RICE UNIVERSITY

Proprietary Information Disclosure and Corporate Financing

By

Rustam Zufarov

A THESIS SUBMITTED
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE

Doctor of Philosophy

APPROVED, THESIS COMMITTEE

Konduru Sivaramakrishnan

Shiva Sivaramakrishnan
Henry Gardiner Symonds Professor of Accounting

Brian Rountree
Brian Rountree (Apr 9, 2020)

Brian Rountree
Associate Professor of Accounting

K. Ramesh
K. Ramesh (Apr 8, 2020)

K. Ramesh
Herbert S. Autrey Professor of Accounting

Brian Akins
Brian Akins (Apr 10, 2020)

Brian Akins
Assistant Professor of Accounting

Richard Boylan
Richard Boylan (Apr 8, 2020)

Richard Boylan
Professor of Economics

HOUSTON, TEXAS

April 2020

Proprietary Information Disclosure and Corporate Financing

Rustam Zufarov

Thesis: Doctor of Philosophy
Accounting, Jones Graduate School of Business
Rice University, Houston, Texas (April 2020)

Abstract

Accounting theory provides considerable insight into corporate disclosures practices and when managers might voluntarily disclose proprietary information. Yet, empirical evidence concerning when firms choose to credibly disclose such information is sparse. It is challenging in general to assess the proprietary information content of corporate disclosures because (i) firms can disseminate information via many different channels, and (ii) credibility of such disclosures is a serious concern. I propose a methodology that addresses these issues, and test the hypothesis that firms disclose more proprietary information ahead of raising equity capital. Specifically, I measure the extent of proprietary information these firms disclose by the magnitude of the association between a private information-based proxy and stock returns prior to equity offerings. To establish a causal link between equity financing and disclosures, I use a difference-in-differences design around the Securities Offering Reform of 2005 that reduced litigation risks associated with disclosures and relaxed restrictions on forward-looking disclosures. I find that equity-issuing firms disclose more than twice as much proprietary information as non-issuing control firms. This result is robust after controlling for any leakage of private information from insider trading and from analysts' information gathering activities. My findings also suggest that larger equity issuers experience 10 to 23 percent greater drop in underpricing relative to smaller equity issuers in the post-Reform period. Finally, by examining a broad sample of firms issuing equity, debt or relying on internal funds, I find that financing choice shapes firms' proprietary information disclosures.

It is also possible that proprietary cost considerations overwhelm these capital market benefits for some firms, inhibiting them from divulging sensitive private information. These firms would have a natural incentive to seek financing via other avenues. Indeed, I find that firms with higher proprietary cost concerns are more likely to raise equity capital via private placements relative to public offerings. Taken together, these results suggest that corporate disclosure policies and financing decisions are interlinked in a significant way.

Acknowledgements

I express my sincere gratitude to my advisor and chair of my committee, Shiva Sivaramakrishnan, for his guidance throughout my doctoral studies. While serious about research, Shiva deeply cares about students and always shines with positive vibes. I am grateful for his support, encouragement, and the time he devoted to my scholarship.

I am extremely grateful to the members of my committee, K. Ramesh, Brian Rountree, Brian Akins, and Richard Boylan, for their advice, insightful comments, and continuous support. I thank my co-authors David De Angelis, Ioannis Floros, and Tarik Umar for their collaborative work and valuable experience. I also thank many other accounting, finance, and economics faculty at Rice University who have contributed to my education.

I am very fortunate to have wonderful current and former fellow doctoral students and friends who have shared long hours of discussions, have provided me feedback, and kept me in shape on the tennis court and in the gym. I especially acknowledge Kirill Evdokimov, Ivan Okhin, Adolfo René, and Emmanuel Yimfor for their friendship, support, and all the great moments they helped enjoy outside the classrooms and offices.

I also gratefully acknowledge Jane Baird, William Brown, Kim Hansen, Danielly Heiny, Jill Holmes, Dan Kane, Oksana Kim, Melodee Morem, Byron Pike, Robert Simonson, and Robert Zelin who had been instrumental in my life prior to my doctoral studies.

And finally, I offer a very special thanks to my parents, Abidjan and Sharafat, and brothers, Alisher, Azamat, and Rovshan, who instilled in me a love for learning and curiosity and have been supportive in every possible way.

Contents

Illustrations

Tables

Prologue: Revelation and Curtailment—Two Sides of a Coin

"Understanding how proprietary costs thwart the voluntary elimination or reduction of information asymmetries between managers and external parties is as natural a concern for accounting researchers as understanding the role of required disclosure."

— *Robert Verrecchia (1990)*

Do firms disclose detailed information about their technology, future product offerings, strategic expansion to new markets, or other *proprietary information*?[1] When do firms take actions to explicitly hide such proprietary information? Addressing these questions is critical to our understanding of what corporate disclosures convey in a variety of contexts and the managerial incentives that drive such disclosures. The disclosure literature is vast and yet there is little by way of a systematic approach to evaluating the nature of private and proprietary information that firms reveal in voluntary corporate disclosures and whether such disclosures are viewed as credible by the markets.

Voluntary disclosures are important sources of information for investors. While investors can learn about firms' past performance and future prospects from mandatory filings (e.g., annual reports, quarterly reports) and capital market intermediaries (e.g., equity analysts, short sellers), managers of the firms have superior private information. Thus,

[1]The way I view proprietary information is consistent with how it is defined in the literature. For instance, Dye (1985) defines proprietary information as a firm's private information whose disclosure may change the distribution of a firm's future earnings.

disclosure strategies provide a potentially important means for managers to share their knowledge with investors. Not only do these disclosures help investors to better evaluate firms, but they may also reduce information asymmetry between managers and outsiders, which may lead to a lower cost of capital.

If releasing value-relevant private information allows firms to reduce investors' information acquisition costs, information asymmetry, and cost of capital, why would some firms attempt to explicitly hide such proprietary information? These capital market benefits may come at a steep cost. Disclosure theory suggests that proprietary cost concerns may inhibit firms in competitive industries from divulging sensitive private information (Verrecchia 1983). Indeed, cost-benefit trade-offs firms face in their voluntary disclosure decisions vary across firms. Some firms with the need to raise external capital may not be willing to incur the proprietary costs associated with releasing private information that competition in product markets can exploit. Faced with such costs, these firms have an incentive to seek equity financing via alternative venues in order to *avoid* or *limit* public dissemination of proprietary information. Raising equity capital via Private Investment in Public Equity (PIPE) transactions is one way firms can achieve this goal.

In this thesis, I contribute to this line of research by investigating a firm's incentives disclosure proprietary information ahead of important external financing transactions. I examine both sides of the disclosure decision—when a firm would choose to disclose proprietary information in a credible manner and when a firm would choose to not disclose by altering its financing decision. To achieve this goal, I develop a proxy for proprietary information and a methodology to assess how much sensitive private information reaches the capital market via such disclosures. I also examine the implications of proprietary information disclosures on firms' cost of capital. I believe my methodology can be used to study disclosure incentives in a variety of contexts.

To my knowledge, the literature offers little empirical evidence as to when firms volun-

tarily disclose value-relevant proprietary information. This requires both an identification of when shifts in cost-benefit trade-offs might compel disclosure and how to measure the proprietary information disclosures. For instance, when firms need to raise external capital, benefits from disclosure can potentially outweigh proprietary costs and firms may actually have the incentive to be more forthcoming (Bhattacharya and Ritter 1983; Newman and Sansing 1993; Gigler 1994). The objective of my methodology is to assess proprietary information content of corporate disclosures so that I can test the hypothesis that firms are more forthcoming with such disclosures prior to raising equity capital.

There is evidence that firms increase disclosure levels ahead of Seasoned Equity Offerings (SEOs). For instance, firms issue more press releases, management earnings forecasts (MEFs), and file more 8-Ks before equity offerings (Frankel, McNichols, and Wilson 1995; Jo and Kim 2007; Li and Zhuang 2012; Shroff et al. 2013; Clinton, White, and Woidtke 2014). However, Lang and Sul (2014), Glaeser (2018), and Cao et al. (2018) view MEFs as non-proprietary in nature. Evidence also suggests that information released via press releases and 8-K filings are subject to credibility concerns.[2] Indeed, even well-known firms such as Microsoft and IBM have been known to engage in "vaporware" disclosures that involve announcing future plans with no apparent intent to follow through (Gerlach 2004; Bayus, Jain, and Rao 2001).

It is important to recognize that firms can disclose information via a multitude of channels. Indeed, they may disclose proprietary information *along* with their forecasts, during the earnings calls, in press releases, or via other disclosure channels. For instance, Gow, Larcker, and Zakolyukina (2019) document that while product-related questions are associated with non-answers during conference calls because of proprietary cost concerns, firms that are planning to raise capital are more willing to address these questions. Relatedly,

[2]Kimbrough and Louis (2011) and Lerman and Livnat (2010) observe that investors do not accept press releases and 8-K filings at "face value," but rather corroborate them with additional industry-specific and firm-specific information.

Cao et al. (2018) find that press releases related to R&D stage, product introduction, or improvement have proprietary content. Moreover, firms seeking equity financing often engage in road shows, marketing activities, and meetings with investors to attract capital, and it is likely that they release proprietary information during these events. The literature does not offer a way of assessing the value-relevant proprietary information that likely gets disseminated through such forums. Evaluating the full extent of proprietary information disclosures is challenging because firms can disseminate information via a multitude of channels.[3] A case in point is T-Mobile's 2018 10-K filing, where the company notes that it announces material financial and operational information to investors using investor relations website, press releases, SEC filings, public conference calls, webcasts, and corporate Twitter account. The company also stresses that CEO, John Legere, uses his personal Twitter, Facebook, and Periscope accounts to disclose material information about T-Mobile and its services.

These considerations point to the need for a methodology to assess proprietary information disclosed through various channels, which is a key contribution of my study. Intuitively, prices in efficient markets quickly reflect all relevant information in corporate disclosures. Therefore, I propose a "revealed disclosure" methodology which allows me to infer proprietary information that firms disclose from stock returns prior to SEOs. To the extent firms disclose proprietary information, I expect that a *private information-based proxy* for proprietary information will be associated with stock returns. This association allows me to assess the full extent of proprietary information disclosed instead of analyzing each channel individually.[4] I discuss the revealed disclosure methodology in more details in

[3]Cao et al. (2018) review 170 papers on voluntary disclosure in the 11 top accounting, economics, and finance journals and find that authors examine MEFs, disclosure ratings by analysts, segment reporting, management discussion and analysis, 10-K-based textual analyses, press releases, and internal control-related disclosures, among others.

[4]The revealed disclosure approach is also in the spirit of Gigler (1994)—in his model, the firm first obtains private knowledge about the future demand for its product, and then discloses this information to favorably influence stock prices before issuing new shares.

Chapter 2 and illustrate it by examining information content of Form 8-K filings.

To implement this methodology, I need a private information-based proxy for the proprietary information. To ascertain what managers are disclosing is in fact credible, such a proxy has to be ex-post verifiable (Verrecchia 2001). Accordingly, I develop a firm-level private information-based index (FPI) as a proxy for managers' private and proprietary information. This index is constructed from future realizations of seven individual variables used in the literature as proxies for proprietary costs (e.g., R&D expenditures, intangible assets) in a variety of contexts (and thus reflects managers' private information along these dimensions). FPI offers three appealing features in my context: (1) it addresses the credibility issue because I assess proprietary information disclosure based on a construct that by design is ex-post verifiable; (2) it is a firm-specific measure and captures cross-sectional differences in cost-benefit trade-offs in firms' proprietary information disclosure decisions; and (3) it is multi-dimensional in nature (i.e., constructed from seven individual variables) and allows for cross-sectional variation in the nature of the proprietary information firms possess. I discuss the construction and validation of FPI in Chapter 1.

I start my empirical analyses in Chapter 3 by comparing the extent of proprietary information firms release before equity offerings to a matched sample of firms that are not conducting SEOs. Because information asymmetry between firms and investors is severe ahead of equity offerings (Myers and Majluf 1984), SEO firms have strong incentives to make voluntary disclosures in order to reduce this asymmetry and raise capital on more favorable terms. To the extent the capital market benefits outweigh the potential proprietary costs, I expect that SEO firms disclose more proprietary information relative to a matched control sample of non-SEO firms. My results lend support to this hypothesis.

Causally attributing a firm's disclosure policy to its equity financing choice is subject to endogeneity concerns. For instance, the decision to issue equity may itself be driven by private information that firms possess. While I argue that equity financing causes firms to

disclose more proprietary information, the existence of proprietary information may also drive the financing choice. The Securities Offering Reform (SOR) of 2005 presents a unique opportunity to address this concern.

The Securities and Exchange Commission (SEC) adopted SOR on June 29, 2005, and it became effective on December 1, 2005. The purpose of the Reform was to modernize the rules governing the public offer and sale of securities under the Securities Act of 1933. Section 5(c) of the Securities Act of 1933 included "gun-jumping" laws that prohibit firms from conditioning the market by making any "offer" to sell a security, and restrict firms' disclosure and communication activity prior to equity offerings. The goal of these laws was to prevent opportunistic disclosures from managers to hype the stock prices.[5]

Prior to SOR, the gun-jumping laws under Section 5(c) of the Securities Act of 1933 constrained firms from disclosing forward-looking information ahead of equity offerings. SOR amendments relax these restrictions and allow SEO firms to disclose forward-looking and potentially proprietary information. For instance, Rule 163A provides a safe harbor for communication before offering; Rule 168 clarifies previously vague definitions (e.g., "forward-looking information"), thus reducing litigation risk associated with disclosures. Therefore, by reducing litigation risk and regulatory costs associated with disclosures, SOR serves as an exogenous shock to the supply of voluntary disclosures.

To the extent some SEO firms had the incentive to disclose proprietary information but were constrained from doing so in the pre-SOR period, I expect them to release more proprietary information in the post-SOR period. I employ a difference-in-differences design to assess the proprietary information content of disclosures of SEO firms after controlling for differences in disclosure behavior between SEO and matched non-SEO firms and for any common trends affecting the disclosure behavior of both groups. I find strong support for the hypothesis that SEO firms disclose more proprietary information in the post-SOR

[5]See the Securities Offering Reform Final Rule at http://www.sec.gov/rules/final/33-8591fr.pdf.

period relative to the pre-SOR period, and relative to the same change for the control group.[6] In particular, my results indicate that SEO firms disclose more than twice as much proprietary information in the post-SOR period as control firms. This result extends the findings in Shroff et al. (2013) and Clinton, White, and Woidtke (2014) by documenting that SEO firms are more forthcoming with proprietary information in the post-SOR period. It also indicates that firms were indeed constrained from releasing such information before SEOs in the pre-SOR period and that the relaxed disclosure environment has improved price informativeness as the proprietary information released gets impounded into stock prices.

SOR also allows for the assessment of whether firms benefited from the documented higher propensity to disclose proprietary information. The Reform creates a new category of issuers—Well-Known Seasoned Issuers (WKSIs). WKSIs are large firms with public float of above $700 million. They enjoy greater benefits from SOR relative to non-WKSIs. Specifically, WKSIs are are more flexible in communicating forward-looking and potentially proprietary information (See Chapter 3). Indeed, I find that the proprietary information disclosure behavior of SEO firms is largely driven by WKSIs. Furthermore, I find that WKSIs have between 0.4 and 0.9 percentage points lower underpricing (10 to 23 percent drop in underpricing from sample average) post-SOR relative to pre-SOR and relative to the same change for non-WKSIs. In sum, I provide direct evidence on the capital market benefit stemming from proprietary information disclosures, i.e., the better pricing WKSIs secure at equity offerings.

It is possible that proprietary information also flows to market participants via insider trading and/or via financial analysts. For instance, analysts may uncover information through their information production activities even in the absence of corporate disclosures;

[6]Important identifying assumptions for consistency and unbiasedness of the difference-in-differences estimator (i.e., parallel trends, no interferences between units, and stable treatment units) are likely satisfied in my setting. See Chapter 3 for a detailed discussion.

insiders may reveal their private information through their trading activities. To address these issues, I control for analyst forecast revisions of future earnings and examine a sample of firms with no insider trading filings during the year of equity offerings. My results are robust after considering these additional channels.

I next extend the scope of my study of how the trade-off between capital market benefits and proprietary costs affects corporate disclosures to a broader sample of firms raising capital from alternate sources. Myers and Majluf (1984) suggest that in the absence of proprietary costs, firms can reveal their private information regarding growth opportunities in order to raise capital from external sources. In the presence of proprietary costs, however, the voluntary disclosure decision involves a cost-benefit trade-off. For instance, when firms have enough internal funds to secure investment projects, they do not stand to benefit from disclosures as much as firms seeking external capital. Thus, I posit that firms seeking external financing are more inclined to disclose proprietary information relative to the firms that rely on internal funds.

Firms seeking private debt financing can communicate with a bank or syndicate members directly, and thus avoid disclosing sensitive information publicly. Firms seeking equity capital, however, have a stronger incentive to disclose proprietary information in order to raise capital on more favorable terms. Consistent with Myers and Majluf (1984), I hypothesize that overall, the proprietary information content of disclosures is greater for firms offering equity compared to that of firms seeking debt financing. My results are in line with these hypotheses and indicate that the financing choice is an important determinant of firms' proprietary information disclosures.

As noted previously, firms in need of capital may not always be in the position to disclose proprietary information voluntarily because the proprietary costs associated with public disclosures may exceed the capital market benefits. These firms have an incentive to seek capital while avoiding public disclosure of such information. As discussed earlier,

raising capital in private equity markets via PIPE transactions is one option. Indeed, as I discuss later, disclosure requirements are less demanding for PIPE transactions relative to SEOs. More importantly, PIPEs allow issuers to disclose private information to a small group of accredited investors and bind them with non-disclosure agreements. In Chapter 4, I examine whether firms are more likely to raise equity capital via PIPE transactions, relative to SEOs, when they have more proprietary private information. The results suggest that proprietary cost concern is a significant driver of a firm's choice of equity issuance venue. Firms with relatively high proprietary costs associated with voluntary disclosures are more likely to raise equity capital via PIPE transactions. In other words, the benefits from disclosing sensitive proprietary information are not likely to outweigh the costs for these firms.

The results in this thesis complement and extend the literature on the disclosures prior to financing transactions. For example, Lang and Lundholm (2000) find that firms maintaining a consistent level of disclosures around SEOs have lower information asymmetry; Shroff et al. (2013) and Clinton, White, and Woidtke (2014) document that firms increase disclosure levels before SEOs in the post-SOR period. I show that SEO firms disclose more *proprietary* information prior to equity offerings post-SOR (relative to pre-SOR and relative to the same change for the control group). This finding not only establishes that SEO firms derive greater benefits from disclosing proprietary information but also suggests that the relaxed disclosure environment surrounding SEOs in the post-SOR period has important implications for corporate disclosure policies and stock price informativeness.

My paper also contributes to the literature that examines the impact of proprietary information cost on voluntary disclosure. Many empirical studies follow Verrecchia (1983) and assume that proprietary costs are constant, independent of what is disclosed. However, proprietary cost concerns vary across firms depending on the nature of private information that managers possess. In my revealed disclosure approach, I use a firm-level private

information-based measure to assess cross-sectional differences in the trade-off between the benefits and costs of disclosing proprietary information and identify the extent to which firms disclose such information. Berger (2011) suggests that empirical studies examining the impact of proprietary cost concerns on voluntary disclosure ignore the potential benefits from disclosure. I establish that by disclosing proprietary information, some SEO firms (WKSIs) secure more favorable pricing terms. Finally, while I apply the revealed disclosure methodology in the context of corporate financing, I believe it can also be applied in settings where researchers are interested in how disclosure policies interact with other corporate decisions.

Chapter 1

Development of Firm-level Private Information Index (FPI)

In this chapter, I present the construction and validation of the firm-level private information-based index (FPI) that I develop. FPI is a proxy for managers' private and proprietary information, disclosure of which can be costly for firms in the product markets.

1.1 Construction of Firm-level Private Information Index

I construct FPI on the premise that any private information a firm possesses at a given time t will realize in measurable terms within a reasonable time horizon. I use a three-year time horizon (i.e., $t+1$ to $t+3$) and check the robustness of my results with two years horizon. To construct this index, I choose variables that have been used in prior research as proxies for proprietary costs in various settings. For each of these variables, I compute the percent change (with the exception of the product fluidity measure I discuss below) from time $t-1$ to the three-year average beginning at time $t+1$. Higher values of these percentages are indicative of more positive private information that a firm possesses ahead of the financing decision at time t and, therefore, reflect higher proprietary costs. In essence, the underlying premise is that, all else equal, firms would be unwilling to publicly disseminate actionable details regarding their private information and their future planned actions because such information can potentially enable competing firms to adjust and react strategically. I focus on the following specific variables:

R&D Expenditures: R&D expenditures reflect efforts toward developing innovations leading to new or improved products. Wang (2007) uses R&D expenditure levels as a proxy for proprietary costs under the premise that firms with higher R&D levels face higher proprietary costs (see also King, Pownall, and Waymire 1990; Ellis, Fee, and Thomas 2012). Thus, all else equal, I expect firms planning higher future R&D expenditures in time $t+1$ to $t+3$ to face higher proprietary costs at time t. I use R&D expenditures deflated by average total assets and set R&D equal to zero if it is missing.

Sales: Prior research finds that sales growth is an important financial value driver (e.g., Bartov, Mohanram, and Seethamraju 2002; Fedyk, Singer, and Soliman 2017). Sales growth is higher for firms in the early stage of their lifespan (introduction or growth) relative to firms in the late stage of their lifespan (mature or decline) (Anthony and Ramesh 1992). In their early life-cycle stages, outsiders have limited knowledge of firms' future revenues and costs (Jovanovic 1982). Publicly announcing good sales prospects can potentially trigger competition from existing and potential rivals. Therefore, a firm's information regarding future sales growth can be proprietary in nature.

Market-to-Book Ratio: Market-to-book ratio is commonly used in the literature as a proxy for investment opportunities (Rhodes–Kropf, Robinson, and Viswanathan 2005; Hertzel and Li 2010). Thus, prior literature uses market-to-book as a proxy for proprietary costs (e.g., Bamber and Cheon 1998; Nagar, Nanda, and Wysocki 2003). In my context, higher *future* market-to-book ratios (in time $t+1$ to $t+3$) likely reflect higher realized growth options in those periods. Under the premise that firms have private information about these growth options at time t, they are not likely to disclose this information because of proprietary cost considerations (Merkley 2013).

Intangible Assets: Innovations in products and processes are inherently proprietary in

nature. Lev (2000a) observes that investments in intangibles are indicative of the extent of innovation. As Ellis, Fee, and Thomas (2012) note, certain intangible assets—developed internally (e.g., expenditures on patents, copyrights, and so forth) or purchased from external sources (such as licenses and customer lists)—are capitalized at cost. Investments in these assets can be viewed as proprietary in nature (see also King, Pownall, and Waymire 1990). Therefore, following Ellis, Fee, and Thomas (2012), I use the ratio of intangible assets (net of goodwill) to total assets, setting intangible assets to zero if they are missing. Firms with high levels of intangible assets, as reflected in future realizations, are more likely to have greater proprietary cost considerations, and thus less likely to engage in voluntary disclosures.

Advertising: Expenditures on advertising may be viewed as a way of attracting and retaining customers. Accordingly, Ellis, Fee, and Thomas (2012) posit that firms with high levels of advertising expenditures will be less forthcoming with "information about their customers." Moreover, increasing advertising intensity would also be one way to stifle competition. However, publicly disclosing details regarding increases in advertising expenditures can forewarn competition. I use advertising expenditures deflated by sales and set advertising equal to zero if it is missing.

Product Market Fluidity: Using a textual analysis of business descriptions from 10-K filings, Hoberg, Phillips, and Prabhala (2014) construct this measure to capture the "change in firm's product space due to moves made by competitors in the firms' product markets." Boone, Floros, and Johnson (2016) use product fluidity as their main measure of the firms' competitive landscape. It is reasonable to assume that firms are not likely to publicly announce how they are adapting to competition, and therefore, this measure is natural proxy for proprietary costs.

Sustained Above-industry Profitability: Harris (1998) observes that the speed with which a firm's profitability (i.e., ROA) reverts back to the industry mean is a measure of the level of competition in the industry. Specifically, Harris (1998) estimates the following regression:

$$X_{ijt} = \alpha + \gamma_{1j} D_n X_{ijt-1} + \gamma_{2j} D_p X_{ijt-1} + \vartheta_{ijt}. \tag{1.1}$$

The dependent variable, X_{ijt}, is the firm's ROA net of its industry mean (industry j). The variable D_n (D_p) assumes value of one if $X_{ijt} < 0$ (> 0), zero otherwise. As Harris (1998) notes, the coefficient γ_{2j} captures the speed of adjustment in industry j, with a more positive coefficient indicating less competition. I focus on the residual from this regression—a positive residual in year t would indicate that firm i is outperforming rivals in its industry j in year t. Thus, I use the percentage change in the residual term from year $t-1$ to years $t+1$ to $t+3$ as a proxy for any private information firm i might have at time t that it will outperform its industry over the ensuing three-year horizon.

Note that some of the measures above also capture a firm's growth potential. However, this should not to be a concern but viewed as a strength as it is in line with the way the literature views proprietary costs. Indeed, the FPI measure is intended to measure private information about future growth options the public dissemination of which can give rise to proprietary costs. The notion that proprietary information relates in an important way to future growth options is well rooted in the literature. For instance, Bamber and Cheon (1998, p. 171) point out: "We examine two indicators of proprietary information: growth opportunities and product-market concentration ratios. Growth opportunities indicate availability of profitable investments such as new product introductions, capacity expansion projects, or creation of barriers to entry (Gaver and Gaver 1993). The greater the growth opportunities, the more reluctant managers are to reveal information that could

dissipate the value of these opportunities." Other examples where growth opportunities are used as a proxy for proprietary costs (e.g., Ellis, Fee, and Thomas 2012; Guo, Lev, and Zhou 2004).

I construct the index using the above variables as follows:

Step 1: I assign sample observations to deciles based on the percent change of each variable, with the top decile consisting of observations with the highest (most positive) change. Because the product fluidity measure is itself a *change* measure by definition, I use its value in period t to classify firms into deciles, with the top decile representing the decile with the highest values.

Step 2: I assign the decile value i as the score for each observation in that decile. Thus, a value of 10 (1) for each variable is indicative of the highest (lowest) magnitude in terms of the proprietary nature of the private information.

Step 3: Using these scores, I construct two alternative versions of the composite index.

1. Equal decile weights (FPI_{EW}): For each decile i, I assign a weight of i to observation in that decile and sum the scores across all the variables to get the index. That is,

$$FPI_{EW} = \sum_{j=1}^{7} i.$$

   Thus, Firm A with scores $\{10, 1, 1, 1, 1, 1, 1\}$ will have $FPI_{EW} = 16$.

2. Unequal decile weights (FPI): For each decile i, I assign a weight of $\frac{i}{10}$ to observation in that decile and sum the weighted scores across all the variables to obtain the index. That is,

$$FPI = i \times \sum_{j=1}^{7} \frac{i}{10} = \sum_{j=1}^{7} \frac{i^2}{10}.$$

Thus, any observation in the top decile (decile 10) will receive a weight of 1, and an observation in the bottom decile (decile 1) will receive a weight of 0.1. Therefore, Firm A with scores $\{10, 1, 1, 1, 1, 1, 1\}$ will have $FPI = 10.60$.

To understand the intuition underlying the unequal weighting scheme, consider another firm, Firm B, with scores $\{3, 4, 4, 4, 3, 2, 1\}$. Firm B will have $FPI_{EW} = 21$. Thus, going by FPI_{EW}, it would appear that Firm B has a higher level of proprietary private information than Firm A (21 vs. 16).

I recognize that not every firm can be expected to score high along every dimension. For some firms, one single dimension could be paramount. Therefore, a firm scoring high in any one dimension should be viewed as having a high level of proprietary cost. Accordingly, it would seem that Firm A, which scores in the highest decile in the first dimension, should be considered to have a higher level of proprietary cost than Firm B, which scores in lower deciles along *all* dimensions. Firm A scores a 10 on the first dimension, but FPI_{EW} assigns a lower score to Firm A than Firm B, which does not have a high score on any dimension. The non-linear weighting scheme I use above mitigates this problem because Firm B will have $FPI = 7.1$, which is lower than Firm A's FPI of 10.6. Note that I scale FPI by 100 in my regressions for ease of presentation.

