Regulatory Costs of Being Public: Evidence from Bunching Estimation *

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Abstract

The increased burden of disclosure and governance regulations is often cited as a key reason for the significant decline in the number of publicly listed companies in the U.S. We explore the connection between regulatory costs and the number of listed firms by exploiting a regulatory quirk: many rules trigger when a firm's public float exceeds a threshold. Consistent with firms seeking to avoid costly regulation, we document significant bunching around multiple regulatory thresholds introduced from 1992 to 2012. We present a revealed preference estimation strategy that uses this behavior to quantify regulatory costs. Our estimates show that various disclosure and internal governance rules lead to a total compliance cost of 4.1% of the market capitalization for a median U.S. public firm. Regulatory costs have a greater impact on private firms' IPO decisions than on public firms' going private decisions. However, heightened regulatory costs only explain a small fraction of the decline in the number of public firms.

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A central explanation for the significant decline in the number of publicly listed companies in the U.S. is the increased burden of disclosure and governance regulations. Indeed, practitioners often point to heightened regulatory costs as the culprit of the disappearing public firms, while recent major de-regulations such as the 2012 JOBS Act were directly motivated by the perceived costs of being public.[1] For instance, in the comment letter to the SEC, Morgenstern and Nealis (2004) write that (p.1) "the Sarbanes-Oxley Act of 2002 and its implementing regulations have significantly increased the costs and regulatory burdens associated with being a public company." Understanding the role of regulations in the cost of being public and the decline in the number of public firms can address concerns on possible capital market dysfunction (Weild, 2011, p.1).

Researchers have explored this "regulatory overreach hypothesis", but the evidence is mixed.[2] A key challenge faced by the prior literature is that firms often engage in regulatory avoidance in response to regulations, as many public firm regulations trigger only when a firm's size exceeds a certain threshold. Firms seeking to avoid costly regulation can bunch their public float below the threshold. Such manipulation creates a selection bias, which may hinder traditional identification strategies such as difference-in-differences (DID) and regression discontinuity (RD). Furthermore, these reduced-form methods are not well-suited for *quantification* of regulatory costs, so the existing evidence has been mainly qualitative rather than quantitative. As Leuz and Wysocki (2016) write in their survey of the literature (p. 529): "evidence on the causal effects of disclosure and financial reporting regulation is often difficult to obtain and still relatively rare;" "while we have a lot of evidence that is qualitatively useful, we are still far from being able to perform quantitative cost-benefit analyses."

In this paper, we attempt to advance the literature in two ways. First, rather than facing manipulation as an identification impediment, we follow the bunching estimation literature (Saez,

[1] "For business owners who want to take their companies to the next level, this bill will make it easier for you to go public." President Obama's remarks at bill signing (`https://obamawhitehouse.archives.gov/the-press-office/2012/04/05/remarks-president-jobs-act-bill-signing`).

[2] Earlier works such as Gao, Ritter, and Zhu (2013) and Doidge, Karolyi, and Stulz (2013) cast doubt on this narrative by noting that the decline in IPOs precedes major regulatory changes such as Sabranes-Oxley (SOX). In contrast, recent work such as Dambra, Field, and Gustafson (2015) find that IPO activity partially increased after the regulatory relief of the 2012 JOBS Act, suggesting regulatory burden is an important cost in the going-public decision. Other explanations of the decline in the number of public firms include declining business dynamism (Decker, Haltiwanger, Jarmin, and Miranda, 2016; Doidge, Karolyi, and Stulz, 2017), shifting investment to intangibles (Kahle and Stulz, 2017; Doidge, Kahle, Karolyi, and Stulz, 2018), increased availability of private equity (Ewens and Farre-Mensa, 2020), changing economies of scale and scope (Gao, Ritter, and Zhu, 2013), and changing acquisition behavior (Gao, Ritter, and Zhu, 2013; Eckbo and Lithell, 2021).

