Strategic Regulatory Non-Disclosure: The Case of the Missing Form D *

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ABSTRACT

We document that the majority of venture-capital backed financing rounds are not accompanied by a Form D filing. We show that filing behavior is predictable and is related to both the ability to fly below the radar and the benefits of withholding information. Financing rounds that are harder to hide, larger offerings and those previously covered by media, are more likely file a Form D while financing rounds by firms with greater proprietary information, early stage firms or companies in biotech, pharmaceutical, and high tech industries, are less likely to file a Form D. We document one adverse outcome to the filing of a Form D, patent litigation, and show that protection from this type of litigation through the enactment of anti-patent trolling laws subsequently increases the rate of filing. Firms are less likely to file a Form D once the form is required to be filed on Edgar. Finally, we note that reliance on Regulation D is stronger as the firm nears an exit from the private market. Our results suggests that some firms view even minimal disclosure and regulatory oversight as costly.

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1 Introduction

How costly is disclosure? The plethora of studies on this topic suggest that while disclosure may be useful in reducing the cost of capital, it may be potentially burdensome for some companies, particularly smaller firms that are early in their life cycle (Gao, Ritter, and Zhu (2013)). Research has shown that firms may go to great lengths to avoid disclosing information to the public (Bushee and Leuz (2005); Iliev (2010)) and high disclosure costs may be related to the decision to go public (Dambra, Field, and Gustafson (2015)). In this paper, we study the behavior of private companies in deciding whether or not to disclose information about the company and the offering to the Securities and Exchange Commission (SEC) when raising capital.

At first glance, the decision to focus on disclosure by private companies may seem an odd choice because the presumption is that private capital raising does not involve much in the way of disclosure. However, all companies, when raising equity or debt capital, are required to either register with the SEC or claim an exemption not to do so. The most popular method of claiming an exemption from registration is through Regulation (Reg) D, which requires firms raising capital to file a Form D that contains information about the firm and the offering within 15 days of the offering. (See Appendix IA.1 for a detailed discussion of the requirements of Regulation D.) We document, however, that in our sample of almost 40,000 rounds of venture capital (VC) financings, over 50% do not file a Form D with the SEC and filing rates significantly decline after the SEC mandates electronic filing of the document.

The deficiency of private firms filing a Form D has been highlighted in the media amid speculation as to the reason for the "disappearing Form D".[1] Academics have also noticed the low number of Form D filings when relying on the information on the form for their research. Denes, Howell, Mezzanotti, Wang, and Xu (2020), who use Form D to collect information on angel activity, states that "while Form D filing is in many cases technically necessary to exempt an equity round from national security registration requirements, it is widely known that many startups do not file, in large part to avoid the accompanying disclosure." Ewens and Malenko (2020), in their internet appendix, compare Form D filers and non-filers to determine whether a bias is introduced in their findings on board dynamics in startup firms. They document that 31.5% of VC-backed firms in VentureSource never file a Form D. This paper seeks to understand why firms may fail to file a

[1] See `https://techcrunch.com/2018/11/07/the-disappearing-form-d/`.

Form D and whether their filing behavior is strategic in nature.

The decision to withhold information from the public must balance the ability to do so with the benefits of keeping certain information private (Bhattacharya and Ritter (1983)). We find that firms are less likely to file a Form D when their ability to fly under the radar is greater. The propensity to file a Form D is lower when the amount raised is smaller, the round has fewer VC investors and these investors are geographically concentrated. In addition, firms that have received less attention from the media after a prior financing round are also less likely to file a Form D.

The desire to shield proprietary information from competitors has been documented in studies on public company disclosures to the SEC. For example, a number of papers show that it is common for firms to request that the SEC redact sensitive information from their filings, such as trade secrets, customer/supplier information, licensing agreements, and research/consulting arraignments (Boone, Floros, and Johnson (2016), Glaeser (2018), and Verrecchia and Weber (2006)).

Because our sample of firms are private companies, we cannot observe the source of the information they wish to protect. Therefore, we use proxies from the academic literature that are designed to capture the extent to which the firm is likely to have valuable proprietary information. Guo, Lev, and Zhou (2004) argue that proprietary disclosure costs are greater for firms in the biotech industry and for early stage companies. Leone, Rock, and Willenborg (2007) argue that high tech firms also face greater proprietary disclosure costs since they are characterized by higher growth opportunities and disclosure likely provides competitors with some useful information. Dambra, Field, and Gustafson (2015) document that after the JOBS Act was passed and public disclosure requirements for emerging growth companies were reduced, more biotech and pharmaceutical firms went public. Chaplinsky, Hanley, and Moon (2017) document that the composition of firms going public after the Act skewed toward younger firms (those more likely in an earlier stage of development). We show that private firms in an early stage of development and in industries such as biotech, pharmaceuticals, and high tech are more likely to have greater proprietary information disclosure costs, and hence, are less likely to file a Form D.

In addition, issuers may wish to conceal information from large players in their industry for fear of competition or a takeover. Gao, Ritter, and Zhu (2013) argue that flying under the radar is beneficial because "...the importance of getting big fast has increased over time due to an increase in the speed of technological innovation in many industries, with profitable growth opportunities

potentially lost if they are not quickly seized." We find that the greater the number of firms with a market capitalization over $50 billion, the less likely a firm will file a Form D. Thus, our findings suggest that non-disclosure is more likely when it is easier to hide the details of the offering and when proprietary information is more valuable. Overall, our results suggest that even the most minor disclosure requirements for early stage companies is viewed as costly to some firms.

Although the Form D is fairly simple in its required disclosure (and free to file), its filing could result in adverse consequences. First, the filing reveals to market participants that the firm has received funding. The disclosure of a substantial capital raise may be viewed as a potential threat by competitors who may alter their behavior in response. Second, the filing brings the firm and its managers/board of directors to the attention of the SEC. Third, filing a Form D reveals the possibility of deep pockets that may attract attention from entities seeking to extract value from the company through adverse means such as litigation.

Due to the availability of data, we can test whether firms that file a Form D are more likely to be subject to patent litigation. The disclosure of new financing through the filing of a Form D may signal to patent litigators that the firm has the ability and resources to settle a lawsuit. Indeed, Caskurlu (2019) documents that firms become targets of excessive patent lawsuits just before completing an IPO.

Research suggests that patent litigation may be costly for firms. Appel, Farre-Mensa, and Simintzi (2019) find that the threat of patent litigation may reduce venture capital funding and firm growth by hindering the amount of employment by private firms. Cohen, Gurun, and Kominers (2019) examine patent litigation in public firms and shows that after firms settle with patent trolls, innovation activity in litigated firms declines. We expect that firms wishing to avoid patent litigation will be less likely to file a Form D.[2]

Using similar data on patent litigation as the studies previously mentioned, we document that firms who file a Form D are more likely to be targeted by patent trolls in the two years following the filing of a Form D. Moreover, the filing of the form reduces the time to the next patent litigation. Thus, filing the form appears to bring some firms to the attention of patent litigators.

[2]Note that we are not suggesting that the sole reason for non-compliance is to avoid litigation. Instead, we are examining patent litigation because, as Noam Chomsky suggests, "Science is a bit like the joke about the drunk who is looking under a lamppost for a key that he has lost on the other side of the street, because that's where the light is. It has no other choice. We must therefore, must search under the light of the lamppost, so to speak" (Barsky (1998)).

In order to overcome endogeneity concerns that an unobservable characteristic of the firm causes it to both not comply with Regulation D and be subject to patent litigation, we conduct a difference-in-differences test using the staggered introduction of anti-patent trolling laws as in Appel, Farre-Mensa, and Simintzi (2019). Our results show that when these laws are enacted and firms are more protected from patent litigation, they are also more likely to file a Form D. These results confirm that some firms rationally believe that public disclosure may result in an adverse outcome for the firm, providing an incentive for strategic disclosure.

Finally, we analyze whether filing a Form D is associated with a reduction in the time to exit, whether by an IPO or an acquisition. We document that firms filing a Form D have a significantly shorter time between the filing and the IPO or acquisition. Of course, we are not implying that this test is causal. In other words, we are not examining whether the filing of the form *causes* the firm to exit more quickly. We interpret these findings, however, as evidence that the willingness to engage with the SEC and provide public information is higher as the time for exit nears.

Are our findings due to firms seeking alternate exemptions or non-compliance with the requirements of Regulation D? Answering this question is difficult because if there is no filing, we are unable to ascertain the specific exemption the firm relied upon when issuing shares. However, to our knowledge, exemptions other than certain sections of Regulation D require a filing at the state level. Thus, firms who do not file a Form D should be filing for an exemption with states securities regulators.

Examining the exemption requests in California where most of our firms and investors are headquartered, we find that the majority of firms raising capital file neither a Form D at the federal level nor a limited exemption notice in California. This finding, coupled with the totality of our results, suggests that at least some issuers maybe relying on Regulation D as an exemption but not filing the form to ensure their privacy. (Note that the consequences of not filing a Form D does not seem particularly dire since it does not affect the ability of the firm to rely on the safe harbor of Regulation D.)

We note one puzzling aspect of our research. Despite the widespread lack of Form D filings, we are able to identify rounds of VC funding from commonly available databases. If withholding valuable information is important to firms, then why are these transactions reported to companies such as Thomson Reuters? TechCrunch states "Here's the secret about Form D filings today: the

norms in Silicon Valley have changed, and Form D filings are often filed late, not at all, and many startups are advised to lie low in the hopes of avoiding stricter SEC scrutiny. What was once a fait accompli is now a deliberative process, with important decision points for founders."[3] Thus, issuers, or their VCs, are willing to provide voluntary disclosure to at least some market participants but may be reluctant to come to the attention of others, such as financial market regulators.

2 Disclosure choices by private companies

Firms raising capital must either register the securities with the SEC through a public offering or claim an exemption to registration under Section 4(a)(2) of the Securities Act for "transactions by an issuer not involving any public offering." To qualify a securities offering for the Section 4(a)(2) exemption, issuers must ensure that investors in the offering must[4]

- either have enough knowledge and experience in finance and business matters to be "sophisticated investors "who are able to evaluate the risks and merits of the investment, or be able to bear the investment's economic risk
- have access to the type of information normally provided in a prospectus of a SEC registration statement such as Form S-1
- agree not to resell or distribute the securities to the public

Generally, issuers who claim an exemption under Section 4(a)(2) must also apply for an exemption from state securities regulators in all states ("Blue Sky laws") in which the security is sold. While claiming an exemption from registration at the state level may be feasible for an offering with a geographically concentrated investor base, it is often costly and time-consuming if investors are dispersed across states and multiple state exemptions are needed.

The requirements of Section 4(a)(2), ascertaining whether investors are sophisticated, providing disclosure similar to a public offering, and complying state securities regulation, may be onerous for some issuers. Thus, many firms that raise capital in the private placement market choose to apply for an exemption from registration using Regulation D. Regulation D is considered a safe harbor

[3] https://techcrunch.com/2019/03/28/how-to-delay-your-form-ds/

[4] https://www.sec.gov/smallbusiness/exemptofferings/exemptofferingschart

that "provides objective standards that a company can rely on to meet the requirements of the Section 4(a)(2) exemption." Under Rule 506 of Regulation D, a firm can raise an unlimited amount of money and can sell securities to an unlimited number of accredited investors.[5] Unlike Section 4(a)(2), the purchasers of the securities need only be accredited (based on a wealth threshold that assumes sophistication) and if the issue is not sold to any non-accredited investors, there is no disclosure requirement.

Issuers availing themselves of the safe harbor under Regulation D must file a Form D within 15 days of the first sale of a security in a private placement. The filing of the form is free and obligates the issuer to disclose the identity of its directors, officers, and promoters, its industry, the type of securities sold, the duration of the offering, how much has been raised, use of proceeds, and compensation paid to securities brokers.[6] The form also requests, on a voluntary basis, information about the issuer's revenue using broad dollar categories. Issuers who rely on Rule 506 are exempt from states securities blue sky laws but all but Florida require that a Form D also be filed with the state when it is filed with the SEC.[7]

3 Data

Our data are derived from multiple sources. We obtain the list of VC deals during 2009 – 2019 from VentureXpert, which provides detailed information on various characteristics on VC investments.[8] Thomson Reuters gets data on private equity data sources for investment, fund raising and profiles from "quarterly surveys of private equity firms; government filings; public news releases; and Thomson reporters - writing for the Venture Capital Journal (VCJ), European Venture Capital and Private Equity Journal (EVCJ), Private Equity Week and Buyouts Newsletter - who gain access to private equity news makers and ensure that breaking news filters into the private equity database." In addition, "the private equity investment, fund raising and profiles information is updated on a nightly basis." We track the status of these VC-backed startups (i.e., whether they went public

[5] Issuers may sell to up to 35 non-accredited investors if they use Rule 506(b) that prohibits general solicitation. Rule 504 of Regulation D has a cap on the funds raised and the offering may be subject to states securities laws.

[6] See `https://www.sec.gov/about/forms/formd.pdf` for an example of the form.

[7] `https://www.foxrothschild.com/publications/interactive-survey-of-state-blue-sky-filing-requirements-facilitates-rule-506-regulation-a-securities-compliance`

[8] In 2009, the SEC adopted an electronic filing requirement for Form D and changed some of the required disclosure items. For most of our analyses on the determinants of firms' Form D disclosure, we focus on the sample period of 2009 – 2019 in order to hold constant the information content of Form D. We, however, use an extended sample period of 2002 – 2019 later in the paper to understand the implication of the electronic filing requirement.

or were acquired) until December 2020 by retrieving IPO information from the SDC Global New Issues database and acquisition information from the SDC Mergers and Acquisition database.

We obtain Form D filings directly from the SEC EDGAR website. To identify whether a VC-backed firm has filed a Form D for a given financing round, we match the VC deals from VentureXpert with available Form D filings based on firm name, location, and whether the filing is within 90 days of the round date from VentureXpert. To avoid filings that could be backfilled at a later date, we drop any firm-round observation (a total of 520 deals) for which the filing date of a new Form D is more than 180 days after the date of the first sale as specified in the Form D.[9]

Figure 1 shows the difference between the filing and sales dates for firms that file a few Form D within six months of the offering. Most firms, approximately 80% of issuers, are compliant with their filings within the 15 day time period restriction. The next largest percentage of filers file a Form D within 30 days, and the remaining few issuers file much later than required.

In addition to restrictions on Form D filings, we also drop financing rounds for which the absolute value of the percentage difference between the amount raised in VentureXpert and the amount sold in Form D filings is more than 50%.[10] After applying these exclusions, our final sample consists of 18,849 unique VC-backed firms and 44,049 financing round observations. Of these, we are able to find corresponding Form D filings for 8,749 firms and 16,969 financing rounds.

We obtain additional firm characteristics in such as sales and employment for any VC-backed firm with data available in the National Establishment Time Series (NETS) database. The NETS database provides longitudinal data at the establishment level for businesses in the U.S., similar to the U.S. Census Bureau's Longitudinal Business Database (LBD) but does not require special permission to access. The version of NETS that we use in this paper ends in December 2019. We match each VC-backed startup with NETS based on firm name and location using a fuzzy matching algorithm. Then we aggregate the establishment-level data and obtain sales and employment at the firm-year level. We are able to find firm characteristics for 14,293 firms with 33,207 financing rounds.

[9] We provide additional details on sample construction in Section IA.3 of the Internet Appendix.

[10] The large difference in the amount in VentureXpert versus in Form D filings is likely because there are other non-VC investors who made significant investment in the firm in these financing rounds. These rounds with significant involvement of non-VC investors are potentially quite different from the rest of the sample. We therefore drop these rounds to focus on a cleaner sample of VC-backed firms in which VCs are the main investors. However, all our results are qualitatively similar without this restriction.

In order to determine whether a firm is covered by any media outlet, we merge our sample of VC-backed firms with data from RavenPack News Analytics. Finally, we retrieve information on patent litigation for each VC-backed firm in VentureXpert form the Stanford NPE Litigation Database. This database is a comprehensive patent litigation database that provides detailed information on the categorization of patent asserters for each case from 2000 to 2019.[11] We match VC-backed firms with patent lawsuits in the NPE Litigation database using fuzzy name matching and compile the patent litigation history through time for each VC-backed firm.