1.2 Validation of Firm-level Private Information Index

In this section, I evaluate FPI as a proxy for proprietary costs by examining its association with other proxies used in the literature. I focus particularly on two measures—references to trade secrecy in 10-K filings (Glaeser 2018), and redaction of material contract disclosures in 10-K filings (Verrecchia and Weber 2006; Boone, Floros, and Johnson 2016). Verrecchia and Weber (2006) and Boone, Floros, and Johnson (2016) find that firms redact information from their SEC filings in order to protect proprietary information. Glaeser (2018) finds that

firms pursuing trade secrecy are more likely to redact material contract disclosures in 10-K filings and thus limit the disclosure of proprietary information.

In performing this analysis, I obtain financial statement data for all firms in the intersection of the CRSP and Compustat with positive total assets for the period 1996-2017. The sample starts from 1996 because electronic filings of 10-K became mandatory on the Securities and Exchange Commission's (SEC) Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system in 1996. I obtain firm fundamentals from Compustat, stock price data from CRSP, and institutional ownership data from Thomson Reuters 13F Holdings master file. I construct FPI for each firm-year using the methodology outlined above. To identify firms that redact information from their 10-K filings, I follow Boone, Floros, and Johnson (2016) and search 10-K filings and specifically their material contracts section for any of the terms "confidential request," "confidential treatment," "confidential," or "redacted."[1] Finally, to identify firms with references to trade secrecy, I follow Glaeser (2018) and Dey and White (2018) and search 10-K filings for either the term "trade secret" or "trade secrecy." Panel A of Table 1 presents descriptive statistics for all the variables I use in this comparative analysis.

1.2.1 FPI vs. Redacted Disclosure and Trade Secrecy

In Panel B of Table 1, I report the Pearson correlation coefficients among *FPI*, *Trade Secrets*, *Redacted 10-K*, and measures of competition and concentration. As this panel reveals, *Trade Secrets* is positively correlated with *Redacted 10-K*, which is consistent with the evidence in Glaeser (2018). *FPI* is also positively correlated with both *Trade Secrets* (correlation coefficient: 0.11) and *Redacted 10-K* (correlation coefficient: 0.10). These associations are statistically significant, and indicate that *FPI* reflects to some extent the proprietary costs

[1]Confidential treatment requests can be made pursuant to Rule 406 of the Securities Act of 1933, or Rule 24b-2 of the Securities Exchange Act of 1934 with respect to information required to be filed with the SEC, such as a material agreement filed as an exhibit to a periodic report.

proxied by *Trade Secrets* and *Redacted 10-K*. I also find that these three measures are all negatively correlated with the three different measures of concentration—*Compustat HHI*, *TNIC HHI*, and *Fitted HHI*—suggesting that firms operating in less-concentrated industries have higher levels of proprietary information. This evidence is consistent with Verrecchia and Weber (2006) who find that firms that operate in less-concentrated industries are more likely to redact material contracts in their SEC filings. The variable *PCTCOMP* is measure of competition used by Li, Lundholm, and Minnis (2013). As expected, this measure is positively correlated with *FPI*, *Trade Secrets*, and *Redacted 10-K*, and negatively correlated with the various concentration measures.

In Panel C of Table 1, I present statistics on *Trade Secrets*, *Redacted 10-K*, and the mean FPI by Fama-French 12 industries. Although the nature of proprietary information varies from firm to firm, it is reasonable to expect some industry-level heterogeneity. Panel C shows that the energy (including oil, gas, coal) industry has the lowest fraction of firms referring to trade secrecy and redacting information from 10-Ks (15 and 7 percent, respectively) compared to all other industries. The healthcare industry, on the other hand, has the highest fraction of trade secrets and redacted information in 10-K filings (78 and 37 percent, respectively). Note that FPI also reflects a similar inter-industry heterogeneity and is generally consistent with the pattern observed in the levels of *Trade Secrets* and *Redacted 10-K* across industries.

In Panel D (E) of Table 1, I provide additional statistics on the relation between *Trade Secrets* (*Redacted 10-K*) and FPI. Both the mean and median FPI values are significantly higher for firms that pursue trade secrets or redact information from their 10-Ks. These panels reveal considerable variation in FPI even among firms that *do not* refer to trade secrets or do not redact material contract information in their SEC filings. That is, there is considerable heterogeneity in private information sets among firms that do not appear to redact or appeal to trade secrecy in their 10-K filings.

1.2.2 FPI vs. Redacted Disclosure and Trade Secrecy—Multivariate analysis

I next investigate the association of FPI with trade secrets after controlling for their other known determinants. I follow Glaeser (2018) and estimate the following regression specification:

$$\begin{aligned} Trade\ Secret\ Measure_{i,t} = \alpha + \beta_1 FPI_{i,t-1} + \beta_2 UTSA_{i,t-1} + \beta_3 IDD_{i,t-1} \\ + \beta_4 NEI_{i,t-1} + \sum_{j=1}^{J} \gamma_j Controls_{j,i,t-1} + \eta_k + \omega_t + \varepsilon_{i,t-1}. \end{aligned} \tag{1.2}$$

I use two different specifications for the dependent variable—*Trade Secret Measure*. In the first specification, I use a indicator equal to one if a firm refers to trade secrecy in its 10-K filings and zero otherwise and estimate probit regressions. In the second specification, I use the number of times a firm mentions "trade secret" or "trade secrecy" in its 10-K filings and run OLS regressions. As in Glaeser (2018), I control for three regulatory shocks that are likely to be associated with the use of trade secrecy (*Uniform Trade Secrets Act*, *Inevitable Disclosure Doctrine*, and *Noncompete Enforcement Index* (Garmaise 2009).[2] I also control for firms' financial and market-based characteristics, and their ownership-related variables. Finally, I include industry and year indicators to control for inter-industry heterogeneity and macro-economic conditions.

Panel A of Table 2 reports results from estimating Eq. (1.2). To be consistent with Glaeser (2018), I exclude utilities (SIC codes 4900-4942) and cluster standard errors by headquarter state and year. I present the results from the probit regressions in which the dependent variable is *Trade Secrets* in Columns (1) and (2), and the results from

[2]These three regulations potentially affect firms based on the states where their headquarters are located. Compustat headquarters' data is subject to errors because Compustat backfills this data when firms change their headquarters. I correct this error using hand-collected firm-headquarters data described in Heider and Ljungqvist (2015) and 10-K header data collected by Bill McDonald from the SEC EDGAR. Data from Heider and Ljungqvist (2015) was provided by request. The header data is available on the University of Notre Dame Software Repository for Accounting and Finance website. I thank Bill McDonald, Alexander Ljungqvist, and Florian Heider for making their data available.

OLS regressions in which the dependent variable is *Trade Secrets Count* in Columns (3) and (4). My findings are consistent with those reported in Glaeser (2018). For example, larger firms and firms with higher research and development activities (highly levered firms and firms with poor stock performance) are more (less) likely to mention trade secrets in their 10-Ks. Importantly, positive and significant association of FPI with *Trade Secrets* and *Trade Secrets Count*—even after controlling for the three regulatory shocks and several firm characteristics—provides some corroboration to my use of FPI as a proxy for proprietary costs.

While I implement the specification in Glaeser (2018) for my probit regressions (Columns 1 and 2) and include year and industry fixed effects, I recognize that there is some controversy surrounding the inclusion of fixed effects in non-linear probability models (Cornelli, Kominek, and Ljungqvist 2013). Therefore, to ensure that my results are robust, I also re-estimate Eq. (1.2) using a linear probability model following Guo and Masulis (2015). Results (untabulated) are materially the same as reported in Panel A of Table 2. I also re-estimate the probit regressions without the year and industry fixed effects, and find qualitatively the same results.

I next examine the association between FPI and the redaction of material contract disclosures in 10-K filings. I follow Verrecchia and Weber (2006) and Boone, Floros, and Johnson (2016) and estimate the following probit regression specification:

$$Redacted\ 10\text{–}K_i = \alpha + \beta_1 FPI_{i,t-1} + \sum_{j=1}^{J} \gamma_j Controls_{j,i,t-1} + \eta_k + \omega_t + \varepsilon_{i,t-1}. \quad (1.3)$$

Panel B of Table 2 reports the results from estimating Eq. (1.3). In Columns (2) and (4) I include *Market Size*, *Entry Costs*, *Product Substitutability*, and *Market Share* as potential determinants of information redaction. My results are consistent with those reported in Verrecchia and Weber (2006) and Boone, Floros, and Johnson (2016). For instance, while firms with poor operating performance are more likely to redact information from their

10-Ks, older firms are less likely to do so. Importantly, I find that FPI is significantly and positively associated with *Redacted 10-K* in all specifications.[3] Taken together, these results on the associations between FPI and the trade secret and information redaction proxies affirm my use of FPI as a measure of proprietary private information in the context of equity financing choice.

1.2.3 FPI vs. Concentration/Competition Measures

Turning next to concentration/competition-based proxies, evidence on the association between concentration/competition proxies and disclosure is mixed (Berger 2011). For example, using the U.S. Census Bureau measure of industry concentration and a limited sample of PIPEs and SEOs, Ali, Klasa, and Yeung (2014) document that firms in more concentrated industries are more likely to avoid disclosure by choosing to raise capital in private equity markets. On the other hand, Li (2010) argues that voluntary disclosures are more likely in highly concentrated industries. The literature offers three potential reasons for these mixed findings. First, some argue that the link between concentration and competition is ambiguous (Raith 2003; Karuna 2010; Berger 2011) and that extant disclosure theory does not explicitly speak to the association between industry concentration and disclosure (Cheynel and Ziv 2016). Second, there is some debate on how industry concentration should be computed.[4] Finally, the literature suggests that industry concentration is not a good proxy for proprietary costs because it does not capture other drivers of competition in an industry such as product substitutability, market size, and entry cost (Raith 2003).

In light of these issues, I use multiple measures of concentration and competition to examine how they relate to FPI. Specifically, I use the following measures: (i) the U.S.

[3] A re-estimation of Eq. (1.3) using a linear probability model yields materially the same inferences.

[4] Ali, Klasa, and Yeung (2014) argue in favor of using the Census Bureau measure of industry concentration over the Compustat-based industry concentration measure because both private and public companies are included in the computation of the Census Bureau measure. However, the Census Bureau measure is only available for the manufacturing sector (Berger 2011).

Census-based HHI; (ii) Compustat-based HHI; (iii) TNIC HHI—a concentration index constructed using product descriptions from 10-K filings (Hoberg and Phillips 2010a; Hoberg and Phillips 2016); (iv) Fitted HHI at the three-digit SIC code industry level as suggested by Hoberg and Phillips (2010b); and (v) PCTCOMP—a measure of competition developed by Li, Lundholm, and Minnis (2013) based on a textual analysis of the MD&A section of 10-K filings. Appendix A provides a detailed description of each of these measures.

To the extent FPI and the industry-level competition and/or concentration measures are reasonable proxies of proprietary costs, I should expect them to be associated with each other. Panel B of Table 1 reveals that all the concentration constructs are positively correlated. As I would expect, FPI is negatively correlated with concentration measures, although these correlations are modest.

To seek some additional insight, I classify sample observations into deciles based on concentration/competition measures. Panel F of Table 1 presents the mean FPI values for each decile of concentration/concentration measures. I do not detect any discernible pattern in the mean values of FPI across the deciles of any of the concentration/concentration measures. In particular, I do not detect any monotonic trends in these values from the top to bottom decile. This evidence, taken together with earlier evidence that the concentration and competition measures are only modestly correlated, raises questions as to whether the concentration measures adequately capture proprietary information as reflected in FPI. Moreover, industry-level proxies cannot account for the possibility that firms within the same industry can potentially face different levels of proprietary costs depending on the nature of their private information, which is precisely what FPI is designed to capture.

While I present results with the main definition of FPI as described above, I also construct seven alternative definitions of this index in the following way. I remove one constituent variable at a time and reconstruct the index (i.e., remove sustained above-industry profitability, advertising, product market fluidity, change in market-to-book ratio,

change in intangible assets, change in R&D expenses, and change in sales, to construct FPI2, FPI3, FPI4, FPI5, FPI6, FPI7, and FPI8 respectively). Thus, FPI contains seven variables and FPI2 through FPI8 each contain six variables. This procedure allows me to check the robustness of the index. All my results are robust to these alternative definition of FPI.

Chapter 2

Revealed Disclosure Methodology

In this chapter, I describe the revealed disclosure methodology. I then illustrate this methodology by examining information content of Form 8-K filings. Finally, I discuss empirical framework I use to test my hypotheses in Chapter 3.

2.1 Revealed Disclosure Methodology

Firms can disseminate information via a number of different channels, making it difficult for researchers to assess the full extent of disclosures. In efficient markets, stock prices should quickly incorporate value-relevant information in such disclosures. Therefore, rather than identifying each and every voluntary disclosure avenue, I use the revealed disclosure approach and measure the extent to which firms disclose proprietary information by the magnitude of the association between stock returns and FPI (See Figure 1a).

Corporate disclosures are characterized by multidimensional flow of information from firms to the market. It is possible that, managers disclose proprietary information along with various forecasts, during the earnings calls, in press releases, or via other disclosure channels. The revealed disclosure methodology captures the extent to which such disclosures are reflected in stock prices. Thus, I do not focus on any specific disclosure channel firms may use to disseminate information. Rather, I assess information disclosed from various channels in aggregate by assessing the extent to which managers' private information, as proxied by FPI, is associated with stock returns.

I estimate returns during the 90 days leading up to the equity issue date because that is the period when disclosure incentives are the most pronounced. While I discuss the construction of FPI in details in Chapter 1, the intuition behind this measure is simple. The premise is that managers have advance, private knowledge about planned R&D programs, advertising campaigns, strategic expansions to new markets, etc. Note that disclosing any of this information can be costly because competitors can potentially exploit it to their benefit. To the extent firms disclose such information, however, I expect that it will be impounded into stock prices. Therefore, the association between stock returns and FPI *reveals* the magnitude of proprietary information firms disclose prior to issuing equity.

2.2 Illustration of Revealed Disclosure Methodology

To illustrate the revealed disclosure approach, consider the disclosure requirements that SEC mandated in 2004 in Form 8-K. This mandate includes item 7.01 – Regulation FD disclosure, which stipulates that any information that is disclosed non-publicly must be made public in item 7.01 of Form 8-K. For example, in its April 13, 2015 Form 8-K filing with item 7.01, J. C. Penney disclosed that a senior official of the Company inadvertently sent an e-mail communication to a securities analyst that contained non-public information. J. C. Penney filed this 8-K with item 7.01 in order to make sure that it is in compliance with Regulation FD.

To the extent such private information disclosure is value-relevant, I expect that it will be quickly reflected in stock prices. In order to explore market reaction, I download all Form 8-K filings from 2004 to 2018 and filter out those with item 7.01. Figure 1b shows Cumulative Abnormal Returns (CARs) for Compustat-CRSP universe around the 8-K filing dates. CARs are calculated using a Fama-French three-factor model. The CAR three days leading up to filing date is about 0.27%, the magnitude consistent with that reported in Lerman and Livnat (2010). If SEO firms indeed disclose more proprietary information, and

subsequently file Form 8-K with item 7.01, I expect the market reaction to be even stronger. Figure 1c plots CARs for SEO firms in my sample. Results show that market reaction is about double that I found for the Compustat-CRSP universe. These results suggest that some proprietary information had been disclosed prior to these Form 8-K filings and that information was impounded into stock prices. My revealed disclosure methodology captures such private and proprietary information disclosures.

I also performed basic textual analysis of all Form 8-K filings with item 7.01 to identify the extent to which firms use words that may suggest the disclosure of proprietary information. Specifically, I searched these forms for words "proprietary", "non-public", "inadvertently", etc., and plot the fraction of Form 8-Ks containing these words in Figure 2. I find that firms are indeed using many of these keywords that may reflect sensitive private and proprietary information. Results confirm that at least some proprietary information could have been disclosed before filing date of Form 8-K with item 7.01.

2.3 Empirical Framework

I build my empirical framework based on the methodology in Collins et al. (1994) and Lundholm and Myers (2002) and regress annual stock returns of year t on unexpected earnings of year t and the change in expectations from years $t-1$ to year t about the earnings of future periods (i.e., periods $t+j$, $j = 1, 2, ...$). I expand this model by adding FPI in order to assess the extent of proprietary information reflected in returns in period t:

$$R_{it} = \beta_0 + \beta_1 FPI_{it} + \beta_2 UX_{it} + \sum_{j=1}^{3} \beta_{3j} \Delta E_{it}(X_{t+j}) + \varepsilon_{it}. \tag{2.1}$$

My main coefficient of interest is β_1. To the extent the proprietary information is value relevant, I expect β_1 to be positive. If, however, disclosures do not have any proprietary information content, I should not find any relation between FPI and returns.

Stock returns in any given period reflect unexpected earnings performance during the period, as well as any changes in market expectations of future earnings based on (new) public information. I follow Lundholm and Myers (2002) to control for these effects. Specifically, I proxy for unexpected earnings (UX_t) with the level of prior and current earnings (X_{t-1} and X_t). Including both of these values on the right-hand side is a way of allowing the regression to find the best representation of the prior expectation for current earnings without imposing a specific time-series structure.[1]

The term $\Delta E_t(X_{t+j})$ in Eq. (2.1) represents changes in expected future earnings conditional on available public information. This term serves as a control for any expected growth trend in earnings unrelated to private information about the future that managers may have at time t. Beaver, Lambert, and Morse (1980) and Warfield and Wild (1992) use realized future earnings (X_{t+j}) to proxy for this expectation. However, it is important to realize that X_{t+j} has both expected and unexpected components. Collins et al. (1994) control for the unexpected component of future earnings with future returns since any unexpected earnings component in a future year will be reflected in the returns of that year. Therefore, I proxy for changes in expected future earnings ($\Delta E_t(X_{t+j})$) at time t using both future earnings (X_{t+j}) and future returns (R_{t+j}). In sum, the empirical specification I estimate is as follows:

$$R_{it} = \beta_0 + \beta_1 FPI_{it} + \beta_2 X_{i,t-1} + \beta_3 X_{it} + \sum_{j=1}^{3}(\beta_{4j} X_{i,t+j} + \beta_{5j} R_{i,t+j}) + \eta_k + \omega_t + \varepsilon_{it}. \quad (2.2)$$

The dependent variable, R_t, is *Raw BHAR* or *Market-Adjusted BHAR*. I include industry (η_k) and year (ω_t) fixed effects to control for time-invariant industry differences and time-specific effects on the relation I am examining.

[1] I do not use analyst forecasts as a proxy for the market's earnings expectations (to measure unexpected earnings) because forecasts would reflect firms' disclosures.

Chapter 3

Revelation of Proprietary Information

3.1 Related Literature

3.1.1 Securities Offering Reform

In 2005 the SEC adopted long-awaited rules that reform the registration, communication, and public offering processes under the Securities Act of 1933 with the goal of modernizing securities offering. Shroff et al. (2013) and Clinton, White, and Woidtke (2014) study the effects of SOR on voluntary disclosure around SEOs. Clinton, White, and Woidtke (2014) document that in the post-SOR period, SEO firms issue more accurate and frequent forecasts and file more 8-Ks relative to the pre-SOR period. They also find that post-SOR, stock returns of the firms that issue MEFs are higher during 21-trading-day window before the equity issuance, without reversals in the 21-trading-day window after the issuance. This result suggests that the pre-SEO information environment is richer in the post-SOR period. Interestingly, the findings are similar even for firms that *do not* issue MEFs. Shroff et al. (2013) document that firms provide more pre-SEO forecasts and press releases in the post-SOR period. They do not find support for the notion that firms make opportunistic disclosures to hype the pre-SEO stock prices in the post-Reform period. However, these studies do not directly address the question of whether SEO firms disclose more *proprietary* information post-SOR.

3.1.2 Proprietary Information Costs and Voluntary Disclosure

Empirical research on how proprietary cost concerns shape voluntary disclosure has yielded mixed evidence (Beyer et al. 2010; Berger 2011). For example, Bamber and Cheon (1998) and Ali, Klasa, and Yeung (2014) use industry concentration measures to proxy for proprietary costs and find that firms in more concentrated industries tend to provide less voluntary disclosures. In contrast, Li (2010) suggests that firms in more concentrated industries are more forthcoming with voluntary disclosures and Verrecchia and Weber (2006) document that firms in more concentrated industries are less likely to redact disclosures. In my view, the mixed evidence is attributable to measurement errors in the proxies for proprietary costs used in the literature. Industry-level concentration measures do not capture cost-benefit trade-offs each firm faces in deciding whether to disclose proprietary information. Moreover, it is difficult to find settings where the proprietary information disclosures can be observed and potential benefits from such disclosures can be estimated. I next provide a brief review of relevant literature on each of these issues.

3.1.3 Proxies for Proprietary Information Costs

A general consensus in the literature is that firms facing greater competition are subject to greater proprietary costs and tend not to disclose unless benefits from disclosure outweigh these costs (Verrecchia 1983). Consequently, many studies use industry concentration measures, such as the Herfindahl-Hirschman Index (HHI), as a proxy for the extent to which competition affects proprietary cost concerns (Botosan 1997; Berger and Hann 2007; Barth, Landsman, and Taylor 2017). However, Cheynel and Ziv (2016) argue that the link between industry concentration and competition is tenuous. Indeed, Ali, Klasa, and Yeung (2014) assume that high industry concentration signifies high competition, while others have argued that high industry concentration indicates low competition (Harris 1998; Li 2010).

In essence, the specific way in which industry concentration might affect disclosure depends on the nature of competition (e.g., existing competition vs. potential threat of entry) and on the causes of variation in competition (e.g., market size, entry cost, product substitutability) (Darrough and Stoughton 1990; Raith 2003). For example, Darrough and Stoughton (1990) argue that firms disclose more to deter entry. Raith (2003) contends that if product markets vary in size or entry cost, then high HHI suggests low competition; however, if they vary in product substitutability, then high HHI implies high competition. More importantly, industry-level measures such as HHI cannot capture firm-level variations in proprietary cost concerns. Thus, while we can use HHI to assess whether, in general, firms in more concentrated industries disclose more or less, we cannot use HHI to examine the cost-benefit trade-off individual firms face in deciding how much proprietary information to disclose.

Turning to other proxies for proprietary costs, some researchers use specific variables, such as past R&D expenditures, advertising, and intangible asset levels (Lev 2000b; Wang 2007; Ellis, Fee, and Thomas 2012; Li, Lin, and Zhang 2018). While these measures are more direct proxies, they may not fully capture cross-sectional differences in the nature of proprietary cost concerns. For example, Hoberg and Maksimovic (2014) find that proprietary cost concerns exist even in Fama-French 48 industries where R&D expenditures are less pervasive, such as Personal Services and Retail. Since the proxy for proprietary costs that I use in this paper (FPI) is at the firm level and captures these cross-sectional differences, it allows me to overcome measurement problems associated with industry-level and individual firm-level proxies in assessing proprietary information disclosures.

3.1.4 Benefits of Disclosing Proprietary Information

When a firm chooses to disclose proprietary information voluntarily, it can be assumed that benefits from disclosure more than offset proprietary costs. Such benefits could in-

clude influencing market expectations prior to IPOs (Leone, Rock, and Willenborg 2007; Hanley and Hoberg 2010; Kumar, Langberg, and Sivaramakrishnan 2016), stock buybacks (Brockman, Khurana, and Martin 2008; Kumar et al. 2017), SEOs (Lang and Lundholm 2000; Shroff et al. 2013; Clinton, White, and Woidtke 2014), and other significant corporate events such mergers and acquisitions (Kimbrough and Louis 2011; Guay, Samuels, and Taylor 2016). Studies that examine the association between voluntary disclosure and proprietary costs (Bamber and Cheon 1998; Botosan and Stanford 2005; Verrecchia and Weber 2006; Ellis, Fee, and Thomas 2012) implicitly ignore cross-sectional differences in disclosure benefits. Indeed, Berger (2011) observes that studies using product market competition as a proxy for proprietary costs are subject to several limitations. Along with measurement errors in the product market competition proxies, Berger (2011, p. 206) points out "...a general failure to control for the potential benefits of discretionary disclosure (even though the benefits are likely correlated with the proprietary costs of disclosure)." It is difficult to find settings where disclosures of proprietary information can be observed and potential benefits can be estimated (Leuz 2004). In this Chapter, I identify and study a setting where firms face distinct benefits from disclosures, which in turn allows me to assess the extent to which firms disclose proprietary information.

3.2 Hypotheses Development

In this section, I develop hypotheses on whether and to what extent firms disclose proprietary information using capital financing transactions as the context. I posit that the incentive to disclose proprietary information is inherently different across different types of financing transactions. According to the pecking order theory, firms prefer internal to external financing if sufficient funds are available (Myers and Majluf 1984). Among external financing options, the theory suggests that firms prefer debt to equity securities. These different types of financing transactions have important implications for how much

proprietary information firms might choose to disclose voluntarily. Firms can disclose all of their private information and issue debt or equity securities if proprietary costs are absent (Myers and Majluf 1984). However, managers are likely to be more strategic in their disclosures in the presence of proprietary cost concerns.

3.2.1 Seasoned Equity Offerings and Proprietary Information Disclosure

Firms that rely on internally generated funds, firms that raise capital via debt, and firms that raise capital via equity likely have fundamentally different profiles. Therefore, the association between voluntary disclosure and capital market benefits may be driven by firm size, performance, and growth options rather than cost-benefit trade-offs firms face (Healy and Palepu 2001). In order to examine the proprietary information content of disclosures carefully, I compare firms issuing new equity with a matched sample of firms that either do not have a financing need or may have financed their investments through debt or internal funds. Matching allows to alleviate observed differences that may explain firms' voluntary disclosure decisions. See Section 3.3 for additional details on the matching procedure.

Focusing on SEO and matched non-SEO firms is useful for two reasons. First, I control for observed differences between these groups. Second, I use publicly available equity issuance dates to more carefully identify time windows in which firms are most likely to make voluntary disclosures to favorably influence market perceptions. For example, marketing activities, roadshows, and book-building typically start a few months before and lasts up to the issuance day. Therefore, assessing proprietary information content of disclosures immediately leading up to the issuance date increases the power of my empirical tests.

Because information asymmetry between firms and investors is severe ahead of equity offerings (Myers and Majluf 1984), SEO firms have strong incentives to make voluntary disclosures in order to reduce this asymmetry and raise capital on more favorable terms. As discussed earlier, proprietary costs constrain firms from disclosing sensitive private in-

formation. To the extent the capital market benefits outweigh the costs for some SEO firms, I expect them to disclose more proprietary information, all else equal. These considerations lead me to test the following hypothesis:

H1: *SEO firms disclose more proprietary information relative to a matched control sample of non-SEO firms.*

3.2.2 Securities Offering Reform and Proprietary Information Disclosure

It is challenging to identify the causal channel of capital financing transaction on a firm's disclosure because variables that determine financing type may also be associated with corporate disclosure. Moreover, while I argue that equity offerings cause firms to disclose more proprietary information, the existence of proprietary information may also drive the financing choice. In order to measure the causal effect of financing on proprietary information disclosure, I take advantage of the Securities Offering Reform of 2005. As discussed earlier, SEO firms were constrained from disclosing important forward-looking information in the pre-SOR period because of the gun-jumping restrictions in place at that time. Under the reasonable assumption that the cost-benefit trade-off is not affected by the implementation of SOR, I expect these firms to release more proprietary information post-SOR after the restrictions were removed. On the other hand, if the costs outweigh benefits, I should not expect to find a change in voluntary disclosures of proprietary information in the post-SOR period. Accordingly, I test the following hypothesis:

H2: *The extent to which SEO firms disclose proprietary information is greater post-SOR relative to pre-SOR and relative to the same change for a control group of non-SEO firms.*

3.2.3 Types of Financing and Proprietary Information Disclosure

I next extend the scope of my study by using the revealed disclosure methodology to examine how the trade-off between capital market benefits and proprietary costs shapes proprietary information disclosures in a broader sample of firms. Firms that rely on internal funds to secure an investment project do not have incentives to actively engage in voluntary disclosures because direct capital market benefits are not immediately apparent. As such, the costs associated with disclosing proprietary information are likely to dominate the benefits. On the other hand, I cannot rule out the possibility that firms relying on internal funds may still release some proprietary information to lower information asymmetry and improve liquidity. Moreover, disclosing proprietary information may help some firms to deter the entry of a potential competitor (Darrough and Stoughton 1990). Thus, voluntary disclosures of the average firm not seeking external financing may have some proprietary information content.