2010; Chetty et al., 2011; Kleven and Waseem, 2013) and use firms' endogenous bunching around the regulatory threshold to infer regulatory costs. The central insight of the approach is a revealed preference argument: greater bunching by public firms to avoid financial regulation implies higher regulatory costs. This approach allows us to analyze multiple regulatory changes over 20 years, which provide a more comprehensive understanding of the regulatory costs borne by public firms. Second, this approach quantifies the monetary value of regulatory costs, which allows us to conduct a novel set of counterfactual analyses on the effects of regulation on the choice of public and private status. These regulatory cost estimates can also be used as critical inputs into quantitative cost-benefit analyses by regulators and policymakers.

We begin by documenting three regulatory thresholds on a firm's public float (i.e., value of trading equity) introduced since 1992. Each regulatory threshold is associated with a set of exemptions from disclosure and internal governance rules. The first threshold is \$25m, which stemmed from the introduction of the "Small Business Issuers" and scaled disclosures in 1992. Firms below \$25m float had less stringent disclosure requirements on financial data, business operation, risk, and governance.[3] The second threshold is \$75m introduced in 2002. Firms below \$75m are exempted from the SOX 404 requirement to hire an outside auditor to attest to their internal controls.[4] The third threshold is \$700m implemented in the JOBS Act in 2012. Newly public firms below this threshold ("Emerging Growth Companies") receive several financial reporting accommodations, deferred compliance with new accounting rules, and an exemption from SOX 404(b). These regulatory thresholds create variation in the major components of disclosure and internal governance regulations faced by public firms.

Next, we document significant bunching in the distribution of firms' public float around each regulatory threshold in years the regulations are in place. As shown by Figure 1, the density falls discretely at each regulatory threshold. On its own, such bunching provides compelling evidence that regulations triggered by these thresholds impose significant compliance costs on firms, and that these costs seem to outweigh the regulations' potential benefits such as lower costs of capital. We find that firms close to the thresholds manipulate their public float mainly by substituting debt

[3]These scaled disclosures were later expanded to firms with less than \$75m float in 2008 with the introduction of "Small Reporting Companies".

[4]The \$75m threshold also features the "Non-accelerated filer" introduced in 2002, which allows firms with a float below \$75m to have 10 (15) more days to file their quarterly (annual) reports to the SEC.

for equity, without changing their operations or insider ownership.

The validity of bunching estimation relies on the "smoothness" assumption: the distribution of the public float is smooth in the absence of regulation. Consistent with this identifying assumption, we find no excess mass in years before the regulatory threshold is introduced or after it is eliminated, making it unlikely that other factors are changing at the threshold. We also find no excess mass around placebo thresholds without regulations.

Motivated by the above bunching patterns, we develop a model to guide our estimation. In the model, firms can avoid regulatory costs by reducing their public float to a level below the regulatory threshold. However, bunching distorts firms' leverage away from the optimum. Firms thus face a trade-off between regulatory costs and capital structure distortion costs. The optimal bunching choice depends on how far away a firm's undistorted public float is from the regulatory threshold. Firms that are just above the threshold shrink their public float to avoid regulation because the associated leverage distortion is small. Firms that are far above the threshold do not bunch because the cost of leverage distortion outweighs the cost of regulation. There exists a marginal firm that is indifferent between the two costs and hence bunching or not. We can infer the regulatory cost facing this marginal firm from its leverage distortion cost.

We use the Alvero and Xiao (2020) fuzzy bunching estimator to estimate the undistorted float of the marginal firm for each regulatory threshold.[5] This estimator infers the marginal firm from the area between the actual cumulative distribution function (CDF) with regulation and the counterfactual CDF in the absence of the regulation. We then translate the estimated float distortion to a dollar value of regulatory costs facing the marginal firm using the leverage distortion cost function from Binsbergen, Graham, and Yang (2010). Finally, we extrapolate the regulatory costs to other firms using the relative share of variable versus fixed costs estimated from SEC surveys (SEC, 2011) and Audit Analytics data.

