	1.098**
		(-1.22)	(-1.05)	(-2.30)	(2.06)
Leverage		0.763	-0.582	-0.592	0.506
		(0.77)	(-1.26)	(-1.19)	(1.29)
Profitability		-2.247***	-2.348***	-1.175*	-1.281***
		(-3.14)	(-2.85)	(-1.77)	(-3.90)
Log(Cash)		-0.608	-1.152	-0.793	-1.499***
		(-1.13)	(-1.51)	(-1.31)	(-4.02)
Tangible Assets		-0.862	0.167	-1.377*	-1.054***
		(-1.69)	(0.24)	(-1.90)	(-3.18)
Log(Int. Coverage)		-0.123	0.743	-0.604	0.409
		(-0.12)	(0.92)	(-1.12)	(1.21)
Growth		-0.063	0.091	0.689	-0.196
		(-0.07)	(0.25)	(1.28)	(-0.89)
Log(Loan Amount)		0.024	-1.440**	0.107	-0.361
		(0.02)	(-2.27)	(0.13)	(-1.12)
Log(Maturity)		0.505	-1.519**	-0.219	-0.231
		(1.22)	(-2.72)	(-0.41)	(-0.96)
Bond Rating Index		-0.081	-1.148	-2.577***	-0.179
		(-0.20)	(-0.89)	(-3.13)	(-0.77)
Firm Info		-1.403**	-0.043	-0.588	-0.425
		(-2.42)	(-0.09)	(-1.29)	(-1.49)
p -Value for Difference in Coefficient for *Peer Info × Year 1*		0.09		< 0.01	
p -Value: |*Peer Info × Year 1*| >= |*Peer Info × Year 3*|		0.10	0.15	0.02	0.32
No. of Observations		108	102	105	105
No. of Unique Bonds		36	34	35	35
Adj. R-Squared		41.7%	75.4%	66.8%	63.9%

Table 6
Comparison of the effect of peer information on the bond yields for private firms and matched public firms

Panel A presents the descriptive statistics for our matching variables after entropy balancing the sample of public firm bonds to match the distributions for the sample of private firm bonds. Panel B compares the mean values of the matching variables for the private and public firms following a propensity score matching procedure. Panel C displays the results of regressing bond yields on peer information and other control variables for both sets of matched samples. ***Bond Yield*** is the excess of the yield-to-maturity over that of a matched Treasury bond; ***Peer Info*** is the average of *Earnings Sync*, *%Public*, and *#Analysts*; ***Earnings Sync*** is a measure of earnings synchronicity within each 3-digit NAICS industry, calculated as the mean adjusted r-squared from regressions of a firm's quarterly ROA on aggregate industry quarterly ROA using the previous sixteen quarters of data; ***%Public*** is the proportion of firms in each 3-digit NAICS industry that are public; ***#Analysts*** is the average number of analyst forecasts issued per firm within each 3-digit NAICS industry; ***Log(Assets)*** is the natural log of total firm assets; ***Profitability*** is the ratio of earnings before income, taxes, depreciation, and amortization to total revenues; ***Log(Cash)*** is the natural log of cash and cash equivalents; ***Tangible Assets*** is the ratio of net property, plant, and equipment to lagged total assets; ***Log(Loan Amount)*** is the natural log of the bond offering amount; ***Log(Maturity)*** is the natural log of the number of months until maturity; ***Bond Rating Index*** is a variable set equal to zero if the bond is not rated, equal to one if the bond has a below investment grade rating, and equal to two if the bond has an investment grade rating. We standardize all the independent variables to facilitate comparison of the coefficients. All specifications include year and NAICS 1-digit industry fixed effects. The standard errors are clustered at the NAICS 3-digit industry level and are robust to heteroskedasticity. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed *t*-test.