3.1 Filing patterns

As shown in Figure 2, of more than 44,000 rounds of capital raised by issuers through the issuance of securities to VCs, approximately 58% are not accompanied by a filing of a Form D and this pattern is present in every year of the sample. Thus, many VC-backed financing rounds either rely on an alternate exemption than Regulation D or fail to file the Form D when raising capital. The filing patterns of firms in our sample stand in contrast to the perception that "Regulation D is the most commonly used set of exemptions for private placement."[12]

To better understand issuers' decisions on whether to rely on Regulation D and file the form, we categorize firms into the type of filer based on its filing behavior. "Always Filed" means that there are corresponding Form D filings for all the VC financings raised by the firm. "Sometimes Filed" means that there are corresponding Form D filings for some (but not all) VC financings raised by the firm. Last, "Never Filed" means that there is no Form D filing available for VC financings raised by the firm. In Figure 3, Panel A presents the number of financings for each category and Panel B shows the number of firms in each category. As can be seen from the chart, firms that never file a Form D is the largest category confirming that most firms are either not relying Regulation D to raise private capital in the private market or are not complying with the requirement to file a Form D.

In Appendix IA.3, we show that these "Sometimes Filed" firms have a variety of patterns in their filing behavior. Of these 4,292 inconsistent filers 1,776 firms turn on the filing of Form D and file consistently thereafter, 1,085 firms stop filing a Form D, and the remainder have no particular

[11] See `https://law.stanford.edu/projects/stanford-npe-litigation-database/#slsnav-news-events-and-social-media` for a detailed description of this database.

[12] `https://thebusinessprofessor.com/en_US/business-transactions/regulation-d-securities-exemption`

pattern. In Table IA.2 we provide some examples.

4 Blue sky laws

Are the missing Form Ds the result of relying solely on Section 4(a)(2) or other exemptions that may require filing with states securities regulators? To see whether firms are using state exemptions rather than Regulation D to conduct private offerings, we examine VC rounds in which either the issuer or the VC is headquartered in California. We use California as a test case for two reasons. First, not all state securities regulators make available securities exemption requests in an accessible format. Thus, we cannot track the filings of every firm in every state. California, however, provides an easily accessible database of Limited Offering Exemption Notice of Transactions available since 2011. Second, many of our VC financing rounds are either by firms headquartered in California (38% of the sample) or purchased by VC investors with headquarters in California (52% of the sample).

California requires that an issuer not relying on a Regulation D Section 506(b) exemption to file a Limited Offering Exemption Notice if they are selling securities within the state of California. There are four requirements to claim the exemption: (1) the sale is to no more than 35 unaccredited investors, (2) each investor is required to have a pre-existing business or personal relationship with the issuer of the securities, or, in the alternative, can be demonstrated to be a sophisticated investor, (3) advertising of the securities is prohibited, and (4) at the time of purchase, the investor must not intend to resell the securities. These requirements are similar in scope to Section 4(a)(2) (requirements 2-4) and Rule 506 (requirement 1). Moreover, if an issuer relies on Regulation D, they must also file the Form D with the state within 15 days of issuance.[13] Therefore, most VC financings within California should be accompanied by some type of filing within that state.

To examine the filing behavior of issuers and investors within the state of California, we download every filing of a Limited Offering Exemption Notice (LOEN) from the California Department of Financial Protection and Innovation.[14] We match the name on the notices by firm name for the entire sample of issuers with VC financing beginning in 2011. We examine the filing behavior of two types of firms who may be required to file an LOEN: those who are headquartered in California,

[13] https://dfpi.ca.gov/corporate-securities-law-of-1968/securities-and-franchises-frequently-asked-questions-and-answers/

[14] https://docqnet.dfpi.ca.gov/search/.

under the assumption that they may sell to non-VC investors in their home state, and firms who sell to VCs headquartered in California.

Figure 4 presents the filing patterns by the size of the round either by firms headquartered in California (Panel A) or by firm-rounds that are sold securities to VCs located in California for firms that did not file a Form D with the SEC. We assume that the probability of relying on an exemption at the state level will be higher for smaller offerings because they are likely to have a more concentrated investor base. While we find that this is the case, it is evident from the graph that missing Form Ds are not simply due to the substitution of state filings for federal filings. The number of California state exemption notices filed is very small relative to the number of financings that likely took place within the state either by firms or to investors headquartered in California.

Because we do not know the identity of all investors in an offering, we acknowledge that not every California-based filing we identify, particularly at the firm level, will need to seek an exemption in California. In order to increase the probability that the offering is sold in California, we restrict the sample to a firm that is headquartered in the state and has at least one VC that participates in the offering. In over 54% of financing rounds by firms either headquartered in California and selling to investors in California where a Form D is missing, there is no California state exemption notices filed. In addition, for this restricted sample of firms, 2,400 offerings file a Form D with the SEC but almost half do not file the form with the state of California. Therefore, we conclude that cases of missing Form Ds are not simply due to these firms seeking a state exemption rather than a federal exemption.

Since we do not know the exact exemption the issuer relied upon for the offering if there is no filing, it is impossible to determine with certainty if firms are avoiding regulatory scrutiny by not complying with the filing requirements of Regulation D or are choosing an exemption for which no filing is available. Our inferences on whether firms are trying to avoid filing a Form D are, therefore, indirect. However, this preliminary evidence suggests that many issuers do not file with either state or federal regulators when conducting a private offering.

In the next section, we examine the tradeoffs a firm may make in choosing whether to remain under the radar by either relying on an exemption that does not trigger a filing with the SEC or by non-compliance with the requirements of Regulation D.

4.1 Tradeoffs

Given the perceived benefits of complying with Regulation D, the filing patterns we document beg the questions of why more firms are not choosing to rely on Regulation D or if they are, why are they not complying with the filing requirements? Disclosure theory in the IPO context suggests that companies, particularly early stage firms, may wish to shield proprietary information from competitors and other market participants (Bhattacharya and Ritter (1983), Bhattacharya and Chiesa (1995), Maksimovic and Pichler (2001)). In addition, Breuer, Leuz, and Vanhaverbeke (2019) provide evidence that new regulations in Europe that require all limited liability firms, whether they are public or not, to disclose information on financial statements, reduce innovative activity. Bushee and Leuz (2005) find that firms would prefer to delist from the OTC Bulletin Board rather than be forced to register with the SEC and disclose information to the public. There is ample anecdotal evidence that private companies in the U.S. face a similar situation. For example, one media article argues that the reason why entrepreneurs are not filing Form D "is that they want to keep their financing 'secret' so they can stay in a stealth mode for longer."[15]

The American Bar Association, in their comment letter on the amendments to require electronic filing of Form D in 2007, points to a number of considerations private companies may face when deciding whether to disclose their financing activities.[16]

> We are aware of a number of investment-oriented publications that track venture-backed financings using the Form D filings. In addition, some third party vendors are currently tracking the paper filings of Form D to do targeted marketing. Companies that have recently filed a Form D are reporting that they are immediately spammed by offers of loans, products and services. Up to now, these third parties generally have had to go to the time and effort of paying someone to search the paper filings. If filings are made electronically, freely available on the Commission's website, the combination of Form D's greater accessibility and data mining technologies is virtually certain to cause an increase in the amount of such "off-label use" by third parties. In fact, we are aware that *some venture funds now require their term sheets to provide that no Form D may be filed without their consent* (italics added). This trend away from Form D is likely to accelerate if an electronic, non-confidential filing of Form D were to be mandated.
>
> Although many privately-held companies have websites and issue regular press releases about their activities, just as public companies do, many other privately-held companies prefer to maintain a lower profile. Such companies do not make public announcements of

[15] https://foundrygroup.com/blog/atvc/do-you-need-to-file-a-form-d-with-a-financing/
[16] https://www.sec.gov/comments/s7-12-07/s71207-9.pdf)

> their financings or other activities, particularly if they are working in a new technology area where competition to develop new products or services is intense. These companies often go to great lengths to avoid unwanted publicity, sometimes asking their attorneys, for example, not to mention their financing transactions in law firm marketing materials. The electronic posting of Form D may create a business problem for these companies, by making information publicly available about their private financings that they had not otherwise wanted or been required to disclose.

Gao, Ritter, and Zhu (2013) suggest that remaining private allows the firm the opportunity to develop economies of scope and to speed products to market. The benefit of stealth mode or non-disclosure of information about financing can be particularly valuable for certain firms.

Given the perceived benefits of shielding information, what is the cost to the issuer for not relying on Regulation D or withholding information by not filing Form D? As noted above, Regulation D provides a safe harbor as long as the firm meets the requirements. However, the penalty for not filing a Form D does not seem particularly serious. Despite the perceived importance of Form D for information gathering for the SEC , "the filing of a Form D is a requirement of Rule 503(a), but it is not a condition to the availability of the exemption pursuant to Rule 504 or 506 of Regulation D."[17]

Even though the firm will not lose its exemption on a particular offering by not filing the form, there may be other risks to consider. First, the SEC and/or state securities regulators could take action against the firm for not filing the appropriate paperwork when raising capital especially if the firm has repeated violations. As a penalty, the SEC can enjoin the issuer from any future use of Regulation D. If the violation is deemed willful, it can be considered a felony. Gullapalli (2020) examines SEC litigation releases over a two year period, from 2014 to 2015, and finds 210 enforcement cases brought against firms with unregistered offerings and in almost all of the cases, the complaint alleges the firm failed to claim an exemption from registration.[18] However, the cases of non-compliance she identifies almost always include other, more serious infractions and they represent a very small fraction of non-filing firms. For example, in our sample of VC rounds in California where we can better observe compliance, there are almost 2,000 non-filers at the state

[17] `https://www.sec.gov/divisions/corpfin/guidance/securitiesactrules-interps.htm`.

[18] An example of a case brought in September 2020 by the SEC for non-compliance is against Covalent Collective who settled charges that they raised $19 million in unregistered sales of securities. The order "finds that Covalent did not file or cause to be filed a registration statement with the Commission in connection with the offer and sale of its securities, that no exemption from the registration requirements was available, and that this violated the registration provisions of Sections 5(a) and 5(c) of the Securities Act of 1933." `https://www.sec.gov/enforce/33-10833-s`.

or federal level in 2014 and 2015. In the full sample, there are 5,000 firms who do not file a Form D.[19] While not all firms that do not file a Form D are non-compliant, the small number of cases means that firms face a low probability of SEC enforcement if they fail to seek an exemption.

Second, investors (and the SEC) may sue the firm to rescind the issuance of securities for violating securities laws. Having to repurchase the shares at the issuance price could be very costly to the firm particularly if the rescission is driven by a declining valuation. Third, if the firm chooses to go public, the failure to file Form D may raise red flags during the due diligence process. Underwriter counsel may be concerned about other violations that may not be disclosed and the firm's lawyers will be unable to represent that the firm is in compliance with all applicable securities laws. These concerns may delay or cancel the offering.

Even if the probability of enforcement is small, it still does not explain why venture capitalists would report their investments in private firms to publicly available databases (albeit expensive ones for investors to purchase) but not file a Form D. The final reason may have to do with providing information to the SEC itself. The filing of a Form D requires that both the firm and the person who is filing the Form D apply for a filing ID. The SEC, through EDGAR, issues a central index key (CIK) for the company and a unique filing ID for the filing agent, often an officer of the company. Moreover, the form asks for "all related persons": (1) Each executive officer and director of the issuer and person performing similar functions (title alone is not determinative) for the issuer, such as the general and managing partners of partnerships and managing members of limited liability companies; and (2) Each person who has functioned directly or indirectly as a promoter of the issuer within the past five years of the later of the first sale of securities or the date upon which the Form D filing was required to be made."[20] Thus, the filing of a Form D subjects both the issuer, its associates, and the agent to the potential scrutiny of the SEC. As we will show later on, the percentage of offerings that file Form D decreases upon enactment of the bad actor provision, consistent with certain persons wishing to avoid regulatory oversight.

[19] The full sample results may include some firms that seek an exemption at the state level.

[20] `https://www.sec.gov/smallbusiness/exemptofferings/formd`

5 Determinants of Form D filing

Table 1 presents firm characteristics of the sample of VC-backed firms split into two subsamples: firms that file at least one Form D for a round of financing and firms that never file a Form D for any round of financing. Approximately 46% of the firms in the sample filed a least one Form D for a round of financing while 54% did not. The average number of rounds for a firm that files a Form D is 3 and for those that do not it is only 2. Even when the firm has at least one Form D, the average percentage of rounds for which a Form D is filed is only 75%.

We document a number of other differences between these two types of firms. First, the mean total amount raised over all financings is larger for firms that file at least one Form D and these larger financings have slightly larger VC syndicates (although the medians are the same) and a slightly greater number of rounds. Form D filers, on average, raise $43 million while Form D non-filers raise only $29 million. Second, Form D filers are substantially younger (4 years) compared to Form D non-filers (5 years) when they receive their first round of financing and are more likely to be in the biotech or pharmaceutical industries. Form D filers are also less likely to be headquartered in California. Third, in terms of innovation, firms that file a Form D have more patents, on average. Form D filers have 4 patent grants and 5 patent applications compared to only 1 patent grants and 2 patent applications for Form D non-filers. Finally, the probability of going public or being acquired is higher for Form D filers than Form D non-filers.

We find only marginal significance on the amount of sales between filers and no-filers and no differences in the number of employees. These univariate statistics suggest that the decision to use/and or comply with Regulation D may be related to firm characteristics that capture the tradeoff between ability to shield proprietary information and the value of that information to the firm.

5.1 Ability to shield proprietary information

Shielding proprietary information from competitors and other market participants may be beneficial for firms if it allows them breathing room to innovate and gain market share. The ability to hide information by either choosing an exemption that does not require a filing or non-compliance with Regulation D, however, is limited. As the firm grows, it attracts more funding and it may come to

the attention of the media. Larger funding rounds necessitate increasing the size and geographic dispersion of the investor base making it more costly to file with many state regulators. All of these factors make it difficult for the issuing firm to remain under the radar if it decides not to utilize Regulation D. Thus, we expect that the propensity to file a Form D is increasing in the size of the offering, the number and geographic dispersion of VC investors, and whether the firm has been subject to prior media attention.[21]

In Table 2, we examine whether the amount raised or the size and geographic dispersion of the VC syndicate can predict the filing of a Form D. We use a linear probability OLS model where the dependent variable is *Form D*, an indicator variable equal to one if the firm files a Form D in a given round of financing, zero otherwise. The independent variables of interest in Panel A is the size of the offering, *Log(Round Amt Raised)*, in Panel B, the number of VC investors participating in the round, *Log(Number of VC Investors)*, and in Panel C, is the number of unique states where the venture capitalist syndicate is headquartered, *(Log Number of VC States)*. In our sample, the size of the VC investor syndicate is highly correlated (0.44) with the size of the offering so we include them in separate panels.

We include a number of fixed effects in the specifications. In order to control for the life cycle of the firm, we include round fixed effects in all columns but (1) and (4). By doing so, we make sure our results are not driven by firms in a later stage of development who may be contemplating an exit from the private market and/or raising more funds making them more likely to use Regulation D. Columns (2) and (5) include firm fixed effects, restricting the sample to only those firms that have at least two rounds of financing. Since there are differences between the types of firms that comply with Regulation D and those that do not, including firm fixed effects can partially address endogeneity concerns that unobservable firm characteristics are driving our results. All standard errors are clustered by firm.

It is unclear whether the management of the firm or the venture capitalist drives the decision to comply with Regulation D. For example, there may be other investors affiliated with the venture capitalist that we cannot observe in our data, who may prefer not to disclose their holdings in a firm. Thus, it may be the case that the VC is the primary decision-maker as was suggested by the American Bar Association in their comment letter on the electronic filing of Form D. In untabulated

[21] Ewens and Malenko (2020) find that firms that do not file a Form D have smaller boards and fewer independent investors and suggest this is because the firm is trying to maintain secrecy about its activities.

results, we examine whether an issuing firm is more likely to file a Form D if one of the syndicate VCs also file a Form D when raising capital for their limited partnership. We match the list of U.S. VC firms with the issuer name on the Form D using a fuzzy name matching algorithm. There 1,603 VC firms who have file a Form D (35%) out of our sample of 4,578 VC firms.