Our estimates show that the median U.S. public firm spends 0.3% of its EBITDA on enhanced disclosure compliance, 0.9% on tightened internal control, and 2.1% on a combination of disclosure and internal control rules every year. The present value of these regulatory costs represents 4.1% of the median firm's equity value. Aggregate regulatory costs have increased significantly in the

[5]The fuzzy bunching estimator is more appropriate than the sharp bunching estimator in settings with smaller samples and greater noise in the data. Our setting fits this well as we focus on a few thousand listed firms and stock price fluctuations can add substantial noise to bunching patterns.

first few years after SOX, but have been declining since, especially after the JOBS Act. Smaller firms bear disproportionate amounts of regulatory costs relative to their size because a large portion of these costs are fixed. Nevertheless, various regulatory exemptions introduced by the SEC substantially alleviated the regulatory burden for firms below the regulatory thresholds.

Using the estimated regulatory costs, we investigate how regulation affects the number of public firms. Doidge et al. (2017) show that the decline in the number of public firms is driven by both low IPO rates and high delisting rates, each explaining about half of the decline. We first examine the effect of regulatory costs on private firms' IPO decisions, using a sample of 21,066 VC-backed firms.[6] We find that regulatory costs significantly impact these firms' decisions to go public: a one-standard-deviation increase in regulatory costs is associated with a 7% decrease in IPO likelihood. However, our counterfactual analysis shows that major regulatory changes in the 2000s have had limited impact on IPO volumes. Removing SOX only increases the average annual IPO likelihood after 2000 from 0.95% to 0.96%, because many potential IPO candidates are small enough to be exempted from this regulation. Removing all estimated regulatory costs increases the average annual IPO likelihood after 2000 from 0.95% to 1.4%, which explains only 7.4% of the decline in IPO likelihood from pre-2000 to post-2000.

Next, we examine the impact of our estimated regulatory costs on public firms' decisions to go private. We find that regulation costs do not appear to be a significant driver of going private decisions. This finding is likely to be explained by the fact that some of the regulatory costs are irreversible, upfront costs, which would enter into firms' going public decisions but are sunk costs for their going private decisions. Our result is consistent with Kaplan (1989), Guo et al. (2011), and Bernstein and Sheen (2016), who show that many going-private deals are motivated by financial or operational engineering reasons, rather than to avoid regulatory costs. Our result also echos Leuz (2007), Leuz et al. (2008), and Bartlett III (2009), who find little evidence on the effect of regulations on going private transactions.

Overall, our findings suggest that regulatory costs affect firms' public-vs-private choice mainly through their going public rather than going private decisions. Nevertheless, quantitatively, regulatory costs only explain a small fraction of the disappeared IPOs, in contrast to the popular claim

[6]Such firms are an important pipeline of IPOs, representing half of the IPO firms in our sample period (e.g., Ritter, 2020; Ewens and Farre-Mensa, 2020).

by practitioners. Instead, our results are consistent with Gao et al. (2013) and Doidge et al. (2013), who suggest that regulatory changes in the early 2000s did not appear to cause the decline of public firms.

Although we believe our estimation approach addresses some limitations in the current literature, our approach requires several assumptions. First, although we study several major regulatory changes over 20 years, the bunching estimator requires that we study threshold-based regulations and thus excludes uniformly implemented regulations (e.g., Reg FD or the introduction of EDGAR). Nevertheless, our analysis covers important regulatory changes that are often attributed to changes in the number of public firms, such as SOX in 2002 and JOBS Act in 2012. Second, our baseline bunching estimation forms the counterfactual distribution using the years before the regulatory threshold is introduced or after it is eliminated. We show that our estimates are robust to dropping the two years before regulation changes to exclude potential anticipation-based bunching, or using a smooth polynominal to estimate counterfactual distributions in the bunching samples. Finally, we use the capital structure distortion costs estimated by Binsbergen et al. (2010) to translate observed bunching to a dollar value of regulatory costs. The main results are robust to alternative parameters to estimate the costs of leverage distortion and an alternative leverage distortion cost function from Korteweg (2010).