In contrast, when firms seek debt or equity financing, the capital market benefits of disclosures are more evident. By disclosing favorable information, these firms can reduce private information acquisition costs of investors and raise capital at a lower cost. To the extent these benefits outweigh proprietary costs, firms raising external capital may be more forthcoming with proprietary information relative to the firms that do not seek external capital. These considerations lead me to test the following hypothesis:

H3a: *Firms raising external capital disclose more proprietary information relative to firms that are not raising external capital.*

Proprietary cost concerns may be one of many factors associated with a financing choice. Some firms may prefer issuing debt over equity securities to avoid public dissemination of proprietary information. Moreover, firms that issue private debt can share proprietary information directly with a bank or syndicate members. This allows them to avoid

public disclosures of sensitive information and to obtain a loan on better terms. Note that disclosure incentives of firms that issue public debt may be similar to those of SEO firms. Overall, I argue that the capital market benefits from disclosing proprietary information outweigh the consequent proprietary costs more for firms issuing equity relative to firms issuing debt.[1] Accordingly, I test the following hypothesis:

H3b: *Firms issuing equity disclose more proprietary information relative to firms issuing debt.*

3.3 Research Design

3.3.1 Seasoned Equity Offerings and Proprietary Information Disclosure

I start by examining the extent of proprietary information firms release before the SEOs relative to a matched sample of firms not conducting SEOs. I assign the "issue date" of SEO firms for their matched non-SEO counterparts. Note that a firm that conducts an SEO in year t may appear in the control group in the short window surrounding the equity issuance (e.g., in years $t-2$ to $t+2$). This might be concerning because the research methodology I employ involves measuring certain variables using future realizations. Thus, I eliminate SEO firms in the five-year window surrounding the SEO issuance year from the potential pool of control firms (Lang and Lundholm 2000).[2]

I follow Barber and Lyon (1997) and Kothari, Mizik, and Roychowdhury (2016) and match SEO firms to non-SEO firms on the market value of equity and book-to-market ratio calculated at the end of the fiscal year immediately prior to the issue date. I require control firms to be in the same two-digit SIC industry and have the same fiscal year as SEO firms.

[1] Including public debt issuances in my sample may bias my tests against a difference between disclosure behavior of debt vs. equity firms. For robustness, I use the subsamples of firms with only private debt or only public debt in my tests. These results are tabulated in Table 16.

[2] I also perform this procedure for the three-year window surrounding the SEO issuance year. The results (untabulated) are similar to those I report using the five-year window.

My matching procedure relies on a nearest neighbor matching of propensity scores (Rosenbaum and Rubin 1983). Specifically, I perform one-to-one matching without replacement to arrive at a high-quality match and minimize faulty inferences (Shipman, Swanquist, and Whited 2017). I also impose a caliper distance of 0.01 to decrease the likelihood of poor matches and improve the covariate balance. My design choices are consistent with the findings in Shipman, Swanquist, and Whited (2017). The authors review articles published in top accounting journals and find that the majority of papers using the propensity score matching technique employ one-to-one matching without replacement. I verify that firms in the treatment and control groups are not significantly different in terms of the market value of equity and the book-to-market ratio.

H1 predicts that the extent of proprietary information content of disclosures of equity-issuing firms to be higher relative to that of non-issuing firms. To test this hypothesis, I estimate the following regression specification:

$$R_t = \beta_0 + \beta_1 FPI_t + \beta_2 SEO + \beta_3 SEO * FPI_t + \sum_{j=1}^{J} \gamma_j Controls_{j,t-1} + \eta_k + \omega_t + \varepsilon_t. \quad (3.1)$$

SEO is an indicator equal to one for firms that conducted SEOs during the year t and zero for matched non-issuing firms. My main coefficient of interest in Eq. (3.1) is β_3. If the proprietary information content of firms' disclosures leading up to the SEOs is higher relative to that of non-issuing firms, then I expect the β_3 to be positive. However, if the equity-issuance event does not differentially alter the issuing firms' incentives to release proprietary information, I should fail to reject the null that β_3 is zero.

Since equity issue dates are identifiable, I can specify the return windows precisely to capture when voluntary disclosures are likely to be most beneficial in influencing the SEOs. Typically, marketing activities, road shows, and bookbuilding start a few months before the issue date and can have a tremendous influence on pricing of the shares offered. Thus, I define the dependent variable, *Raw BHAR*, as a buy-and-hold return that begins three

months before and ends two days before issue date.[3,4] *Market-Adjusted BHAR* is the buy-and-hold return that begins three months before and ends two days before issue date less corresponding CRSP value-weighted market return. I do not use equal-weighted market returns because of potential biases associated with this index (Canina et al. 1998). All my results are robust to using size-adjusted returns, where I adjust firm-specific returns using the size decile daily portfolio return reported on CRSP.

The stock return window I use is in line with the various return windows used in the literature in different contexts. For example, Lang and Lundholm (2000) study disclosure behavior of SEO firms and use six months returns prior to the SEOs to examine the relation between voluntary disclosures and stock returns. Muslu et al. (2015) study the association between forward-looking disclosures and stock returns during the period of 11 and three months prior to the 10-K filing date.

I follow Clinton, White, and Woidtke (2014) and use equity issue date rather than registration filing date to estimate returns. Some papers focus on pre-filing period to examine disclosure environment (Lang and Lundholm 2000; Shroff et al. 2013). However, as shelf offerings are gaining popularity, the gap between registration filing and equity issue dates is increasing.[5] Clinton, White, and Woidtke (2014) find that the average number of days between the filing and issue dates increased from 62 days in 2002 to 362 days in 2009. Therefore, it is more appropriate to focus on the disclosures prior to issue date.

I use two sets of control variables. First, I follow Lundholm and Myers (2002) and

[3]SEO issue date variable in the SDC database is not adjusted for the offerings that are launched after the close of exchanges, in which case the issue date should be the next trading day. I follow Safieddine and Wilhelm (1996) and Corwin (2003) to determine the actual issue date. SEOs are characterized by a sharp increase in a trading volume. Thus, if the trading volume on the day following the issue date has more than twice the level observed on the SDC reported issue date, I adjust the SEO issue date to the following trading day.

[4]The results are robust to using a six-month window.

[5]The SEC Rule 415 allows firms to shelf register securities without selling the entire amount at once. The issuer can sell portions of these shares over a two (three in the post-SOR period) years without re-registering securities.

Collins et al. (1994) and include all independent variables from Eq. (2.2)—unexpected earnings and the cumulative change in the current expectations about the earnings of future periods. Second, Bessembinder and Zhang (2013) find that firms conducting SEOs differ from their size- and book-to-market-matched control group in terms of idiosyncratic volatility, liquidity, and market beta. Thus, I also control for these variables that may explain stock returns ahead of SEOs. Finally, I include industry (η_k) and year (ω_t) fixed effects to control for time-invariant industry differences and time-specific effects.

3.3.2 Securities Offering Reform and Proprietary Information Disclosure

H2 posits that SEO firms are more forthcoming with their proprietary information post-SOR relative to pre-SOR and relative to the same change for the control group. To test this hypothesis, I compare the extent to which SEO firms disclose proprietary information prior to issue date to that of matched control firms (as discussed above) over the same period before and after SOR. To the extent unobservable differences between SEO and matched control firms drive their disclosure behavior, my identification strategy is compromised. However, my research design alleviates this concern because there is no reason to believe that unobservables are correlated with the enactment of SOR.

I use a difference-in-differences design to filter out the effects of permanent (time-invariant) differences between the SEO and control groups and any common trends affecting both groups (Roberts and Whited 2013). Accordingly, I estimate the following regression specification:

$$R_{it} = \beta_0 + \beta_1 SEO * Post * FPI_{it} + \beta_2 SEO * Post + \beta_3 SEO * FPI_{it} + \beta_4 Post * FPI_{it} + \beta_5 SEO + \beta_6 FPI_{it} + \sum_{j=1}^{J} \gamma_j Controls_{ij} + \eta_k + \omega_t + \varepsilon_{it}. \quad (3.2)$$

SEO is an indicator equal to one for firms that conducted SEOs during the year t and zero for matched control firms. *Post* is an indicator equal to one if the equity is issued

after December 1, 2005. My main coefficient of interest is β_1. H2 predicts that β_1 should be positive. However, if the SOR does not differentially alter treated and control firms' ability to release proprietary information, I should fail to reject the null that β_1 is zero.

3.3.3 Financing and Proprietary Information Disclosure

I estimate pooled regressions in order to evaluate the relative proprietary information content of disclosures of the firms seeking (1) debt capital vs. no external financing, (2) equity capital vs. no external financing, and (3) debt capital vs. equity capital. When comparing firms across any two groups, I only keep sample observations pertaining to those two groups in order to evaluate incremental effects. Specifically, I interact equity issuance and debt issuance indicators with FPI and all control variables, and estimate the following specifications:

$$\begin{aligned} R_{it} = {} & \beta_0 + \beta_1 External_{it} + \beta_2 FPI_{it} + \beta_3 FPI_{it} * External_{it} \\ & + \sum_{j=1}^{J} \{\beta_{4j} + \beta_{5j} External_{it}\} * Control_{ij} + \eta_k + \omega_t + \varepsilon_{it}. \end{aligned} \tag{3.3a}$$

$$\begin{aligned} R_{it} = {} & \beta_0 + \beta_1 Equity_{it} + \beta_2 FPI_{it} + \beta_3 FPI_{it} * Equity_{it} \\ & + \sum_{j=1}^{J} \{\beta_{4j} + \beta_{5j} Equity_{it}\} * Control_{ij} + \eta_k + \omega_t + \varepsilon_{it}. \end{aligned} \tag{3.3b}$$

The dependent variable, R_{it}, is *Raw BHAR* or *Market-Adjusted BHAR*. *Raw BHAR* is the buy-and-hold return for the 12-month period starting three months after year $t-1$ fiscal year-end. *Market-Adjusted BHAR* is the buy-and-hold return for the 12-month period starting three months after year $t-1$ fiscal year-end less corresponding CRSP value-weighted market return. I use Eq. (3.3a) to compare the proprietary information content of disclosures of the firms seeking external financing (debt or equity) vs. firms seeking no external financing, and Eq. (3.3b) to compare that of the firms with debt issuances vs. equity issuances. *Equity* is an indicator equal to one if a firm issued common equity. I

classify a firm as engaging in debt financing if it issues long-term debt during the year.[6] If a firm issues both debt and equity in a given year, I code it as a firm issuing equity under the assumption that disclosure motives related to raising equity capital dominate. Following Leary and Roberts (2010), I assume that firms not seeking external capital are relying on internal funds to finance investments.

In Eq. (3.3a), the variable *External* is an indicator equal to one for observations corresponding to debt and equity issuances and zero for those with no external financing. Similarly, in Eq. (3.3b), the variable *Equity* takes on a value of one for observations corresponding to equity issuances and zero for debt issuances. As is evident from these specifications, I estimate pooled regressions in the most unconstrained form by allowing the intercept and all the slope coefficients to be different for the two groups being compared. My coefficient of interest in these Equations is β_3—it reflects the *incremental* association between FPI and stock returns for one group relative to the other comparison group. H3a predicts β_3 to be positive in Eq. (3.3a), which would suggest that the extent of proprietary information disclosures of firms raising capital externally is higher than that of firms not seeking external capital. H3b predicts β_3 to be positive in Eq. (3.3b) when comparing firms with debt vs. equity issuances.

3.4 Data and Summary Statistics

3.4.1 Sample

I obtain all financial statements data from Compustat for the period of 1997–2017. I start my sample period in 1997 because one of the key variables used in the construction of FPI is available from 1997 onward.[7] I exclude utilities (SICH code 4900-4999) and financial

[6]Some firms may retire and issue a debt at the same time. In order to eliminate such debt rollovers, I subtract debt reduction from debt issuance. All my results (untabulated) are robust to this definition of firms issuing debt.

[7]Note that all my results are robust to excluding financial crisis years.

services firms (SICH code 6000-6900) and require firms to have positive total assets. I further eliminate observations with missing CRSP identifiers and variables to calculate returns. Finally, I exclude firms with missing FPI. I winsorize all continuous variables at the top and bottom one percent to mitigate outlier effects. My sample selection criteria yield 51,155 firm-year observations for my analyses to assess the extent of proprietary information disclosures as a function of various financing transactions. This sample consists of 23,814 firm-years relying on internal funds, 24,218 firm-years issuing debt (either private or public), and 3,123 firm-years issuing equity.

I access data for SEOs from the SDC New Issues database. Following prior studies on SEOs, I only consider firm-commitment underwritten SEOs of common shares (Corwin 2003; Karpoff, Lee, and Masulis 2013). I follow Lowry, Michaely, and Volkova (2017) and exclude offerings by closed-end mutual funds, real estate investment trusts, limited partnerships, rights and unit issues, as well as offerings made on non-U.S. exchanges. I also drop firms with simultaneous international offerings, American Depositary Receipts, offerings with an offer price less than $3, and pure secondary stock offerings.[8] If a firm has multiple SEOs in a given year, I include only the earliest issuance to avoid using overlapping data (Teoh, Welch, and Wong 1998).

As noted previously, I follow Lang and Lundholm (2000) and eliminate SEO firms in the five-year window surrounding the SEO issuance year from the potential pool of control firms. This procedure eliminates 6,392 firm-years from the sample of 51,155 firm-years. Thus, I arrive at 3,123 SEO firm-years and 41,640 non-SEO firm-years (pool of potential control firms). I match 2,900 SEO firms to 2,900 non-SEO firms (see Section 3.3). Finally, after eliminating observations with missing control variables, my final sample to test H1 and

[8] A secondary offering is not about raising capital for the firm, but rather about giving existing shareholders, such as founders or venture capital firms, an opportunity to sell their blocks of shares.

H2 consists of 5,654 firm-years (2,827 SEO and 2,827 matched non-SEO firms).[9] Table 3 provides details of my sample selection process.

3.4.2 Summary Statistics

Table 4 presents summary statistics of variables used in this Chapter. Panel A reports statistics for a sample of SEO and matched non-SEO firms that I use to test H1 and H2. Panel B reports results for all firms that I use to test H3a and H3b. Mean and median values of FPI, *Ln(Total Assets)*, and *Ln(Market Value of Equity)* are similar across the two samples, suggesting that the sample of SEO firms and their matched counterparts are representative of the firms in the intersection of the Compustat and CRSP population. Median lagged, current, and future earnings are roughly equal, and thus, structural changes in earnings over the sample period should not significantly influence the results. I conduct all my analyses using both raw returns and market-adjusted returns. Mean values of current and future returns are consistent with the magnitudes reported in prior research (e.g., Lundholm and Myers 2002).

3.5 Results

I start my analysis by examining how earnings and FPI are associated with returns for the overall sample. I next focus on the sample of firms that issue equity securities via SEOs and investigate the extent of proprietary information they release relative to a sample of matched firms that did not issue equity. In order to alleviate potential endogeneity concern, I use a difference-in-differences design to examine how the relaxation of restrictions on forward-looking disclosures in the post-SOR period affects disclosures of proprietary information of SEO firms relative to those of the matched non-SEO firms and relative to

[9]Note that these matched non-SEO observations include some firms that may have issued debt. For robustness, I remove firms that issued debt from the pool of potential control firms and re-perform the matching procedure. All results (untabulated) are similar to those that includes firms with debt issuances.

disclosures in the pre-SOR period. Finally, to generalize my revealed disclosure methodology, I evaluate the extent of proprietary information revealed around important financing activities. To this end, I perform two analyses. First, I compare proprietary information content of disclosures of firms seeking external financing to firms not seeking external capital. Second, I assess the relative magnitudes of proprietary information content of disclosures of firms issuing equity to the firms issuing debt.

3.5.1 Baseline Results

I begin by verifying the association between returns and earnings (Eq. 2.2) documented in Lundholm and Myers (2002). I also include FPI as an additional explanatory variable in this model in order to assess the extent of proprietary information reflected in returns in period t for the average firm. A positive association between FPI and returns will provide initial evidence that the former has information content beyond what is available in current earnings and current expectations of future earnings. I estimate Eq. (2.2) for all firms in my final sample to establish the revealed disclosure methodology. I also estimate this association for the matched sample of firms I use to test H1 and H2.

Table 5 reports the results of Eq. (2.2) (excluding FPI) using *Raw BHAR* (Columns 1–2) and *Market-Adjusted BHAR* (Columns 4–5) as the dependent variables. Panel A (B) presents results for matched (all) firms. I present the results with the full sample in Columns (1) and (4), and the sample that excludes financial crisis (2007-2009) in Columns (2) and (5).[10] The findings (including the orders of magnitude of the coefficients) are in line with the results in Collins et al. (1994) and Lundholm and Myers (2002). The positive coefficients on future earnings suggest that the current stock returns reflect some revision in expectations about future earnings. The negative coefficients on the future returns are indicative of mea-

[10] I report the results excluding observations during the financial crisis to ensure that the baseline results are not substantially affected by the events during these years.

surement errors in proxying future earnings expectations with future earnings realizations.

Columns (3) and (6) of Table 5 present Eq. (2.2) including FPI on the right-hand side. The coefficients on earnings and returns are similar to those in other columns. More importantly, the positive coefficients on FPI (both in matched and full samples) suggest that some proprietary information has reached the market even after controlling for current earnings and revisions in future earnings expectations caused by information in the public domain. As previously noted, the trade-off between proprietary cost concerns and capital market benefits of voluntary disclosure vary among firms, implying that firms may differ in their incentives to disclose proprietary information. These context-independent results suggest that an average firm's disclosure contains some information that is proprietary in nature. In terms of economic significance, one standard deviation increase in FPI is associated with about 9% to 10% increase in returns.

3.5.2 Seasoned Equity Offerings and Proprietary Information Disclosure

I next concentrate on the sample of firms that issue equity securities via SEOs to carefully examine the revealed disclosures of these firms relative to the non-issuing firms. Specifically, I compare the extent of proprietary information firms release before equity offerings to a matched sample of firms that are not conducting SEOs. H1 predicts that equity-issuing firms release more proprietary information prior to the SEOs relative to non-issuing firms. To test this hypothesis, I estimate Eq. (3.1).

Panel A (B) of Table 6 reports the results from estimating Eq. (3.1) using *Raw BHAR* (*Market-Adjusted BHAR*) as a dependent variable. As in the full sample analysis, I find that the coefficient on FPI is positive and significant for the sample of SEO and matched non-SEO firms. This suggests that the information content of the released private information prior to the SEOs is impounded in the current returns and incremental to the information in the future earnings. The coefficient on the *SEO* indicator is also positive and significant,

consistent with a price run-up for firms issuing equity securities observed in practice and documented in the literature (e.g., Lang and Lundholm 2000). More importantly, the positive and significant coefficients on the $SEO * FPI$ lends support to my hypothesis that equity-issuing firms disclose more private information prior to SEOs relative to non-issuing firms.

The results I have presented thus far are subject to the caveat that some proprietary information reaches the market through insider trading, data breaches, or other information leakage. This said, to the extent that information flowing through these other channels is not systematically different across different types of financing transactions, my inferences regarding the incremental effects of external financing vs. no external financing, and equity vs. debt financing, should not be subject to this concern. Nevertheless, I expect my subsequent difference-in-differences analysis to further alleviate this concern.

3.5.3 Securities Offering Reform and Proprietary Information Disclosure

H2 predicts that the extent to which SEO firms disclose proprietary information is greater in the post-SOR period relative to the pre-SOR period and relative to the same change for the control group. Table 7 reports the results from my difference-in-differences regressions (Eq. 3.2) with *Raw BHAR* and *Market-Adjusted BHAR* as the dependent variables in Columns (1)–(2) and Columns (3)–(4), respectively. My coefficient of interest is β_1, the coefficient on the triple interaction term $SEO * Post * FPI$. I standardize FPI to have a population mean of zero and standard deviation of one in order to obtain consistent estimators and ease the interpretation of coefficients (Wooldridge 2010, Ch. 4).

Consistent with H2, I find positive and significant coefficients on $SEO * Post * FPI$ across all specifications. In terms of economic significance, difference-in-differences impact on returns is between 5% and 6%. Comparing coefficients on $SEO * Post * FPI$ and FPI (i.e., when both *SEO* and *Post* variables are zeroes) suggests that SEO firms disclose more

than twice as much proprietary information in the post-SOR period as control firms in the pre-SOR period. Consistent with my expectation, the coefficients on $SEO * FPI$ is not significant. These results suggest that equity-issuing firms were constrained with respect to the disclosure of proprietary information in the pre-SOR period, perhaps because of gun-jumping restrictions. In the post-SOR period, however, it appears that the equity-issuing firms are more forthcoming with the proprietary information. Note that the coefficients on the interaction term $Post * FPI$ are not significant after I include additional control variables. These results indicate no change in the extent to which control firms disclose proprietary information in the post-SOR period relative to the pre-SOR period. The coefficient on the SEO indicator is positive and significant, consistent with a price run-up for firms issuing equity securities (Lang and Lundholm 2000).

It is possible that the composition of firms offering equity may have changed in the post-SOR period in a way that confounds my hypothesis. For instance, the disclosure policies of the firms offering equity in the post-SOR period could be substantially different relative to those in the pre-SOR period. To address this concern, I estimate Eq. (3.2) for a sample of SEO firms (and their matched counterparts) that have at least two offerings—one in the pre-SOR period and the other in the post-SOR period. Results presented in Table 8 are consistent with H2 (i.e., the coefficient on $SEO * Post * FPI$ remains positive and significant).

My identifying assumption for consistency of the difference-in-differences estimator is that in the absence of SOR, the revealed disclosure of proprietary information would have been similar for the SEO and control groups (parallel trends assumption). To gauge whether this assumption holds in my setting, I estimate Eq. (3.2), and include year indicators interacted with the relevant variables (similar to the indicator $Post$) (Autor 2003; Angrist and Pischke 2008). In Figure 3, I plot the coefficients of the interaction term $SEO * FPI * Year$ for each year. The figure shows that there are no significant differences in terms of

proprietary information disclosure between SEO and matched control firms in the pre-SOR period. The differences sharply increase and become significant in the first few years after SOR, which then flatten out with permanently higher magnitude of these differences. While the parallel trends assumption is inherently untestable, the pattern presented in the figure seems consistent with this assumption (Angrist and Pischke 2008).

The Stable Unit Treatment Value Assumption (SUTVA) is another important assumption for the difference-in-differences estimator (Angrist, Imbens, and Rubin 1996). Two components of SUTVA are (1) no interferences between units and (2) stable treatment units. In my setting, the first component of SUTVA requires that treatment status of firms (those raising capital via SEOs) does not affect the extent of proprietary information disclosed by control firms. I expect this assumption to hold as capital market benefits of disclosing proprietary information are not apparent for the firms that are not issuing equity securities. The second component of SUTVA requires well-defined treatment units that precludes multiple versions of the treatment. I expect firms that conduct SEOs carefully interpret the SOR amendments in an informed way, and thus, there is less room for non-homogeneous interpretations among treatment firms.

I note that the difference-in-differences design alleviates any concern that information can reach the market via alternate channels (e.g., insider trading, analysts, or some other information leakage) to some degree. There is no reason to believe that SOR systematically affects information flow along these channels prior to any particular financing transaction. Nevertheless, I present additional tests on the effects of these alternate information channels on my results in Section 3.6.

3.5.4 Financing and Proprietary Information Disclosure

H3a posits that firms seeking external financing are likely to disclose more proprietary information because these firms have stronger incentives to reduce information asymmetry

and investors' information acquisition costs in order to raise capital at a lower cost. I also hypothesize that these incentives are more pronounced for firms issuing equity as opposed to the firms issuing debt (H3b). Specifically, I compare the extent of proprietary information disclosures of the firms with (1) no external financing vs. debt issuances, (2) no external financing vs. equity issuances, and (3) debt issuances vs. equity issuances, by estimating Eqs. (3.3a) and (3.3b).

Table 9 reports the results from estimating these Equations using *Raw BHAR* (Panel A) and *Market-Adjusted BHAR* (Panel B) as the dependent variables. My coefficients of interest in the first two columns are the coefficients of interaction terms $Debt * FPI$ and $Equity * FPI$. They reflect the incremental association between FPI and stock returns for one group (firms with debt or equity issuances) relative to the other comparison group (firms without any external financing transactions). These coefficients are positive and significant in Columns (1) and (2) of both panels, lending strong support for H3a. Interestingly, the coefficient on FPI (i.e., the main effect) is also positive and significant, which suggests that some proprietary information is reflected in stock returns even for firms that are not raising external capital. The result indicates that even these firms disclose some proprietary information.[11]

Turning next to H3b, my coefficient of interest on the interaction term $Equity * FPI$ is positive and significant in Column (3) of both panels, suggesting that SEO firms release more proprietary information compared to firms that issue debt. Note that the coefficient on FPI in Column (3) is also positive and significant. This result indicates that some proprietary information is reflected in the stock prices of the firms issuing debt—a result that is consistent with the positive coefficient on interaction term $Debt * FPI$ in Column (1). Overall, the results presented in Table 9 are consistent with H3a and H3b.

[11] This inference is consistent with the finding in my baseline analysis described in Section 3.3.

3.6 Additional Analyses

3.6.1 Seasoned Equity Offerings Underpricing

Prior literature documents that a large majority of SEOs are underpriced (issue price is below the closing price in the previous day) (Corwin 2003; Eckbo, Masulis, and Norli 2007). Interestingly, Corwin (2003) does not find any evidence that SEO underpricing is associated with proxies of information asymmetry. While disclosures of *non-proprietary* information prior to SEOs may reduce information asymmetry (Shroff et al. 2013; Clinton, White, and Woidtke 2014), a more direct benefit of disclosing *proprietary* information could be better "pricing" terms. One of the advantages of studying SEO underpricing is that it is a direct measure of the cost of raising capital. In order to test this hypothesis, I use the fact that SOR creates a new category of issuers—WKSIs.[12]

WKSIs are the biggest winners of the SOR amendments. A significant aspect of SOR is a set of rules that provide safe harbor for firms to disclose forward-looking information between the SEC filing and equity issuance dates using free writing prospectus (FWP) without amending their registration statements. WKSIs enjoy two noteworthy benefits relative to non-WKSIs. First, SOR allows WKSIs to communicate via FWP *anytime* before SEO filings without running the risk of violating gun-jumping laws. Non-WKSIs, however, are not allowed to release information during the 30 days leading up to the SEO filing (See Figure 4). Second, for WKSIs, shelf registration statements are automatically effective without SEC reviews. Non-WKSIs, on the other hand, need to wait until the SEC declares their registration statements effective before they can sell shares. Non-WKSIs are also restricted in their communications during this "waiting period" (Covington and Burling 2005).

[12]To qualify as a WKSI, an issuer must have at least $700 million worldwide common equity held by non-affiliates or have issued at least $1 billion aggregate amount of non-convertible securities during the past three years. Affiliates include management, directors, and large shareholders.