Panel A: Entropy balanced matching sample

	Private Firm Bonds (N=70)			Public Firm Bonds (N=5,120)		
Dependent Variable:	**Mean**	**Variance**	**Skewness**	**Mean**	**Variance**	**Skewness**
Bond Yield	5.943	5.450	-0.177	4.933	4.919	0.148
Matching Variables:						
Peer Info	0.521	0.049	0.561	0.521	0.049	0.566
Log(Assets)	6.939	1.519	0.546	6.937	1.548	0.604
Profitability	0.149	0.009	1.278	0.150	0.009	1.300
Log(Cash)	3.274	2.847	0.204	3.292	2.891	0.220
Tangible Assets	0.408	0.085	0.849	0.407	0.085	0.857
Log(Loan Amount)	12.430	0.382	1.063	12.420	0.386	1.146
Log(Maturity)	4.596	0.067	1.103	4.598	0.068	1.083
Bond Rating Index	0.943	0.142	-0.633	0.943	0.144	-0.596

Panel B: Propensity score matching sample

	Private Firm Bonds	Public Firm Bonds			
	Mean	**Mean**	**Difference in Means**	**t-Statistic**	***N***
Dependent Variable:					
Bond Yield	6.699	3.939	2.760	4.17	64
Matching Variables:					
Peer Info	0.508	0.508	0.000	0.00	64
Log(Assets)	7.009	7.384	-0.375	-1.63	64
Profitability	0.151	0.137	0.014	0.57	64
Log(Cash)	3.358	3.723	-0.365	-1.13	64
Tangible Assets	0.425	0.357	0.069	1.45	64
Log(Loan Amount)	12.460	12.291	0.169	1.45	64
Log(Maturity)	4.601	4.658	-0.057	-1.00	64
Bond Rating Index	0.984	1.063	-0.078	-0.84	64

Table 6 (continued)

Panel C: Regression results

Matching Method:		**Entropy Balanced Matching**		**Propensity Score Matching**	
Dependent Variable:		*Bond Yield*		*Bond Yield*	
	Pr. Sign	Private Firms	Public Firms	Private Firms	Public Firms
Peer Info	-, 0	-0.885*	0.084	-0.712**	-0.063
		(-1.95)	(1.09)	(-2.20)	(-0.19)
Log(Assets)		-1.060	-1.228***	-0.928	-1.555**
		(-1.23)	(-6.85)	(-1.29)	(-2.53)
Leverage		0.589	0.007	1.147	0.037
		(0.79)	(0.11)	(1.51)	(0.06)
Profitability		-0.709	-0.035	-0.633	-0.111
		(-1.08)	(-0.28)	(-1.04)	(-0.30)
Log(Cash)		-0.622	-0.132	-0.570	0.196
		(-1.41)	(-0.68)	(-1.15)	(0.70)
Tangible Assets		-0.508	-0.145	-0.284	0.334
		(-0.60)	(-1.45)	(-0.43)	(0.79)
Log(Int. Coverage)		0.598	-0.619***	1.267	-0.450
		(0.94)	(-6.71)	(1.37)	(-1.31)
Growth		0.064	0.048	0.138	0.286
		(0.19)	(0.92)	(0.32)	(1.53)
Log(Loan Amount)		0.546	0.243*	0.471	0.164
		(0.83)	(1.90)	(0.70)	(0.40)
Log(Maturity)		-0.155	-0.687***	-0.312	-0.025
		(-0.42)	(-5.05)	(-0.63)	(-0.08)
Bond Rating Index		-1.172**	-0.207**	-1.521**	-0.390*
		(-2.64)	(-2.16)	(-2.26)	(-1.72)
Firm Info		-0.369	-0.055	-0.831	-0.559*
		(-0.60)	(-0.93)	(-1.65)	(-1.73)
p -Value for Difference in Coefficient for *Peer Info*		< 0.01		0.04	
No. of Observations		70	5,120	64	64
No. of Unique Bonds		70	5,120	64	64
Industry Fixed Effects		Yes	Yes	Yes	Yes
Year Fixed Effects		Yes	Yes	Yes	Yes
Adj. R-Squared		45.1%	49.1%	50.8%	62.9%

Table 7
Comparison of the effect of peer information on firms' bond yields and loan spreads in private debt contracts

This table presents the results from regressing loan spreads in private debt contracts and bond yields on peer information and control variables. All variables are defined in the Variable Appendix. We standardize all the independent variables to facilitate comparison of the coefficients. The standard errors are clustered at the NAICS 3-digit industry level and are robust to heteroskedasticity. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed *t*-test.