This paper contributes to a growing literature on the disappearing public firms puzzle. Aside from the "regulatory overreach hypothesis" and the aforementioned papers, the literature has also proposed five other major hypotheses: (1) declining business dynamism (Decker et al., 2016; Doidge et al., 2017), (2) shifting investment to intangibles (Kahle and Stulz, 2017; Doidge et al., 2018), (3) increased availability of private equity (Ewens and Farre-Mensa, 2020), (4) changing economies of scale and scope (Gao et al., 2013), and (5) changing acquisition behavior (Gao et al., 2013; Eckbo and Lithell, 2021). Using the new bunching estimation strategy developed from the public economics literature, our paper provides an in-depth study of the "regulatory overreach hypothesis" by estimating the regulatory costs of being a public firm, examining the margins through which regulatory costs affect public-vs-private decisions, and quantifying how much of the decline in IPOs can be attributed to heightened regulatory costs. Our study suggests that regulatory costs only explain a small fraction of the decline in public firms; non-regulatory factors seem to be playing a more important role.

Our paper also adds to the extensive literature studying the impacts of disclosure and internal governance regulations (see Leuz and Wysocki (2016) for a survey). Related to our work, Iliev (2010), Gao et al. (2009), Dharmapala (2016), Bernard et al. (2018), Alsabah and Moon (2020), and Liu (2020) study the effects of regulatory thresholds on firm outcomes such as earnings quality, audit fees, leverage, and firm size and value.[7] We differ from the existing literature by using bunching estimation to quantify regulatory costs from firms' regulatory avoidance behavior. This approach is not impacted by avoidance behavior, but rather exploits the manipulation as a source of identification. Our approach complements traditional identification strategies such as DID and RD by expanding the scope of regulations that can be studied. Furthermore, most existing literature has been qualitative (Leuz and Wysocki, 2016). We quantify the net costs for a firm to comply with various disclosure and internal governance regulations. Our estimates are of interest to regulators, who can use these estimates as inputs to cost-benefit analysis on regulations. Our estimates also shed light on the ongoing debate on whether public firms face excessive regulatory burdens (Coates, 2007).

Finally, our application of bunching estimation to public firms adds to a growing literature that uses the bunching technique to study finance topics. Prior applications includes mortgage (DeFusco and Paciorek, 2017; DeFusco, Johnson, and Mondragon, 2020), small business lending (Bachas, Liu, and Yannelis, 2019; Bachas, Kim, and Yannelis, 2020), municipal bonds (Dagostino, 2018), bankruptcy fees (Antill, 2020), and banks (Alvero, Ando, and Xiao, 2020). The prior literature typically uses large administrative data with little noise. Hence, their bunching pattern is often characterized by a sharp density spike at the threshold. Our setting differs in that the sample size is smaller and the running variable contains more randomness (i.e., public float fluctuates with stock prices). As a result, the bunching pattern is much noisier. We address this challenge by using a new fuzzy bunching estimator introduced by Alvero and Xiao (2020). Given that many corporate finance settings feature relatively small samples and noisy data, our methodology can be fruitfully applied to future research in this area.

[7] Chaplinsky et al. (2017), Barth et al. (2017), Dambra et al. (2015), and Dambra and Gustafson (2020) study the impact of JOBS Act on IPO firms; Coates and Srinivasan (2014) surveys the literature on the effect of SOX on firm outcomes; Iliev and Vitanova (2019) study the effect of say-on-pay on compensation and firm value.

1 Data and Institutional Background

1.1 Data Sources

The SEC uses public float to determine firms' compliance status with multiple regulations. Formally, it is defined as the market value of all outstanding common equity (voting and non-voting) held by non-affiliates at the end of the second fiscal quarter.[8] Firms must disclose their public float according to this exact definition at the beginning of their 10-K. We collect public float data for all U.S. listed firms from 10-K filings (including 10-KSB, 10-KT, and 10-K405) using a customized web-crawling script.[9] We restrict to all fiscal years from 1994 (the year EDGAR starts and financial statements are machine-readable) to 2018. We further require firms to have non-missing sales in Compustat and non-missing public float. These restrictions exclude shell and pink sheet companies. We match these firms to Jay Ritter's IPO database to identify the year a firm went public.[10] To estimate the cost structure of regulatory costs, we obtain audit fees data from Audit Analytics and SOX 404 compliance costs data reported in a SEC survey SEC (2011). Lastly, we use a sample of VC-backed firms from VentureSource to study the impact of regulatory costs on IPO decisions. We also use a sample of public firms that went through going private transactions (identified using 13e-3 filings) to study the impact of regulatory costs on going private decisions.