To gauge whether SEO firms indeed use forward-looking language in FWPs, I download all FWPs filed between 2005 and 2017 from the SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system. Figure 5 shows that firms immediately took advantage of this disclosure channel and have been using it steadily over the years. Next, I follow Muslu et al. (2015) and search all FWPs for keywords and conjugations of action verbs (e.g., "upcoming quarter", "subsequent period", "following year", "we expect", "company plans", "management intends", etc.) and find that large majority of these documents indeed contain forward-looking and potentially proprietary information.[13]

The ability to use FWPs anytime during the offering process and to file registration statements that are immediately effective without SEC reviews implies that WKSIs are better positioned to disclose proprietary information. Non-WKSIs, however, are somewhat constrained even in the post-SOR period. Therefore, I expect that the extent of proprietary information reflected in stock returns to be higher for WKSIs relative to non-WKSIs. I classify an issuer as a WKSI if its public float is above $700 million. The public float is the share of common equity held by non-affiliates of an issuer. Since it is not readily available, I use a Python program to download 10-Ks of the firms that conducted SEOs between 1997 and 2017 from the EDGAR and to extract their public float listed on the first page of 10-Ks.[14] To test the extent of proprietary information disclosures of WKSIs and non-WKSIs, I estimate Eq. (3.2) separately for these two groups (along with their matched counterparts) and report results in Table 10. Consistent with the SOR offering greater flexibility in the communication of forward-looking information to WKSIs relative to non-WKSIs, β_1 is only significant for the subsample of WKSIs.

This result allows me to examine the implication of the differential proprietary informa-

[13]FWP is an important but unexplored disclosure channel. Detailed examination of the content of FWPs provides a natural avenue for future work to extend the findings in this paper.

[14]Because the SEC required firms to report public floats in 10-K filings only starting 2002, I proxy for public float with market value of equity for the period before 2002.

tion disclosure between WKSIs and non-WKSIs on SEO underpricing. I estimate following difference-in-differences model to investigate how proprietary information disclosures affect SEO underpricing for WKSIs relative non-WKSIs around SOR:

$$Underpricing_{it} = \beta_0 + \beta_1 WKSI * Post + \beta_2 WKSI + \sum_{j=1}^{J} \gamma_j Controls_{ij,t-1} + \eta_k + \omega_t + \varepsilon_{it}. \tag{3.4}$$

Underpricing is the return from the previous day's closing price to the equity offer price. I multiply *Underpricing* by negative 100 for ease of interpretation. Thus, higher values indicate more underpricing. *WKSI* is an indicator equal to one if a firm's public float is above $700 million. *Post* is an indicator equal to one if the equity is issued after December 1, 2005. I also control for various characteristics that are known to be associated with SEO underpricing, and include year and industry fixed effects. Table 11 reports the results of estimating Eq. (3.4). The negative coefficients on *WKSI* suggest that underpricing is in general lower for WKSIs. More importantly, the negative coefficient on the interaction term $WKSI * Post$ indicates that WKSIs have between 0.4 and 0.9 percentage points lower underpricing (10 to 23 percent drop in underpricing from sample average) post-SOR relative to pre-SOR and relative to the same change for non-WKSIs.

In sum, the evidence in this subsection suggests that WKSIs disclose more proprietary information in the post-SOR period and one direct benefit stemming from such disclosures is better pricing obtained at the issuance of the equity.

3.6.2 Alternative Channels of Proprietary Information Flow

In my analysis thus far, I assume that the only way a firm's proprietary information can reach the capital market if it chooses to disclose the information in some form. However, as noted previously, proprietary information can also seep into prices via insider trading and analysts' information production activities. In this subsection, I address the effects of

alternative channels of information flow on my results. First, while proprietary information can plausibly reach capital markets via insider trading, whether such information transfer happens in practice is not clear. On the one hand, Carlton and Fischel (1983) note that "through insider trading, a firm can convey [proprietary] information it could not feasibly announce publicly." On the other hand, the authors also suggest that firms can limit the amount of proprietary information impounded in stock prices by controlling who has access to inside information and who can trade on that information. In order to address the effects of insider trading, I examine a subsample of firms with no insider trading filings during the year. Specifically, I drop SEO firms from the sample if these firms filed SEC Form 4 during the year SEO firms conduct equity offering.

Second, information can reach capital markets via analysts who are sophisticated capital market intermediaries. Analysts perform two important roles—information processing and information production (Bhushan 1989; Schipper 1991). Specifically, analysts add value by processing and interpreting information they gather from firm disclosures and other sources. This information processing role of analysts merely facilitates the incorporation of proprietary information disclosures into prices as reflected in the positive association between FPI and stock returns that I document. However, analysts' information production role could potentially affect my results if the information analysts generate is correlated with the proprietary information that a firm possesses. In this case, it can be argued that analysts—and not the firm—are informing the capital markets. Therefore, I cannot attribute the release of proprietary information to the firm's voluntary disclosure decision without accounting for this information production role of analysts. Consequently, I control for analyst forecast revisions of future earnings in assessing the association between FPI and returns. Specifically, I augment Eq. (3.2) by including *Analyst Forecast Revision*, calculated as mean value of the first EPS forecast in year t minus the first EPS forecast in year $t-1$ by the same analyst for the years $t+1, t+2$, and $t+3$, scaled by the beginning

of the year share price.

Finally, the presence of proprietary information may be more prevalent in certain industries such as healthcare and technology. As I noted earlier, industry level measures do not allow us to assess the extent of proprietary information disclosures. Nevertheless, I control for such industry effects that might be associated with a disclosure of proprietary information with *HHI*.

The specification in Table 12 is similar to that in Table 7. Column (1) corresponds to the sample with no insider trading filings during the year. Consistent with my main analysis, the coefficient of the interaction term $SEO * POST * FPI$ is positive and significant, suggesting that proprietary information is impounded into stock prices even in the absence of insider trading. Column (2) corresponds to the sample with non-missing *Analyst Forecast Revisions*. This variable is positively associated with returns (although not statistically significant), consistent with the notion that analysts do supply new information to the market. Nevertheless, the coefficient on $SEO * POST * FPI$ remains positive and significant, suggesting that proprietary information that reaches the market is incremental to the information provided by analysts. Finally, in Column (3), I control for *HHI*. My main coefficient of interest on the triple interaction is in the expected direction and remains significant.

There is no denying that the market has access to a number of information channels other than corporate disclosures such as insider trading on private information or analysts securing information via their information acquisition activities. Nevertheless, my results in this subsection indicate that the primary source for much of the revealed proprietary information is the firm itself.

3.6.3 Falsification Test

In this subsection, I address the possibility that the change in proprietary information disclosure around SOR is not attributable to the Reform, but is rather due to other unidentified factors. Specifically, I run a falsification test by choosing 2000 as the placebo year of regulation change and repeat the estimation of Eq. (3.2). I choose this year because the Regulation Fair Disclosure (Reg FD) became effective in 2000 and affected how firms can disseminate information to capital markets.[15] The Reg FD shuts down any private information communication between firms and analysts in an attempt to level the playing field. This may motivate firms to voluntarily disclose more information publicly in the post-Reg FD period. However, it is not likely that the Reg FD directly affects firms' incentives and ability to disclose more forward-looking or proprietary information prior to SEOs because they were still bound by gun-jumping laws. Therefore, in this falsification test, I expect β_1 (coefficient on $SEO * Post * FPI$) to be insignificantly different from zero.

Table 13 reports the results of estimating Eq. (3.2), where *Post* is an indicator equal to one for the equity issued after 2000. Similar to the results in Table 7, the coefficient on SEO indicator is positive and significant. More importantly, the coefficient on the triple interaction term, $SEO * Post * FPI$, is indistinguishable from zero, thus lending confidence to my earlier results in support of H1.

3.6.4 Alternative Classification of Firms as Using Internal Resources

In this subsection, I revisit H3a wherein I compare the extent of proprietary information disclosures of firms seeking external financing vs. those of firms that do not. As noted earlier, I assume that if a firm issues neither debt nor equity, it is relying on internal resources (Leary and Roberts 2010). Typically, firms can either raise funds externally and

[15] For robustness, I also use years 2002 and 2004, and results are similar to what I present using the year 2000.

disclose some of their private information to obtain capital market benefits or use internal funds and avoid making such disclosures. Firms without any investment opportunities or financing needs may not have any proprietary information to disclose, all else equal. As long as such firms are in my comparison group, I run the risk of falsely rejecting the null of H3a. To mitigate this possibility, I refine my tests and compare firms with external financing to firms that do not seek external financing *and* have net cash outflows from investing activities during the year. This requirement ensures that the firms in both groups potentially have proprietary information.

Table 14 presents the results of estimating Eq. (3.3a) using this alternative classification. These results are substantially similar to the results presented in Table 9, suggesting that my earlier inferences are not biased by the firm composition in the group classified as using internal resources.

Chapter 4

Curtailment of Proprietary Information Disclosure

4.1 Background

In competitive industries, public dissemination of proprietary information potentially allows existing rivals and potential entrants to exploit that information to the detriment of the disclosing firm. Therefore, firms have a natural incentive to not disclose such information in order to avoid these proprietary costs. However, as I demonstrated in Chapter 3, disclosure of such information can benefit firms in the financial markets from a valuation perspective. For instance, by disclosing value-relevant information, firms can potentially attract equity capital at a lower cost. The consequent trade-off between these countervailing incentives, shapes corporate disclosure policies in an important way and has been the subject of many voluntary disclosure models in the literature.

In particular, Verrecchia (1983) shows that firms will choose non-disclosure in equilibrium when proprietary costs associated with disclosure outweigh the benefits from securing higher valuations in the equity market. Darrough and Stoughton (1990) examine firms' incentives to disclose proprietary information in an entry deterrence context, and show that the market's prior about a firm's future plays an important role in shaping the firm's equilibrium disclosure policy. Intuitively, a "good" firm (a firm with favorable information about the future) has an incentive to withhold information to deter entry by a potential rival, while a "bad" firm has an incentive to reveal information to deter entry. If the mar-

ket's prior that the firm is of the good type is relatively low, then in equilibrium the good firm avoids public disclosure of information (the bad firm may or may not disclose). Thus, Darrough and Stoughton (1990) also provide a theoretical rationale for PCH—i.e., firms preferring non-disclosure to avoid competition from potential entrants.

4.2 Private Placements vs. Public Offerings

Public and private equity markets differ markedly in terms of the disclosure environments they offer to firms (i.e., private placements have fewer SEC-mandated public disclosures than SEOs (Wu 2004; Ali, Klasa, and Yeung 2014). PIPEs typically involve the sale of unregistered shares and are not subject to pre-closing reviews (Chaplinsky and Haushalter 2010; Chakraborty and Gantchev 2013). Therefore, most PIPE issuers do not have to file a registration statement *ahead* of the transaction. In contrast, firms opting for SEOs are subject to pre-closing reviews and must file registration statements prior to a sale. However, in many PIPE transactions, firms end up making post-transaction public disclosures that are in essence comparable to disclosure requirements for SEO firms.[1] In other words, while SEC-mandated disclosures may be different across the two markets, "market-demanded" public disclosures may be at par. If so, I should not expect to find support for the PCH.

In addition to these differences in SEC disclosure requirements, private equity markets offer issuing firms a platform to potentially release private *proprietary* information to select groups of accredited investors and bind them with adequate non-disclosure agreements to prevent its public dissemination. In contrast, firms may not be able to "hide" information as effectively if they seek financing in public markets. SEOs often necessitate road shows and question-answer conference calls that allow prospective investors, including large institutions, fund managers, and analysts to assess why capital is being raised (Gibson, Safieddine,

[1] In 54.5 percent of all PIPEs issued between 2001 to 2015, issuers filed registration statements either before closing or within 30 days of closing.

and Sonti 2004; Chemmanur, He, and Hu 2009; Gao and Ritter 2010).[2]

In sum, in the context of this equity financing choice, the PCH posits that firms wanting to avoid public dissemination of proprietary private information would gravitate more toward PIPE transactions as opposed to SEOs. While in Chapter 3 I show that firms disclose proprietary information in order to obtain certain benefits, in this Chapter I test whether firms disclose less sensitive private information when the costs associated with these disclosures presumably outweigh the benefits.

4.3 Data and Summary Statistics

4.3.1 Sample

I access data for SEOs completed between January 1, 2001 and December 31, 2015 from the Securities Data Company (SDC) New Issues database. I consider SEOs beginning in 2001 as I only have PIPEs data available from 2001 onward from the PrivateRaise database. Following prior studies on SEOs, I only consider firm-commitment underwritten SEOs of common shares listed on the NYSE, NASDAQ, and AMEX (up to 2008) (Chemmanur, He, and Hu 2009; Karpoff, Lee, and Masulis 2013). I exclude offerings by closed-end mutual funds, real estate investment trusts, limited partnerships, LBOs, rights and unit issues, as well as offerings made on non-U.S exchanges. I also exclude simultaneous international offerings, American Depository Receipts, and offerings with an offer price less than $3 and more than $400 (Corwin 2003). I drop another 1,134 observations corresponding to pure secondary stock offerings.

I construct my PIPEs sample from all completed transactions available in the Placement Tracker database between January 1, 2001 and December 31, 2015. To ensure com-

[2]Gibson, Safieddine, and Sonti (2004) observe: "The prospectus, road shows, and conference calls that are part of the firm's and underwriter's SEO marketing efforts provide outside investors with extraordinary opportunities to interact with firm management and members of the underwriting team to elicit information." See also Blankespoor, Hendricks, and Miller (2018).

parability with the SEO sample, I only consider private placements of common stock—the most popular PIPE security type, which accounts for over 61 percent of all available security types covered by Placement Tracker. I require that companies be listed on one of the major U.S. exchanges (NYSE, NASDAQ, and AMEX for the offerings preceding 2008), and that financial and stock data are available in Compustat and CRSP. I also eliminate offerings with no mandatory registration requirement.[3] I access firm fundamentals from Compustat, stock price data from CRSP, and institutional ownership data from Thomson Reuters 13F Holdings master file.

PIPE issuers are, on average, small and poorly performing firms with high degrees of information asymmetry (Wu 2004; Brophy, Ouimet, and Sialm 2009; Chaplinsky and Haushalter 2010). Lim, Schwert, and Weisbach (2019) note that the public equity market may be prohibitively costly for such firms, and that these firms also most likely do not have quick access to sources of debt capital (public debt markets and bank loans). Consequently, PIPEs may be the only viable choice for these firms. Nevertheless, the PIPE market has gained in size and importance over time, especially following many SEC regulatory actions taken post-2003 to enhance liquidity in this market. Hence, PIPEs have increasingly become a reasonable alternative to SEOs even for larger firms with substantial capital needs.

I am interested in analyzing a sample of firms for which both PIPEs and SEOs are legitimate options in order to examine whether proprietary cost considerations are a potential determinant of their choice. Therefore, I eliminate very small PIPE firms (gross proceeds below \$10M) and very large SEO firms (gross proceeds above \$1B) under the premise that these firms have less of an option in choosing between private and public markets, relatively

[3]There are two types of private placements in my sample—Registered Directs (RDs) and unregistered PIPEs—that include mandatory registration rights guaranteeing that issuers will subsequently file registration statements. I exclude 599 PIPEs that are not subject to mandatory registration clauses because the disclosure environment of these firms is not similar to that of RDs or unregistered PIPEs with mandatory registration clauses.

speaking.[4] This criterion eliminates 94 SEOs and 2,642 PIPEs from my sample. Finally, after eliminating some offerings due to missing identifiers in Compustat, utilities (SICH code 4900-4999), and financial services firms (SICH code 6000-6900) I arrive at a final SEO sample of 1,825 issuances and a PIPE sample of 2,239 issuances over the sample period. Table 17 provides details of my sample selection process.

While I report my main results using these samples, I also conduct my analysis using alternate sample designs. First, I employ propensity score matching of PIPE and SEO firms on size (total assets) and gross proceeds, and restrict my attention to these matched PIPEs and SEOs under the premise that private and public markets are equally legitimate options for these firms. Second, I follow Hainmueller (2012) and employ entropy balancing to balance the first two moments (mean and variance) of several firm characteristics of PIPE and SEO samples.[5] Untabulated results using these alternative samples are qualitatively the same as my main results.

4.3.2 Summary Statistics

Panel A of Table 18 presents summary statistics of the main variables I use in my analysis. In Panel B of Table 18, I compare key PIPE and SEO firm, ownership, and equity issuance characteristics. I winsorize all continuous variables at the top and bottom one percent to mitigate outlier effects. As Panel B reveals, PIPE firms are smaller than SEO firms. They also have significantly poorer operating performance relative to SEO firms, as reflected by *EBITDA*. *Cash Flow Return on Assets* also paints a similar picture. Significantly higher

[4]Results are qualitatively the same when I use \$15 and \$20M as alternate cutoffs for gross proceeds from PIPEs.

[5]As reported in Dey and White (2018) and McMullin and Schonberger (2018), entropy balancing is superior to propensity score matching in three dimensions: first, unlike propensity score matching, entropy balancing uses continuous weights and allows similarity across the higher moments of a covariate; second, it permits less discretion to the researcher by solely focusing on the algorithm's tolerance for convergence; and third, the assignment of continuous weights reduces idiosyncratic noise.

R&D expenditures of PIPE firms suggest that the average PIPE firm is in its growth stage relative to the average SEO firm.

PIPE firms have higher cash burn rates suggesting that, on average, they have an urgent need for cash. Such firms also appear to be riskier than SEO firms with significantly higher stock return volatility. Consistent with prior research (Chaplinsky and Haushalter 2010), PIPE firms are associated with a higher degree of information asymmetry as indicated by significantly lower analyst coverage. Although institutional ownership and block holdings are higher for SEO firms, *changes* in institutional ownership are not significantly different between the two groups. Consistent with the literature, PIPE discounts are significantly higher than the SEO discounts. PIPE gross spreads, however, are significantly lower than the SEO gross spreads perhaps due to lower marketing efforts involved in PIPEs (Gustafson and Iliev 2017; Derrien and Kecskes 2007) or the absence of any placement agents.[6]

Overall, the profile of a PIPE firm that emerges from these statistics is consistent with that documented in the literature, despite the fact that I have restricted my attention to a subset of PIPEs and SEOs by eliminating very small PIPEs (gross proceeds less than \$10M) and very large SEOs (gross proceeds greater that \$1B). Thus, conventional wisdom that poorer performing firms with an urgent need for cash and a high degree of information asymmetry gravitate toward PIPEs rings true even in my sample.

4.4 Results

The proprietary cost hypothesis predicts that firms characterized by high levels of proprietary information would prefer to raise equity capital through PIPEs as opposed to SEOs. To test this hypothesis, I use a probit specification in which the dependent variable takes

[6]The equivalent of gross spread in the private placement market is the placement agent's fee. For convenience, I refer to both as gross spread or spread. Public offerings are firm commitment offers underwritten by investment bankers, but private placements are often conducted directly by firms without employing placement agents, and thus have no agent fees (Chen, Dai, and Schatzberg 2010).

on a value of one for a PIPE offering, and zero for an SEO offering. I expect the coefficient of my main variables of interest, *Redacted 10-K*, *Trade Secrets*, and FPI, to be positive. My main probit specification is as follows:

$$PIPE_{i,t} = \alpha + \beta_1 PropCost_{i,t-1} + \sum_{j=1}^{J} \gamma_j Controls_{j,i,t-1} + \eta_k + \omega_t + \varepsilon_{i,t-1}. \quad (4.1)$$

As already stated, the three measures of *PropCost* I employ are *Redacted 10-K*, *Trade Secrets*, and FPI. I follow prior research to control for a number of firm characteristics and information environment variables that determine a firm's propensity to sell new shares either in the private or the public market. Specifically, I follow Wu (2004) to control for information asymmetry using *Natural Log of Assets* and *Firm Age*. To control for growth potential, I include *Industry Adj. Sales Growth* and *Change in Industry Adj. MTB*. Similar to Gomes and Phillips (2012), I use *Cash Flow Return on Assets* and *Altman-Z Score* to control for profitability and bankruptcy risk, respectively. I use *Cash Flow Volatility, Return Volatility,* and *Bid-Ask Spread* to control for uncertainty. I also control for *Analyst Coverage* as well as *Deal Size* as both of these variables could potentially influence the level of investor attention.

I include industry (η_k) and year (ω_t) fixed effects to control for time-invariant industry differences and time-specific effects on the PIPE vs. SEO choice. Inclusion of fixed effects in non-linear probability models has been subject to concern (Cornelli, Kominek, and Ljungqvist 2013). For this reason, I re-estimate all my ensuing regressions using linear probability models (Guo and Masulis 2015). I also estimate the probit specifications without industry and year fixed effects. My results are robust to these alternate specifications.

Table 19 presents associations among FPI, *Trade Secrets*, *Redacted 10-K*, and measures of competition and concentration for the subsample for which *Trade Secrets*, *Redacted 10-K* measures are available. In Panel A, I report Pearson correlation coefficients. As this panel reveals, *Trade Secrets* is positively correlated with *Redacted 10-K*, which is consistent with the

evidence in Glaeser (2018). FPI is also positively correlated with both *Trade Secrets* (correlation coefficient: 0.24) and *Redacted 10-K* (correlation coefficient: 0.23). These associations are statistically significant, and indicate that FPI reflects to some extent the proprietary costs proxied by *Trade Secrets* and *Redacted 10-K*. I also find that these three measures are all negatively correlated with the three different measures of concentration—*Compustat HHI*, *TNIC HHI*, and *Fitted HHI*—suggesting that firms operating in less-concentrated industries have higher levels of proprietary information. This evidence is consistent with Verrecchia and Weber (2006) who find that firms that operate in less-concentrated industries are more likely to redact material contracts in their SEC filings. The variable *PCTCOMP* is measure of competition used by Li, Lundholm, and Minnis (2013). As expected, this measure is positively correlated with FPI, *Trade Secrets*, and *Redacted 10-K*, and negatively correlated with the various concentration measures.

In Panel B (C) of Table 19, I provide additional statistics on the relation between *Trade Secrets* (*Redacted 10-K*) and FPI. Both the mean and median FPI values are higher for firms that refer to trade secrets or redact information from their 10-Ks. Interestingly, these panels reveal considerable variation in FPI even among firms that *do not* refer to trade secrets or do not redact material contract information in their SEC filings. This variation in FPI suggests that even firms that do not engage in information redaction and/or appeal to trade secrecy likely differ from each other in terms of proprietary cost considerations.

4.4.1 Proprietary Information and Financing Choice

Table 20 presents the results from estimating Eq. (4.1) using *Redacted 10-K* and *Trade Secrets* as measures of proprietary costs.[7] *Redacted 10-K* and *Trade Secrets* do not appear to have any explanatory power in Table 20, indicating that these variables are not associated with a firm's choice between a PIPE and an SEO. Recall that in the context of this choice, the proprietary cost hypothesis predicts that firms wanting to avoid public dissemination of proprietary inform would prefer PIPEs over SEOs. These findings are consistent with the notion that once proprietary information is either redacted from material contracts or not disclosed by appealing to trade secrecy *ahead* of the financing choice, proprietary cost considerations become moot in the equity financing choice.

Moreover, *Redacted 10-K* and *Trade Secrets* measures are only available for a subsample, as noted previously. Even for the subsample, these variables may not capture proprietary information not contained in material contracts and/or not subject to trade secrecy protections. Indeed, as Table 19 indicates, the correlations between *Redacted 10-K* and *Trade Secrets* measures, while significant, are of the order of 23-24 percent, suggesting that there could be aspects of a firm's private information that are proprietary in nature and that go beyond redactions and references to trade secrets in 10-K filings. In addition, for the subsample of firms for which *Redacted 10-K* and *Trade Secrets* measures are not available, it is possible that proprietary cost considerations along other dimensions (e.g., those included in the construction of FPI) could play a role in the equity financing choice.

Table 21 presents the results from estimating Eq. (4.1) using FPI as a measure of proprietary information. In Column (1), the coefficient of FPI is positive and statistically

[7] To my knowledge, this is the first time in the related empirical literature that these measures of proprietary costs have been utilized to explain this financing choice. Kankanhalli, Kwan, and Merkley (2018) document a positive association between information redaction and seasoned equity offerings and Boone, Floros, and Johnson (2016) find that nearly 40 percent of firms redact information from their IPO filings and that redacting-firm insiders reduce underpricing-related wealth transfers at the IPO stage by raising more equity financing in later SEOs.

significant. That is, the higher a firm's private information index, the greater the probability that it will choose a PIPE over an SEO. In terms of economic significance, one standard deviation increase in FPI, increases the probability of a firm choosing a PIPE over SEO anywhere between 2.8 to 5.4 percent depending on the different specifications I use in Table 21. Referring to Columns (2) and (3), the coefficient of FPI stays positive and significant even when I control for *Trade Secrets* and *Redacted 10-K* variables. This finding provides strong support for the PCH. These results, taken together with the findings presented in Table 20, indicate that FPI captures aspects of proprietary information that go beyond the proprietary information redacted from material contracts and information not disclosed by referring to trade secrecy.

To examine whether firm size and the amount of capital being raised have any effect on the association between FPI and the financing choice, in Column (4) I include the interactions of the *Natural Log of Assets* and *Deal Size* with FPI.[8] The coefficient of FPI remains positive and significant and the coefficient on the interaction of *Deal Size* with FPI is negative and significant.[9] This negative interaction coefficient supports the narrative that firms with larger deal sizes are less concerned with the revelation of proprietary information. As is well documented in the literature, SEOs involve lower discounts than PIPEs. Thus, my evidence suggests that firms with larger deal sizes may be more willing to incur proprietary costs to attract capital at a lower cost.

[8] *Natural Log of Assets* and *Deal Size* are equal to one (zero) for firms above (below) median assets and median deal size, respectively.

[9] Ai and Norton (2003) note that the statistical significance of interaction effects cannot be tested using canonical t-tests. I employ their suggested methodology and confirm the significance of the negative coefficient on the interaction of FPI with *Deal Size*. I recognize that marginal effects of interaction terms are difficult to interpret in probit estimations, and therefore, I only interpret these coefficients in terms of their directions and statistical significance.

4.5 Additional Analyses

4.5.1 Concentration/Competition Measures

Thus far, I have argued that the trade-off firms face ahead of the financing choice between capital market benefits of disclosure and the consequent proprietary costs is inherently firm-specific, and that industry-level proxies are not suitable for testing the PCH. To provide some additional insight into this issue, I next examine how measures of concentration/competition used in the literature fare against FPI in testing PCH. Table 22 presents the results of the probit estimations using several concentration/competition measures. I do not find a significant association between the *Compustat HHI* and firm choice of equity issuance venue (Column 1). When I use the *TNIC HHI* as the proxy for concentration (Column 2), my results suggest that firms in a highly concentrated industries appear to prefer PIPEs over SEOs. However, when I use the *Fitted HHI* as the proxy (Column 3), its estimated coefficient is not significant. Thus, even keeping aside issues of whether concentration and competition are unambiguously related (Raith 2003), results with respect to the choice of PIPEs vs. SEOs using various concentration proxies are at best inconclusive, and do not provide any consistent inference with respect to the PCH.

Turning next to more direct measures of competition, Column (4) of Table 22 presents my results using the *PCTCOMP* as a measure of competition. I fail to reject the null that its estimated coefficient is zero at conventional levels of significance. In Column (5) I use multi-dimensional measures of competition developed using the methodology in Li (2010) and find that only *Existing Competition* and not *Potential Competition* significantly explains the financing choice. This result indicates that higher existing competition may determine a firm's equity issuance venue. Notwithstanding a lack of consistent support for the PCH using competition measures, in untabulated results I find that FPI remains positive and significant even after accounting for the effects of these measures on the PIPE

vs. SEO choice.[10]

As noted previously, Ali, Klasa, and Yeung (2014) provide evidence that firms in highly concentrated industries are more likely to choose PIPEs over SEOs. They document this result using a hand-collected sample of PIPEs in years 1997, 2000, 2002, 2004, and 2007 (I am able to replicate their analysis using a sample similar to what they use). It is to be noted that a large portion of this sample period predates the private equity market reforms instituted by the SEC beginning 2002 that made PIPEs more attractive to investors and firms. Thus, the results of Ali, Klasa, and Yeung (2014), together with the lack of support for the PCH using concentration and competition measures in this paper, indicate that since these reforms the trade-off firms face in choosing between private and public equity markets has arguably become more firm-specific, and that industry proxies are not adequate enough to capture this trade-off.