Dependent Variable:	Pr. Sign	*Loan Spread*		*Bond Yield*	
Peer Info	0, -	0.057	-0.065	-0.819*	-1.078**
		(0.53)	(-0.58)	(-1.84)	(-2.01)
Log(Assets)		0.292	0.069	0.538	0.601
		(1.38)	(0.17)	(0.76)	(0.68)
Leverage		-0.162	-0.174	0.276	-0.072
		(-1.11)	(-0.75)	(0.67)	(-0.10)
Profitability		0.212	0.281	0.018	-0.361
		(1.27)	(0.77)	(0.04)	(-0.56)
Log(Cash)		-0.096	-0.042	-0.815	-1.138
		(-0.59)	(-0.15)	(-1.54)	(-1.69)
Tangible Assets		-0.016	-0.043	-0.871**	-1.386*
		(-0.16)	(-0.20)	(-2.60)	(-1.79)
Log(Int. Coverage)		-0.236*	-0.143	0.096	0.039
		(-1.80)	(-0.89)	(0.27)	(0.08)
Growth		-0.127	-0.061	-0.087	-0.416
		(-1.52)	(-0.27)	(-0.24)	(-1.02)
Log(Loan Amount)		-0.515***	-0.299	0.184	-0.211
		(-2.75)	(-1.06)	(0.35)	(-0.44)
Log(Maturity)		0.140	0.143	-0.203	-0.184
		(0.70)	(0.37)	(-0.52)	(-0.30)
Bond Rating Index				-0.501	-1.178
				(-1.03)	(-1.69)
Firm Info		-0.086	0.028	-0.453	-0.275
		(-0.59)	(0.14)	(-0.79)	(-0.31)
No. of Observations		50	50	50	50
No. of Unique Private Loans/Bonds		50	50	50	50
Industry Fixed Effects		Yes	Yes	Yes	Yes
Year Fixed Effects		No	Yes	No	Yes
Adj. R-Squared		27.0%	9.9%	29.5%	41.5%

Table 8
Effect of peer information on bond yields at the time of private placement and subsequent SEC registration

This table presents the results from regressing bond yields at the time of private placement and following SEC registration on peer information and other determinants of bond yield. All variables are defined in the Variable Appendix. We standardize all the independent variables to facilitate comparison of the coefficients. All specifications include year and NAICS 1-digit industry fixed effects. The standard errors are clustered at the NAICS 3-digit industry level and are robust to heteroskedasticity. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed *t*-test.

Dependent Variable:		*Bond Yield*	
	Pr. Sign	Issue Date to Yr. 1	Issue Date to Yr. 3
Peer Info × Issue Date		-0.274	-0.527
		(-0.76)	(-1.17)
Peer Info × Year 1	-	-1.072*	-1.336**
		(-1.96)	(-2.31)
Peer Info × Year 2			-1.102***
			(-2.75)
Peer Info × Year 3			-0.407
			(-1.05)
Year 1		1.285**	1.256**
		(2.66)	(2.56)
Year 2			2.962***
			(3.88)
Year 3			3.149***
			(3.59)
Log(Assets)		-1.132***	-1.476***
		(-3.21)	(-3.24)
Leverage		0.244	-0.274
		(0.57)	(-0.68)
Profitability		-0.335	-1.122***
		(-0.93)	(-3.43)
Log(Cash)		-0.129	-0.723**
		(-0.51)	(-2.69)
Tangible		-0.666**	-0.650**
		(-2.45)	(-2.08)
Log(Int Coverage)		0.087	-0.366
		(0.23)	(-1.28)
Growth		0.381*	0.326
		(1.74)	(1.31)
Log(Amount)		0.448	-0.180
		(1.01)	(-0.55)
Log(Maturity)		-0.141	-0.467
		(-0.46)	(-1.49)
Bond Rating Index		-1.132***	-1.044**
		(-4.03)	(-2.46)
Firm Info		-0.714*	-0.503**
		(-1.81)	(-2.21)
p -Value: |*Peer Info × Issue Date*| = |*Peer Info × Year 1*|		0.10	0.09
p -Value: |*Peer Info × Year 1*| >= |*Peer Info × Year 3*|			0.09
No. of Observations		140	280
No. of Unique Bonds		70	70
Adj. R-Squared		50.2%	53.3%

Table 9
Effect of peer information on bid-ask spreads following IPOs

This table presents the results from regressing bid-ask spreads on peer information and other control variables for the full sample of IPOs as well as IPOs partitioned based on the level of firm information and trading volume in the first quarter after IPO. All variables are defined in the Variable Appendix. We standardize all the independent variables to facilitate comparison of the coefficients. All specifications include year and NAICS 1-digit industry fixed effects. The standard errors are clustered at the NAICS 3-digit industry level and are robust to heteroskedasticity. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed *t*-test.