1.2 Institutional Background

SEC regulations on public firms can be characterized into two major categories: disclosure and governance. In this section, we describe the institutional details surrounding several regulatory reliefs offered by the SEC in the past three decades, which helps shed light on regulatory costs faced by public firms. We focus on four types of regulatory reliefs: scaled disclosure, non-accelerated filing, exemption from SOX Section 404, and Emerging Growth Company benefits. These benefits apply to firms of different sizes as determined by their public float, and sometimes by their revenue. For each rule change, we also provide the SEC's original assessment of costs and benefits. Although our bunching estimation does not rely on the exogeneity of these regulatory changes, we detail their

[8] Before 2002, public float was computed within 60 days of 10-K filing date. Rule 405 defines an affiliate as a "person that directly, or indirectly through one or more intermediaries, controls, is controlled by, or is under common control with," an issuer. Appendix Section A.1.1 provides more details on public float data.

[9] The data on public float is available here: `https://michaelewens.github.io/public_float_regulation/`.

[10] The data can be found here: `https://site.warrington.ufl.edu/ritter/ipo-data/`.

history and potential lobbying or anticipation in Appendix Section A.1.2.

1.2.1 Scaled Disclosure and Small Business Issuers

Enacted in August of 1992, the SEC implemented a new set of rules centered on the SB-2 registration form and refined the class of companies called "Small Business Issuers" (SBI).[11] These new rules refined Regulation S-K, a regulation about the information requirements in filings and the now defunct Form S-18.[12] These regulatory changes significantly expanded the set of companies that could take advantage of scaled disclosure from Form S-18. Some of the scaled disclosures included pared down selected financial data, simplified description of business, limited executive compensation information, no disclosure on beneficial ownership and less extensive details provided in annual reports. Appendix Table A.1 provides the full list of scaled disclosure items.

The 1992 rule change resulted in the introduction of small business annual reports (10-KSB) and quarterly reports (10-QSB). In its simplest form, a company could use the new SBI definition if it had a public float less than $25m and annual revenues less than $25m. Once a company began reporting with the SEC, it remained SBI until *either* its revenue or public float exceeded the $25m threshold for two consecutive years (in its 10-KSB).

In 2008, the scaled disclosure regulatory relief was expanded to a broader set of firms called "Smaller Reporting Companies" (SRC), defined as firms with less than $75m public float and less than $50m in revenues (see Appendix A.1.3 for details on SRC). With the introduction of SRC, the SEC eliminated all SBI filings as such as 10-KSB and 10-QSB. The $25m threshold for scaled disclosure thus ends in 2008.

As with all rule changes, the SEC assesses the costs and benefits of scaled disclosure. The SEC collected no data on expected costs and benefits from these changes, but did find some consensus from the majority of public commenters that the changes would result in cost savings for firms that chose the exemption (i.e., it would be costly to have more disclosure).

[11] See `https://www.sec.gov/rules/final/6949.txt` for the final rules.

[12] Form S-18 allowed qualified users with small offerings less than $7.5m to avoid significant disclosures.

1.2.2 Non-accelerated Filer

First proposed in 1998 and eventually enacted in April 2002, the SEC created a new category of registered firms called "Accelerated Filers."[13] Such firms were required to file their finalized annual and quarterly reports within 75 and 35 days of the end of the fiscal period, respectively. Before this change, all registered firms had to file these reports within 90 and 45 days. The stated goal was "modernizing the periodic reporting system and improving the usefulness of periodic reports to investors." (SEC, 2002, sec I.B) Importantly for our purposes, the SEC and public commenters recognized that the burden of accelerating filing may be higher for smaller firms. After the phase-in period, the new rule applied to firms whose public float was $75 million or more as of the last business day of its most recently completed second fiscal quarter, among other conditions that accelerated filers need to satisfy.[14] Firms that did not satisfy these conditions are "Non-Accelerated Filers."