4.5.2 Other Motives for PIPE vs. SEO Choice and the PCH

There is general consensus in the accounting and finance literature that institutional shareholders play an important role in mitigating agency problems and in shaping operating and financing decisions (e.g., Shleifer and Vishny 1986; Bushee 1998; Ajinkya, Bhojraj, and Sengupta 2005; Michaely and Vincent 2013; Crane, Michenaud, and Weston 2016). Bushee (1998) documents that institutional investors serve a monitoring role in effectively mitigating myopic behavior. Michaely and Vincent (2013) provide evidence that institutional shareholders affect capital structure decisions by reducing information asymmetry problems through their monitoring and information-gathering roles. Crane, Michenaud,

[10] I also use U.S. Census measure of industry concentration as another proxy for proprietary costs, noting that it is only available for firms in the manufacturing sector. I obtain the measure from the Census Bureau website for the 2002, 2007, and 2012 census years that fall within my sample period. I follow prior work and use it as a measure for industry concentration for each of the five years in a five-year window centered on the year a census is published (Aggarwal and Samwick 1999; Haushalter, Klasa, and Maxwell 2007). In untabulated results, I fail to detect any significant association between *Census HHI* and a firm's propensity to choose a PIPE over an SEO.

and Weston (2016) show that institutional owners play an important role pressuring firms to pay more dividends. Because PIPE issuers are characterized by a higher degree of information asymmetry compared to SEO firms, it is reasonable to expect that institutional investors will affect a firm's choice between a PIPE and an SEO when raising equity capital. My interest lies in examining whether the PCH receives support after controlling for their role.

Following Bushee and Noe (2000), I divide institutional investors into three groups: dedicated investors, quasi-indexers, and transient investors. Dedicated investors acquire large stakes in their portfolio firms and trade infrequently; quasi-indexers have highly diversified portfolio holdings and usually play a more passive role; and transient investors have high levels of diversification and turnover but more short-term oriented. Given the different goals of these three types of investors, it is likely that they affect a firm's choice between a PIPE and an SEO differently. I obtain institutional ownership data from Thomson Reuters 13F Holdings master file and merge it with the database provided by Brian Bushee.[11]

Table 23 reports the results from the regression models that details a firm's choice of PIPE vs. SEO. Column (1) suggests that firms with higher *Inst. Ownership* are more likely to raise equity capital in the public market. This result also holds in the presence of *Dedicated Inst. Ownership, Transient Inst. Ownership,* and *Quasi-Indexer Inst. Ownership* (Column 2)—notwithstanding their different investing goals and incentives. However, consistent with the PCH, positive and significant coefficients on FPI in both columns suggest that firms with higher proprietary costs opt to raise equity in the private market. Under the premise that the influential presence of institutional shareholders mitigates agency costs, these results suggest that SEOs are perhaps beneficial from a shareholder perspec-

[11]To avoid changes in the classification of an institutional investor over time, I use Brian Bushee's "permanent" classification. My findings are qualitatively unchanged if I use Brian Bushee's time-varying classifications instead.

tive. Results with respect to institutional ownership variables presented in Columns (3) and (4) are similar to those in Columns (1) and (2). However, I am not able to offer a consistent explanation for the results with respect to *Existing Competition* and *Potential Competition*.[12]

4.5.3 Private Information Sharing

Finally, private equity markets offer a platform for PIPE firms to share private information with select investors confidentially. The question is whether they actually do *share* private information. One benefit PIPE firms may reap from such information sharing is lower issuance costs that are known to account for a substantial portion of the total cost of raising equity capital (e.g., Lim, Schwert, and Weisbach 2019; Gomes and Phillips 2012; Chen, Dai, and Schatzberg 2010). Accordingly, I estimate a two-stage endogenous treatment effect model to analyze discounts associated with PIPEs and SEOs and present results in Table 24. Consistent with the literature, my results reveal that discounts are, on average, higher for PIPEs than for SEOs. My results also suggest that discounts are lower when unobservables (e.g., private information) seem to influence the choice of a PIPE over an SEO. In other words, the firms that opt for the PIPE financing route decide to do so as they would have had to offer higher discounts with the alternative SEO route.

[12]The evidence remains inconclusive in the untabulated results with other measures of concentration/competition.

Conclusion

Extant literature documents that disclosure of value-relevant information can help firms to raise capital at a lower cost, reduce information asymmetry, and improve liquidity. However, the evidence on the association between proprietary costs and voluntary disclosure is inconclusive (Beyer et al. 2010; Berger 2011). Moreover, assessing when and to what extent firms are willing to disclose proprietary information has proven to be challenging. In my dissertation, I extend the literature that studies the association between proprietary costs and voluntary disclosure by providing novel evidence that firms *disclose* proprietary information when benefits of such disclosures outweigh the costs. I also document that when firms have significant proprietary costs associated with their voluntary disclosures, they *avoid* or *limit* public dissemination of proprietary information.

My contributions to the literature are threefold. First, I construct a firm-specific, multi-dimensional private information index (FPI) to serve as a proxy for proprietary costs. While industry-level competition-based and firm-specific proxies for proprietary costs that are widely used in the literature are appealing, they do not capture cross-sectional differences in cost-benefit trade-offs in firms' proprietary information disclosure decisions and variation in the nature of the proprietary information firms possess. FPI overcomes both of these potential concerns. Second, I advance the revealed disclosure methodology to assess the extent to which firms disclose proprietary information. This methodology can be potentially used to evaluate the proprietary information content of disclosures around important capital market transactions and corporate events. It can also further our understanding of

corporate disclosure behavior. Third, in the context of equity offerings, I document that SEO firms disclose more proprietary information relative to matched control group of non-SEO firms. I also find that SEO firms disclose more proprietary information post-SOR relative to pre-SOR and relative to the same change for the matched non-issuing firms. This result extends the findings in Shroff et al. (2013) and Clinton, White, and Woidtke (2014) by documenting that firms seeking equity capital are more forthcoming with proprietary information in the post-SOR era. The result also implies that equity-issuing firms were constrained from disclosing proprietary information in the pre-SOR period, perhaps because of gun-jumping restrictions. Finally, my results suggest that firms choose private equity markets over public issuances when the costs of disclosing sensitive proprietary information outweigh the benefits. Overall, I find that the type of financing is an important determinant of proprietary information disclosure.

The findings in this thesis are subject to a few caveats. First, in using my revealed disclosure methodology, I implicitly assume that the private (proprietary) information managers have flows into stock prices only via voluntary disclosures. However, such information may also be reflected in returns via other channels. As I have shown, my main results are robust after accounting for at least some information channels such as insider trading and analyst forecasts. Second, there is no generally accepted way of identifying firms that use internal resources to fund investment projects. I attempt to mitigate this misclassification by using two different methods of identifying such firms. Finally, I use SOR as an exogenous shock that only affects the disclosure environment surrounding equity offerings. In my analysis, I have implicitly assumed that SOR does not alter the incentives of firms to issue equity. However, this assumption may not be valid. To address this issue I estimate a difference-in-differences model for a sample of SEO firms that have at least two offerings—one in the pre-SOR period and the other in the post-SOR period. Results are consistent with my findings using the full matched sample, thus lending confidence to my inferences.

My revealed disclosure methodology is not context-specific, and therefore, in future research it can be applied in several other settings to answer interesting and important questions. For instance, while there is a large literature on the proprietary costs shaping firms' disclosure policies, we do not know much about the interplay between managerial incentives and disclosure of proprietary information. It is interesting to examine whether managers disclose proprietary information at the expense of shareholders, in order to achieve self-serving goals. Relatedly, it might be important for stakeholders of the companies to know how managerial incentives to disclose proprietary information interact with various corporate governance forces.

Bibliography

Aggarwal, Rajesh K, and Andrew A Samwick. 1999. Executive compensation, strategic competition, and relative performance evaluation: theory and evidence. *The Journal of Finance* 54 (6).

Ai, Chunrong, and Edward C Norton. 2003. Interaction terms in logit and probit models. *Economics Letters* 80 (1): 123–129.

Ajinkya, Bipin, Sanjeev Bhojraj, and Partha Sengupta. 2005. The association between outside directors, institutional investors and the properties of management earnings forecasts. *Journal of Accounting Research* 43 (3): 343–376.

Ali, Ashiq, Sandy Klasa, and Eric Yeung. 2014. Industry concentration and corporate disclosure policy. *Journal of Accounting and Economics* 58 (2-3): 240–264.

Angrist, Joshua D, Guido W Imbens, and Donald B Rubin. 1996. Identification of causal effects using instrumental variables. *Journal of the American Statistical Association* 91 (434): 444–455.

Angrist, Joshua D, and Jörn-Steffen Pischke. 2008. *Mostly harmless econometrics: an empiricist's companion.* Princeton university press.

Anthony, Joseph H, and Krishnamoorthy Ramesh. 1992. Association between accounting performance measures and stock prices: a test of the life cycle hypothesis. *Journal of Accounting and Economics* 15 (2-3): 203–227.

Autor, David H. 2003. Outsourcing at will: the contribution of unjust dismissal doctrine to the growth of employment outsourcing. *Journal of Labor Economics* 21 (1): 1–42.

Bamber, Linda Smith, and Youngsoon Susan Cheon. 1998. Discretionary management earnings forecast disclosures: antecedents and outcomes associated with forecast venue and forecast specificity choices. *Journal of Accounting Research* 36 (2): 167–190.

Barber, Brad M, and John D Lyon. 1997. Detecting long-run abnormal stock returns: the empirical power and specification of test statistics. *Journal of Financial Economics* 43 (3): 341–372.

Barth, Mary E, Wayne R Landsman, and Daniel J Taylor. 2017. The jobs act and information uncertainty in ipo firms. *The Accounting Review* 92 (6): 25–47.

Bartov, Eli, Partha Mohanram, and Chandrakanth Seethamraju. 2002. Valuation of internet stocks-an ipo perspective. *Journal of Accounting Research* 40 (2): 321–346.

Bayus, Barry L, Sanjay Jain, and Ambar G Rao. 2001. Truth or consequences: an analysis of vaporware and new product announcements. *Journal of Marketing Research* 38 (1): 3–13.

Beaver, William, Richard Lambert, and Dale Morse. 1980. The information content of security prices. *Journal of Accounting and Economics* 2 (1): 3–28.

Berger, Philip G. 2011. Challenges and opportunities in disclosure research—a discussion of 'the financial reporting environment: review of the recent literature'. *Journal of Accounting and Economics* 51 (1-2): 204–218.

Berger, Philip G, and Rebecca N Hann. 2007. Segment profitability and the proprietary and agency costs of disclosure. *The Accounting Review* 82 (4): 869–906.

Bessembinder, Hendrik, and Feng Zhang. 2013. Firm characteristics and long-run stock returns after corporate events. *Journal of Financial Economics* 109 (1): 83–102.

Beyer, Anne, Daniel A Cohen, Thomas Z Lys, and Beverly R Walther. 2010. The financial reporting environment: review of the recent literature. *Journal of Accounting and Economics* 50 (2): 296–343.

Bhattacharya, Sudipto, and Jay R Ritter. 1983. Innovation and communication: signalling with partial disclosure. *The Review of Economic Studies* 50 (2): 331–346.

Bhushan, Ravi. 1989. Firm characteristics and analyst following. *Journal of Accounting and Economics* 11 (2-3): 255–274.

Blankespoor, Elizabeth, Bradley E Hendricks, and Gregory S Miller. 2018. The pitch: managers' disclosure choice during ipo roadshows. *Working Paper.*

Boone, Audra L, Ioannis V Floros, and Shane A Johnson. 2016. Redacting proprietary information at the initial public offering. *Journal of Financial Economics* 120 (1): 102–123.

Botosan, Christine A. 1997. Disclosure level and the cost of equity capital. *The Accounting Review* 72 (3): 323–349.

Botosan, Christine A, and Mary Stanford. 2005. Managers' motives to withhold segment disclosures and the effect of sfas no. 131 on analysts' information environment. *The Accounting Review* 80 (3): 751–772.

Brockman, Paul, Inder K Khurana, and Xiumin Martin. 2008. Voluntary disclosures around share repurchases. *Journal of Financial Economics* 89 (1): 175–191.

Brophy, David J, Paige P Ouimet, and Clemens Sialm. 2009. Hedge funds as investors of last resort? *The Review of Financial Studies* 22 (2): 541–574.

Bushee, Brian J. 1998. The influence of institutional investors on myopic r&d investment behavior. *The Accounting Review:* 305–333.

Bushee, Brian J, and Christopher F Noe. 2000. Corporate disclosure practices, institutional investors, and stock return volatility. *Journal of Accounting Research:* 171–202.

Canina, Linda, Roni Michaely, Richard Thaler, and Kent Womack. 1998. Caveat compounder: a warning about using the daily crsp equal-weighted index to compute long-run excess returns. *The Journal of Finance* 53 (1): 403–416.

Cao, Sean Shun, Guang Ma, Jennifer Wu Tucker, and Chi Wan. 2018. Technological peer pressure and product disclosure. *The Accounting Review* 93 (6): 95–126.

Carlton, Dennis W, and Daniel R Fischel. 1983. The regulation of insider trading. *Stanford Law Review* 35:857.

Chakraborty, Indraneel, and Nickolay Gantchev. 2013. Does shareholder coordination matter? evidence from private placements. *Journal of Financial Economics* 108 (1): 213–230.

Chaplinsky, Susan, and David Haushalter. 2010. Financing under extreme risk: contract terms and returns to private investments in public equity. *The Review of Financial Studies* 23 (7): 2789–2820.

Chemmanur, Thomas J, Shan He, and Gang Hu. 2009. The role of institutional investors in seasoned equity offerings. *Journal of Financial Economics* 94 (3): 384–411.

Chen, Hsuan-Chi, Na Dai, and John D Schatzberg. 2010. The choice of equity selling mechanisms: pipes versus seos. *Journal of Corporate Finance* 16 (1): 104–119.

Cheynel, Edwige, and Amir Ziv. 2016. On market concentration and disclosure. *Working Paper.*

Clinton, Sarah B, Joshua T White, and Tracie Woidtke. 2014. Differences in the information environment prior to seasoned equity offerings under relaxed disclosure regulation. *Journal of Accounting and Economics* 58 (1): 59–78.

Collins, Daniel W, S. P. Kothari, Jay Shanken, and Richard G Sloan. 1994. Lack of timeliness and noise as explanations for the low contemporaneuos return-earnings association. *Journal of Accounting and Economics* 18 (3): 289–324.

Cornelli, Francesca, Zbigniew Kominek, and Alexander Ljungqvist. 2013. Monitoring managers: does it matter? *The Journal of Finance* 68 (2): 431–481.

Corwin, Shane A. 2003. The determinants of underpricing for seasoned equity offers. *The Journal of Finance* 58 (5): 2249–2279.

Covington and Burling. 2005. *A breath of fresh air: the sec adopts securities offering reform amendments.* Https://cov.com/-/media/files/corporate/publications/2005/07/oid16074.pdf.

Crane, Alan D, Sebastien Michenaud, and James P Weston. 2016. The effect of institutional ownership on payout policy: evidence from index thresholds. *The Review of Financial Studies* 29 (6): 1377–1408.

Darrough, Masako N, and Neal M Stoughton. 1990. Financial disclosure policy in an entry game. *Journal of Accounting and Economics* 12 (1-3): 219–243.

Derrien, François, and Ambrus Kecskes. 2007. The initial public offerings of listed firms. *The Journal of Finance* 62 (1): 447–479.

Dey, Aiyesha, and Joshua T White. 2018. Trade secrets protection and antitakeover provisions. *Working Paper.*

Dye, Ronald A. 1985. Disclosure of nonproprietary information. *Journal of Accounting Research:* 123–145.

Eckbo, B Espen, Ronald W Masulis, and Øyvind Norli. 2007. Security offerings. In *Handbook of empirical corporate finance,* 233–373. Elsevier.

Ellis, Jesse A, C Edward Fee, and Shawn E Thomas. 2012. Proprietary costs and the disclosure of information about customers. *Journal of Accounting Research* 50 (3): 685–727.

Fama, Eugene F, and Kenneth R French. 1993. Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33 (1): 3–56.

Fedyk, Tatiana, Zvi Singer, and Mark Soliman. 2017. The sharpest tool in the shed: ipo financial statement management of stem vs. non-stem firms. *Review of Accounting Studies* 22 (4): 1541–1581.

Frankel, Richard, Maureen McNichols, and G Peter Wilson. 1995. Discretionary disclosure and external financing. *The Accounting Review* 70 (1): 135–150.

Gao, Xiaohui, and Jay R Ritter. 2010. The marketing of seasoned equity offerings. *Journal of Financial Economics* 97 (1): 33–52.

Garmaise, Mark J. 2009. Ties that truly bind: noncompetition agreements, executive compensation, and firm investment. *The Journal of Law, Economics, and Organization* 27 (2): 376–425.

Gerlach, Heiko A. 2004. Announcement, entry, and preemption when consumers have switching costs. *RAND Journal of Economics:* 184–202.

Gibson, Scott, Assem Safieddine, and Ramana Sonti. 2004. Smart investments by smart money: evidence from seasoned equity offerings. *Journal of Financial Economics* 72 (3): 581–604.

Gigler, Frank. 1994. Self-enforcing voluntary disclosures. *Journal of Accounting Research* 32 (2): 224–240.

Glaeser, Stephen. 2018. The effects of proprietary information on corporate disclosure and transparency: evidence from trade secrets. *Journal of Accounting and Economics.*

Gomes, Armando, and Gordon Phillips. 2012. Why do public firms issue private and public securities? *Journal of Financial Intermediation* 21 (4): 619–658.

Gow, Ian D, David F Larcker, and Anastasia A Zakolyukina. 2019. Non-answers during conference calls. *Chicago Booth Research Paper,* nos. 19-01.

Guay, Wayne, Delphine Samuels, and Daniel Taylor. 2016. Guiding through the fog: financial statement complexity and voluntary disclosure. *Journal of Accounting and Economics* 62 (2-3): 234–269.

Guo, Re-Jin, Baruch Lev, and Nan Zhou. 2004. Competitive costs of disclosure by biotech ipos. *Journal of Accounting Research* 42 (2): 319–355.

Guo, Lixiong, and Ronald W Masulis. 2015. Board structure and monitoring: new evidence from ceo turnovers. *The Review of Financial Studies* 28 (10): 2770–2811.

Gustafson, Matthew T, and Peter Iliev. 2017. The effects of removing barriers to equity issuance. *Journal of Financial Economics* 124 (3): 580–598.

Hainmueller, Jens. 2012. Entropy balancing for causal effects: a multivariate reweighting method to produce balanced samples in observational studies. *Political Analysis* 20:25–46.

Hanley, Kathleen Weiss, and Gerard Hoberg. 2010. The information content of ipo prospectuses. *The Review of Financial Studies* 23 (7): 2821–2864.

Harris, Mary Stanford. 1998. The association between competition and managers' business segment reporting decisions. *Journal of Accounting Research* 36 (1): 111–128.

Haushalter, David, Sandy Klasa, and William F Maxwell. 2007. The influence of product market dynamics on a firm's cash holdings and hedging behavior. *Journal of Financial Economics* 84 (3): 797–825.

Healy, Paul M, and Krishna G Palepu. 2001. Information asymmetry, corporate disclosure, and the capital markets: a review of the empirical disclosure literature. *Journal of Accounting and Economics* 31 (1-3): 405–440.

Heider, Florian, and Alexander Ljungqvist. 2015. As certain as debt and taxes: estimating the tax sensitivity of leverage from state tax changes. *Journal of Financial Economics* 118 (3): 684–712.

Hertzel, Michael G, and Zhi Li. 2010. Behavioral and rational explanations of stock price performance around seos: evidence from a decomposition of market-to-book ratios. *Journal of Financial and Quantitative Analysis* 45 (4): 935–958.

Hoberg, Gerard, and Vojislav Maksimovic. 2014. Redefining financial constraints: a text-based analysis. *The Review of Financial Studies* 28 (5): 1312–1352.

Hoberg, Gerard, and Gordon Phillips. 2010a. Product market synergies and competition in mergers and acquisitions: a text-based analysis. *The Review of Financial Studies* 23 (10): 3773–3811.

———. 2010b. Real and financial industry booms and busts. *The Journal of Finance* 65 (1): 45–86.

———. 2016. Text-based network industries and endogenous product differentiation. *Journal of Political Economy* 124 (5): 1423–1465.

Hoberg, Gerard, Gordon Phillips, and Nagpurnanand Prabhala. 2014. Product market threats, payouts, and financial flexibility. *The Journal of Finance* 69 (1): 293–324.

Jo, Hoje, and Yongtae Kim. 2007. Disclosure frequency and earnings management. *Journal of Financial Economics* 84 (2): 561–590.

Jovanovic, Boyan. 1982. Selection and the evolution of industry. *Econometrica: Journal of the Econometric Society:* 649–670.

Kankanhalli, Gaurav, Alan Kwan, and Kenneth Merkley. 2018. Speech is silver, but silence is golden: information suppression and the promotion of innovation. *Working Paper.*

Karpoff, Jonathan M, Gemma Lee, and Ronald W Masulis. 2013. Contracting under asymmetric information: evidence from lockup agreements in seasoned equity offerings. *Journal of Financial Economics* 110 (3): 607–626.

Karuna, Christo. 2010. Discussion of "the impact of product market competition on the quantity and quality of voluntary disclosures". *Review of Accounting Studies* 15 (3): 712–723.

Kimbrough, Michael D, and Henock Louis. 2011. Voluntary disclosure to influence investor reactions to merger announcements: an examination of conference calls. *The Accounting Review* 86 (2): 637–667.

King, Ronald, Grace Pownall, and Gregory Waymire. 1990. Expectations adjustment via timely management forecasts: review, synthesis, and suggestions for future research. *Journal of Accounting Literature* 9 (1): 113–144.

Klasa, Sandy, Hernan Ortiz-Molina, Matthew Serfling, and Shweta Srinivasan. 2018. Protection of trade secrets and capital structure decisions. *Journal of Financial Economics* 128 (2): 266–286.

Kothari, S. P, Natalie Mizik, and Sugata Roychowdhury. 2016. Managing for the moment: the role of earnings management via real activities versus accruals in seo valuation. *The Accounting Review* 91 (2): 559–586.

Kumar, Praveen, Nisan Langberg, Jacob Oded, and K Sivaramakrishnan. 2017. Voluntary disclosure and strategic stock repurchases. *Journal of Accounting and Economics* 63 (2-3): 207–230.

Kumar, Praveen, Nisan Langberg, and K Sivaramakrishnan. 2016. Voluntary disclosure with informed trading in the ipo market. *Journal of Accounting Research* 54 (5): 1365–1394.

Lang, Mark H, and Russell J Lundholm. 2000. Voluntary disclosure and equity offerings: reducing information asymmetry or hyping the stock? *Contemporary Accounting Research* 17 (4): 623–662.

Lang, Mark, and Edward Sul. 2014. Linking industry concentration to proprietary costs and disclosure: challenges and opportunities. *Journal of Accounting and Economics* 58 (2-3): 265–274.

Leary, Mark T, and Michael R Roberts. 2010. The pecking order, debt capacity, and information asymmetry. *Journal of Financial Economics* 95 (3): 332–355.

Leone, Andrew J, Steve Rock, and Michael Willenborg. 2007. Disclosure of intended use of proceeds and underpricing in initial public offerings. *Journal of Accounting Research* 45 (1): 111–153.

Lerman, Alina, and Joshua Livnat. 2010. The new form 8-k disclosures. *Review of Accounting Studies* 15 (4): 752–778.

Leuz, Christian. 2004. Proprietary versus non-proprietary disclosures: evidence from germany. *The Economics and Politics of Accounting* 13 (4): 164–199.

Lev, Baruch. 2000a. *Intangibles: management, measurement, and reporting.* Brookings institution press.

———. 2000b. *Intangibles: management, measurement, and reporting.* Brookings institution press.

Li, Feng, Russell Lundholm, and Michael Minnis. 2013. A measure of competition based on 10-k filings. *Journal of Accounting Research* 51 (2): 399–436.

Li, Oliver Zhen, and Zili Zhuang. 2012. Management guidance and the underpricing of seasoned equity offerings. *Contemporary Accounting Research* 29 (3): 710–737.

Li, Xi. 2010. The impacts of product market competition on the quantity and quality of voluntary disclosures. *Review of Accounting Studies* 15 (3): 663–711.

Li, Yinghua, Yupeng Lin, and Liandong Zhang. 2018. Trade secrets law and corporate disclosure: causal evidence on the proprietary cost hypothesis. *Journal of Accounting Research* 56 (1): 265–308.

Lim, Jongha, Michael W Schwert, and Michael S Weisbach. 2019. The economics of pipes. *Working Paper.*

Lowry, Michelle, Roni Michaely, and Ekaterina Volkova. 2017. Initial public offerings: a synthesis of the literature and directions for future research. *Foundations and Trends and in Finance* 11 (3-4): 154–320.

Lundholm, Russell, and Linda A Myers. 2002. Bringing the future forward: the effect of disclosure on the returns-earnings relation. *Journal of Accounting Research* 40 (3): 809–839.

McMullin, Jeff L., and Bryce Schonberger. 2018. Entropy-balanced discretionary accruals. *Working paper.*

Merkley, Kenneth J. 2013. Narrative disclosure and earnings performance: evidence from r&d disclosures. *The Accounting Review* 89 (2): 725–757.

Michaely, Roni, and Christopher Vincent. 2013. Do institutional investors influence capital structure decisions. *Working Paper.*

Muslu, Volkan, Suresh Radhakrishnan, KR Subramanyam, and Dongkuk Lim. 2015. Forward-looking md&a disclosures and the information environment. *Management Science* 61 (5): 931–948.

Myers, Stewart C, and Nicholas S Majluf. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13 (2): 187–221.

Nagar, Venky, Dhananjay Nanda, and Peter Wysocki. 2003. Discretionary disclosure and stock-based incentives. *Journal of Accounting and Economics* 34 (1-3): 283–309.

Newman, Paul, and Richard Sansing. 1993. Disclosure policies with multiple users. *Journal of Accounting Research* 31 (1): 92–112.

Raith, Michael. 2003. Competition, risk, and managerial incentives. *American Economic Review* 93 (4): 1425–1436.

Rhodes–Kropf, Matthew, David T Robinson, and S Viswanathan. 2005. Valuation waves and merger activity: the empirical evidence. *Journal of Financial Economics* 77 (3): 561–603.

Roberts, Michael R, and Toni M Whited. 2013. Endogeneity in empirical corporate finance1. In *Handbook of the economics of finance,* 2:493–572. Elsevier.

Rosenbaum, Paul R, and Donald B Rubin. 1983. The central role of the propensity score in observational studies for causal effects. *Biometrika* 70 (1): 41–55.

Safieddine, Assem, and William J Wilhelm. 1996. An empirical investigation of short-selling activity prior to seasoned equity offerings. *The Journal of Finance* 51 (2): 729–749.

Schipper, Katherine. 1991. Analysts' forecasts. *Accounting Horizons* 5 (4): 105–121.

Shipman, Jonathan E, Quinn T Swanquist, and Robert L Whited. 2017. Propensity score matching in accounting research. *The Accounting Review* 92 (1): 213–244.

Shleifer, Andrei, and Robert W Vishny. 1986. Large shareholders and corporate control. *Journal of Political Economy* 94 (3, Part 1): 461–488.

Shroff, Nemit, Amy X Sun, Hal D White, and Weining Zhang. 2013. Voluntary disclosure and information asymmetry: evidence from the 2005 securities offering reform. *Journal of Accounting Research* 51 (5): 1299–1345.

Teoh, Siew Hong, Ivo Welch, and Tak Jun Wong. 1998. Earnings management and the underperformance of seasoned equity offerings. *Journal of Financial Economics* 50 (1): 63–99.

Verrecchia, Robert E. 1983. Discretionary disclosure. *Journal of Accounting and Economics* 5:179–194.

———. 1990. Endogenous proprietary costs through firm interdependence. *Journal of Accounting and Economics* 12 (1-3): 245–250.

———. 2001. Essays on disclosure. *Journal of Accounting and Economics* 32 (1-3): 97–180.

Verrecchia, Robert E, and Joseph Weber. 2006. Redacted disclosure. *Journal of Accounting Research* 44 (4): 791–814.