Dependent Variable:		*Bid-Ask Spread*				
Cross-Sectional Partition:	Pr. Sign	All IPOs	Low Firm Info	High Firm Info	Low Trade Volume	High Trade Volume
Peer Info × *Year 1*	-	-0.046**	-0.071*	-0.011	-0.076**	-0.042
		(-2.13)	(-1.83)	(-0.42)	(-2.23)	(-1.30)
Peer Info × *Year 2*		-0.027	-0.053	0.003	-0.031	-0.011
		(-1.15)	(-1.37)	(0.12)	(-0.91)	(-0.32)
Peer Info × *Year 3*		-0.008	0.015	-0.028	-0.025	0.003
		(-0.40)	(0.51)	(-0.73)	(-0.80)	(0.09)
Year 1		-0.003	0.038	-0.015	-0.129***	0.275***
		(-0.08)	(0.62)	(-0.33)	(-2.95)	(3.46)
Year 2		-0.106***	-0.107***	-0.100***	-0.085**	-0.121***
		(-4.07)	(-3.08)	(-3.48)	(-2.17)	(-3.91)
Log(Assets)		-0.367***	-0.449***	-0.280***	-0.434***	-0.246***
		(-16.35)	(-11.84)	(-8.68)	(-15.35)	(-7.76)
Log(Price)		-0.589***	-0.653***	-0.511***	-0.653***	-0.509***
		(-24.08)	(-22.25)	(-19.15)	(-22.24)	(-16.23)
Log(Volume)		-0.203***	-0.257***	-0.152***	-0.208***	-0.271***
		(-13.37)	(-11.83)	(-8.51)	(-7.28)	(-10.79)
Log(Ret Variability)		0.031*	0.025	0.055**	0.024	0.059***
		(1.80)	(1.19)	(2.18)	(1.13)	(2.88)
Firm Info		-0.043***	0.001	-0.051**	-0.048**	-0.028*
		(-3.56)	(0.05)	(-2.18)	(-2.05)	(-1.70)
p -Value for Difference in Coefficient for *Peer Info* × *Year 1*		---	0.06		0.17	
p -Value: |*Peer Info* × *Year 1*| >= |*Peer Info* × *Year 3*|		0.07	0.04	0.65	0.09	0.15
No. of Observations		2,712	1,362	1,350	1,356	1,356
No. of Unique IPOs		904	454	450	452	452
Adj. R-Squared		74.6%	76.1%	72.1%	77.8%	72.1%

Table 10
Effect of peer information on bid-ask spreads following IPOs and matched SEOs

Panel A presents the descriptive statistics for our matching variables after entropy balancing the sample of SEO firms to match the distributions for the sample of IPO firms. Panel B compares the mean values of the matching variables for the IPO and SEO firms following a propensity score matching procedure. Panel C displays the results of regressing bid-ask spreads on peer information and other control variables for both sets of matched samples. All variables are defined in the Variable Appendix. We standardize all the independent variables to facilitate comparison of the coefficients. All specifications include year and NAICS 1-digit industry fixed effects. The standard errors are clustered at the NAICS 3-digit industry level and are robust to heteroskedasticity. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed *t*-test.

Panel A: Entropy balanced matching sample

	IPO Firms (N=904)			SEO Firms (N=2,125)		
Dependent Variable	**Mean**	**Variance**	**Skewness**	**Mean**	**Variance**	**Skewness**
Bid-Ask Spread	1.224	1.309	1.074	1.103	1.192	1.271
Matching Variables						
Peer Info	0.495	0.032	-0.058	0.495	0.032	-0.058
Log(Assets)	4.622	1.996	0.456	4.623	1.998	0.458
Log(Price)	2.409	0.791	-0.302	2.409	0.791	-0.302
Log(Volume)	9.997	1.236	0.312	9.997	1.236	0.312
Log(Ret Variability)	0.170	0.005	0.758	0.170	0.005	0.758