The SEC investigated the costs and benefits of this rule change using data for the former a survey from the American Society of Corporate Secretaries. The organization summarized the estimated costs provided by 46 of the surveyed companies with approximately $75m float:

> "These estimates ranged from $12,500 to $5,000,000, with a median value of $125,000. 50% expected on-going annual costs to comply with the proposals. These estimates ranged from $27,500 to $250,000, with a median value of $90,000. 11% of respondents expected both initial and on-going costs to comply with the proposals."[15]

The SEC highlighted other potential costs including risk of lower quality information, increased audit fees, increased compliance costs (e.g. headcount), and general filing complications because there were no "best-practices" for report creation at the time of passage. The SEC weighed these costs against benefits to investors. Here, investors in accelerated filers would benefit because of improved timeliness and transparency of disclosures.

[13] The final rules are found here: `https://www.sec.gov/rules/final/33-8128.htm`.

[14] These conditions include i) The company has been subject to the reporting requirements of Section 13(a) or 15(d) of the Exchange Act for a period of at least 12 calendar months; ii) The company has previously filed at least one annual report pursuant to Section 13(a) or 15(d) of the Exchange Act; iii) The company is not eligible to use Forms 10-KSB and 10-QSB.

[15] These substantial numbers relative to the size of the surveyed firm (around $75m float) highlight the potentially large upward bias in firms' self-reported compliance costs.

1.2.3 SOX Section 404 Exemption

The passage of the Sarbanes-Oxley (SOX) Act in 2002 introduced many new disclosure and governance rules for public companies. Section 404 concerns a firm's internal controls and is widely considered as the costliest part of SOX (Zhang, 2007; Gao et al., 2009). Expecting a disproportionate burden of this section on small firms, the law provided an initial 5-month extension to both part (a) and (b) to firms with public floats less than $75m in 2002. The former requires that firms provide a management's report on their internal controls, while the latter requires that the firm hire an outside auditor to attest to the firm's internal controls. Firms with floats above this threshold – accelerated filers – had to comply with 404(a) and (b) on or after November 15, 2004. Firms whose public float did not exceed $75m – non-accelerated filers – in 2002, 2003 or 2004 could choose to not comply with both parts of Section 404. These exemptions were later extended multiple times and then made permanent.[16]

Regulators were aware that these new rules would introduce costs on firms. Specifically, the SEC expected that compliance with 404(b) in particular would lead to increased auditing fees and labor hours preparing financial statements. In an August 2006 report, the SEC writes:

> "Many public commenters have asserted that the internal control reporting compliance costs are likely to be disproportionately higher for smaller public companies than larger ones, and that the auditor's fee represents a large percentage of those costs. Furthermore, we have learned from public comments [...] that while companies incur increased internal costs in the first year of compliance as well due to "deferred maintenance" items (e.g., documentation, remediation, etc.), these costs may decrease in the second year."

A 2009 SEC survey (SEC, 2009) reports the estimated pre-2007 costs of 404 compliance for non-accelerated filers to be an average (median) of $770K ($580K). Iliev (2010), Gao et al. (2009), Dey and Sullivan (2009), and Alexander et al. (2013) each provide empirical evidence for these costs, while arguing that they likely did not outweigh the benefits.

[16] The delay in compliance was later extended in September 2005 to 2007 (SEC Release NOS. 33-8731; 34-54295; File No. S7-06-03). In August 2006, non-accelerated filers were given extensions of 404(a) to 2007 and 404(b) to 2008. The SEC notes in that report for both rules, these "deadline[s] could be further postponed." The exemption from 404(b) continued to be extended until non-accelerated filers were permanently exempt with the passage of the Dodd-Frank Act in 2010.

1.2.4 Emerging Growth Companies

In December 2011, the JOBS Act introduced the "Emerging Growth Company" (EGC) category for firms that went public after December 8, 2011. A company qualifies as an EGC if it has total annual gross revenues of less than $1 billion ($1.07 billion after 2017) during its most recently completed fiscal year and, as of December 8, 2011, had not sold common equity securities under a registration statement. A company retains its EGC status until it crosses one of the following thresholds: 1) reaching $1 billion ($1.07 billion after 2017) in gross revenue, 2) past the fifth anniversary of its IPO, 3) issuing more than $1 billion of non-convertible debt within a three-year period, 4) has more than $700 million public float (i.e., becomes a large accelerate filer). We focus on the last threshold, public float, because it is much harder to manipulate gross revenue, and newly public startups rarely issue more than $1 billion of non-convertible public debt in the first five years after IPO. Notably, although a firm can transition out of the EGC status, it cannot transition into EGC if it did not elect EGC status during IPO filing.