Wang, Isabel Yanyan. 2007. Private earnings guidance and its implications for disclosure regulation. *The Accounting Review* 82 (5): 1299–1332.

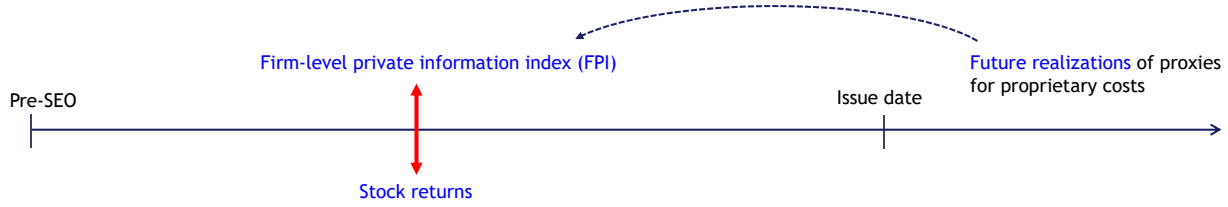
Warfield, Terry D, and John J Wild. 1992. Accounting recognition and the relevance of earnings as an explanatory variable for returns. *The Accounting Review* 67 (4): 821–842.

Wooldridge, Jeffrey M. 2010. *Econometric analysis of cross section and panel data.* MIT press.

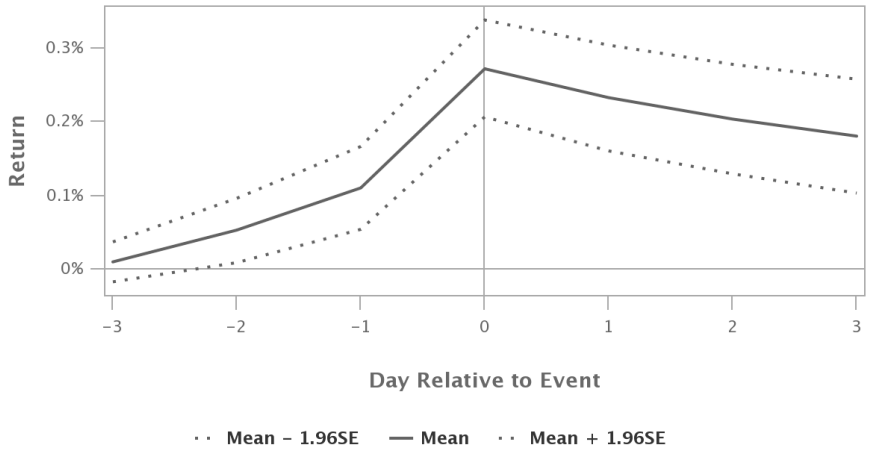
Wu, YiLin. 2004. The choice of equity-selling mechanisms. *Journal of Financial Economics* 74 (1): 93–119.

Figure 1: Revealed Disclosure: Illustration and Example

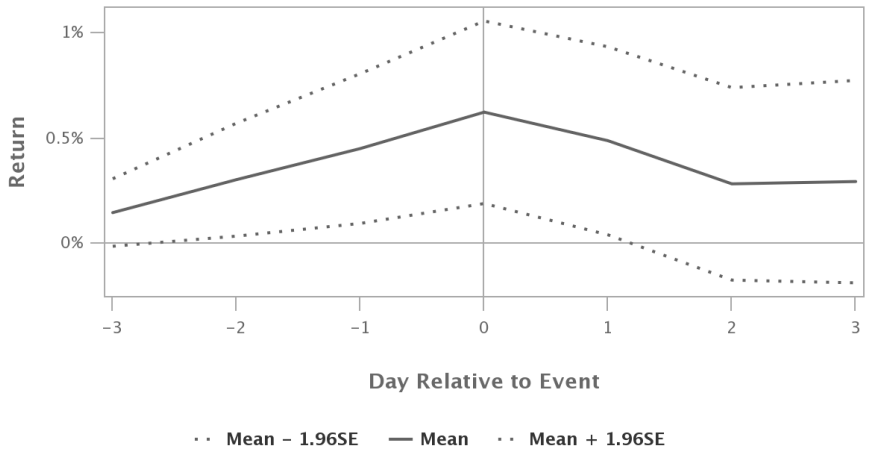
Figure 1a illustrates the revealed disclosure methodology. The association between firm-level private information index and stock returns in the 90-day period prior to equity issue date reveals proprietary information disclosures. Figures 1b and 1c plot Cumulative Abnormal Returns (CARs) for Compustat-CRSP universe and for SEO firms in my sample, respectively. CARs around Form 8-K (Item 7.01) filing dates are calculated using a Fama-French three-factor model.



(a) Revealed Disclosure Methodology Illustration



(b) CARs for Compustat-CRSP Universe Around Form 8-K Filing Dates



(c) CARs for SEO Firms in my Sample Around Form 8-K Filing Dates

Figure 2: Textual Analysis of 8-K Filings with Item 7.01 (Regulation FD Disclosures)

This figure shows fraction of Form 8-K filings with item 7.01 (Regulation FD disclosure) containing keywords listed below the bars. Light gray and dark blue bars plot fraction of Form 8-Ks with a certain keyword for Compustat-CRSP universe and for SEO firms in my sample, respectively. The Securities and Exchange Commission (SEC) has mandated new disclosure requirements in Form 8-K, which became effective on August 23, 2004. The SEC expanded the list of items that have to be reported, including item 7.01. Form 8-Ks are downloaded from SEC's EDGAR system for the period of 2004-2018.

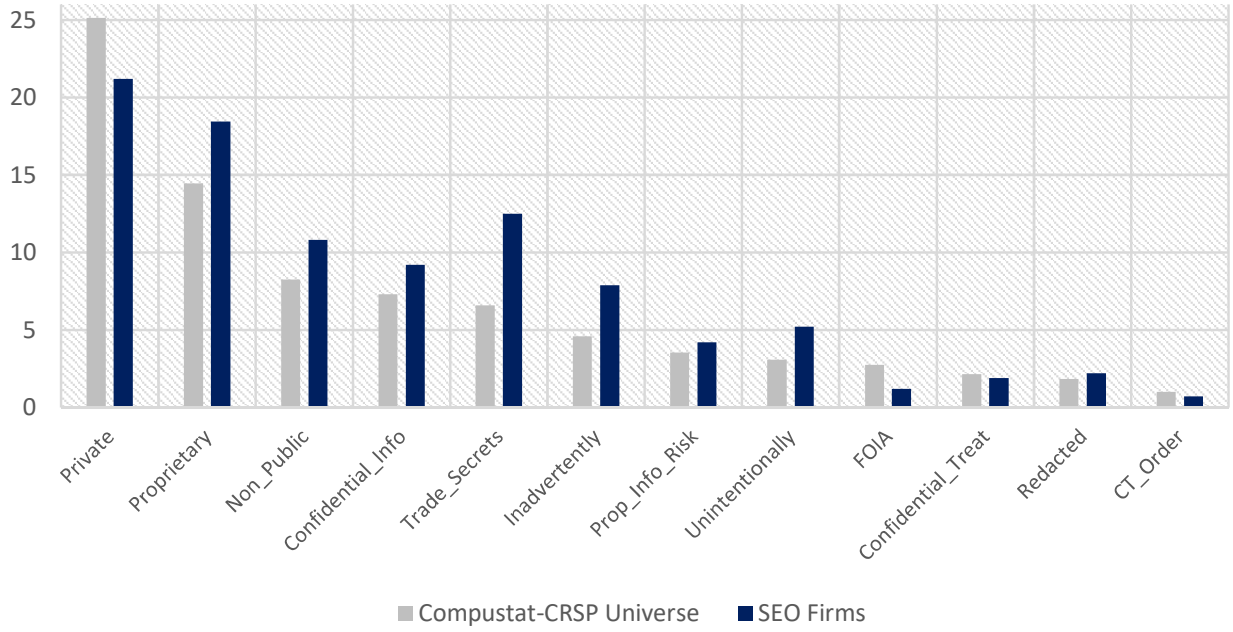


Figure 3: Parallel Trends in Proprietary Information Disclosures

This figure shows differences in terms of proprietary information disclosure between SEO and matched control firms. To construct the figure, I include year indicators interacted with the relevant variables Eq. (3.2) (similar to the indicator *Post*) and plot the coefficients of the interaction term $SEO * FPI * Year$ for each year. The bars represent 90% confidence intervals.

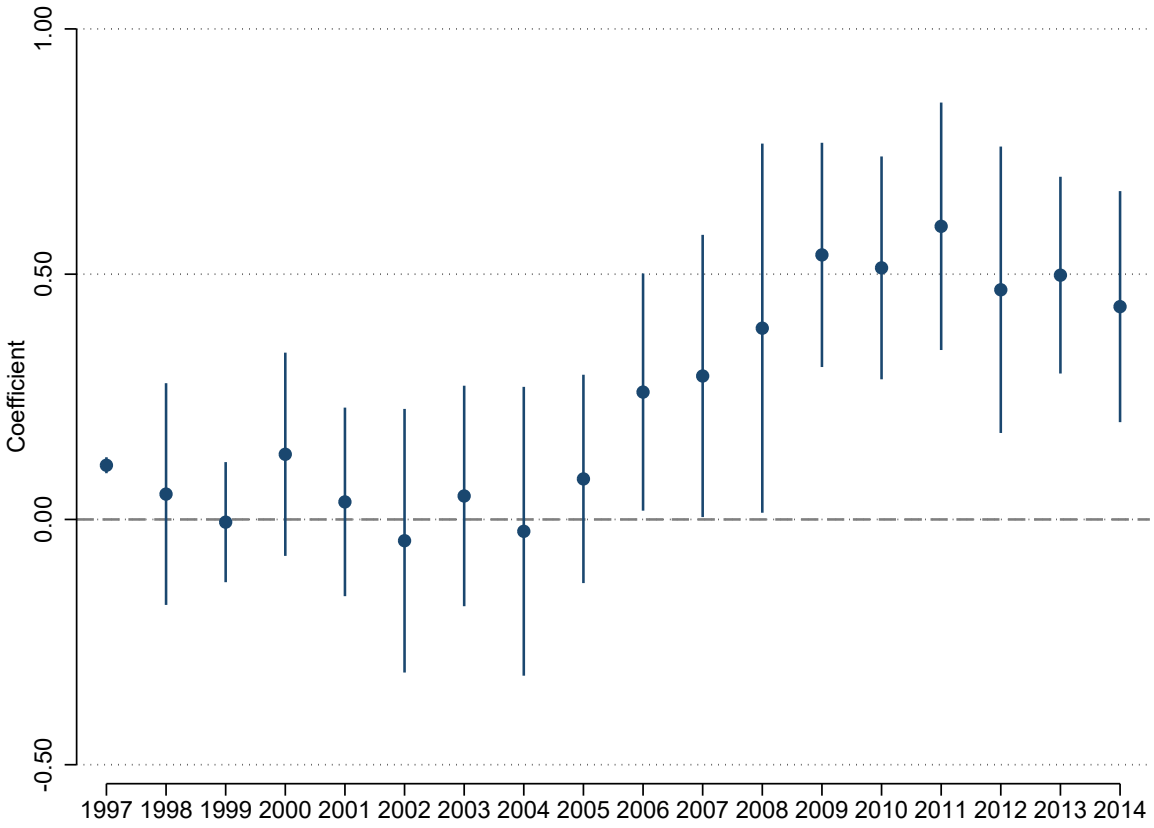


Figure 4: Timeline of Registration Process

This figure shows the timeline of the registration process in the post-Securities Offering Reform period. It also illustrates differences in communication and registration process between well-known seasoned issuers (WKSI) and non-well-known seasoned issuers (Non-WKSI).

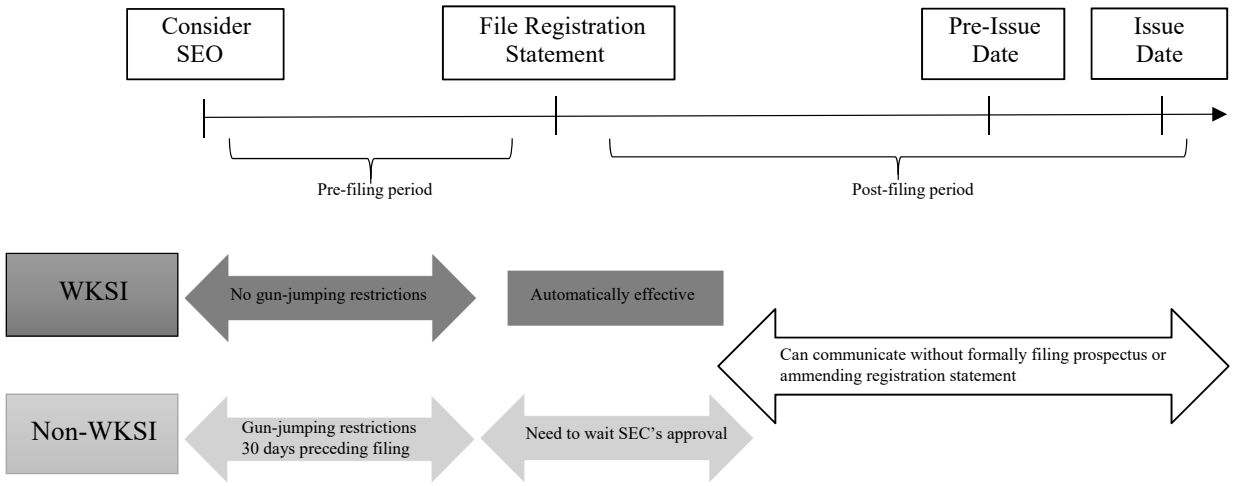


Figure 5: Free Writing Prospectuses Filed Over the Years

This figure shows the number of free writing prospectuses (FWPs) filed over the years. FWPs are downloaded from the SEC's EDGAR system.

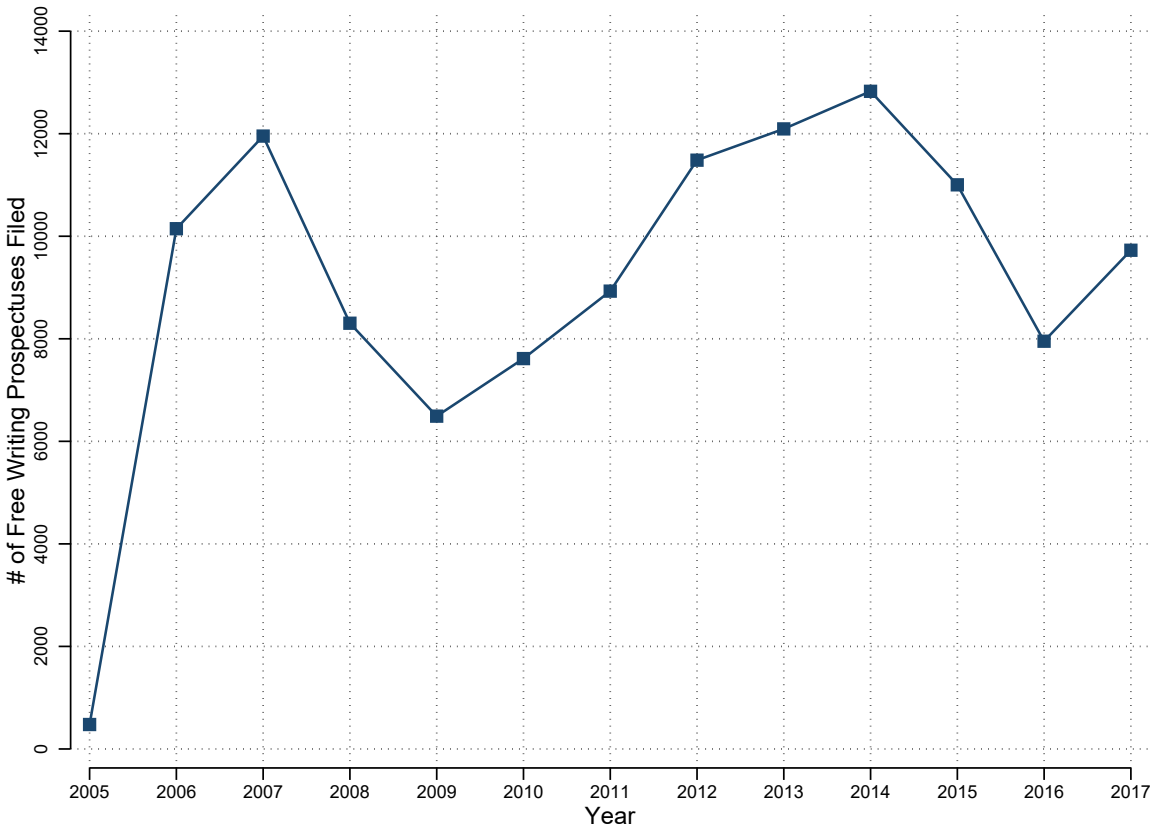


Table 1: Summary Statistics (All Firms)

Panel A of this table presents summary statistics of the variables used in Panels A and B of Table 2. Panel B reports pairwise Pearson correlation coefficients and the p-values in parentheses below the correlation coefficients. Panel C summarizes *Trade Secrets*, *Redacted 10-K* and mean *FPI* by Fama-French 12 industry classification. Note that following Glaeser (2018) I exclude utilities (SIC codes 4900–4942), and therefore, Panel C tabulates 11 industries. Panel D (E) presents relation between *Trade Secrets* (*Redacted 10-K*) and *FPI*. Panel F presents mean *FPI* for each decile of various concentration/competition measures. All variables are defined in Appendix A.

	N	Mean	P25	Median	P75	SD
Dependent Variables						
Trade Secrets	91,072	0.40	0.00	0.00	1.00	0.49
Trade Secrets Count	91,072	1.98	0.00	0.00	3.00	3.72
Redacted 10-K	91,072	0.13	0.00	0.00	0.00	0.34
Regulatory Variables						
Uniform Trade Secrets Act	91,072	0.63	0.00	1.00	1.00	0.48
Inevitable Disclosure Doctrine	91,072	0.46	0.00	0.00	1.00	0.50
Noncompete Enforcement Index	91,072	3.55	3.00	4.00	5.00	2.09
FPI	91,072	0.18	0.10	0.18	0.25	0.11
Firm Characteristics						
Ln(Size)	91,072	5.83	4.23	5.74	7.29	2.16
Leverage	91,072	0.21	0.02	0.16	0.34	0.21
Return on Assets	91,072	-0.02	-0.02	0.02	0.07	0.20
Market-To-Book	91,072	2.92	1.09	1.78	3.12	3.77
Loss	91,072	0.30	0.00	0.00	1.00	0.46
Special Items	91,072	-0.01	-0.01	0.00	0.00	0.05
Blockholders	91,072	1.66	0.00	1.00	3.00	1.62
Research & Development	91,072	0.04	0.00	0.00	0.04	0.10
Missing R&D	91,072	0.48	0.00	0.00	1.00	0.50
Debt Issuance	91,072	0.50	0.00	1.00	1.00	0.50
Return on Assets	91,072	-0.02	-0.02	0.02	0.07	0.20
Firm Age	91,072	16.10	6.00	12.00	21.00	13.20
Comp. HHI	91,072	0.15	0.06	0.10	0.18	0.15
Ln(Number of Exhibits)	91,072	1.43	0.00	1.79	2.30	1.05
Market Characteristics						
Returns	91,072	0.15	-0.24	0.06	0.37	0.65
Return Volatility	91,072	0.14	0.08	0.12	0.18	0.09
Market Size	91,072	11.49	10.36	11.49	12.87	1.68
Entry Cost	91,072	10.39	1.00	3.94	13.50	17.99
Product Substitutability	91,072	1.11	1.00	1.08	1.23	0.44
Market Share	91,072	0.04	0.00	0.00	0.02	0.10

Panel B: Pearson Correlation

Variables	*FPI*	*Trade Secrets*	*Redacted 10-K*	*Comp. HHI*	*TNIC HHI*	*Fitted HHI*	*PCT COMP*
FPI	1.00						
	(.)						
Trade Secrets	0.11	1.00					
	(0.00)	(.)					
Redacted 10-K	0.10	0.29	1.00				
	(0.00)	(0.00)	(.)				
Comp. HHI	-0.07	-0.04	-0.05	1.00			
	(0.00)	(0.00)	(0.00)	(.)			
TNIC HHI	-0.04	0.07	-0.02	0.24	1.00		
	(0.00)	(0.00)	(0.00)	(0.00)	(.)		
Fitted HHI	-0.07	-0.21	-0.11	0.60	0.07	1.00	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(.)	
PCTCOMP	-0.01	0.12	-0.01	-0.12	-0.06	-0.11	1.00
	(0.09)	(0.00)	(0.18)	(0.00)	(0.00)	(0.00)	(.)

Panel C: Trade Secrets, Redacted 10-K, and Mean FPI by Fama-French 12 Industries

	Trade Secrets	Redacted 10-K	
Industry	% of Firm-Years	% of Firm-Years	Mean FPI
Consumer Non-Durables	32%	11%	0.16
Consumer Durables	39%	7%	0.18
Manufacturing	40%	8%	0.17
Energy	15%	7%	0.17
Chemicals	46%	15%	0.19
Business Equipment	74%	20%	0.20
Telecom	29%	15%	0.20
Retail	30%	10%	0.16
Healthcare	73%	37%	0.23
Finance	15%	4%	0.18
Other	29%	11%	0.16

Panel D: Relation Between Trade Secrets and FPI						
	FPI					
Trade Secrets	Mean	P1	P25	Median	P75	P99
Yes	0.20	0.00	0.10	0.20	0.28	0.48
No	0.17	0.00	0.10	0.17	0.24	0.41
Difference	0.03***			0.03***		
t- and z-stats	32.47			27.99		

Panel E: Relation Between Redacted 10-K and FPI						
	FPI					
Redacted 10-K	Mean	P1	P25	Median	P75	P99
Yes	0.21	0.00	0.10	0.21	0.29	0.49
No	0.18	0.00	0.10	0.18	0.25	0.43
Difference	0.03***			0.03***		
t- and z-stats	29.18			25.20		

Panel F: Mean FPI and Concentration/Competition Measures				
Decile	*Comp. HHI*	*TNIC HHI*	*Fitted HHI*	*PCTCOMP*
1	0.19	0.17	0.19	0.18
2	0.20	0.18	0.17	0.19
3	0.21	0.19	0.17	0.19
4	0.19	0.19	0.21	0.19
5	0.17	0.19	0.19	0.19
6	0.18	0.18	0.18	0.19
7	0.18	0.18	0.17	0.18
8	0.17	0.17	0.16	0.18
9	0.17	0.17	0.16	0.18
10	0.17	0.17	0.17	0.19

Table 2: Determinants of Trade Secrets and Redacted 10-K

Panel A of this table reports the results from probit (Columns 1-2) and OLS (Columns 3-4) regressions of trade secrecy measures. Panel B presents the estimates of marginal effects from probit models of redaction measure. Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered by the headquarter state and the year in Panel A, by Fama-French 49 industry classification in Panel B, and t- and z-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

Panel A: Trade Secrets				
Dependent Variable =	Trade Secrets		Trade Secrets Count	
	(1)	(2)	(3)	(4)
FPI	0.483***	0.338***	1.443***	0.858***
	(3.52)	(3.05)	(4.68)	(4.00)
Uniform Trade Secrets Act	0.335***	0.367***	0.522***	0.575***
	(4.15)	(5.45)	(3.19)	(4.09)
Inevitable Disclosure Doctrine	0.174**	0.160**	0.193	0.161
	(2.26)	(2.36)	(1.11)	(1.06)
Noncompete Enforcement Index	0.042***	0.049***	0.068***	0.069***
	(2.94)	(4.21)	(2.75)	(3.22)
Ln(Size)	0.023***	0.031***	0.091***	0.100***
	(3.07)	(4.41)	(4.78)	(5.69)
Leverage	-0.483***	-0.268***	-0.810***	-0.395***
	(-4.84)	(-3.22)	(-4.26)	(-2.62)
Return on Assets	0.381***	-0.044	0.127	-0.326
	(2.76)	(-0.50)	(0.63)	(-1.50)
Market-To-Book	0.021***	0.014***	0.032***	0.015***
	(3.68)	(3.02)	(4.28)	(3.00)
Returns	-0.074***	-0.053***	-0.134***	-0.095***
	(-3.58)	(-3.42)	(-3.69)	(-3.18)
Return Volatility	2.493***	1.807***	3.887***	2.961***
	(10.90)	(11.89)	(10.07)	(8.60)
Loss	0.145***	0.100***	0.449***	0.340***
	(2.90)	(2.75)	(3.77)	(3.40)
Special Items	-1.553***	-0.539***	-1.328*	-0.589
	(-6.65)	(-3.30)	(-1.91)	(-1.14)
Blockholders	0.088***	0.074***	0.160***	0.139***
	(14.38)	(14.35)	(10.41)	(9.51)
Research & Development	5.084***	2.845***	10.790***	6.450***
	(12.67)	(10.95)	(12.52)	(9.60)
Missing R&D	-0.438***	-0.169***	-0.761***	-0.364***
	(-7.58)	(-3.60)	(-5.43)	(-3.73)
Year FE	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes
Pseudo R^2	0.22	0.28	.	.
Adjusted R^2	.	.	0.21	0.24
Observations	91,072	91,072	91,072	91,072

Panel B: Redacted 10-K				
Dependent Variable =	Redacted 10-K			
	(1)	(2)	(3)	(4)
FPI	0.103***	0.101***	0.064***	0.062***
	(2.63)	(2.93)	(3.52)	(3.43)
Debt Issuance	-0.026***	-0.026***	-0.021***	-0.020***
	(-4.39)	(-4.50)	(-4.62)	(-4.30)
Return on Assets	0.041	0.080*	0.007	0.017
	(1.02)	(1.89)	(0.28)	(0.62)
Loss	0.064***	0.046***	0.042***	0.039***
	(4.04)	(3.87)	(4.94)	(4.60)
Ln(Size)	0.009***	0.013***	0.008***	0.011***
	(3.24)	(3.93)	(4.07)	(5.27)
Research & Development	0.638***	0.612***	0.346***	0.338***
	(9.40)	(9.27)	(8.13)	(8.22)
Firm Age	-0.002***	-0.002***	-0.003***	-0.002***
	(-4.54)	(-5.35)	(-7.84)	(-7.19)
Comp. HHI	0.029	0.023	0.013	0.037
	(0.53)	(0.87)	(0.32)	(1.34)
Ln(Number of Exhibits)	0.067***	0.068***	0.069***	0.069***
	(7.30)	(8.43)	(12.95)	(12.99)
Market Size		-0.010		-0.010
		(-1.34)		(-1.32)
Entry Cost		0.001*		0.001*
		(1.71)		(1.82)
Product Substitutability		-0.064***		-0.021
		(-3.46)		(-1.48)
Market Share		-0.202***		-0.209***
		(-3.82)		(-4.28)
Year FE	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes
Pseudo R^2	0.19	0.20	0.23	0.24
Observations	91,072	91,072	91,072	91,072

Table 3: Sample Selection (Revelation of Information Sample)

This table reports my sample selection process. The first column describes the filter applied, the second (third) column contains the number of observations lost (remaining) after each filter step.

Filter Description		**# of Observations**
Firms with positive total assets in Compustat from 1997 - 2017		212,757
Less: Utilities & financial firms (SIC 4900-4999 & 6000-6999)	(49,236)	163,521
Observations with missing CRSP identifiers & variables	(73,829)	89,692
Observations with missing *FPI*	(16,779)	72,913
Observations with missing control variables	(21,758)	51,155
Full sample – all firms		51,155
Less: SEO firms in the five-year window surrounding		
the SEO issuance year	(6,392)	44,763
Observations eliminated after matching	(38,963)	5,800
Observations with missing control variables	(146)	5,654
Matched sample – 2,827 SEO and 2,827 matched non-SEO firms		5,654

Table 4: Summary Statistics (Revelation of Information Sample)

This table presents summary statistics of the variables used in this paper. Panels A and B report statistics for the matched sample and all firms, respectively. All variables are defined in Appendix A.