Panel B: Propensity score matching sample

	IPO Firms	SEO Firms			
	Mean	**Mean**	**Difference in Means**	**t-Statistic**	***N***
Dependent Variable					
Bid-Ask Spread	1.156	0.828	0.328	4.45	397
Matching Variables					
Peer Info	0.509	0.509	0.000	0.00	397
Log(Assets)	4.463	4.616	-0.153	-1.52	397
Log(Price)	2.753	2.697	0.056	1.17	397
Log(Volume)	10.477	10.435	0.042	0.54	397
Log(Ret Variability)	0.153	0.151	0.002	0.45	397

Table 10 (continued)

Panel C: Regression results

Matching Method:		**Entropy Balanced Matching**		**Propensity Score Matching**	
Dependent Variable:		*Bid-Ask Spread*		*Bid-Ask Spread*	
	Pr. Sign	IPOs	SEOs	IPOs	SEOs
Peer Info × *Year 1*	-	-0.046**	-0.001	-0.078**	0.010
		(-2.13)	(-0.04)	(-2.16)	(0.39)
Peer Info × *Year 2*		-0.027	-0.039	-0.036	-0.010
		(-1.15)	(-1.57)	(-0.99)	(-0.31)
Peer Info × *Year 3*		-0.008	-0.047	-0.026	-0.029
		(-0.40)	(-0.86)	(-0.75)	(-0.81)
Year 1		-0.003	-0.383***	-0.082	-0.198***
		(-0.08)	(-7.77)	(-1.36)	(-4.92)
Year 2		-0.106***	-0.121***	-0.090**	-0.038
		(-4.07)	(-3.75)	(-2.24)	(-1.47)
Log(Assets)		-0.367***	-0.325***	-0.369***	-0.268***
		(-16.35)	(-8.22)	(-9.10)	(-7.07)
Log(Price)		-0.589***	-0.351***	-0.684***	-0.219***
		(-24.08)	(-11.45)	(-13.62)	(-6.21)
Log(Volume)		-0.203***	-0.343***	-0.185***	-0.241***
		(-13.37)	(-12.91)	(-5.32)	(-7.56)
Log(Ret Variability)		0.031*	0.170***	-0.007	0.118***
		(1.80)	(4.92)	(-0.23)	(4.23)
Firm Info		-0.043***	-0.029	-0.064**	-0.042*
		(-3.56)	(-0.96)	(-2.37)	(-1.74)
p -Value for Difference in Coefficient for *Peer Info* × *Year 1*		0.01		0.03	
p -Value: |*Peer Info* × *Year 1*| >= |*Peer Info* × *Year 3*|		0.07	0.81	0.10	0.87
No. of Observations		2,712	6,375	1,191	1,191
No. of Unique IPOs/SEOs		904	2,125	397	397
Adj. R-Squared		74.6%	70.5%	70.6%	61.7%

Table 11
Effect of peer information on bid-ask spreads during the quiet periods before SEOs

This table presents the results of our test for the effect of peer information on bid-ask spreads during the SEO quiet period. The Pre-2005 Securities Offering Reform column displays the results for SEOs in years 2003 to 2005, prior to the reform. The Post-2005 Securities Offering Reform column shows the results for SEOs in years 2006 to 2008, after the reform. All variables are defined in the Variable Appendix. We standardize all the independent variables to facilitate comparison of the coefficients. All specifications include year and NAICS 1-digit industry fixed effects. The standard errors are clustered at the NAICS 3-digit industry level and are robust to heteroskedasticity. *,**,*** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed *t*-test.

Dependent Variable:		*Bid-Ask Spread*	
	Pr. Sign	Pre-2005 Securities Offering Reform	Post-2005 Securities Offering Reform
Peer Info		0.018	0.023
		(0.87)	(0.93)
SEO Quiet Period		0.075***	0.010
		(4.01)	(0.48)
Peer Info × SEO Quiet Period	-, 0	-0.044**	-0.018
		(-2.04)	(-0.78)
Log(Assets)		-0.215***	-0.105***
		(-6.10)	(-4.13)
Log(Price)		-0.146***	-0.128***
		(-3.94)	(-3.82)
Log(Volume)		-0.154***	-0.153***
		(-6.88)	(-4.39)
Log(Ret Variability)		0.166***	0.097***
		(6.17)	(3.09)
Firm Info		-0.002	-0.008
		(-0.13)	(-0.28)
No. of Observations		627	405
No. of Unique SEOs		209	135
Adj. R-Squared		48.4%	44.2%