For financing rounds for which we can identify the VC investors (i.e., excluding undisclosed VC firms or disclosed VC firms not in the U.S.), 62% of the rounds involve at least one VC firm who previously filed a Form D on its own behalf. We create a dummy variable equal to one if a financing round involves at least one VC firm that has filed a Form D and use it as the main independent variable of interest to predict whether or not a portfolio firm files a Form D. We find that a VC who files a Form D when raising its own capital is positively associated with the probability that their portfolio company will also file a Form D. This finding is robust to the inclusion of firm and round fixed effects. Because the VC itself may affect the decision to file a Form D, we include VC fixed effects in columns (3) and (6) in all three panels.[22]

In Panel A, the coefficient on the independent variable *Log(Round Amount Raised)* is significant and positive indicating that when a firm raises more money in a particular round of financing, it is more likely to file a Form D. This finding is consistent with Ewens and Malenko (2020) who also note that the probability of filing a Form D is greater when the offering amount is larger. In terms of economic magnitude, columns (2) and (5) of Panel A suggest that a one standard deviation increase in *Log(Round Amt Raised)* is associated with an increase of 9% in the probability of filing a Form D. Within a firm, the probability of filing a form D is increasing when the financing round is greater and within a VC, portfolio firms in the same stage of development but who raise a larger amount of capital, have a higher probability of filing a Form D. Columns (4)–(6) include firm characteristics for the subsample of firm-rounds for which we have data. The level of sales and employment does not appear to affect the decision to comply but we find that as the firm ages, its propensity to file a Form D increases but this effect diminishes when including firm and VC fixed effects. (Note that we include firm characteristics in our specifications for information purposes only. The legal requirement to file a Form D is invariant to these characteristics.)

In terms of investor base, in Panels B and C, we test whether the probability of filing a Form

[22]Our results are robust if we include a measure of VC reputation, as in Megginson and Weiss (1991), and the coefficient on VC reputation is insignificant suggesting that non-compliance is not driven by lower or higher quality VCs.

D is related to the number of VC investors in the round, *Log(Number of VC Investors)* number of unique states where venture capitalist investors are headquartered, *Log(Number of VC States)*. Of the entire sample of VCs, we are able to identify the headquarter state of at least one VC for 67% of the firm financing rounds. Since an exemption under Rule 506 of Regulation D preempts state securities registration requirements, we expect that firms are more likely to file a Form D when the number of states where the securities are sold to VCs increases for at least two reasons.[23] First, it is more costly to file with a larger number of state regulators when there are geographically dispersed investors. Second, the safe harbor of Regulation D is more valuable as the investor base becomes larger.

As can be seen in the table, our predictions are confirmed. When the number of VC investors and states where VCs are headquartered increases, the probability of a firm filing a Form D also increases. Thus, when a firm obtains financing from more VCs with larger geographic dispersion, they are more likely to comply with the filing requirement of Regulation D. The same interpretation exists when examining the specification with VC fixed effects. When there are a larger number of VCs among the VC syndicate that may have greater geographic dispersion, the portfolio firm is more likely to file a Form D.

Offering size and investor characteristics are only one metric by which to judge the difficulty of flying under the radar. We next examine whether firms that have received media attention in the past are more likely to file a Form D for their next round of financing. Media interest puts firms in the spotlight and thus, we predict that the probability of that the financing will become known by outside sources will increase. This lowers the proprietary information cost of filing a Form D. We test this prediction in Table 3. Our data on media coverage comes from RavenPack News Analytics. This database reports news data from major news agencies such as Dow Jones Financial Wires, Wall Street Journal, Barron's and Market Watch. The independent variable of interest is an indicator variable, *Prior Media Coverage*, equal to one if a firm is covered by a major news agency within one month after the prior round of financing, zero otherwise.

Since larger offers are positively associated with media coverage, we exclude the size of the offering in the specification. In most columns in the table, we find that if a firm receives media attention after its last round, it is more likely to file a Form D. To control for the endogeneity of

[23]Note that we cannot determine the geographic location of non-VC investors who are not disclosed in our database.

media attention, we include firm fixed effects in columns (2) and (5) and show that the probability of filing increases when the prior round of financing has been covered by the media. These results are economically significant. For example, column (2) suggests that being covered by media after a prior financing round increases the probability of filing a Form D in the current round by 5.8%. A similar rationale exists for using VC fixed effects in columns (3) and (6). There may be certain VCs that are more likely to be covered by the media. Again, we find that within a VC's portfolio of firms, those firms that receive media attention are more likely to comply with Regulation D's filing requirement.

Overall, we conclude that filing a Form D is more likely when firms are more visible to market participants and when the ability to shield proprietary information becomes harder. We examine in the next section whether firms that are hypothesized to have greater proprietary information and hence, greater benefits from withholding information, are less likely to either use Regulation D as an exemption or file a Form D.

5.2 Benefits to withholding proprietary information

The IPO Task Force raised concerns about the onerous disclosure requirements on smaller companies seeking to access public markets.[24] This report leads to the passage of the JOBS Act that allowed smaller firms to reduce their disclosure when going public. Dambra, Field, and Gustafson (2015) find that firms in information sensitive industries such as biotech and pharmaceuticals, are more likely to benefit from the reduced disclosure requirements of the JOBS Act. Indeed, firms in these industries go public at a higher rate after its passage suggesting that disclosure costs and the benefits of withholding information are high for these issuers.

In this section, we use two different firm characteristics to proxy for the potential amount of proprietary information a firm may have: its stage in development and its industry. We begin by analyzing the firm's development stage and predict that, consistent with Gao, Ritter, and Zhu (2013), that early stage firms are more likely than later stage firms to benefit from withholding funding information from the public and their competitors in order to allow breathing room to build out their product. Therefore, we predict that firms that are assumed to have greater proprietary information costs such as those in the early stage of development and in industries such as biotech,

[24] https://www.sec.gov/info/smallbus/acsec/rebuilding_the_ipo_on-ramp.pdf.

pharmaceuticals, and high tech have a greater incentive to shield information by not filing a Form D at the time of financing.

Figure 6 shows the distribution of financings by rounds. Panel A is for the full sample of firms and Panel B is restricted to firms that file at least one Form D. As can be seen from the red bars in Panel A, most rounds of financing are not accompanied by a Form D filing and we do not see a pattern based upon whether the round is early or late. The percentage of filings relative to financings is low in all rounds. (Note that the number financings in the category *Round 5+* aggregates all financings in round 5 or higher and therefore appears larger than prior rounds. The maximum number of rounds in the sample is 20.) Not surprisingly, the compliance rate for firms that file at least one Form D, in Panel B, is better than the sample as a whole but is still well below 100%.

In Table 4, we examine whether early stage firms are more or less likely to rely file a Form D than later stage firms. Our primary independent variable of interest is *Early Stage*, an indicator variable equal to one if the firm is in the seed/startup stage or early stage as defined by VentureXpert, and zero if the firm is in the later stage, expansion stage, or buyout/acquisition stage. As with the prior analyses, we employ firm and VC fixed effects that hold constant attributes of the firm and the venture capitalist that may affect the decision to file a Form D. We do not include round fixed effects in the specification since the round number and the development stage are highly correlated.

In all columns of the table, we find that the probability of filing a Form D is lower when the firm is in an early stage compared to a later stage of development. Moreover, this finding holds even when controlling for the size of the offering. When we include firm fixed effects, we find that a firm is more likely to file a Form D when it is in a later stage of development. Economically, column (2) suggests that being in the early stage of development decreases the probability of filing a Form D by 4.3%. With VC fixed effects, early stage portfolio firms are less likely than later stage firms to comply with the filing requirement. Our results are consistent with Guo, Lev, and Zhou (2004) who find that early stage companies provide less disclosure to the market than late stage companies at the time of the IPO. Early stage firms may find it easier to comply with other types of exemptions that do not require the filing of Form D since the investor base is likely to be smaller than later stage investments.

Next, we examine whether firms in industries that are more highly competitive (and secretive)

such as the biotech and pharmaceutical industries (Dambra, Field, and Gustafson (2015)) and high tech industries (Leone, Rock, and Willenborg (2007)) are less likely to file a Form D because they face greater proprietary disclosure costs.[25] As justification for examining these industries, particularly biotech, Guo, Lev, and Zhou (2004) argues that "unusually fast innovation pace in the biotech sector and the low barriers to entry enhance competition and the consequent proprietary costs of disclosure." Note that the availability of alternative exemptions to registration should be invariant to the firm's industry. Thus, this test sheds some light on whether firms may be avoiding the filing of Form D rather than using a different exemption.

To test this conjecture, we include in Table 5 two independent variables: *Biotech/Pharma*, which is an indicator variable equal to one if a firm is in the biotech or pharmaceutical industries (with SIC codes of 2830, 2832, 2834, 2834, 2835, 2836, and 8731, following Loughran and Ritter (2004)), zero otherwise; and *High Tech*, which is an indicator variable equal to one if a firm is in the high tech industries (with 2-digit SIC codes of 35 and 73, following Cohen, Gurun, and Kominers (2019)).[26] In this analysis, we do not include firm fixed effects because the industry classification of the firm does not vary through time. We do, include, however, VC and round fixed effects.

In columns (1) and (2), firms classified as biotech, pharmaceutical, or high tech firms are less likely to file a Form D than their counterparts in other industries and this finding is robust to including the amount raised. When we include VC fixed effects, we find that within a VC's portfolio of firms, companies in the biotech/pharmaceutical industries and high tech industries are less likely to file a Form D than their portfolio firms in other sectors. In terms of economic magnitude, column (2) suggests that the probability of filing a Form D is 2.7% lower for biotech and pharmaceutical industries and 1.7% lower for high tech industries, compared to other industries. The results are consistent in columns (3) and (4) when we use the subsample of firms for which we have firm characteristics. Thus, when shielding proprietary information may be more valuable, when a firm either in the early stage or in certain industries, it is less likely to file a Form D after receiving financing.

Finally, we consider whether the number of larger players or "sharks" in an industry affects the

[25]Guo, Lev, and Zhou (2004) argue that the biotech industry does not lend itself to other measures of competitiveness such as a Herfindahl index because of the heterogeneous nature of the products being developed.

[26]In Table IA.1 of the Internet Appendix, we create indicator variables for firms in the biotech/pharmaceutical industries, computer-related (hardware or software) industries, and Internet specific industries using the industry classifications provided in VentureXpert. We obtain consistent results as in Table 5.

decision to file a Form D. Gao, Ritter, and Zhu (2013) argues that small firms must grow quickly to outswim these large players before they either attempt to take them over or begin to compete in their marketplace. If this is true, then staying under the radar may be beneficial to these firms as they try to maximize their growth potential before coming to the attention of market leaders.

In order to test this hypothesis, we collect the number of firms in an issuer's two digit SIC code that have $50 billion or more in market capitalization for each year. In Table 6, we include both firm characteristics when available as well as round and VC fixed effects. For the full sample in columns (1)-(4), the coefficient on *Ln(No. Large Firms)* is negative and significant suggesting that as the number of large players in an issuer's industry increase, the propensity to file a Form D declines. This finding is robust to the inclusion of the size of the offer as well as within both round and venture capitalist. The results weaken as the sample is restricted to only those firms for which we have firm age, sales, and employment.

Overall, the results in this and the prior sections are are consistent with the hypothesis that firms with greater proprietary information disclosure costs and less market scrutiny may be more willing fly under the radar either by seeking an alternative exemption to registration or not complying with the filing requirements of Regulation D.

6 Form D mandatory electronic filing requirement

We next test whether firms are more or less likely to file a Form D by examining the implementation of the electronic filing requirement for Form D. Until September 15, 2008, Form D was a paper-only filing, even though the introduction of the EDGAR system in 1993 required many other forms to be filed electronically. In particular, compared to electronic filings, which are readily available through anyone with Internet access, paper Form D filings were available only in person at the Public Reference Room of the SEC in Washington D.C. or via a mail request, thus making it difficult for the general public to access and use.

Through time, the SEC has considered whether filing a Form D should be mandatory and has gone back and forth with respect to its importance. (See Appendix IA.2 for some additional information on the history of the Form D filing requirement.) On February 6, 2008, the SEC issued the final rule "Electronic Filing and Revision of Form D," that mandated the electronic filing of

Form D through the EDGAR system, with the objective of easing the filing burdens and providing better availability of Form D information to the public. In the adopting release, the Commission noted that the absence of electronic filing of Form D information "prevents issuers from filing through efficient modern methods and limits the usefulness of the information collected from Form D."[27] In addition, the SEC also adopted revisions to the content of Form D. While the new Form D carries over many of the requirements in the old Form D, it also requires some new items, such as the date of first sale in the offering and revenue range information (subject to an option to decline to disclose). Moreover, the new Form D now requires issuers to indicate whether the offering is made in connection with a business combination, tender offer, or merger and the types of securities offered. During the transition (phase-in) period from September 15, 2008 to March 15, 2009, the electronic filing of Form D was voluntary and issuers were permitted to file Form D either in paper or electronically. Beginning March 16, 2009, issuers were required to file Form D electronically through the EDGAR system.

The electronic filing of Form D allows it to be searchable and easily accessible, thereby reducing the ability of the firm to shield proprietary information from the public and its competitors. As noted by partner of the law firm Blank Rome "it's out there for the world to see when you file it."[28] If shielding proprietary information is important to firms, then we predict that the rate of firms filing Form D will decline after electronic filing is implemented.

In Table 7, we examine how the rule change mandating electronic filing affects firms' propensity to file a Form D. We extend our main sample to include firm financing rounds from 2002–2008 and obtain Form D information over this time period from by Ewens and Farre-Mensa (2020).[29] We create a an indicator variable, *Mandatory Electronic Filing*, equal to one if a financing round occurred on or after March 16, 2009, the date on which the mandatory electronic filing requirement of Form D took effect, zero otherwise. As shown in the table, the probability of filing a Form D declines after the mandatory electronic filing requirement. In addition, we interact the the mandatory electronic filing variable with other variables examined previously and find that the decline in Form D filings is greater for firms with a higher probability of having valuable proprietary

[27]SEC final rule "Electronic Filing and Revision of Form D" (Release No. 33-8891): `https://www.sec.gov/rules/final/2008/33-8891.pdf`.

[28]`https://www.complianceweek.com/brace-yourself-new-form-d-draws-near/5390.article`.

[29]Ewens and Farre-Mensa (2020) obtain the history of Form D filings over 1992–2008 via a FOIA request to the SEC.

information: those in an early stage of development or in the biotech, pharma, and high technology industries.

In Table 8, we examine the dynamics of firms' Form D disclosure over time. The independent variables of interest are indicators for different periods from 2003 to 2019. Column (1) does not include the amount raised by firm in the offering, whereas column (2) does. In both columns, we find that the coefficients of the indicators in the pre-electronic filing era are all positive and significant, whereas the coefficients of indicators in the post-electronic filing era are mostly negative or indistinguishable from zero. The exception is the negative coefficient for 2013. One possible reason for the decline in compliance during this year was the adoption of amendments to Rule 506 that disqualifies the issuer or certain "covered persons" from claiming an exemption from registration through Regulation D (Bad Actors).[30] The rule was proposed in July of 2013, finalized in July 2013 and went into effect in September 2013. The potential effect of the adoption of electronic filing and the Bad Actors rulemaking on the propensity to file a Form D can be seen in Figure 7. From the chart, it is clear that VC-backed private firms are less likely to file a Form D from 2009 onward, generally, and during 2013 specifically, when the SEC passed rulemaking that reduces the ability of firms to shield proprietary information and potential wrongdoing.

7 Patent litigation

In the prior section, we argued that firms with proprietary information may wish to avoid releasing information into the public market place. Of course, we are unable to determine what type of information a firm may be shielding but in order for our results to be convincing, we must show that, at least under certain circumstances, a firm faces an adverse consequence after filing a Form D for a round of financing. Evidence suggests that certain entities, such as patent litigators, take advantage of firms that are either cash rich or recently raised capital. Cohen, Gurun, and Kominers (2019) find that patent "trolls", nonpracticing entities that amass patents to claim license fees, target cash rich firms. Caskurlu (2019) documents that firms that complete an IPO increase the probability of being targeted by patent litigation by 33% in the next three years. As evidence that this type of litigation is due to deep pockets, there is no such increase in lawsuits if the firm

[30]This rulemaking also adopted rules around general solicitation in Rule 506 offerings that were proposed in the JOBS Act.

eventually withdraws its IPO. In this section, we examine whether some private firms wish to conceal fundraising because the filing of a Form D attracts the attention of patent litigators.[31]

Firms facing patent lawsuits may also have future adverse outcomes so avoiding their attention may be beneficial. Appel, Farre-Mensa, and Simintzi (2019)'s findings suggest that patent litigation, because of its costly nature, stifles employment, particularly for startup ventures. Furthermore, they document an increase in patent activity after the anti-patent troll laws take effect, suggesting that patent litigation decreases innovative activity. Thus, patent litigation can result in real consequences for a firm that could impede its ability to innovate and grow. We, therefore, predict that one benefit to not filing a Form D is shielding information from patent trolls.