Panel A – Matched Firms

	N	Mean	P25	Median	P75	SD
FPI	5,654	0.19	0.10	0.18	0.26	0.10
Ln(Total Assets)	5,654	5.69	4.27	5.62	7.06	1.91
Ln(Market Value of Equity)	5,654	6.09	4.92	6.07	7.21	1.69
Book-to-Market	5,654	0.45	0.19	0.34	0.59	0.39
Earnings (t-1)	5,654	-0.01	-0.06	0.03	0.07	0.22
Earnings	5,654	-0.01	-0.05	0.03	0.07	0.19
Earnings (t+1)	5,654	-0.02	-0.06	0.03	0.06	0.20
Earnings (t+2)	5,654	-0.04	-0.08	0.02	0.06	0.25
Earnings (t+3)	5,654	-0.08	-0.10	0.02	0.06	0.33
Raw BHAR	5,654	0.19	-0.05	0.10	0.30	0.43
Mkt-Adj. BHAR	5,654	0.13	-0.09	0.05	0.24	0.41
Raw BHAR (t+1)	5,654	0.06	-0.35	-0.03	0.30	0.63
Raw BHAR (t+2)	5,654	0.12	-0.32	-0.00	0.36	0.74
Raw BHAR (t+3)	5,654	0.14	-0.30	0.04	0.38	0.71
Mkt-Adj. BHAR (t+1)	5,654	-0.01	-0.37	-0.10	0.21	0.58
Mkt-Adj. BHAR (t+2)	5,654	0.05	-0.34	-0.07	0.24	0.67
Mkt-Adj. BHAR (t+3)	5,654	0.07	-0.31	-0.04	0.26	0.65
Idiosyncratic Volatility	5,654	0.03	0.02	0.03	0.04	0.02
Beta	5,654	0.53	0.32	0.52	0.72	0.32
Illiquidity	5,654	0.19	0.00	0.01	0.09	0.48

Panel B – All Firms

	N	Mean	P25	Median	P75	SD
FPI	51,155	0.20	0.13	0.19	0.27	0.10
Ln(Total Assets)	51,155	5.96	4.41	5.86	7.42	2.11
Ln(Market Value of Equity)	51,155	6.02	4.46	5.96	7.45	2.16
Book-to-Market	51,155	0.65	0.27	0.49	0.82	0.62
Internal Funds	51,155	0.47	0.00	0.00	1.00	0.50
Debt Issuance	51,155	0.47	0.00	0.00	1.00	0.50
Equity Issuance	51,155	0.06	0.00	0.00	0.00	0.24
Earnings (t-1)	51,155	0.02	-0.04	0.04	0.07	0.33
Earnings	51,155	0.00	-0.04	0.04	0.07	0.35
Earnings (t+1)	51,155	-0.01	-0.05	0.04	0.07	0.39
Earnings (t+2)	51,155	-0.01	-0.05	0.04	0.07	0.41
Earnings (t+3)	51,155	-0.02	-0.06	0.03	0.07	0.46
Raw BHAR	51,155	0.19	-0.26	0.05	0.41	0.77
Mkt-Adj. BHAR	51,155	0.09	-0.31	-0.04	0.27	0.71
Raw BHAR (t+1)	51,155	0.18	-0.27	0.03	0.38	0.76
Raw BHAR (t+2)	51,155	0.19	-0.24	0.05	0.39	0.75
Raw BHAR (t+3)	51,155	0.14	-0.25	0.04	0.36	0.66
Mkt-Adj. BHAR (t+1)	51,155	0.10	-0.30	-0.04	0.27	0.70
Mkt-Adj. BHAR (t+2)	51,155	0.11	-0.28	-0.02	0.28	0.69
Mkt-Adj. BHAR (t+3)	51,155	0.07	-0.28	-0.03	0.26	0.60

Table 5: Baseline Results

This table reports results from OLS regressions. Panels A and B present results for the matched sample and all firms, respectively. In Panel A, the dependent variables are *Raw BHAR* (buy-and-hold return that begins three months before and ends two days before issuance day) and *Market-Adjusted BHAR* (the buy-and-hold return that begins three months before and ends two days before issuance day less corresponding CRSP value-weighted market return). In Panel B, the dependent variables are *Raw BHAR* (buy-and-hold return for the 12-month period starting three months after year $t-1$ fiscal year-end) and *Market-Adjusted BHAR* (buy-and-hold return for the 12-month period starting three months after year $t-1$ fiscal year-end less the corresponding CRSP value-weighted market return). Columns (2) and (5) exclude the financial crisis years (2007-2009). Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered at the firm level and t-statistics are reported in parentheses. All variables are defined in Appendix A. ***, **, and * indicate statistical significance level at 1%, 5%, and 10%, respectively.

Panel A – Matched Firms

Dependent Variable =	Raw BHAR			Market-Adjusted BHAR		
	(1)	(2)	(3)	(4)	(5)	(6)
FPI			0.092***			0.088***
			(7.05)			(6.86)
Earnings (t-1)	-0.516***	-0.420***	-0.493***	-0.493***	-0.410***	-0.471***
	(-5.95)	(-4.99)	(-5.71)	(-5.78)	(-5.00)	(-5.55)
Earnings	-0.039	0.213*	0.093	-0.044	0.301**	0.201
	(-0.31)	(1.90)	(0.35)	(-0.69)	(2.34)	(1.44)
Earnings (t+1)	0.952***	0.903***	0.952***	0.929***	0.879***	0.929***
	(11.84)	(10.78)	(11.92)	(11.79)	(10.70)	(11.89)
Earnings (t+2)	0.221***	0.182***	0.217***	0.210***	0.166***	0.206***
	(3.78)	(2.77)	(3.74)	(3.69)	(2.61)	(3.65)
Earnings (t+3)	0.119***	0.114***	0.113***	0.110***	0.105**	0.105**
	(2.82)	(2.59)	(2.69)	(2.69)	(2.44)	(2.56)
Raw BHAR (t+1)	-0.217***	-0.231***	-0.235***			
	(-9.12)	(-9.01)	(-9.87)			
Raw BHAR (t+2)	-0.104***	-0.095***	-0.110***			
	(-6.57)	(-5.27)	(-6.96)			
Raw BHAR (t+3)	-0.089***	-0.091***	-0.093***			
	(-4.57)	(-4.32)	(-4.81)			
Mkt-Adj. BHAR (t+1)				-0.178***	-0.189***	-0.197***
				(-7.80)	(-7.75)	(-8.60)
Mkt-Adj. BHAR (t+2)				-0.102***	-0.103***	-0.108***
				(-6.52)	(-5.76)	(-6.90)
Mkt-Adj. BHAR (t+3)				-0.070***	-0.070***	-0.073***
				(-3.73)	(-3.49)	(-3.95)
Year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Crisis Yrs. Included	Y	N	Y	Y	N	Y
Adjusted R^2	0.21	0.19	0.22	0.14	0.14	0.15
Observations	5,654	4,875	5,654	5,654	4,875	5,654

Panel B – All Firms						
Dependent Variable =	Raw BHAR			Market-Adjusted BHAR		
	(1)	(2)	(3)	(4)	(5)	(6)
FPI			0.098***			0.095***
			(26.75)			(26.44)
Earnings (t-1)	-0.371***	-0.329***	-0.354***	-0.362***	-0.325***	-0.345***
	(-20.83)	(-18.43)	(-20.16)	(-20.60)	(-18.61)	(-19.95)
Earnings	0.021	0.039*	0.038*	0.023	0.047**	0.040**
	(1.04)	(1.88)	(1.91)	(1.15)	(2.32)	(2.00)
Earnings (t+1)	0.311***	0.320***	0.310***	0.300***	0.307***	0.299***
	(24.97)	(22.12)	(25.15)	(24.70)	(21.84)	(24.88)
Earnings (t+2)	0.075***	0.055***	0.072***	0.074***	0.054***	0.071***
	(7.33)	(4.94)	(7.09)	(7.49)	(5.02)	(7.24)
Earnings (t+3)	0.033***	0.025***	0.026***	0.031***	0.024***	0.025***
	(3.67)	(2.79)	(2.94)	(3.54)	(2.71)	(2.84)
Raw BHAR (t+1)	-0.131***	-0.132***	-0.147***			
	(-25.44)	(-22.48)	(-28.02)			
Raw BHAR (t+2)	-0.074***	-0.064***	-0.083***			
	(-15.47)	(-11.65)	(-17.60)			
Raw BHAR (t+3)	-0.064***	-0.072***	-0.069***			
	(-11.48)	(-12.09)	(-12.40)			
Mkt-Adj. BHAR (t+1)				-0.108***	-0.108***	-0.124***
				(-21.29)	(-18.73)	(-24.00)
Mkt-Adj. BHAR (t+2)				-0.075***	-0.076***	-0.085***
				(-15.92)	(-14.02)	(-18.02)
Mkt-Adj. BHAR (t+3)				-0.052***	-0.057***	-0.057***
				(-9.38)	(-9.75)	(-10.33)
Year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Crisis Yrs. Included	Y	N	Y	Y	N	Y
Adjusted R^2	0.21	0.17	0.22	0.12	0.12	0.14
Observations	51,155	43,157	51,155	51,155	43,157	51,155

Table 6: Seasoned Equity Offerings and Proprietary Information Disclosure

This table reports results from OLS regressions. The dependent variable in Panel A, *Raw BHAR*, is buy-and-hold return that begins three months before and ends two days before equity issuance day. The dependent variable in Panel B, *Market-Adjusted BHAR*, is buy-and-hold return that begins three months before and ends two days before issuance day less the corresponding CRSP value-weighted market return. Controls are all independent variables in Eq. 2.2 (Table 5). Market-based controls include *Idiosyncratic Volatility, Illiquidity,* and *Beta*. Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered at the firm level and t-statistics are reported in parentheses. All variables are defined in Appendix A. ***, **, and * indicate statistical significance level at 1%, 5%, and 10%, respectively.

Panel A

Dependent Variable =	Raw BHAR			
	(1)	(2)	(3)	(4)
FPI	0.163**	0.164**	0.074	0.078
	(2.09)	(2.16)	(0.75)	(0.81)
SEO			0.131***	0.121***
			(6.37)	(6.08)
*SEO*FPI*			0.224*	0.232*
			(1.68)	(1.79)
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Mkt.-Based Controls	N	Y	N	Y
Adjusted R^2	0.09	0.13	0.13	0.16
Observations	5,654	5,654	5,654	5,654

Panel B

Dependent Variable =	Market-Adjusted BHAR			
	(1)	(2)	(3)	(4)
FPI	0.166**	0.169**	0.085	0.090
	(2.22)	(2.31)	(0.89)	(0.97)
SEO			0.133***	0.125***
			(6.75)	(6.51)
*SEO*FPI*			0.210	0.220*
			(1.64)	(1.76)
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Mkt.-Based Controls	N	Y	N	Y
Adjusted R^2	0.08	0.12	0.12	0.16
Observations	5,654	5,654	5,654	5,654

Table 7: Securities Offering Reform and Proprietary Information Disclosure

This table reports results from OLS regressions. The dependent variable in Columns (1)–(2), *Raw BHAR*, is the buy-and-hold return that begins three months before and ends two days before equity issuance day. The dependent variable in Columns (3)–(4), *Market-Adjusted BHAR*, is the buy-and-hold return that begins three months before and ends two days before equity issuance day less the corresponding CRSP value-weighted market return. Controls are all independent variables in Eq. (2.2) (unexpected earnings and the cumulative change in the current expectations about the future earnings). Market-based controls include *Idiosyncratic Volatility, Illiquidity,* and *Beta*. Complete table with full set of control variables is available in the internet appendix. Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered at the firm level and t-statistics are reported in parentheses. All variables are defined in Appendix A. ***, **, and * indicate statistical significance level at 1%, 5%, and 10%, respectively.

Dependent Variable =	Raw BHAR		Market-Adjusted BHAR	
	(1)	(2)	(3)	(4)
*SEO*Post*FPI*	0.064***	0.060***	0.057***	0.053***
	(3.01)	(2.89)	(2.77)	(2.64)
*SEO*Post*	0.003	-0.011	0.002	-0.012
	(0.12)	(-0.56)	(0.10)	(-0.63)
*SEO*FPI*	-0.020	-0.019	-0.018	-0.017
	(-1.24)	(-1.19)	(-1.17)	(-1.10)
*Post*FPI*	-0.032**	-0.021	-0.031**	-0.021
	(-2.10)	(-1.44)	(-2.15)	(-1.47)
SEO	0.157***	0.156***	0.158***	0.159***
	(9.79)	(9.91)	(10.29)	(10.50)
FPI	0.020	0.018	0.022*	0.020*
	(1.52)	(1.44)	(1.74)	(1.66)
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Mkt.-Based Controls	N	Y	N	Y
Adjusted R^2	0.13	0.16	0.12	0.16
Observations	5,654	5,654	5,654	5,654

Table 8: Proprietary Information Disclosure: Constant sample pre- and post-Reform

This table reports results from OLS regressions for a sample of SEO firms (and their matched counterparts) that have at least two offerings—one in the pre-SOR period and the other in the post-SOR period. The dependent variable in Columns (1)–(2), *Raw BHAR*, is buy-and-hold return that begins three months before and ends two days before equity issuance day. The dependent variable in Columns (3)–(4), *Market-Adjusted BHAR*, is buy-and-hold return that begins three months before and ends two days before equity issuance day less the corresponding CRSP value-weighted market return. Controls are all independent variables in Eq. (2.2) (unexpected earnings and the cumulative change in the current expectations about the future earnings). Market-based controls include *Idiosyncratic Volatility, Illiquidity,* and *Beta*. Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered at the firm level and t-statistics are reported in parentheses. All variables are defined in Appendix A. ***, **, and * indicate statistical significance level at 1%, 5%, and 10%, respectively.

Dependent Variable =	Raw BHAR		Market-Adjusted BHAR	
	(1)	(2)	(3)	(4)
*SEO*Post*FPI*	0.084**	0.084**	0.074*	0.073*
	(2.12)	(2.11)	(1.94)	(1.92)
*SEO*Post*	0.039	0.040	0.039	0.041
	(0.94)	(0.97)	(1.00)	(1.03)
*SEO*FPI*	-0.056*	-0.056*	-0.046	-0.046
	(-1.87)	(-1.88)	(-1.63)	(-1.64)
*Post*FPI*	-0.020	-0.020	-0.014	-0.014
	(-0.73)	(-0.74)	(-0.56)	(-0.56)
SEO	0.117***	0.119***	0.116***	0.118***
	(3.53)	(3.59)	(3.67)	(3.74)
FPI	0.006	0.007	0.007	0.008
	(0.27)	(0.30)	(0.34)	(0.37)
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Mkt.-Based Controls	N	Y	N	Y
Adjusted R^2	0.12	0.11	0.11	0.11
Observations	1,252	1,252	1,252	1,252

Table 9: Financing and Proprietary Information Disclosure

This table reports results from OLS regressions. The dependent variable in Panel A, *Raw BHAR*, is the buy-and-hold return for the 12-month period starting three months after year $t-1$ fiscal year-end. The dependent variable in Panel B, *Market-Adjusted BHAR*, is the buy-and-hold return for the 12-month period starting three months after year $t-1$ fiscal year-end less the corresponding CRSP value-weighted market return. Controls are all independent variables in Eq. (2.2) (unexpected earnings and the cumulative change in the current expectations about the future earnings). Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered at the firm level and t-statistics are reported in parentheses. All variables are defined in Appendix A. ***, **, and * indicate statistical significance level at 1%, 5%, and 10%, respectively.

Panel A

Dependent Variable =	Raw BHAR		
	Internal vs. Debt	Internal vs. Equity	Debt vs. Equity
	(1)	(2)	(3)
FPI	0.088***	0.076***	0.101***
	(17.82)	(14.94)	(20.11)
*Debt*FPI*	0.029***		
	(4.44)		
*Equity*FPI*		0.096***	0.099***
		(10.37)	(10.63)
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
Debt*Controls	Y	N	N
Equity*Controls	N	Y	Y
Controls	Y	Y	Y
Adjusted R^2	0.23	0.23	0.24
Observations	48,030	26,939	27,341

Panel B

Dependent Variable =	Market-Adjusted BHAR		
	Internal vs. Debt	Internal vs. Equity	Debt vs. Equity
	(1)	(2)	(3)
FPI	0.084***	0.073***	0.099***
	(17.51)	(14.83)	(20.18)
*Debt*FPI*	0.030***		
	(4.78)		
*Equity*FPI*		0.090***	0.092***
		(10.62)	(10.80)
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
Debt*Controls	Y	N	N
Equity*Controls	N	Y	Y
Controls	Y	Y	Y
Adjusted R^2	0.14	0.15	0.15
Observations	48,030	26,939	27,341

Table 10: Proprietary Information Disclosure: WKSIs vs. Non-WKSIs

This table reports results from OLS regressions. The specification in this table is similar to that in Table 7. The dependent variable in Columns (1)–(2), *Raw BHAR*, is the buy-and-hold return that begins three months before and ends two days before equity issuance day. The dependent variable in Columns (3)–(4), *Market-Adjusted BHAR*, is the buy-and-hold return that begins three months before and ends two days before equity issuance day less the corresponding CRSP value-weighted market return. Odd (even) columns include a sample of issuers classified as well-known seasoned issuers (non-well-known seasoned issuers) and their matched counterparts. Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered at the firm level and t-statistics are reported in parentheses. All variables are defined in Appendix A. ***, **, and * indicate statistical significance level at 1%, 5%, and 10%, respectively.

Dependent Variable =	Raw BHAR		Market-Adjusted BHAR	
	(1)	(2)	(3)	(4)
*SEO*Post*FPI*	0.082***	0.018	0.074***	0.012
	(2.96)	(0.57)	(2.78)	(0.41)
*SEO*Post*	0.023	-0.067**	0.023	-0.069**
	(0.87)	(-2.09)	(0.88)	(-2.28)
*SEO*FPI*	-0.022	-0.026	-0.019	-0.023
	(-1.03)	(-1.03)	(-0.97)	(-0.95)
*Post*FPI*	-0.031*	-0.001	-0.029	-0.001
	(-1.67)	(-0.02)	(-1.62)	(-0.06)
SEO	0.151***	0.156***	0.154***	0.159***
	(7.44)	(6.20)	(7.90)	(6.57)
FPI	0.017	0.024	0.018	0.026
	(1.08)	(1.17)	(1.20)	(1.32)
Sample	WKSI	Non-WKSI	WKSI	Non-WKSI
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Adjusted R^2	0.17	0.16	0.16	0.15
Observations	3,514	2,140	3,514	2,140

Table 11: Proprietary Information Disclosure and Cost of Capital

This table reports results from OLS regressions. The dependent variable, *Underpricing*, is return from the previous day's closing transaction price to the offer price multiplied by negative 100. Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered at the firm level and t-statistics are reported in parentheses. All variables are defined in Appendix A. ***, **, and * indicate statistical significance level at 1%, 5%, and 10%, respectively.

Dependent Variable =	Underpricing		
	(1)	(2)	(3)
*WKSI*Post*	-0.854***	-0.430*	-0.478**
	(-3.74)	(-1.91)	(-2.10)
WKSI	-1.680***	-0.874***	-0.790***
	(-11.65)	(-5.63)	(-5.01)
Post	2.071***		
	(11.97)		
Return on Assets		-2.616***	-2.352***
		(-8.75)	(-7.04)
Market-to-Book		-0.341	-0.382
		(-0.83)	(-0.92)
Sales		0.009	0.010
		(0.73)	(0.81)
Analyst Coverage		-0.363***	-0.390***
		(-5.15)	(-5.47)
Leverage		-0.316	0.167
		(-1.13)	(0.53)
Ln(Gross Proceeds)		-0.511***	-0.523***
		(-7.45)	(-7.52)
Public Float		0.006	0.003
		(1.14)	(0.64)
Capital Expenditures		0.014	0.018**
		(1.56)	(2.03)
Firm Age		0.113	1.600**
		(0.22)	(2.55)
Year FE	N	Y	Y
Industry FE	N	N	Y
Adjusted R^2	0.08	0.15	0.16
Observations	6,390	6,390	6,390

Table 12: Alternative Channels of Proprietary Information Flow

This table reports results from OLS regressions. The specification in this table is similar to that in Table 7. The dependent variable, *Market-Adjusted BHAR*, is the buy-and-hold return that begins three months before and ends two days before equity issuance day less the corresponding CRSP value-weighted market return. Column (1) includes a sample with no insider trading filings during the year; Column (2) includes a sample with non-missing *Analyst Forecast Revision*; Column (3) includes full sample controlling for *HHI*. Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered at the firm level and t-statistics are reported in parentheses. All variables are defined in Appendix A. ***, **, and * indicate statistical significance level at 1%, 5%, and 10%, respectively.

Dependent Variable =	Market-Adjusted BHAR		
	(1)	(2)	(3)
*SEO*Post*FPI*	0.165***	0.153*	0.057***
	(2.67)	(1.82)	(2.76)
*SEO*Post*	0.040	0.063	0.002
	(0.73)	(0.72)	(0.10)
*SEO*FPI*	-0.028	-0.054	-0.018
	(-0.78)	(-0.87)	(-1.16)
*Post*FPI*	-0.038	-0.095	-0.031**
	(-1.03)	(-1.49)	(-2.13)
SEO	0.178***	0.202***	0.158***
	(5.07)	(3.23)	(10.28)
FPI	-0.009	0.032	0.021*
	(-0.30)	(0.63)	(1.73)
Analyst Forecast Revision		0.104	
		(1.25)	
HHI			-0.033
			(-0.87)
Sample	No Insider Trading	Non-Missing AF Revision	Full
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
Controls	Y	Y	Y
Adjusted R^2	0.16	0.15	0.12
Observations	1,102	1,124	5,654

Table 13: Falsification Test

This table reports results from OLS regressions. The dependent variable in Columns (1)–(2), *Raw BHAR*, is the buy-and-hold return that begins three months before and ends two days before equity issuance day. The dependent variable in Columns (3)–(4), *Market-Adjusted BHAR*, is the buy-and-hold return that begins three months before and ends two days before equity issuance day less the corresponding CRSP value-weighted market return. *Post* is an indicator equal to one for the equity issued after 2000. Controls are all independent variables in Eq. (2.2) (unexpected earnings and the cumulative change in the current expectations about the future earnings). Market-based controls include *Idiosyncratic Volatility, Illiquidity,* and *Beta*. Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered at the firm level and t-statistics are reported in parentheses. All variables are defined in Appendix A. ***, **, and * indicate statistical significance level at 1%, 5%, and 10%, respectively.

Dependent Variable =	Raw BHAR		Market-Adjusted BHAR	
	(1)	(2)	(3)	(4)
*SEO*Post*FPI*	0.031	0.031	0.020	0.020
	(0.96)	(0.97)	(0.64)	(0.66)
*SEO*Post*	-0.097***	-0.104***	-0.099***	-0.106***
	(-2.82)	(-3.05)	(-2.99)	(-3.27)
*SEO*FPI*	0.000	-0.001	0.007	0.006
	(0.01)	(-0.02)	(0.24)	(0.22)
*Post*FPI*	-0.028	-0.023	-0.030	-0.025
	(-1.13)	(-0.97)	(-1.26)	(-1.10)
SEO	0.230***	0.228***	0.233***	0.233***
	(7.06)	(7.07)	(7.47)	(7.54)
FPI	0.019	0.020	0.023	0.024
	(0.81)	(0.85)	(1.01)	(1.06)
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Mkt.-Based Controls	N	Y	N	Y
Adjusted R^2	0.13	0.16	0.12	0.16
Observations	5,654	5,654	5,654	5,654

Table 14: Financing and Proprietary Information Disclosure (Alt. Classification)

This table reports results from OLS regressions with an alternative classification of firms as using internal resources. The dependent variable in Panel A, *Raw BHAR*, is the buy-and-hold return for the 12-month period starting three months after year $t-1$ fiscal year-end. The dependent variable in Panel B, *Market-Adjusted BHAR*, is the buy-and-hold return for the 12-month period starting three months after year $t-1$ fiscal year-end less the corresponding CRSP value-weighted market return. Controls are all independent variables in Eq. (2.2) (unexpected earnings and the cumulative change in the current expectations about the future earnings). Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered at the firm level and t-statistics are reported in parentheses. All variables are defined in Appendix A. ***, **, and * indicate statistical significance level at 1%, 5%, and 10%, respectively.

Panel A		
Dependent Variable =	Raw BHAR	
	Internal vs. Debt	Internal vs. Equity
	(1)	(2)
FPI	0.092***	0.077***
	(15.29)	(12.51)
*Debt*FPI*	0.025***	
	(3.39)	
*Equity*FPI*		0.090***
		(9.62)
Year FE	Y	Y
Industry FE	Y	Y
Debt*Controls	Y	N
Equity*Controls	N	Y
Controls	Y	Y
Adjusted R^2	0.23	0.22
Observations	39,957	18,866

Panel B		
Dependent Variable =	Market-Adjusted BHAR	
	Internal vs. Debt	Internal vs. Equity
	(1)	(2)
FPI	0.087***	0.074***
	(14.89)	(12.41)
*Debt*FPI*	0.027***	
	(3.84)	
*Equity*FPI*		0.086***
		(9.92)
Year FE	Y	Y
Industry FE	Y	Y
Debt*Controls	Y	N
Equity*Controls	N	Y
Controls	Y	Y
Adjusted R^2	0.14	0.14
Observations	39,957	18,866

Table 15: Securities Offering Reform and Proprietary Information Disclosure (Controls)

This table reports results from OLS regressions. The dependent variable in Columns (1)–(2), *Raw BHAR*, is buy-and-hold return that begins three months before and ends two days before equity issuance day. The dependent variable in Columns (3)–(4), *Market-Adjusted BHAR*, is buy-and-hold return that begins three months before and ends two days before equity issuance day less the corresponding CRSP value-weighted market return. Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered at the firm level and t-statistics are reported in parentheses. All variables are defined in Appendix A. ***, **, and * indicate statistical significance level at 1%, 5%, and 10%, respectively.

Dependent Variable =	Raw BHAR		Market-Adjusted BHAR	
	(1)	(2)	(3)	(4)
*SEO*Post*FPI*	0.064***	0.060***	0.057***	0.053***
	(3.01)	(2.89)	(2.77)	(2.64)
*SEO*Post*	0.003	-0.011	0.002	-0.012
	(0.12)	(-0.56)	(0.10)	(-0.63)
*SEO*FPI*	-0.020	-0.019	-0.018	-0.017
	(-1.24)	(-1.19)	(-1.17)	(-1.10)
*Post*FPI*	-0.032**	-0.021	-0.031**	-0.021
	(-2.10)	(-1.44)	(-2.15)	(-1.47)
SEO	0.157***	0.156***	0.158***	0.159***
	(9.79)	(9.91)	(10.29)	(10.50)
FPI	0.020	0.018	0.022*	0.020*
	(1.52)	(1.44)	(1.74)	(1.66)
Earnings (t-1)	-0.215***	-0.132***	-0.210***	-0.129***
	(-5.62)	(-3.57)	(-5.65)	(-3.58)
Earnings	0.035	0.118**	0.029	0.111**
	(0.67)	(2.37)	(0.57)	(2.31)
Earnings (t+1)	0.162***	0.187***	0.174***	0.199***
	(3.51)	(4.23)	(3.89)	(4.64)
Earnings (t+2)	0.002	0.022	-0.001	0.019
	(0.05)	(0.65)	(-0.02)	(0.59)
Earnings (t+3)	-0.003	0.011	0.000	0.013
	(-0.13)	(0.53)	(0.02)	(0.67)
Raw BHAR (t+1)	-0.031**	-0.032***		
	(-2.57)	(-2.70)		
Raw BHAR (t+2)	-0.019**	-0.023***		
	(-2.33)	(-2.80)		
Raw BHAR (t+3)	0.004	0.004		
	(0.42)	(0.36)		
Mkt-Adj. BHAR (t+1)			-0.031**	-0.031***
			(-2.53)	(-2.66)
Mkt-Adj. BHAR (t+2)			-0.020**	-0.024***
			(-2.52)	(-2.96)
Mkt-Adj. BHAR (t+3)			0.004	0.004
			(0.41)	(0.40)
Idiosyncratic Volatility		0.061***		0.060***
		(9.56)		(9.72)
Beta		0.020		0.010
		(0.91)		(0.47)
Illiquidity		-0.053***		-0.049***
		(-3.24)		(-3.14)
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Adjusted R^2	0.13	0.16	0.12	0.16
Observations	5,654	5,654	5,654	5,654

Table 16: Financing and Proprietary Information Disclosure (Private vs. Public Debt)

This table reports results from OLS regressions. Panel A (B) presents results using subsamples with only private (public) debt. The dependent variable, *Market-Adjusted BHAR*, is the buy-and-hold return for the 12-month period starting three months after year $t-1$ fiscal year-end less the corresponding CRSP value-weighted market return. Controls are all independent variables in Eq. (2.2) (unexpected earnings and the cumulative change in the current expectations about the future earnings). Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered at the firm level and t-statistics are reported in parentheses. All variables are defined in Appendix A. ***, **, and * indicate statistical significance level at 1%, 5%, and 10%, respectively.