We first test whether the filing of a Form D is more likely to lead to future litigation. In Table 9 we examine both the probability that a firm will be the target of patent litigation and whether such filings reduce the duration to the next patent lawsuit. In columns (1) and (2) of both panels we use all patent lawsuits while in columns (3) and (4), we use only those lawsuits brought by patent trolls. We define patent trolls as in Miller (2018) to include the following three categories: (1) firms with acquired patents, who license patents or generate revenue from licensing patents but do not make, sell, or offer a product or service, (2) corporate heritage, who were successful producers for a while but later transitioned to a patent asserter entity model, and (3) individual inventor-started companies, who do not offer products or services for sale. Other patent litigators not classified as trolls are entities such as universities.

In Panel A, the dependent variable, *Targeted in Next Two Years*, takes a value of one if the firm has a patent lawsuit within the next two years after the round of funding. Since the patent litigation data ends in 2019, we use VC financing rounds from 2009 to 2017 in our analysis so that we can track whether a VC-backed firm has had a patent lawsuit in the next two years. All specifications include year, industry, and round fixed effects. The positive and significant coefficient on *Form D* indicates that the probability of being a target of a patent lawsuit is higher when the firm files a Form D. In economic terms, columns (2) and (4) suggest that filing a Form D increases the probability of being a target of any patent litigators and of patent trolls by 0.8% and 0.5%, respectively. These results are economically significant since only 6% and 4% of our sample firms during 2009 – 2019 had a patent lawsuit initiated by any litigators and by patent trolls, respectively.

[31] We examine patent litigation not because we believe it is the most important reason why a firm may not comply but because we have excellent data to analyze whether filing a Form D results in a higher incidence of patent lawsuits.

We also find evidence consistent with the "deep pocket" story as a rationale for patent lawsuits. Patent litigation is more likely when a firm raises a larger amount of capital.

In Panel B, we employ a Cox proportional hazard model to determine whether the filing a Form D increases the hazard rate of being the subject of a lawsuit. Similar to in Panel A, we use VC financing rounds from 2009 to 2017 in our analyses so that we allow at least two years to track whether a VC-backed firm has become the subject of a patent lawsuit. The use of a Cox proportional hazard model is common in the literature when modeling the differences in time between the event and the outcome (Hellmann and Puri (2002)). In our case, the dependent variable is the time until the next patent lawsuit (measured in months) after the round of financing. The independent variable of interest is *Form D*. We expect that the coefficient on this variable will have a value greater than one, indicating that an increase in the covariate increases the hazard rate and decreases the time between filing and being subject to a lawsuit.

The findings in Panel B shows that filing a Form D decreases the time between filing and subsequent patent litigation. When we split the sample between different types of lawsuits, patent litigation generally and patent troll litigation specifically, the hazard ratios are relatively similar. We also find that when firms raise more capital, the time to litigation declines. Thus, we confirm the findings in the prior literature that patent litigators are attracted to firms that have larger cash reserves and also document that the filing of a Form D may attract the attention of patent trolls.

We next examine whether variation in the enactment of anti-patent troll laws across states affects the propensity to file a Form D. Our approach is similar to that of Appel, Farre-Mensa, and Simintzi (2019) who use the enactment of anti-patent trolling laws as an identification strategy to study the effect of patent litigation on firm outcomes.[32] (See Appendix A.2 for the states used in the analysis and the dates of passage.) We predict that the passage of these laws will increase the use of Regulation D by VC-backed firms because they are more likely to be protected from litigation when disclosing a round of financing on Form D. To further investigate the effect of these laws, we posit that the enactment will be more beneficial for high tech firms than non-high tech firms because they are more engaged in innovative activity. Therefore, we classify each firm in our sample as high tech or non-high tech using information as in Cohen, Gurun, and Kominers (2019).

[32]We include Michigan in our sample because it passed its own anti-patent troll law after the publication of Appel, Farre-Mensa, and Simintzi (2019). Refer to this website for more information `https://www.patentprogress.org/patent-progress-legislation-guides/patent-progresss-guide-state-patent-legislation`.

In Table 10, we use a difference-in-differences methodology to determine whether filing a Form D is more likely after a state passes an anti-patent trolling law. We include year, firm, and round fixed effects in the specifications as well control for the amount raised in the round of financing. In column (1) of the table, we include the sample of all firms and find that the probability that a firm will file a Form D increases after the passage of anti-patent trolling laws. Moreover, we show in columns (2) and (3) that this effect is significant only for firms in high tech industries because they are most likely to be targeted by patent litigators. The differential effect of the laws on high tech and non-high tech firms is consistent with Appel, Farre-Mensa, and Simintzi (2019) who find that technology patenting increases after the enactment but the passage has no effect on non-technology patenting activity. The results of this section suggest that firms may rationally choose not to disclose information on Form D if the cost of doing so is high.

8 Duration to exit

In this section, we examine whether the duration to exit is shorter for firms that file a Form D. To be clear, we are not claiming that filing a Form D affects the timing of an exit whether by an IPO or an acquisition. Instead, we expect that it is more likely that firms have a greater incentive to comply with securities laws the closer they get to exiting the private market. This is because of the heightened scrutiny that exiting firms receive during the due diligence process. In order not to have a look-ahead bias, we do not test whether the probability of filing a Form D increases as the time to exit decreases. Rather, we use a Cox proportional hazard model to test whether there is a relationship between the filing of a Form D and the time to exit. We use VC financing rounds from 2009 to 2018 in our analyses so that we allow at least two years to track the exit status of these firms until December 2020.[33]

In Table 11, the dependent variable is the difference in between the filing of the Form D and the firm's IPO date measured in months. All specifications include year and industry fixed effects and standard errors are clustered at the industry level. As shown in the table, the coefficient on *Form D* is positive and significant with a value over one, indicating that the time to IPO is shortened when the firm has previously filed a Form D. These findings hold true in column (3) for the smaller subsample of firms for which we have firm characteristics.

[33]Note that our results are also robust to using VC financing rounds from 2009 to any year between 2015 and 2018.

In Table 12, we repeat this same exercise but replace the time to IPO with the time to acquisition measured in months. Again the coefficients are significantly positive and in excess of one in columns (1) and (2). The findings are robust to the inclusion of firm characteristics for a smaller subsample of firms.

Overall, we interpret the findings of this section as evidence that firms increase their willingness to file a Form D as they near an exit. "Cleaning house" before an IPO or an acquisition is particularly important since investors or acquirers may be hesitant to purchase securities from firms with securities laws violations. As evidence that firms restructure as they move toward an exit, Ewens and Malenko (2020) find that firms increase the size of their board and add more independent directors as they approach an IPO. In our sample, there are a number of late filings. There are 238 firms that file 90 days or later than the round date with an average of one year. With half filing one year or later than the round date. In addition, a few of the apparent backfillers do so around the date of their IPO. For example, Snowflake, Inc. went public on September 15, 2020 and filed two Form Ds on May 6, 2020; one 701 days and 964 days after the round date respectively.

9 Discussion and conclusion

Private markets are an important venue for capital raising for firms. According to Gullapalli and Ivanov (2018), proceeds raised in the private market during 2017 is almost twice the amount raised in public markets and this statistic is likely underestimated because they rely on Form D filings for their estimates. Indeed, for our sample of VC financing, almost $52 billion of fundraising in VentureXpert is not reported on a Form D.[34] In addition, the SEC has a renewed interest in the regulation of private markets. In November 2020, the SEC passed a series of changes to its private offering rules that are intended to "simplify, harmonize, and improve aspects of the exempt offering framework to promote capital formation while preserving or enhancing important investor protections."

Generally, participation in private securities offerings under Regulation D is limited to accredited investors, investors whose income meets certain requirements. In 2020, the SEC expanded

[34]It is hard to say whether our estimate of non-reported proceeds raised is overstated or understated. It is likely overstated because some firms sought a state exemption to registration (also not captured by the SEC study) but understated because we limit capital raising to VCs. There may be additional funds raised from non-VC investors that we cannot observe.

the definition of accredited investor to include persons in certain industries but kept the income thresholds the same as they were in 1983. The result is a movement to more open access to private offerings. However, investor advocates argue that allowing relatively unsophisticated investors access to private market securities can result in potential fraud. For example, according to a Forbes article, "Consumer Federation of America" Director of Investor Protection Barbara Roper, claimed that the Commission's refusal to raise the thresholds allows private issuers to remain free to peddle their securities to people who do not have access to essential information about the investments."[35]

Protecting investors in private markets is, therefore, an important regulatory objective and the requirement to file a Form D is designed to provide the Commission and others about the fund raising activities of private firms. If no filing occurs, it is impossible for the SEC to easily determine whether private offering restrictions, such as the prohibition on general solicitation (if not using Rule 506(c)) or excessive sales to non-accredited investors (no more than 35 investors for Rule 506(b)) is violated. In addition, the Commission cannot monitor whether the company provided "non-accredited investors disclosure documents that generally contain the same type of information as provided in Regulation A offerings." Thus, these filings are an important tool for use in market surveillance and the Commission has stated that "availability of Form D information filed with us through an searchable electronic database will enable both federal and state securities regulators to monitor the exempt securities transaction markets more effectively."[36]

However, we find that many firms do not file a Form D either because they use another exemption to registration or because they fail to comply with the requirement if relying on Regulation D. We show that the compliance behavior of our sample of venture-capital backed firms is predictable and appears to balance the ability to shield proprietary information with the perceived benefits of withholding information. For example, when it is easier to hide information either by reducing the risk of detection or relying on another exemption, such as for firms with smaller offerings and fewer VC investors, the probability of filing a Form D decreases.

Firms whose proprietary costs of disclosure are high and the benefits of shielding information from competitors and market participants are also high, are less likely to file a Form D. Firms that are in industries where trade secrets are an important asset, such as biotech, pharmaceutical,

[35] https://www.forbes.com/sites/tedknutson/2020/08/26/sec-gives-more-retail-investors-access-to-private-funds-companies/#5374e1bfa4a9.

[36] https://www.sec.gov/rules/final/2008/33-8891.pdf.

and high tech companies, have a lower probability of filing a Form D. We also present results that are consistent with protecting the firm from competition when they are in the early stage of development. Early stage VC-backed firms are less prone to filing a Form D than later stage companies as are issuers in industries with a large number of big firms.

Although there may be many unobservable benefits to not filing a Form D, we examine one possible benefit for which we have data, reducing the incidence of patent litigation. Firms that file a Form D are much more likely to be the target of patent trolls and the time until litigation is shortened. We also document that the introduction of anti-patent troll laws in various states increases the propensity for firms to file a Form D.

While we cannot conclusively determine whether the lack of Form D filings is intentional non-compliance or reliance on alternate exemptions, the plethora of evidence we provide (and anecdotal evidence) suggests that some firms are choosing to ignore the requirements of Regulation D. If so, this suggests that even minor disclosure requirements can result firms choosing to avoid filings.

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Table A.1
Variable Definitions

Variable	Definition
Form D	An indicator variable equal to one if the issuer files a Form D for the round of financing. Source: SEC EDGAR.
Log (Round Amount Raised)	The natural log of the offering size of the round. Source: VentureXpert.
Log (Number of VC Investors)	The natural log of the number of VC investors in the round. Source: VentureXpert.
Log (Number of VC States)	The natural log of the number of unique states where the venture capitalist syndicate is headquartered. Source: VentureXpert.
Log (Firm Age)	The natural log of firm age plus one. Source: VentureXpert.
Log (Sales)	The natural log of sales for a VC-backed firm in a given year. Source: NETS.
Log (Employment)	The natural log of the number of employees for a VC-backed firm in a given year. Source: NETS.
Prior Media Coverage	An indicator variable equal to one if a firm was covered by a major news agency within a month after the prior round of financing. Source: RavenPack News Analytics.
Early Stage	An indicator variable equal to one if the private firm is in start-up/seed stage or early stage, zero if it is in later stage, expansion stage, or buyout/acquisition stage. Source: VentureXpert.
Biotech/Pharma	An indicator variable equal to one if a firm is in the biotech industries or pharmaceutical industries, zero otherwise. Source: VentureXpert.
High Tech	An indicator variable equal to one if a firm is in the high tech industries (as in Cohen, Gurun, and Kominers (2019)), zero otherwise. Source: VentureXpert.
Targeted in Next Two Years	An indicator variable equal to one if the firm faces patent litigation within the next two years. Source: Stanford Patent Litigation Database.
Duration to Next Patent Litigation	The amount of time to next patent litigation (in months) within two years. Source: Stanford Patent Litigation Database.
Duration to IPO	The amount of time to IPO (in months). Source: SDC Global New Issues Database.
Duration to Acquisition	The amount of time to being acquired by another company (in months). Source: SDC Mergers & Acquisitions Database.
Ln(Total Rounds to Date)	The natural log of the total number of rounds until the current round. Source: VentureXpert.

Table A.2
State Anti-Patent Troll Laws

This table lists the 33 states which passed anti-patent troll laws, the corresponding bill, and the dates on which the laws were signed.

State	Bill	Signed Date
Alabama	Ala. Code § 8-12A	4/2/2014
Arizona	H.B. 2386	3/24/2016
Colorado	Colo. Rev. Stat. § 6-12-101	6/5/2015
Florida	Flor. Stat. § 501.991	6/2/2015
Georgia	Ga. Stat. § 10-1-27A	4/15/2014
Idaho	S.B. 1354	3/26/2014
Illinois	S.B. 3405	8/26/2014
Indiana	H.B. 1102	5/5/2015
Kansas	S.B. 38	5/20/2015
Louisiana	S.B. 255	5/28/2014
Maine	S.P. 654	4/14/2014
Maryland	S.B. 585	5/5/2014
Michigan	S.B. 289	1/6/2017
Minnesota	S.F. 1321	4/29/2016
Mississippi	H.B. 589	3/28/2015
Missouri	S.B. 706	7/8/2014
Montana	SB 39	4/2/2015
New Hampshire	S.B. 303	7/11/2014
North Carolina	S.B. 648	8/6/2014
North Dakota	HB 1163	3/26/2015
Oklahoma	H.B. 2837	5/16/2014
Oregon	S.B. 1540	3/3/2014
Rhode Island	H.B. 7425	6/4/2016
South Carolina	H. 3682	6/9/2016
South Dakota	S.B. 143	3/26/2014
Tennessee	H.B. 2117	5/1/2014
Texas	SB 1457	6/17/2015
Utah	Utah H.B. 117	4/1/2014
Vermont	Vermont's Act 44	5/22/2013
Virginia	H.B. 375	5/23/2014
Washington	SB 5059	4/25/2015
Wisconsin	S.B. 498 (Act 339)	4/24/2014
Wyoming	S.F. 65	3/11/2016

Figure 1

Difference between Filing and Offer Dates in Form D Filings

This figure shows the distribution of the difference between filing and offer dates in Form D filings during 2009 – 2019. For example, "<= 15 days" means that a Form D is filed less than 15 days later than the date of sale as specified in the Form D.

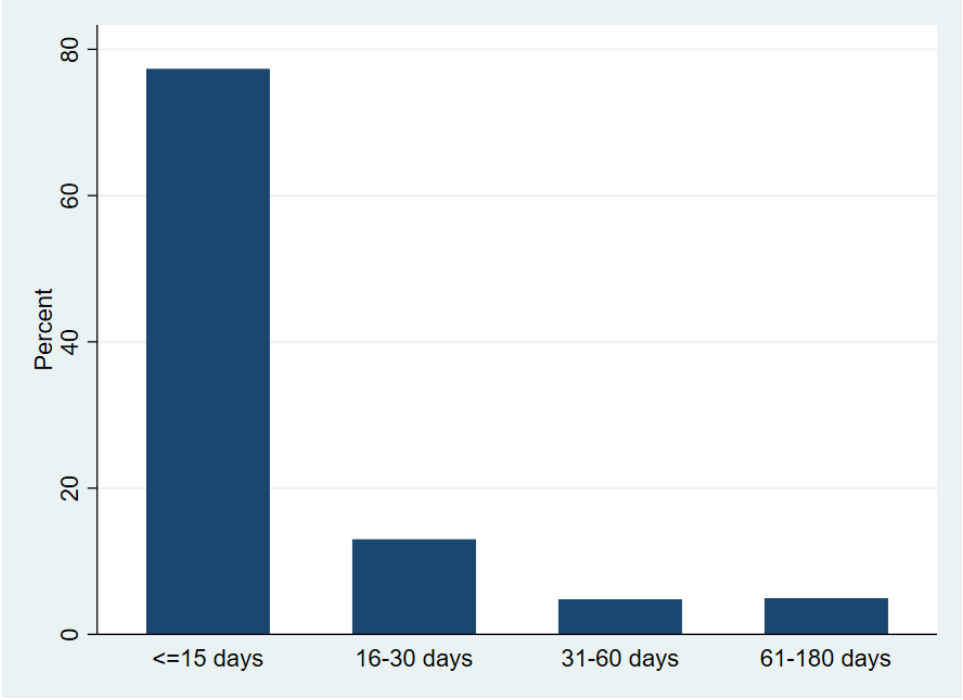


Figure 2
Financings and Form D Filings By Year

This figure shows the distribution of the number of VC financings and Form D filings by year.

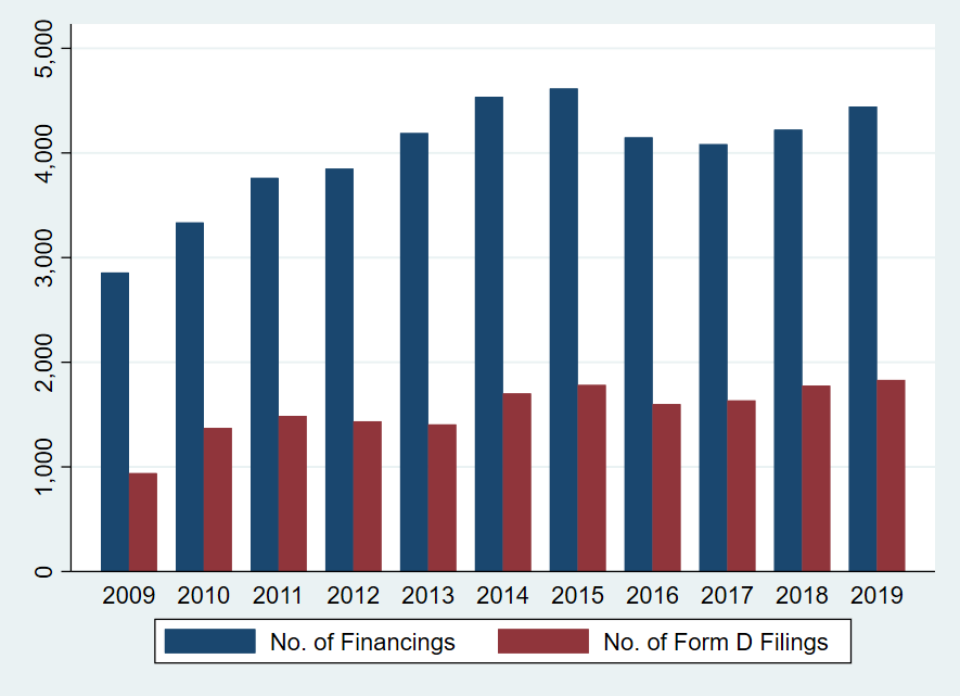
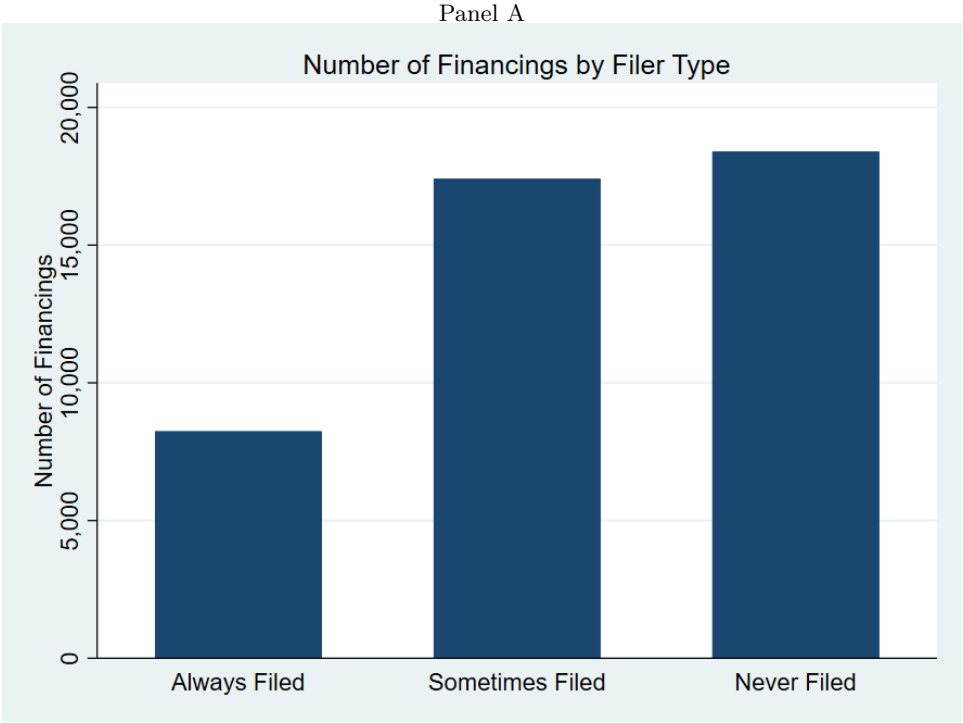


Figure 3
Distribution of Financings and Firms by Filer Type

This figure shows the distribution of the number of VC financings (in Panel A) and the number of unique VC-backed firms (in Panel B) by filer type during 2009 – 2019. "Always Filed" means that there are corresponding Form D filings for all the VC financings raised by the firm. "Sometimes Filed" means that there corresponding Form D filings for some (but not all) VC financings raised by the firm. "Never Filed" means that there is no Form D filing available for VC financings raised by the firm.

Panel A



Panel B

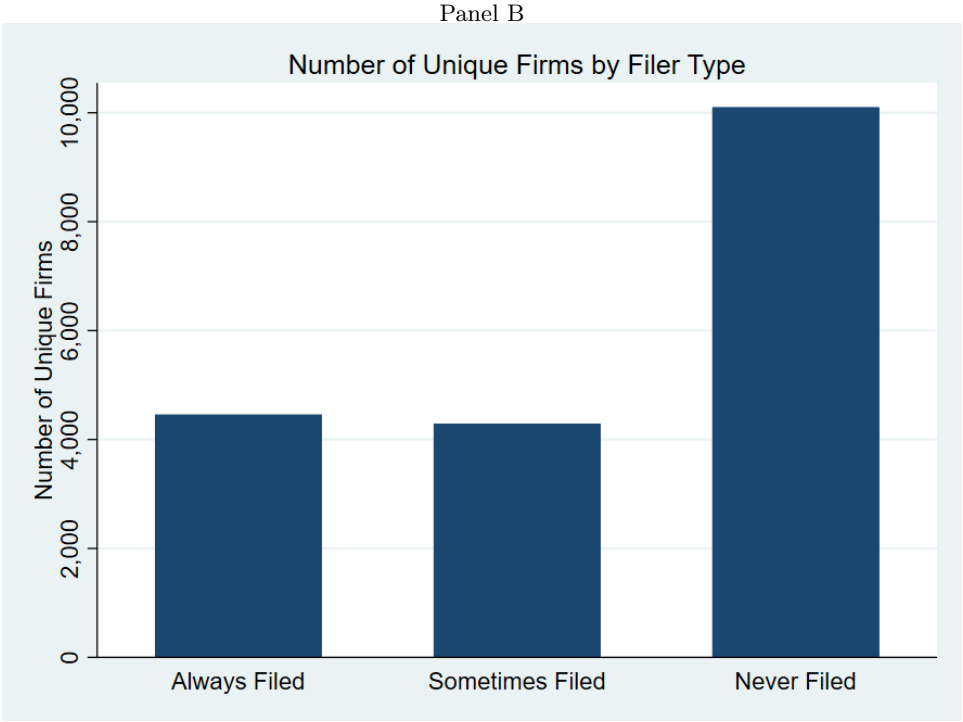
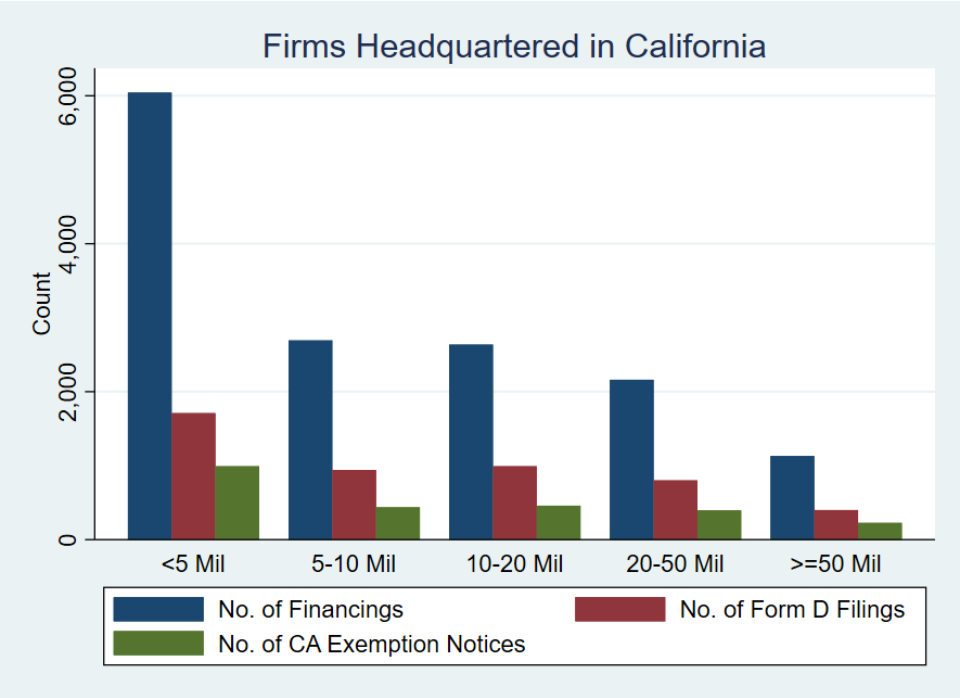


Figure 4

Number of Financings, Form D Filings, and State Filings in California by Amount Raised

This figure shows the distribution of the number of financings, Form D filings, and California Limited Offering Exemption Notices (LOENs) by offering amount during 2011 – 2019. Panel A are the financings by firms headquartered in California and Panel B are financings sold to VC investors headquartered in California.

Panel A



Panel B

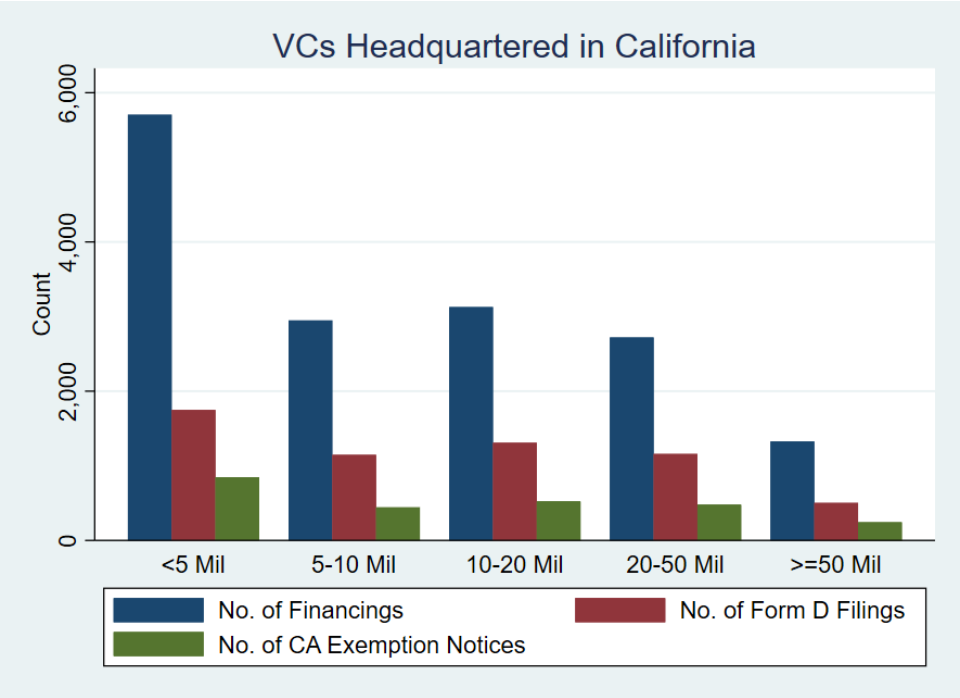
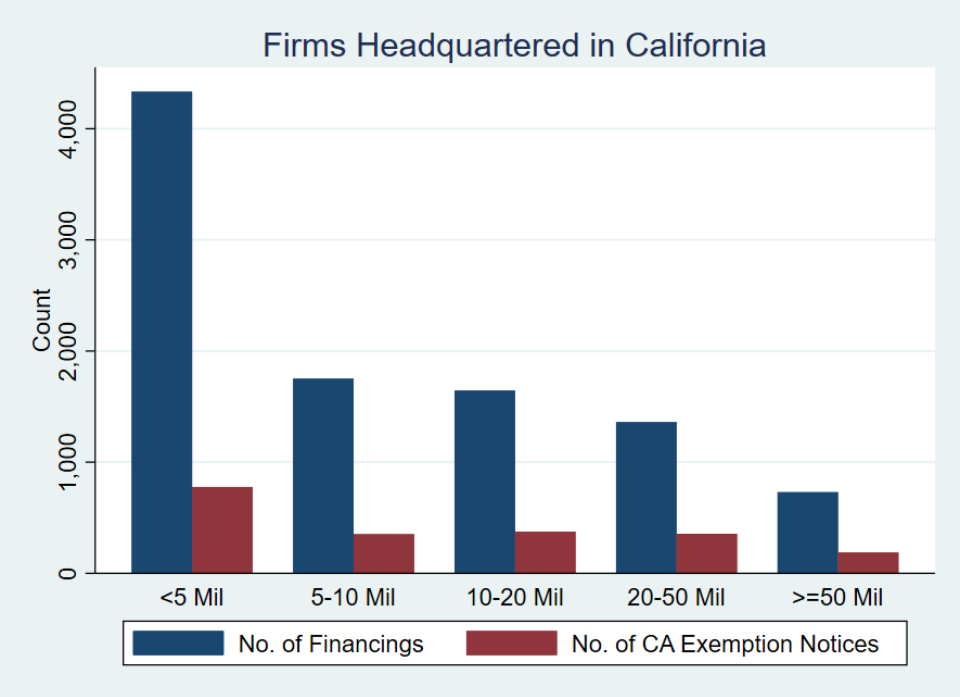


Figure 5

Number of Financings and State Filings in California by Amount Raised for Rounds without a Form D

This figure shows the distribution of the number of VC-backed firm financings, Form D filings, and California Limited Offering Exemption Notices (LOENs) for rounds of financings not accompanied by a Form D filing during 2011 – 2019. Panel A are the financings by firms headquartered in California and Panel B are financings sold to VC investors headquartered in California.