Panel A – Private Debt

Dependent Variable =	Market-Adjusted BHAR	
	Internal vs. Private Debt	Private Debt vs. Equity
	(1)	(2)
FPI	0.084***	0.081***
	(17.19)	(11.28)
*Debt*FPI*	0.027***	
	(3.44)	
*Equity*FPI*		0.091***
		(10.14)
Year FE	Y	Y
Industry FE	Y	Y
Debt*Controls	Y	N
Equity*Controls	N	Y
Controls	Y	Y
Adjusted R^2	0.14	0.14
Observations	33,576	12,887

Panel B - Public Debt

Dependent Variable =	Market-Adjusted BHAR	
	Internal vs. Public Debt	Public Debt vs. Equity
	(1)	(2)
FPI	0.083***	0.092***
	(17.11)	(14.42)
*Debt*FPI*	0.032***	
	(4.22)	
*Equity*FPI*		0.093***
		(10.59)
Year FE	Y	Y
Industry FE	Y	Y
Debt*Controls	Y	N
Equity*Controls	N	Y
Controls	Y	Y
Adjusted R^2	0.15	0.15
Observations	38,268	17,579

Table 17: Sample Selection (Curtailment of Information Sample)

This table reports my sample selection process. The first column describes the filter applied and the second column contains the number of observations lost after each filter.

SEO	Number of Observations
All completed firm-commitment underwritten SEOs of common shares to be listed on the NYSE, NASDAQ and AMEX between 1/1/2001 and 12/31/2015	6,617
Less: Offerings by real estate investment trusts	(862)
Offerings by closed-end mutual funds	(47)
Offerings by limited partnerships	(479)
LBOs	(78)
Rights and unit issues	(29)
ADRs and simultaneous international offerings	(461)
Offer price less than $3 and more than $400	(373)
Pure secondary stock offerings	(1,134)
Offerings with missing identifiers	(126)
Offerings with gross proceeds above $1 billion	(94)
Utilities and financial firms (SIC 4900-4999 & 6000-6999)	(757)
Final SEO Sample	1,825

PIPE	Number of Observations
All completed private placements of firms listed on the NYSE, NASDAQ and AMEX between 1/1/2001 and 12/31/2015	9,258
Less: Non-common stock private placements	(3,338)
Offerings with missing identifiers	(140)
Offerings with gross proceeds below $10 million	(2,642)
Offerings with no mandatory registration requirement	(599)
Utilities and financial firms (SIC 4900-4999 & 6000-6999)	(300)
Final PIPE Sample	2,239

Table 18: Summary Statistics (Curtailment of Information Sample)

Panel A (B) of this table presents summary statistics (differences in mean and median) of firm, ownership, and equity issuance characteristics. All variables are defined in Appendix A.

Panel A: Summary Statistics

	N	Mean	P25	Median	P75	SD
Firm Characteristics						
Natural Log of Assets	4,064	4.97	3.80	4.71	5.99	1.65
Firm Age	4,057	8.77	2.08	6.33	12.59	8.69
Market-To-Book	3,949	4.25	1.53	3.01	5.86	7.69
EBITDA	4,031	-0.22	-0.46	-0.07	0.11	0.44
Cash Flow Return on Assets	4,030	-0.20	-0.40	-0.07	0.07	0.37
Cash Flow Volatility	3,395	0.17	0.05	0.10	0.20	0.21
Cash Burn Rate	4,055	0.72	0.00	0.24	0.75	1.62
Cash Need Index	4,064	0.26	0.20	0.27	0.33	0.08
Altman-Z Score	3,812	6.66	0.19	2.64	7.97	18.12
Research & Development	4,064	0.21	0.00	0.10	0.34	0.27
Leverage	3,989	0.42	0.19	0.37	0.57	0.31
FPI	4,064	0.19	0.12	0.19	0.25	0.09
Trade Secrets	4,064	0.65	0.00	1.00	1.00	0.48
Redacted 10-K	4,064	0.40	0.00	0.00	1.00	0.49
Market Characteristics						
Bid-Ask Spread	4,039	0.01	0.00	0.00	0.01	0.01
Return Volatility	4,042	0.04	0.03	0.04	0.05	0.02
Analyst Coverage	3,867	3.44	0.00	2.00	6.00	4.23
Ownership Characteristics						
Inst. Ownership	3,971	0.44	0.20	0.41	0.66	0.28
Δ *in Inst. Ownership*	3,241	0.46	-0.02	0.05	0.23	2.08
Equity Issuance Variables						
Gross Proceeds	4,064	85.12	20.00	43.60	100.68	112.72
Deal Size	4,016	0.18	0.10	0.15	0.21	0.14
Discount	4,050	6.49	1.17	4.60	10.80	8.24
Spread	3,263	5.34	5.00	5.75	6.21	1.63

Panel B: Differences in Means and Medians

	PIPE		SEO		Difference in Mean		Wilcoxon Rank-Sum Test	
	Mean	Median	Mean	Median	Diff.	*T-stat*	Diff	*Z-stat*
Firm Characteristics								
Natural Log of Assets	4.30	4.10	5.78	5.64	-1.48	-31.98	-1.54	-29.56
Firm Age	8.49	6.50	9.12	5.84	-0.63	-2.31	0.67	2.25
Market-To-Book	4.37	3.18	4.10	2.84	0.26	1.07	0.34	2.44
EBITDA	-0.35	-0.29	-0.06	0.07	-0.29	-21.93	-0.36	-23.02
Cash Flow Return on Assets	-0.31	-0.24	-0.06	0.04	-0.25	-22.86	-0.28	-23.34
Cash Flow Volatility	0.21	0.13	0.11	0.07	0.10	14.34	0.07	18.18
Cash Burn Rate	0.98	0.50	0.41	0.00	0.57	11.39	0.50	24.57
Cash Need Index	0.29	0.30	0.24	0.23	0.05	19.98	0.07	19.31
Altman-Z Score	5.23	2.04	8.47	3.06	-3.24	-5.50	-1.02	-10.98
Research & Development	0.27	0.19	0.13	0.02	0.14	17.13	0.17	17.40
Leverage	0.40	0.32	0.44	0.42	-0.04	-3.70	-0.10	-7.07
FPI	0.20	0.20	0.18	0.18	0.02	7.15	0.02	6.71
Trade Secrets	0.71	1.00	0.58	1.00	0.12	8.33	0.00	8.26
Redacted 10-K	0.45	0.00	0.34	0.00	0.11	7.08	0.00	7.04
Market Characteristics								
Bid-Ask Spread	0.01	0.01	0.00	0.00	0.00	24.34	0.00	29.54
Return Volatility	0.05	0.04	0.04	0.03	0.01	17.47	0.01	18.62
Analyst Coverage	2.73	1.00	4.33	3.00	-1.60	-11.89	-2.00	-8.41
Ownership Characteristics								
Inst. Ownership	0.32	0.27	0.59	0.60	-0.27	-34.35	-0.33	-30.19
Δ *in Inst. Ownership*	0.48	0.05	0.43	0.05	0.05	0.66	0.00	-0.73
Equity Issuance Variables								
Gross Proceeds	37.89	22.40	143.05	98.00	-105.16	-33.39	-75.60	-41.45
Deal Size	0.19	0.15	0.17	0.16	0.02	5.58	-0.01	-1.50
Discount	8.94	9.10	3.46	2.47	5.49	22.33	6.63	23.22
Spread	5.21	6.00	5.46	5.70	-0.25	-4.40	0.30	1.36

Table 19: Proprietary Information, Concentration, and Competition Measures

Panel A of this table reports pairwise Pearson correlation coefficients and the p-values in parentheses below the correlation coefficients. Panel B (C) presents relation between *Trade Secrets* (*Redacted 10-K*) and *FPI*. All variables are defined in Appendix A.

Panel A: Pearson Correlation

Variables	*FPI*	*Trade Secrets*	*Redacted 10-K*	*Comp. HHI*	*TNIC HHI*	*Fitted HHI*	*PCT COMP*
FPI	1.00						
	(.)						
Trade Secrets	0.24	1.00					
	(0.00)	(.)					
Redacted 10-K	0.23	0.48	1.00				
	(0.00)	(0.00)	(.)				
Comp. HHI	-0.11	-0.14	-0.20	1.00			
	(0.00)	(0.00)	(0.00)	(.)			
TNIC HHI	-0.11	-0.05	-0.17	0.31	1.00		
	(0.00)	(0.00)	(0.00)	(0.00)	(.)		
Fitted HHI	-0.08	-0.19	-0.16	0.74	0.22	1.00	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(.)	
PCTCOMP	0.08	0.20	0.07	-0.06	-0.02	-0.07	1.00
	(0.02)	(0.00)	(0.04)	(0.06)	(0.59)	(0.09)	(.)

Panel B: Relation Between Trade Secrets and FPI

	FPI						
Trade Secrets	N	Mean	P1	P25	Median	P75	P99
Yes	2,641	0.21	0.00	0.14	0.21	0.28	0.44
No	1,423	0.16	0.00	0.10	0.16	0.22	0.38
Difference		0.05***			0.05***		
t- and z-stats		15.56			15.25		

Panel C: Relation Between Redacted 10-K and FPI

	FPI						
Redacted 10-K	N	Mean	P1	P25	Median	P75	P99
Yes	1,624	0.22	0.00	0.16	0.22	0.29	0.45
No	2,440	0.18	0.00	0.11	0.17	0.23	0.40
Difference		0.04***			0.05***		
t- and z-stats		14.72			14.37		

Table 20: Financing Choice: Redaction and Trade Secrecy Measures

This table reports results of probit regression models using *Redacted 10-K* and *Trade Secrets* measures. The dependent variable equals one for PIPEs and zero for SEOs. Industry fixed effects are defined using the Fama-French 49 industry classification. The table presents estimates of marginal effects. Robust standard errors are clustered by Fama-French 49 industry classification and z-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

Dependent Variable =	PIPE	
	(1)	(2)
Redacted 10-K	-0.001	
	(-0.03)	
Trade Secrets		-0.007
		(-0.32)
Deal Size	-0.346**	-0.348**
	(-2.05)	(-2.04)
Ln(Assets)	-0.080***	-0.080***
	(-8.11)	(-8.22)
Firm Age	0.021	0.021
	(0.22)	(0.22)
Industry Adj. Sales Growth	0.010***	0.010***
	(4.24)	(4.20)
Change in Industry Adj. MTB	-0.092	-0.091
	(-0.37)	(-0.37)
Cash Flow Return on Assets	-0.123	-0.124
	(-1.47)	(-1.44)
Cash Flow Volatility	0.152***	0.152***
	(3.49)	(3.52)
Altman-Z Score	-0.003***	-0.003***
	(-4.50)	(-4.49)
Return Volatility	0.025***	0.025***
	(3.21)	(3.21)
Bid-Ask Spread	0.208***	0.207***
	(6.52)	(6.50)
Analyst Coverage	-0.005**	-0.005**
	(-2.20)	(-2.26)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Pseudo R^2	0.31	0.31
Observations	2,869	2,869

Table 21: Financing Choice: Private Information Index Measure

This table reports results of probit regression models. The dependent variable equals one for PIPEs and zero for SEOs. *Ln(Assets)* in the interaction term with *FPI* is equals one (zero) for firms above (below) median natural log of total assets. *Deal Size* in the interaction term with *FPI* is equals one (zero) for firms above (below) median gross proceeds scaled by the pre-offering market value of an equity. Industry fixed effects are defined using the Fama-French 49 industry classification. The table presents estimates of marginal effects. Robust standard errors are clustered by Fama-French 49 industry classification and z-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

Dependent Variable =	PIPE			
	(1)	(2)	(3)	(4)
FPI	0.308***	0.312***	0.315***	0.598***
	(3.63)	(3.65)	(3.62)	(4.65)
Redacted 10-K		-0.008		
		(-0.33)		
Trade Secrets			-0.015	
			(-0.62)	
Deal Size x FPI				-0.532**
				(-2.55)
Ln(Assets) x FPI				-0.105
				(-0.65)
Deal Size	-0.334**	-0.335**	-0.336**	-0.081
	(-1.97)	(-1.99)	(-1.99)	(-0.48)
Ln(Assets)	-0.082***	-0.082***	-0.083***	-0.080***
	(-8.40)	(-8.39)	(-8.54)	(-9.71)
Firm Age	0.012	0.010	0.011	-0.006
	(0.12)	(0.10)	(0.12)	(-0.06)
Industry Adj. Sales Growth	0.010***	0.010***	0.010***	0.010***
	(4.32)	(4.31)	(4.25)	(4.58)
Change in Industry Adj. MTB	-0.093	-0.093	-0.090	-0.127
	(-0.37)	(-0.37)	(-0.36)	(-0.50)
Cash Flow Return on Assets	-0.115	-0.118	-0.117	-0.099
	(-1.45)	(-1.51)	(-1.47)	(-1.24)
Cash Flow Volatility	0.155***	0.155***	0.155***	0.147***
	(3.55)	(3.50)	(3.54)	(3.55)
Altman-Z Score	-0.003***	-0.003***	-0.003***	-0.003***
	(-4.55)	(-4.58)	(-4.58)	(-5.44)
Return Volatility	0.025***	0.025***	0.025***	0.024***
	(3.10)	(3.13)	(3.13)	(3.04)
Bid-Ask Spread	0.203***	0.202***	0.202***	0.200***
	(6.46)	(6.51)	(6.49)	(6.63)
Analyst Coverage	-0.005**	-0.005**	-0.005**	-0.006***
	(-2.48)	(-2.36)	(-2.44)	(-2.71)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Pseudo R^2	0.32	0.32	0.32	0.33
Observations	2,869	2,869	2,869	2,869

Table 22: Financing Choice: Other Competition Measures

This table reports results of probit regression models. The dependent variable equals one for PIPEs and zero for SEOs. Industry fixed effects are defined using the Fama-French 49 industry classification. The table presents estimates of marginal effects. Robust standard errors are clustered by Fama-French 49 industry classification and z-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

Dependent Variable =	PIPE				
	(1)	(2)	(3)	(4)	(5)
Comp. HHI	0.011				
	(0.09)				
TNIC HHI		0.186***			
		(3.42)			
Fitted HHI			-2.046		
			(-1.34)		
PCTCOMP				0.025	
				(0.45)	
Existing Competition					-0.028**
					(-2.55)
Potential Competition					0.021
					(1.18)
Industry Profitability					-0.003
					(-0.31)
Deal Size	-0.346**	-0.445***	-1.009***	-1.062***	-0.396***
	(-2.03)	(-3.44)	(-6.23)	(-5.18)	(-2.72)
Ln(Assets)	-0.080***	-0.080***	-0.065***	-0.065***	-0.081***
	(-8.26)	(-8.18)	(-6.25)	(-3.89)	(-7.96)
Firm Age	0.021	0.080	0.235*	0.077	0.001
	(0.22)	(0.80)	(1.66)	(0.38)	(0.01)
Industry Adj. Sales Growth	0.010***	0.009***	0.007	0.028	0.010***
	(4.24)	(4.42)	(1.08)	(1.10)	(4.21)
Change in Industry Adj. MTB	-0.093	-0.060	0.145	-1.185**	-0.140
	(-0.37)	(-0.24)	(0.37)	(-2.00)	(-0.57)
Cash Flow Return on Assets	-0.123	-0.152*	-0.179	-0.483***	-0.131
	(-1.44)	(-1.74)	(-1.27)	(-3.80)	(-1.41)
Cash Flow Volatility	0.152***	0.158***	0.069	0.204	0.127***
	(3.55)	(3.52)	(0.89)	(1.32)	(3.22)
Altman-Z Score	-0.003***	-0.003***	-0.001*	-0.001	-0.003***
	(-4.41)	(-4.59)	(-1.78)	(-0.62)	(-5.87)
Return Volatility	0.025***	0.027***	0.042***	0.031***	0.023***
	(3.20)	(3.66)	(5.66)	(3.41)	(2.67)
Bid-Ask Spread	0.208***	0.191***	0.289***	0.236***	0.207***
	(6.45)	(5.86)	(5.40)	(4.23)	(5.79)
Analyst Coverage	-0.005**	-0.005***	0.001	-0.003	-0.005**
	(-2.27)	(-2.96)	(0.26)	(-0.77)	(-2.41)
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.314	0.334	0.333	0.293	0.309
Observations	2,869	2,682	1,156	782	2,584

Table 23: Other Motives for Financing Choice

This table reports results of probit regression models. The dependent variable equals one for PIPEs and zero for SEOs. The table presents estimates of marginal effects. Industry fixed effects are defined using the Fama-French 49 industry classification. Robust standard errors are clustered by Fama-French 49 industry classification and z-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

Dependent Variable =	PIPE			
	(1)	(2)	(3)	(4)
FPI	0.294***	0.347***		
	(3.52)	(3.55)		
Existing Competition			-0.033***	-0.045***
			(-3.11)	(-4.28)
Potential Competition			0.025	0.033**
			(1.44)	(1.97)
Inst. Ownership	-0.334***		-0.351***	
	(-8.10)		(-8.69)	
Dedicated Inst. Ownership		-0.366**		-0.377**
		(-2.56)		(-2.38)
Transient Inst. Ownership		-0.421***		-0.435***
		(-6.21)		(-7.07)
Quasi-Indexer Inst. Ownership		-0.282***		-0.298***
		(-3.18)		(-3.38)
Deal Size	-0.382***	-0.468**	-0.423***	-0.464**
	(-2.87)	(-2.39)	(-3.08)	(-2.35)
Ln(Assets)	-0.052***	-0.063***	-0.048***	-0.060***
	(-5.81)	(-6.87)	(-5.25)	(-6.04)
Firm Age	0.095	0.070	0.071	0.022
	(1.02)	(0.57)	(0.64)	(0.15)
Industry Adj. Sales Growth	0.009***	0.011***	0.009***	0.011***
	(4.15)	(3.29)	(4.08)	(3.31)
Change in Industry Adj. MTB	-0.076	-0.022	-0.111	0.114
	(-0.36)	(-0.07)	(-0.55)	(0.36)
Cash Flow Return on Assets	-0.119	-0.105	-0.140	-0.117
	(-1.61)	(-1.13)	(-1.57)	(-1.15)
Cash Flow Volatility	0.152***	0.161***	0.119**	0.138**
	(3.28)	(2.63)	(2.43)	(2.04)
Altman-Z Score	-0.002***	-0.003***	-0.003***	-0.003***
	(-4.23)	(-4.73)	(-5.09)	(-6.79)
Return Volatility	0.021***	0.021**	0.019***	0.021**
	(3.27)	(2.52)	(3.04)	(2.40)
Bid-Ask Spread	0.148***	0.163***	0.147***	0.164***
	(6.07)	(5.32)	(5.04)	(4.76)
Analyst Coverage	-0.002	-0.001	-0.001	-0.000
	(-1.11)	(-0.33)	(-0.62)	(-0.14)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Pseudo R^2	0.35	0.32	0.34	0.32
Observations	2,804	1,943	2,532	1,768

Table 24: Treatment Effect Analysis

This table reports results of the second stage OLS models along with average treatment effect and correlation of error terms from the first stage and second stage. In the first stage, I estimate a probit model that predicts the choice of PIPEs vs SEOs (Column 1 of Table 21). ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

Dependent Variable =	Discount	Total Issuer Fees
	(1)	(2)
Ln(Assets)	0.064	-0.344
	(0.20)	(-0.93)
Natural Log of Market Cap	-0.262	-0.613*
	(-0.90)	(-1.82)
Market-To-Book	-0.061	-0.072
	(-1.56)	(-1.51)
Returns	-0.263*	-0.180
	(-1.76)	(-1.05)
EBITDA	-1.041	-1.309
	(-1.34)	(-1.50)
Tangibility	-1.017	-0.684
	(-1.20)	(-0.69)
Cash Ratio	-3.822***	-2.763***
	(-4.28)	(-2.67)
Leverage	0.694	0.376
	(0.59)	(0.28)
Inst. Ownership	-3.049***	-3.683***
	(-4.07)	(-4.31)
Natural Log of Firm Age	0.151	0.313
	(0.89)	(1.63)
Altman-Z Score	0.052***	0.037*
	(2.76)	(1.68)
Average Treatment Effect (ATE)	7.616***	2.997**
	(5.34)	(1.97)
rho0	-0.691***	-0.350
	(-2.60)	(-1.47)
rho1	-0.249**	-0.077
	(-2.21)	(-0.71)
Observations	2,358	2,358

Appendix A: Description of Main Variables

This table describes the variables used in this study. Compustat variables are measured at the end of the fiscal year immediately preceding the equity issuance date.

Variable	Description	Source
Ln(Total Assets)	Natural log of book value of total assets $[Ln(AT)]$.	Compustat
Ln(Market Value of Equity)	Natural log of market value of the firm's equity $[Ln(CSHO * PRCCF)]$.	Compustat
Book-to-Market	Book value of equity divided by market value of equity $[CEQ/(CSHO * PRCCF)]$.	Compustat
EBITDA	Operating income before depreciation scaled by average total assets $[OIBDP/(AT_t + AT_{t-1})/2)]$	Compustat
Loss	An indicator equal to one if income before extraordinary items $[IB]$ is negative	Compustat
Market-to-Book	Market value of equity divided by book value of equity $[(CSHO * PRCCF)/CEQ]$	Compustat
Cash Burn Rate	Absolute value of operating cash flow scaled by cash if operating cash flow is negative; otherwise zero $[OANCF/CHE$ if $OANCF < 0]$	Compustat
Research and Development	Research and development scaled by average total assets $[XRD/((AT_t + AT_{t-1})/2)]$	Compustat
Leverage	Book value of total debt scaled by average total assets $[(DLTT + DLC)/(AT_t + AT_{t-1})/2)]$	Compustat
Ln(Number of Exhibits)	Natural log of the number of exhibits filed in a fiscal year	SEC EDGAR
Trade Secrets	An indicator equal to one if the firm's 10-K filing mentions "trade secret" or "trade secrecy"	SEC EDGAR
Redacted 10-K	An indicator equal to one if the 10-K filing includes the term "confidential request," "confidential treatment," "confidential," or "redacted"	SEC EDGAR
Debt Issuance	Indicator equal to one if a firm issued debt $[DLTIS]$.	Compustat
Equity Issuance	Indicator equal to one if a firm issued common equity.	SDC
Internal Funds	Indicator equal to one if a firm issued neither debt nor equity securities during the year.	Compustat, SDC
Earnings	Income before extraordinary items deflated by market value of equity three months after the year $t-1$ fiscal year end $IB/Lag(CSHO * PRCCF)$.	Compustat
Raw BHAR	Buy-and-hold return that begins three months before and ends two days before equity issuance day.	CRSP
Mkt-Adj. BHAR	Buy-and-hold return that begins three months before and ends two days before equity issuance day less the corresponding CRSP value-weighted market return.	CRSP
Idiosyncratic Volatility	The annualized standard deviation of the residuals in monthly regressions of daily stock returns on the three Fama and French (1993) factors.	CRSP
Beta	Estimated in each of the 12 months before the external financing events by implementing the market model in daily stock returns.	CRSP
Illiquidity	Average of the daily ratio of absolute stock return to dollar trading volume for 12 months before the financing event.	CRSP
Analyst Forecast Revision	Mean of the first EPS forecast in year t minus the first EPS forecast in year $t-1$ by the same analyst for $t+1, t+2$, and $t+3$ scaled by the beginning of the year share price.	IBES

Continued on next page...

...continued from previous page

Variable	Description	Source
HHI	Sum of squared market shares of sales of all firms in three-digit SIC code industry.	Compustat
WKSI	Indicator equal to one if a firm's public float is above $700M.	EDGAR
Return on Assets	Earnings before extraordinary items divided by average total assets $[IB/(AT_t + AT_{t-1})/2)]$.	Compustat
Sales	Sales divided by average total assets $[SALE/(AT_t + AT_{t-1})/2)]$.	Compustat
Analyst Coverage	Log transformation of the number of analysts issuing earnings forecasts in the year prior to the offer $[Ln(1 + Coverage)]$.	IBES
Ln(Gross Proceeds)	Log transformation of gross proceeds from the sale of equity.	SDC
Public Float	Public float listed on the first page of 10-Ks.	EDGAR
Capital Expenditures	Capital expenditures divided by average total assets $[CAPX/(AT_t + AT_{t-1})/2)]$.	Compustat
Firm Age	The difference between the most recent year and the first year a firm appeared in Compustat.	Compustat
Market Size	Natural log of industry (three-digit SIC code) sales	Compustat
Entry Cost	Weighted average of gross value of cost of PPE for firms in the three-digit SIC code industry weighted by each firm's market share in the three-digit SIC code industry	Compustat
Product Substitutability	Sales over operating costs (COGS, SG&A and depreciation, depletion, and amortization) for each three-digit SIC code industry	Compustat
Market Share	Percentage of sales obtained by each firm relative to the total sales for all firms in three-digit SIC code industry	Compustat
Bid-Ask Spread	Average daily bid-ask spread for three month before the event date scaled by same day closing prices	CRSP
Return Volatility	The standard deviation of daily stock return during the trading period (-90, -11) prior to the event date	CRSP
Blockholders	The number of shareholders with 5% or more ownership of the firm	Thomson Reuters
Inst. Ownership	Percentage of common stock held by institutions	Thomson Reuters
Δ in Inst. Ownership	Percentage change in institutional ownership calculated from the beginning to the end of the calendar quarter of the event	Thomson Reuters
Deal Size	Gross proceeds scaled by the market value of an equity computed the trading day before the event date	PrivateRaise, SDC
Discount	Percentage decrease from the closing stock price one day before the offering to the offer price	PrivateRaise, SDC
Spread	SEO underwriter's gross spreads or the PIPE placement agent's fees as a percentage of offer proceeds	PrivateRaise, SDC
Uniform Trade Secrets Act	An indicator equal to one if the firm's headquarters state has enacted the Uniform Trade Secrets Act	Glaeser (2018)
Inevitable Disclosure Doctrine	An indicator equal to one if the headquarters state judiciary applies the inevitable disclosure doctrine	Klasa et al. (2018)
Noncompete Enforcement Index	The noncompete enforcement index developed by Mark Garmaise	Garmaise (2009)

Continued on next page...

...continued from previous page

Variable	Description	Source
U.S. Census HHI	Measure computed for the years 2002, 2007, and 2012. It is available once every five years, and only for firms with manufacturing operations.	U.S. Census Bureau
Comp. HHI	Sum of squared market shares of all firms in three-digit SIC code industry level	Compustat
TNIC HHI	Text-based network industry classification, based on product descriptions from 10-K filings	Hoberg and Phillips (2016)
Fitted HHI	Computed by combining data from the Commerce Department, the Bureau of Labor Statistics, and Compustat. The main advantage of this measure is that it covers both private and public firms, varies through time, and is not restricted to manufacturing firms	Hoberg and Phillips (2010b)
PCTCOMP	Based on a count the number of references to competition in the MD&A section of 10-K filings	Li, Lundholm, and Minnis (2013)
Existing Competition, Potential Competition, Industry Profitability	First three factors emerging from a principal-component analysis on nine different competition measures suggested by prior research.	Li (2010)