Panel A



Panel B

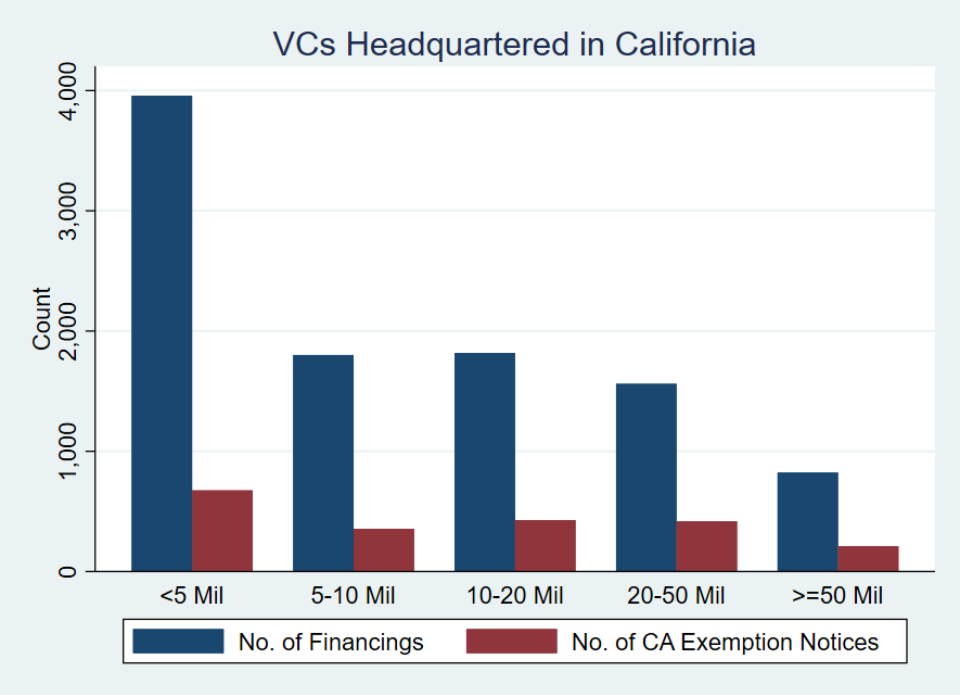
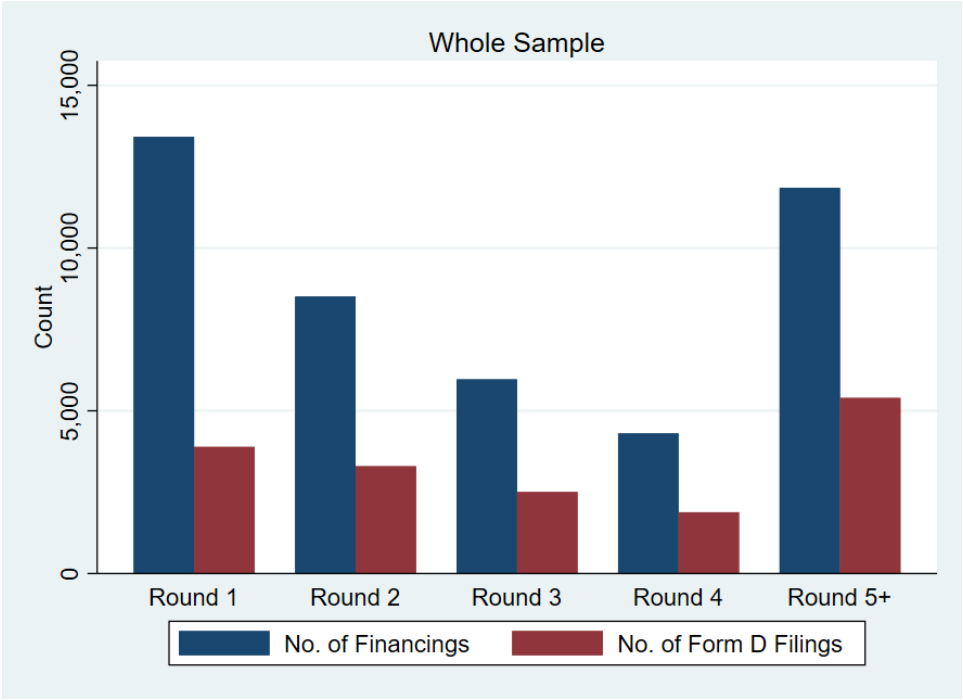


Figure 6
Distribution of Financings and Form D Filings by Round

This figure shows the distribution of the number of VC financings and the number of Form D filings by round during 2009 – 2019. Panel A uses the entire sample of firms and Panel B uses the subset of firms which have filed at least one Form D.

Panel A



Panel B

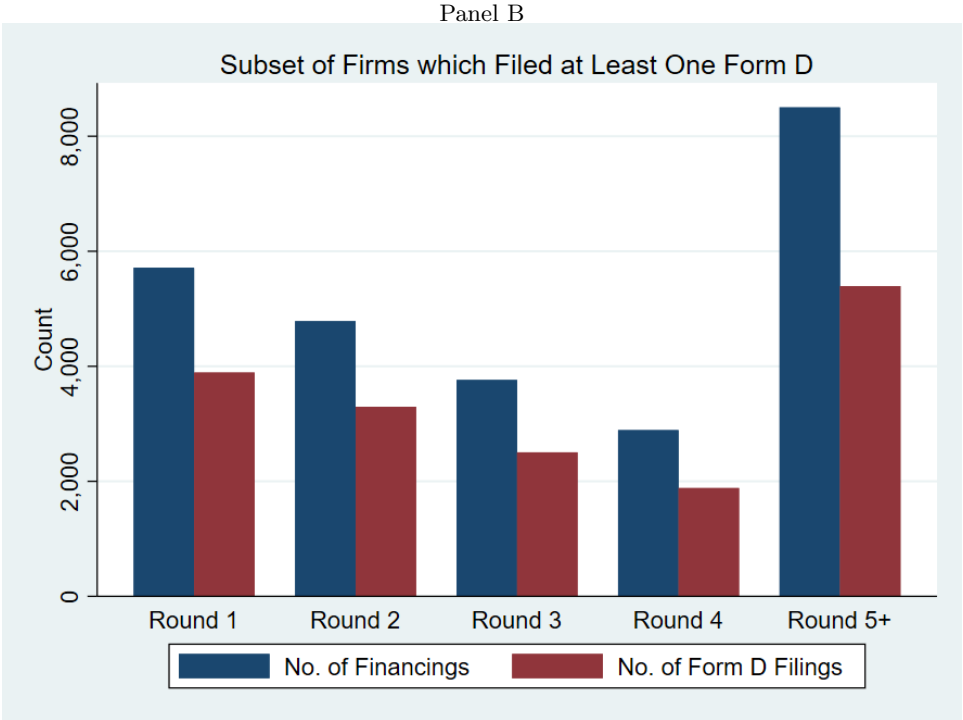


Figure 7
Dynamics of Form D Disclosure Over Time

This figure plots the coefficients of the dummy variables for each year from 2003 to 2009 on Form D filings during 2002 – 2019.

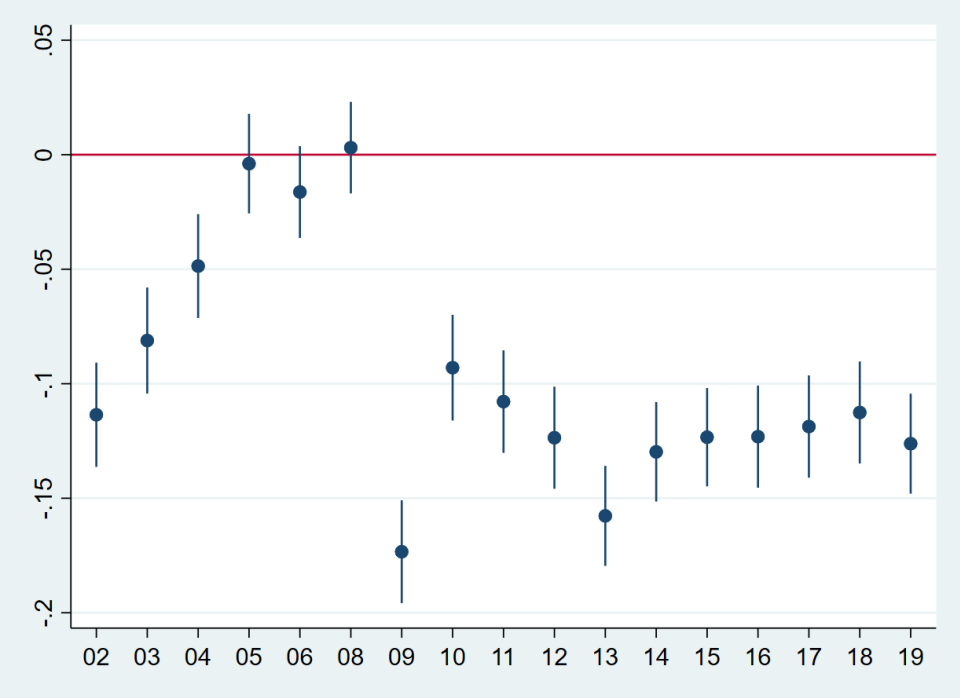


Table 1
Descriptive Statistics

This table presents the descriptive statistics of firms backed by venture capitalists (VCs) during 2009 – 2019 that have filed at least one Form D and that have never filed any Form D. *Number of Rounds* is the total number of rounds of financing for the firm during the sample period. *% of Rounds with Form D* is the percentage of financings for which the firm files a Form D. *Total Amount Raised* is the total VC investment raised across all rounds. *Syndicate Size in 1st Round* is the number of VCs investing in the startup in the first round. *Age at 1st Round* is the firm age at the time of receiving the first round of VC investment. *Sales* is the average sales per year for a VC-backed firm. *Employees* is the average number of employees per year for a VC-backed firm. *Biotech/Pharma* is an indicator variable equal to one if the firm is in the biotechnology or pharmaceutical industry, zero otherwise. *High Tech* is an indicator variable equal to one if the firm is in the high tech industry, zero otherwise. *HQ in CA* is an indicator variable equal to one if a firm is headquartered in California, zero otherwise. *Total Patent Grants* is the total number of patent grants until the last round of financing round. *Total Patent Applications* is the total number of patent applications made by the firm until the last round of financing. *Litigation by Any Patent Asserter* is an indicator variable equal to one if the firm is the target of patent litigation, zero otherwise. *Litigation by Patent Troll* is an indicator variable equal to one if the firm is the target of patent litigation by a nonpracticing entity or patent troll, zero otherwise. *IPO* is an indicator variable equal to one if the startup eventually went public (by December 2020), zero otherwise. *Acquired* is an indicator variable equal to one if the startup was eventually acquired (by December 2020), zero otherwise.

	Had a Form D				Never Had a Form D				Difference
	N	Mean	Median	SD	N	Mean	Median	SD	in Means
Number of Rounds	8749	2.93	2.00	2.11	10100	1.82	1.00	1.48	1.11***
Percentage of Rounds with Form D	8749	75.77	100.00	27.67	10100	0.00	0.00	0.00	75.77***
Total Amount Raised (in million)	8749	43.18	12.99	245.06	10100	29.16	5.18	140.59	14.03***
Syndicate Size in 1st Round	8749	2.66	2.00	1.92	10100	2.54	2.00	2.04	0.13***
Age at 1st Round	7634	4.35	3.00	5.67	7461	5.15	3.00	8.47	-0.80***
Sales (in million)	7306	3.83	0.72	30.21	6987	6.47	0.47	20.44	-2.63*
Employees	7306	28.21	8.20	154.25	6987	39.17	6.00	145.89	-10.96
Biotech/Pharma	8744	0.11	0.00	0.32	10097	0.08	0.00	0.28	0.03***
High Tech	8744	0.56	1.00	0.50	10097	0.60	1.00	0.49	-0.04***
HQ in CA	8749	0.35	0.00	0.48	10100	0.42	0.00	0.49	-0.07***
Total Patent Grants	8749	3.80	0.00	21.00	10100	1.49	0.00	11.78	2.31***
Total Patent Applications	8749	5.48	0.00	24.61	10100	2.15	0.00	14.69	3.32***
Having a Litigation by Any Patent Asserter	8749	0.08	0.00	0.27	10100	0.05	0.00	0.21	0.03***
Having a Litigation by Patent Troll	8749	0.05	0.00	0.22	10100	0.03	0.00	0.17	0.02***
Went Public	8749	0.05	0.00	0.21	10100	0.02	0.00	0.13	0.03***
Acquired	8749	0.21	0.00	0.41	10100	0.14	0.00	0.34	0.07***

Table 2
Offering Size and VC Investors

This table reports the determinants of Form D disclosure by VC-backed startups. The independent variable, *Form D*, is an indicator variable equal to one if the issuer files a Form D for the round of financing. *Log(Round Amount Raised)* is the natural log of the offering size of the round. *Number of VC Investors* is the number of VC investors in the round. *Number of VC States* is the number of unique states where the venture capitalist syndicate is headquartered. All other variables are defined in Appendix A.1. Standard errors are adjusted for clustering at the firm level and *t*-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1, 5 and 10 percent levels, respectively.

			Form D			
Panel A	(1)	(2)	(3)	(4)	(5)	(6)
Log(Round Amount Raised)	0.033***	0.051***	0.030***	0.021***	0.051***	0.031***
	(21.701)	(22.374)	(13.276)	(9.506)	(18.022)	(10.676)
Log(Firm Age)				0.051***	0.009	-0.006
				(8.258)	(0.495)	(-0.789)
Log(Sales)				0.006	0.004	0.005
				(1.069)	(0.548)	(0.931)
Log(Employment)				-0.005	-0.010	-0.007
				(-0.719)	(-1.006)	(-0.973)
Firm FE	N	Y	N	N	Y	N
Round FE	N	Y	Y	N	Y	Y
VC FE	N	N	Y	N	N	Y
Observations	44,049	35,330	35,984	29,530	24,638	23,424
Adjusted R-squared	0.015	0.429	0.121	0.012	0.413	0.117
			Form D			
Panel B	(1)	(2)	(3)	(4)	(5)	(6)
Log(Number of VC Investors)	0.009**	0.028***	0.053***	-0.004	0.031***	0.059***
	(2.099)	(5.891)	(9.866)	(-0.711)	(5.429)	(8.942)
Log(Firm Age)				0.052***	0.054***	0.004
				(8.423)	(3.052)	(0.466)
Log(Sales)				0.008	0.005	0.007
				(1.372)	(0.573)	(1.187)
Log(Employment)				-0.001	-0.006	-0.006
				(-0.090)	(-0.656)	(-0.784)
Firm FE	N	Y	N	N	Y	N
Round FE	N	Y	Y	N	Y	Y
VC FE	N	N	Y	N	N	Y
Observations	44,049	35,330	35,984	29,530	24,638	23,424
Adjusted R-squared	0.000	0.415	0.119	0.007	0.399	0.115

Table 2
Offering Size and VC Investors (continued)

				Form D		
Panel C	(1)	(2)	(3)	(4)	(5)	(6)
Log(Number of VC States)	0.137***	0.119***	0.099***	0.125***	0.120***	0.110***
	(19.038)	(13.081)	(11.424)	(14.535)	(11.189)	(10.541)
Log(Firm Age)				0.045***	0.014	0.006
				(6.567)	(0.616)	(0.736)
Log(Sales)				0.010*	0.000	0.007
				(1.680)	(0.041)	(1.123)
Log(Employment)				-0.002	-0.002	-0.003
				(-0.305)	(-0.146)	(-0.386)
Firm FE	N	Y	N	N	Y	N
Round FE	N	Y	Y	N	Y	Y
VC FE	N	N	Y	N	N	Y
Observations	29,671	21,702	28,214	19,970	15,425	18,709
Adjusted R-squared	0.018	0.423	0.124	0.021	0.407	0.121

Table 3
Media Attention

This table reports the determinants of Form D disclosure by whether or not the firm has had the attention of media outlets after past financings. *Prior Media Coverage* is an indicator variable equal to one if a firm was covered by a major news agency within one month after the prior round of financing as reported in RavenPack News Analytics, zero otherwise. All other variables are defined in Appendix A.1. Standard errors are adjusted for clustering at the firm level and t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1, 5 and 10 percent levels, respectively.

	Form D					
	(1)	(2)	(3)	(4)	(5)	(6)
Prior Media Coverage	0.004	0.058**	0.043*	-0.016	0.062*	0.054*
	(0.185)	(2.011)	(1.652)	(-0.662)	(1.922)	(1.862)
Log(Firm Age)				0.057***	0.103***	0.001
				(6.601)	(4.109)	(0.057)
Log(Sales)				0.004	0.005	0.004
				(0.632)	(0.534)	(0.588)
Log(Employment)				-0.001	-0.013	0.000
				(-0.137)	(-1.119)	(0.024)
Firm FE	N	Y	N	N	Y	N
Round FE	N	Y	Y	N	Y	Y
VC FE	N	N	Y	N	N	Y
Observations	27,069	22,349	20,913	20,375	17,033	15,448
Adjusted R-squared	-0.000	0.433	0.104	0.005	0.413	0.103

Table 4
Early Stage versus Late Stage Ventures

This table reports the determinants of Form D disclosure in early-stage ventures versus late-stage ventures. *Early Stage* is an indicator variable equal to one if the private firm is in start-up/seed stage or early stage as specified in VentureXpert, zero if it is in later stage, expansion stage, or buyout/acquisition stage. All other variables are defined in Appendix A.1. Standard errors are adjusted for clustering at the firm level and t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1, 5 and 10 percent levels, respectively.

	Form D					
	(1)	(2)	(3)	(4)	(5)	(6)
Early Stage	-0.084***	-0.043***	-0.036***	-0.040***	0.007	-0.023***
	(-13.291)	(-5.229)	(-4.874)	(-4.084)	(0.613)	(-3.942)
Log(Round Amount Raised)	0.023***	0.051***	0.031***	0.011***	0.045***	0.030***
	(13.447)	(21.821)	(12.340)	(4.959)	(15.152)	(6.391)
Log(Firm Age)				0.041***	0.077***	0.012*
				(5.178)	(5.815)	(1.690)
Log(Sales)				0.007	0.005	0.007
				(1.178)	(0.586)	(1.404)
Log(Employment)				-0.006	-0.007	-0.004
				(-0.874)	(-0.716)	(-0.738)
Firm FE	N	Y	N	N	Y	N
VC FE	N	N	Y	N	N	Y
Observations	41,059	32,611	30,289	27,644	22,865	21,904
Adjusted R-squared	0.016	0.427	0.116	0.010	0.411	0.106

Table 5
Biotech/Pharmaceutical and High Tech versus Other Industries

This table reports the determinants of Form D disclosure for biotech/pharmaceutical and high tech firms compared to firms in other industries. *Biotech/Pharma* is an indicator variable equal to one if a firm is in the biotech industries or pharmaceutical industries, zero otherwise. *High Tech* is an indicator variable equal to one if a firm is in the high tech industries, zero otherwise. All other variables are defined in Appendix A.1. Standard errors are adjusted for clustering at the firm level and t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1, 5 and 10 percent levels, respectively.

	Form D			
	(1)	(2)	(3)	(4)
Biotech/Pharma	-0.032***	-0.027*	-0.033**	-0.031*
	(-2.637)	(-1.864)	(-2.298)	(-1.781)
High Tech	-0.037***	-0.017**	-0.031***	-0.020*
	(-4.798)	(-2.079)	(-3.210)	(-1.868)
Log(Round Amount Raised)	0.033***	0.030***	0.021***	0.031***
	(21.653)	(13.249)	(9.709)	(10.662)
Log(Firm Age)			0.049***	-0.007
			(7.827)	(-0.856)
Log(Sales)			0.005	0.005
			(0.863)	(0.859)
Log(Employment)			-0.004	-0.007
			(-0.611)	(-0.978)
VC FE	N	Y	N	Y
Round FE	N	Y	N	Y
Observations	44,029	35,968	29,514	23,412
Adjusted R-squared	0.016	0.121	0.013	0.117

Table 6
Number of Large Players in the Industry

This table reports the effect of the number of large firms in an industry as a determinant of Form D disclosure. *Ln(No. Large Firms)* is the number of firms in the issuer's two digit SIC code that have a market cap of $50 billion or more. All other variables are defined in Appendix A.1. Standard errors are adjusted for clustering at the firm level and t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1, 5 and 10 percent levels, respectively.

	Form D					
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(No. Large Firms)	-0.014**	-0.018**	-0.021***	-0.022***	-0.029*	-0.021
	(-2.007)	(-2.412)	(-3.050)	(-2.957)	(-1.862)	(-1.223)
Log(Round Amount Raised)			0.033***	0.030***	0.034***	0.033***
			(21.646)	(13.389)	(12.557)	(9.067)
Log(Firm Age)					0.047***	0.015
					(6.176)	(1.511)
Log(Sales)					0.007	0.004
					(0.877)	(0.460)
Log(Employment)					-0.012	-0.010
					(-1.286)	(-1.037)
Observations	43,850	35,826	43,850	35,826	17,571	15,049
Adjusted R-squared	0.000	0.115	0.015	0.121	0.019	0.131
Round FE	N	Y	N	Y	N	Y
VC FE	N	Y	N	Y	N	Y

Table 7
Electronic Filing Requirement of Form D

This table reports the effect of the electronic filing requirement on Form D disclosure. *Mandatory Electronic Filing* is an indicator variable equal to one if a financing round occurred on or after March 16, 2009, the date on which the mandatory electronic filing requirement of Form D took effect. *Biotech/Pharma* is an indicator variable equal to one if a firm is in the biotech industries or pharmaceutical industries, zero otherwise. *High Tech* is an indicator variable equal to one if a firm is in the high tech industries (as in Cohen, Gurun, and Kominers (2019)), zero otherwise. Standard errors are adjusted for clustering at the firm level and t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1, 5 and 10 percent levels, respectively.

	Form D				
	(1)	(2)	(3)	(4)	(5)
Mandatory Electronic Filing	-0.041***	-0.099***	-0.033***	-0.084***	-0.083***
	(-4.308)	(-15.615)	(-3.244)	(-10.924)	(-8.479)
Early Stage			-0.013	-0.003	
			(-1.430)	(-0.303)	
Mandatory Electronic Filing*Early Stage			-0.019	-0.027**	
			(-1.610)	(-2.547)	
Biotech/Pharma or High Tech					0.003
					(0.360)
Mandatory Electronic Filing*Biotech/Pharma or High Tech					-0.030***
					(-2.661)
Firm FE	Y	N	Y	N	N
Round FE	Y	Y	N	N	Y
VC FE	N	Y	N	Y	Y
Observations	58,915	61,349	56,090	58,911	59,880
Adjusted R-squared	0.381	0.108	0.384	0.102	0.108

Table 8
Dynamics of Form D Disclosure

This table reports the dynamics of Form D disclosure over time. The main independent variables of interest are the indicator variables for each year or period from 2003 to 2019. Other variables are defined in Appendix A.1. Standard errors are adjusted for clustering at the firm level and t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1, 5 and 10 percent levels, respectively.

	Form D	
VARIABLES	(1)	(2)
Year 2003	0.029**	0.032***
	(2.547)	(2.856)
Year 2004	0.068***	0.065***
	(5.727)	(5.562)
Year 2005	0.113***	0.110***
	(9.177)	(9.081)
Year 2006	0.099***	0.097***
	(8.282)	(8.248)
Year 2007	0.115***	0.114***
	(9.790)	(9.778)
01/01/08-09/14/08	0.142***	0.142***
	(11.160)	(11.265)
09/15/08-03/15/09	-0.072***	-0.063***
	(-5.115)	(-4.462)
03/16/09-12/31/09	-0.005	0.002
	(-0.329)	(0.128)
Year 2010	0.016	0.021
	(1.209)	(1.619)
Year 2011	-0.000	0.006
	(-0.040)	(0.467)
Year 2012	-0.023*	-0.010
	(-1.850)	(-0.832)
Year 2013	-0.060***	-0.044***
	(-5.039)	(-3.759)
Year 2014	-0.021*	-0.016
	(-1.724)	(-1.377)
Year 2015	-0.009	-0.010
	(-0.803)	(-0.843)
Year 2016	-0.010	-0.010
	(-0.834)	(-0.798)
Year 2017	0.005	-0.005
	(0.377)	(-0.427)
Year 2018	0.025**	0.001
	(2.079)	(0.090)
Year 2019	0.016	-0.013
	(1.380)	(-1.066)
Log(Round Amount Raised)		0.040***
		(29.916)
Observations	70,474	70,474
Adjusted R-squared	0.013	0.031

Table 9
Patent Litigation

This table reports the effect of Form D disclosure on the probability that the firm will face patent litigation within the next two years after filing a Form D (Panel A) and the duration to the next litigation initiated by patent trolls using a Cox Hazard model (Panel B). Coefficients reported in Panel B are Hazard ratios (i.e., exponentiated coefficients). All variables are defined in Appendix A.1. Standard errors are adjusted for clustering at the industry level and t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1, 5 and 10 percent levels, respectively.

	Panel A: Targeted in Next Two Years			
	All Patent Litigation		Patent Troll Litigation	
	(1)	(2)	(3)	(4)
Form D	0.014***	0.008**	0.010***	0.005**
	(4.553)	(2.406)	(5.292)	(2.525)
Ln(Round Amount Raised)		0.014***		0.011***
		(4.792)		(3.345)
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Round FE	Y	Y	Y	Y
Observations	34,580	34,580	34,580	34,580
Adjusted R-squared	0.031	0.048	0.032	0.046
	Panel B: Duration to Next Patent Litigation			
	All Patent Litigation		Patent Troll Litigation	
	(1)	(2)	(3)	(4)
Form D	1.421***	1.343**	1.347***	1.279**
	(2.833)	(2.056)	(3.302)	(2.323)
Ln(Round Amount Raised)		1.639***		1.698***
		(12.70)		(9.659)
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Round FE	Y	Y	Y	Y
Observations	32,823	32,823	33,326	33,326

Table 10
Anti-Troll Laws

This table reports the effect of the differential enactment of anti-patent troll laws on the relationship between patent litigation risk and Form D disclosure. Firms are classified as high tech or non-high tech using information as in Cohen, Gurun, and Kominers (2019). All variables are defined in Appendix A.1 and the dates of enactment are in Appendix A.2. Standard errors are adjusted for clustering at the firm level and t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1, 5 and 10 percent levels, respectively.

	Form D		
	All	Non-High Tech	High Tech
	(1)	(2)	(3)
Post Anti-Troll Laws	0.038**	0.016	0.055***
	(2.425)	(0.716)	(2.578)
Log(Round Amount Raised)	0.051***	0.056***	0.045***
	(22.202)	(17.514)	(13.845)
Year FE	Y	Y	Y
Firm FE	Y	Y	Y
Round FE	Y	Y	Y
Observations	35,330	15,683	19,647
Adjusted R-squared	0.430	0.442	0.421

Table 11
Duration to IPO

This table reports the relationship between Form D disclosure and the duration to a firm's IPO using a Cox Hazard model. Coefficients reported are Hazard ratios (i.e., exponentiated coefficients). All variables are defined in Appendix A.1. Standard errors are adjusted for clustering at the industry level and t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1, 5 and 10 percent levels, respectively.

	Duration to IPO		
	(1)	(2)	(3)
Form D	1.718***	1.447***	1.401***
	(6.437)	(6.093)	(6.433)
Log(Round Amount Raised)		1.807***	1.628***
		(16.15)	(12.93)
Ln(Total Rounds to Date)		2.276***	1.816***
		(6.523)	(6.701)
Log(Firm Age)			1.067
			(0.373)
Log(Sales)			1.211***
			(3.510)
Log(Employment)			1.157*
			(1.888)
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
Observations	37,904	37,904	25,043

Table 12
Duration to Acquisition

This table reports the relationship between Form D disclosure and the duration to being acquired by another company using a Cox Hazard model. Coefficients reported are Hazard ratios (i.e., exponentiated coefficients). All variables are defined in Appendix A.1. Standard errors are adjusted for clustering at the industry level and t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1, 5 and 10 percent levels, respectively.

	Duration to Acquisition		
	(1)	(2)	(3)
Form D	1.449***	1.364***	1.255***
	(13.51)	(10.20)	(5.747)
Log(Round Amount Raised)		1.130***	1.100***
		(10.67)	(7.066)
Ln(Total Rounds to Date)		1.047	0.962
		(1.295)	(-0.974)
Log(Firm Age)			1.317***
			(5.684)
Log(Sales)			1.024
			(0.990)
Log(Employment)			0.915***
			(-3.196)
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
Observations	39,586	39,586	26,453

Internet Appendix

IA.1 Section 4(a)(2), Regulation D Rule 506, and California Limited Offering Exemption

1.1 Section 4(a)(2)

The following limitations apply to a section 4(a)(2) exemption:[37]

- Disclosure - Prospective purchasers must receive the pre-sale, statutory disclosures in the form of a private placement memorandum.
- Sophistication Requirement - The issuer may offer or sell securities only to investors who are sophisticated and are not in need of the public protections afforded under the SECs regulations. Courts have interpreted this standard to mean that an investor must have the financial ability to bear the risk of loss in the investment or extensive business experience and open access to necessary information. Note: There is no bright-line test for sophistication and financial ability to bear risk under the statute. If the potential investor does not meet the standard of sophistication, the exemption could be lost. If so, any investor who purchased securities within twelve months of the unauthorized offer will have an action to rescind the purchase of the security.
- General Solicitation - The offering cannot involve the general solicitation of purchasers. This concept is discussed further below.
- Restricted Securities - These are restricted securities. They cannot be resold unless they are held for 6 months (reporting company) or 12 months (not a reporting company), or they are registered prior to resale, or the seller perfects another transactional exemption.

1.2 Regulation D

Regulation D is the most commonly used set of exemptions for private placement. It consists of Rules 501-508 of the 33 Act. In addition to several statutory exemptions from registration, the SEC adopted Regulation D to provide "safe harbors" for issuers of securities. These exemptions are referred to as safe harbors because compliance with these rules will provide for an exemption from the standard disclosure requirements. Unlike the statutory exemptions, such as Section 4(a)(2) or Section 4(a)(5), failure to achieve or perfect an exemption is not completely detrimental to the validity of the securities offering. Rather, if the validity of the issuance under a Regulation D rule is challenged, the issuer can then attempt to assert a statutory exemption for the issuance. As such, Regulation D provides a safe harbor for pursing an exemption and leaves open other possibilities for seeking exemption if somehow the offering runs afoul of the Regulation D exemptions.

[37] https://thebusinessprofessor.com/en_US/business-transactions/what-is-a-section-4-securities-exemption

Rule 506 of Regulation D allows for two exemptions of securities issuances. The statutory authority for a Rule 506 is pursuant to Section 4(a)(2) of the 33 Act. Rule 506 exemptions are the most commonly employed exemptions to securities registration. (For information on other rules of Regulation D, please see the URL in the footnote. All of these rules must file a Form D within 15 days of the offering.) The requirements for exemption under Rule 506 are less stringent than those under Section 4(a)(2). For example, Rule 506 allows for purchase by non-sophisticated investors through an agent (purchaser representative). The main advantage of having this safe harbor provision is that, in the event the issuer fails to meet the requirements, it may still attempt to claim the exemption under Section 4(a)(2) or another exemption.

What is a Rule 506 Safe Harbor Exemption?

- Issuer Protection - Rule 506 protections available for issuers are similar those of Rule 505. The notable exception is that the limitations for reporting companies under the 34 Act, or the so-called bad boy disqualifications do not apply to this exemption.
- Dollar Limits - This exemption allows for an unlimited dollar value for issuances.
- Purchaser Requirements - Rule 506 (b) allows an issuer may sell its securities to an unlimited number of accredited investors and up to 35 non-accredited investors. If using general solicitation under Rule 506 (c), the sale of securities is restricted to accredited investors only.
- Restricted Securities - This is a transactional exemption. As such, this exemption applies only to issuers and does not cover later sales by investors.
- General Solicitation - Rule 506(b) does not allow for general solicitation, which means that the issuer cannot use general advertising methods to reach potential customers. Rule 506(c) allows for general solicitation in an issuance.
- Private Placement Memorandum - Rule 506(b) information disclosures are divided between accredited and non-accredited investors. There is no information disclosure requirement for the accredited investors, but the non-accredited investors must receive extensive disclosures. These disclosures are similar to those required under other Regulation D exemptions. The issuer must provide a private placement memorandum containing the necessary disclosures. Also, all non-accredited investors must meet a sophistication requirement. More specifically, they must have the knowledge or resources necessary to evaluate the merits of the investment.

  Note: As with a Section 4(a)(2) exemption, the issuer must ascertain that offers only happen to individuals who meet qualification requirements to be purchasers. These non-accredited investors must either have sufficient sophistication to evaluate the merits and risk of the prospective investment or be represented by a sophisticated agent.
- State Regulation - Section 18 of the 33 Act exempts Rule 506 securities from registration requirements or a merits review under state law. As such, states cannot place additional registration requirements on the security issuance.

1.3 California Limited Offering Exemption

PART 2. QUALIFICATION OF AND FILING REQUIREMENTS FOR THE SALE OF SECURITIES [25100 - 25166] (Heading of Part 2 amended by Stats. 1997, Ch. 391, Sec. 3.)

CHAPTER 1. Exemptions and Certain Securities and Transactions Not Subject to Qualification [25100 - 25105] (Heading of Chapter 1 amended by Stats. 1997, Ch. 391, Sec. 4.)

25102. The following transactions are exempted from the provisions of Section 25110:

(a) Any offer (but not a sale) not involving any public offering and the execution and delivery of any agreement for the sale of securities pursuant to the offer if (1) the agreement contains substantially the following provision: "The sale of the securities that are the subject of this agreement has not been qualified with the Commissioner of Business Oversight and the issuance of the securities or the payment or receipt of any part of the consideration therefor prior to the qualification is unlawful, unless the sale of securities is exempt from the qualification by Section 25100, 25102, or 25105 of the California Corporations Code. The rights of all parties to this agreement are expressly conditioned upon the qualification being obtained, unless the sale is so exempt;" and (2) no part of the purchase price is paid or received and none of the securities are issued until the sale of the securities is qualified under this law unless the sale of securities is exempt from the qualification by this section or Section 25100 or 25105.

(b) Any offer (but not a sale) of a security for which a registration statement has been filed under the Securities Act of 1933, as amended, but has not yet become effective, or for which an offering statement under Regulation A has been filed but has not yet been qualified, if no stop order or refusal order is in effect and no public proceeding or examination looking towards an order is pending under Section 8 of the act and no order under Section 25140 or subdivision (a) of Section 25143 is in effect under this law.

(c) Any offer (but not a sale) and the execution and delivery of any agreement for the sale of securities pursuant to the offer as may be permitted by the commissioner upon application. Any negotiating permit under this subdivision shall be conditioned to the effect that none of the securities may be issued and none of the consideration therefor may be received or accepted until the sale of the securities is qualified under this law.

(d) Any transaction or agreement between the issuer and an underwriter or among underwriters if the sale of the securities is qualified, or exempt from qualification, at the time of distribution thereof in this state, if any.

(e) Any offer or sale of any evidence of indebtedness, whether secured or unsecured, and any guarantee thereof, in a transaction not involving any public offering.

(f) Any offer or sale of any security in a transaction (other than an offer or sale to a pension or profit-sharing trust of the issuer) that meets each of the following criteria:

(1) Sales of the security are not made to more than 35 persons, including persons not in this state.

(2) All purchasers either have a preexisting personal or business relationship with the offeror or any of its partners, officers, directors or controlling persons, or managers (as appointed or elected by the members) if the offeror is a limited liability company, or by reason of their business or financial experience or the business or financial experience of their professional advisers who are unaffiliated with and who are not compensated by the issuer or any affiliate or selling agent of the issuer, directly or indirectly, could be reasonably assumed to have the capacity to protect their own interests in connection with the transaction.

(3) Each purchaser represents that the purchaser is purchasing for the purchaser's own account

(or a trust account if the purchaser is a trustee) and not with a view to or for sale in connection with any distribution of the security.

(4) The offer and sale of the security is not accomplished by the publication of any advertisement. The number of purchasers referred to above is exclusive of any described in subdivision (i), any officer, director, or affiliate of the issuer, or manager (as appointed or elected by the members) if the issuer is a limited liability company, and any other purchaser who the commissioner designates by rule. For purposes of this section, spouses (together with any custodian or trustee acting for the account of their minor children) are counted as one person and a partnership, corporation, or other organization that was not specifically formed for the purpose of purchasing the security offered in reliance upon this exemption, is counted as one person. The commissioner shall by rule require the issuer to file a notice of transactions under this subdivision.

The failure to file the notice or the failure to file the notice within the time specified by the rule of the commissioner shall not affect the availability of the exemption. Any issuer that fails to file the notice as provided by rule of the commissioner shall, within 15 business days after discovery of the failure to file the notice or after demand by the commissioner, whichever occurs first, file the notice and pay to the commissioner a fee equal to the fee payable had the transaction been qualified under Section 25110. Neither the filing of the notice nor the failure by the commissioner to comment thereon precludes the commissioner from taking any action that the commissioner deems necessary or appropriate under this division with respect to the offer and sale of the securities.

Section 260.102.14 - Limited Offering Exemption Notice of Transaction

(a) An issuer who conducts a transaction under section 25102(f) of the Code shall file a notice with the Commissioner as follows: (1) If in connection with the transaction the issuer is filing a notice with the Securities and Exchange Commission pursuant to section 4(6) of the Securities Act of 1933 or Regulation D (Rule 230.503), the notice may be a copy of the form first filed pursuant to those provisions. The fee required by section 25608(c) of the Code must accompany the filing. Each issuer (other than a California corporation) must also file a consent to service of process (Form 260.165), unless it already has a consent to service on file with the Commissioner. The filing should be accompanied with a cover letter indicating that the filing is pursuant to section 25102(f), and if a consent to service is not included, a statement that the issuer already has a consent to service on file with the Commissioner. (2) Unless a notice is filed pursuant to paragraph (1), the notice shall be filed electronically through the Internet process made available by the Department at www.dbo.ca.gov. If the issuer claims the exception under subsection (f), the notice shall be in the form and contain the information specified by subsection (c) and in accordance with the instructions in subsection (d). (b) A notice required by this section shall be filed with the Commissioner no later than 15 calendar days after the first sale of a security in the transaction in this state. No notice is required if none of the securities offered are purchased in this state.

IA.2 Regulatory history of Form D filing requirment

Regulation D was proposed in 1982 as a way to "simplify and clarify existing exemptions, to expand their availability, and to achieve uniformity between Federal and state exemptions in order to facilitate capital formation consistent with the protection of investors."[38] The requirement that

[38] https://www.govinfo.gov/app/details/FR-1982-03-16

the issuer file a Form D withing 15 days after the date of sale was first adopted. At this time, there clearly was a presumption that filing a Form D was a requirement for relying on the safe harbor of Regulation D because in 1988, the Commission requested comment on whether it should consider "the deletion of the filing of a Form D as a condition to the Regulation D exemption." State securities regulators "voiced substantial opposition" to the elimination of the filing requirement. Clearly unsatisfied with the response, in 1989, the SEC re-proposed the elimination of Form D as a condition of reliance on Regulation D without change.[39] In the 1989 proposing release one paragraph cost-benefit analysis, the Commission states "it appears to the Commission that the proposals if adopted would work significant cost savings for issuers using Regulation D without compromising investor protection." The removal of a filing requirement for Form D as a condition to exemption was made in the final rule in March of 1989.[40] At that time, Rule 507 was added to Regulation D to provide an incentive for issuers to make a Form D filing, even though it was no longer a condition to the availability of the exemptions. "Specifically, Rule 507 disqualifies an issuer from using a Regulation D exemption in the future if it has been enjoined by a court for violating Rule 503 by failing to file the information required by Form D. Consequently, an issuer has an incentive to make a Form D filing to avoid the possibility that a court would enjoin the issuer for violating Rule 503 and, as a result, disqualify the issuer from using a Regulation D exemption in the future."

In 1996, in consideration of the Report of the Task Force on Disclosure Simplification, the Commission proposed the elimination of the requirement that issuers file a Form D when relying on Regulation D.[41] Instead, issuers would be required to retain the form for its records for three years after the date of sale for possible inspection by the Commission's staff. This rule was never adopted and in its 2007 proposing release, the Commission states "After reviewing comments on the proposal, we determined that the information collected in Form D filings was still useful to us in conducting economic and other analyses of the private placement market and retained the requirement."

In 2007, the staff proposed the electronic filing of Form D on the EDGAR system. In its comment letter, the North American Securities Administrators Association (NASAA) noted[42]:

> The Commission should require the filing of the Form D with the Commission as a condition to the availability of the exemptions set forth in Regulation D. The fact that filing is not currently a condition to the availability of the exemptions at the federal level creates confusion as to the necessity of filing with SEC as well as the states and serves as a roadblock to enforcement efforts. Requiring the filing of the Form D as a condition to the availability of the exemptions set forth in Regulation D would eliminate this confusion and promote compliance and uniformity. It would also serve to curtail the growing litigation on this issue. Finally, it would help ensure that information compiled from the Forms was not derived solely from a self-selected subset of voluntary filers, but the universe of those conducting Regulation D and section 4(6) offerings

The American Bar Association proposed flexible filing options for Form D:[43]

[39] https://www.govinfo.gov/app/details/FR-1988-03-10
[40] https://www.govinfo.gov/app/details/FR-1989-03-20
[41] https://www.sec.gov/rules/proposed/33-7301.txt
[42] https://www.nasaa.org/wp-content/uploads/2011/07/37-Comment_efile_formd_S71207_final.pdf
[43] https://www.sec.gov/comments/s7-12-07/s71207-9.pdf

> We hope that with the adoption of one-stop filing, this will not change and that the various filing strategies that are available in the offline world will similarly be available in the online world. For example, an issuer may simply wish to file Form D with a particular state or states and not with the Commission where that issuer is comfortable with relying on the Securities Act § 4(2) private placement exemption at the federal level. Accordingly, in such a case, an issuer should have the flexibility to designate whether or not the Commission will receive Form D and should not be required to file with the Commission just because it is filing with one or more states. One-stop filing efficiencies should not be at the expense of flexible filing options.

They expressed the concern that "even though Forms D currently are publicly accessible, their increased public accessibility as a result of mandated electronic filing would encourage third parties to use Form D for purposes beyond its original intent or current use and might result in issuers making less use of Form D than they do now and, thereby, deprive them of the benefits of the use of Regulation D and cause the Commission to receive less information than it does now."[44]

In the 2008 adopting release, the Commission noted that "our Form D electronic filing system should assist in our enforcement efforts and enhance our ability to use filed Form D information. The Form D information database will allow us to better evaluate our exemptive schemes on a continuing basis in order to facilitate capital formation in a manner consistent with investor protection."[45]

IA.3 Additional details of sample construction

We use the sample of VC financing rounds from VentureXpert from 2009 to 2019 for most of our empirical analyses. As mentioned in Section 6, the SEC adopted revisions to the content of Form D in connection with the electronic filing requirement in 2009. Therefore, focusing on the post-2009 period rather than a longer period starting earlier allows us to hold constant the content of Form D and examine various determinants that affect firms' decisions of filing a Form D using a cleaner sample. Below, we provide additional details regarding our sample construction procedure.

To identify whether a VC-backed firm has filed a Form D for a given financing round, we adopt the fuzzy name matching algorithm to match the list of VC financing rounds from VentureXpert with available Form D filings (either new filings or amendments) based on firm name, location, and investment date. In specific, we match a given financing round in VentureXpert to the Form D with consistent name and location, which was filed closest to the round date in VentureXpert and was filed within 90 days of the round date. We also make sure that a given Form D is only matched to one round in VentureXpert, the round date of which is closest to the file date of the filing. Note that we consider both new filings and amendments of Form D because some financing round in VentureXpert can be a follow-on sale of an existing on-going offering, for which the firm had filed a Form D around the time of the first sale. If this is the case, the firm may be required to file an amendment, rather than a new Form D.[46]

[44] `https://www.sec.gov/rules/proposed/2007/33-8814.pdf`

[45] IBID

[46] The SEC requires issuers to file amendments annually, on or before the first anniversary of the filing of the Form D or the filing of the most recent amendment, if the offering is continuing at that time. Refer to: `https://www.sec.gov/info/smallbus/secg/formdguide.htm`.

We then perform manual verification to ensure the accuracy of the above matching between Form D filings and financing rounds in VentureXpert. First, we look into the case of firms having multiple Form D filings on the same date. We find that there are multiple filings on the same round date for about 700 financing rounds in VentureXpert. For some of these rounds, the amount sold in one Form D (or the incremental amount sold in one amendment compared to a previous filing) matches the round amount in VentureXpert. In such cases, we match the filing, which has the amount closest to the amount in VentureXpert, to that round and disregard other filings. For other rounds, the sum of the amounts sold in multiple Form D filings matches the round amount in VentureXpert. In such cases, we keep one filing only for that round and update the Form D amount using the sum of the amounts across multiple filings. Second, we look into the case of firms having more than one round listed in VentureXpert within 30 days. We observe roughly 650 such rounds and manually verify the matching between Form D filings and these rounds. For example, for some firms, there are two rounds listed in VentureXpert on the same date. We therefore manually check whether this is likely to be a duplicate or error using other online sources such as CrunchBase. For other firms, the two rounds in VentureXpert (which are usually within 15 days of each other) are likely to correspond to one Form D filing, given that the sum of amounts in the two filings matches the round amount in VentureXpert. If this is the case, we aggregate these two rounds into one firm-round observation. Finally, we perform a random check on the rest of the matched pairs between Form D filings and financing rounds in VentureXpert to ensure that matching is accurate.

IA.4 "Turn-on" behavior of filing Form D

As shown in Figure 3, 4,292 firms with 17,411 rounds comply at least once but not for all financings over our sample period of 2009 – 2019. We investigate whether such "inconsistent filers" change their filing behavior only once (thus exhibiting a "turn-on" or "turn-off behavior"), or they change their filing behavior more than once.

Out of the 4,292 inconsistent filers, we find that 2,861 firms (including 1,155 firms with 2 rounds and 1,706 firms with 3 rounds or more) change their filing behavior only once and the remaining 1,434 firms change their filing behavior more than once. Out of the 2,861 firms that change their filing behavior only once, 1,776 firms exhibit a "turn-on" behavior, i.e., starting to comply at some point and continue to do so thereafter. 1,085 firms, on the other hand, exhibit a "turn-off" behavior, they comply for earlier rounds but do not comply thereafter. For firms with 3 rounds or more, 1,103 firms exhibit a "turn-on" behavior, whereas 603 firms exhibit a "turn-off" behavior. In Table IA.2, we provide a few examples to show different compliance patterns with regard to Form D.

Table IA.1

Robustness: Biotech/Pharmaceutical, Computer, Internet versus Other Industries

This table reports the determinants of Form D disclosure for different industries as specified in VentureXpert. *Biotech/Pharma* is an indicator variable equal to one if a firm is in the biotech industries or pharmaceutical industries, zero otherwise. *Computer (Hardware and Software)* is an indicator variable equal to one if a firm is in the computer-related (hardware or software) industries, zero otherwise. *Internet Specific* is an indicator variable equal to one if a firm is in the Internet industries, zero otherwise. All other variables are defined in Appendix A.1. Standard errors are adjusted for clustering at the firm level and *t*-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1, 5 and 10 percent levels, respectively.

	Form D			
VARIABLES	(1)	(2)	(3)	(4)
Biotech/Pharma	-0.042***	-0.035**	-0.040***	-0.044**
	(-3.336)	(-2.448)	(-2.731)	(-2.533)
Computers (Hardware and Software)	-0.053***	-0.038***	-0.045***	-0.042***
	(-5.932)	(-3.872)	(-3.998)	(-3.366)
Internet Specific	-0.066***	-0.043***	-0.048***	-0.039***
	(-6.687)	(-4.042)	(-3.801)	(-2.775)
Log(Round Amount Raised)	0.033***	0.030***	0.022***	0.031***
	(21.196)	(12.935)	(9.710)	(10.610)
Log(Firm Age)			0.045***	-0.008
			(7.182)	(-1.100)
Log(Sales)			0.004	0.005
			(0.731)	(0.784)
Log(Employment)			-0.003	-0.006
			(-0.476)	(-0.897)
VC FE	N	Y	N	Y
Round FE	N	Y	N	Y
Observations	43,307	35,337	29,157	23,105
Adjusted R-squared	0.017	0.122	0.013	0.117

Table IA.2
Examples of Different Compliance Patterns

This table presents examples from our sample showing firms' differenct compliance patterns.

Panel A: Turn-on Behavior			
Company Name	Round Date in VentureXpert	File Date of Form D	Type
Able Planet Inc	1/21/2009		
Able Planet Inc	6/7/2010	6/8/2010	New filing
Able Planet Inc	5/27/2011	5/27/2011	Amendment
Able Planet Inc	1/31/2012	2/1/2012	New filing
Panel B: Turn-off Behavior			
Company Name	Round Date in VentureXpert	File Date of Form D	Type
Adara Media Inc	3/31/2011	4/12/2011	New filing
Adara Media Inc	1/24/2012		
Adara Media Inc	2/21/2013		
Panel C: Changing Filing Behavior More than Once			
Company Name	Round Date in VentureXpert	File Date of Form D	Type
2nd Watch Inc	12/21/2012	12/26/2012	New filing
2nd Watch Inc	11/5/2013		
2nd Watch Inc	10/14/2014	10/15/2014	New filing
2nd Watch Inc	3/13/2017	3/13/2017	New filing
2nd Watch Inc	11/14/2019		