There are several benefits of being an EGC, which are best summarized as a combination of scaled disclosure and relaxation of some internal governance rules. First, an EGC filer faces less extensive disclosure requirements in initial and subsequent registration statements, particularly in the description of executive compensation and the time periods covered by the MD&A section. Second, EGC filers only need to provide two years' instead of three years' of audited financial statements in initial registration statement and subsequent annual reports. Third, EGC filers do not need to provide an auditor attestation of internal control under SOX 404(b). Fourth, these filers can delay compliance with new accounting standards. Lastly, EGC filers can use test-the-waters communications with qualified institutional buyers and institutional accredited investors when issuing securities.[17]

1.3 Summary of Regulatory Thresholds

Despite the above regulations' differences, they share a common eligibility criterion—public float. Panel A of Table 1 summarizes the various regulatory reliefs described above and the associated

[17]Since 2007, being below $700m float also gives firms additional 15 days in filing 10-Ks and 10-Qs relative to large accelerated filers that are above $700m. However, as documented in both Alsabah and Moon (2020) and our Figure 1, there is no bunching in float below $700m before 2012 when there was filing delay benefits but no other EGC benefits, suggesting that the value of this 15-day filing delay is negligible for firms around $700m float.

public float cutoffs. Panel B describes the set of regulatory benefits enjoyed by firms in different public float categories. In particular, the last column summarizes the key thresholds that can be exploited in each time period and the associated benefits if firms stay below the threshold. These variations in cutoffs and their effective periods give us a rich empirical setting to separately identify the value of different regulatory reliefs.

Our empirical design exploits firms' bunching behavior around three key public float cutoffs: \$25m, \$75m, an \$700m.[18] The bottom of Table 3 summarizes the thresholds and samples used to identify different sets of regulatory reliefs. Specifically, we use the period when the regulatory relief is in place as the bunching period, and the period before the relief is introduced (or after it expires) as the non-bunching period. The non-bunching period acts as the counterfactual distribution of firms' public float in the absence of bunching incentives. In particular, we will use bunching around \$25m in 1994–2007 to identify the value of scaled disclosure, bunching around \$75m in 2003–2007 to identify the value of SOX 404 exemption and delayed filing, and bunching around \$700m in 2012–2018 to identify the value of EGC benefits. We provide more details on our estimation samples in Section 3.4.

1.4 How Significant Are These Regulations?

The regulations detailed above make up important components of regulations faced by the registered (i.e., public) firm in the U.S. For example, the internal governance provisions of SOX only emerged with the law's passage, and is widely regarded as the costliest part of SOX (Zhang, 2007; Gao et al., 2009). The regulations that we study capture the two fundamental goals of the Securities Act of 1933: 1) requiring that investors receive financial and other significant information, and 2) prohibiting fraud and misrepresentations.[19] However, quantifying the importance of these rules relative to *all* public firm regulations is challenging. We attempt one quantification using the Small Business Issuer (SBI) classification introduced in 1992. To do so, we collect all 10-Ks and 10-KSBs from 1994 (availability of EDGAR) to 2007 (when 10-KSBs were eliminated). Annual reports have four parts, each of which we summarize with a simple measure of string length.[20] Table A.2 in

[18] Being above the \$75m and \$700m thresholds is also associated with certain benefits in security issuance. We discuss these alternative regulations in Section 6.1.

[19] See `https://www.sec.gov/answers/about-lawsshtml.html`.

[20] Although the content and details of each 10-K section change over the sample period, we can summarize them as follows. Part I details the business, properties and legal proceedings. Part II contains financial data. Part III has

the Appendix compares the length of annual reports for SBIs and non-SBIs, controlling for various firm characteristics and fixed effects. Column 1 shows that the average SBI annual report file size is 27% smaller than those of non-SBI filings. Specifically, SBI 10-KSBs have 21% shorter Part Is, 20% shorter Part IIs and 80% shorter Part IVs (columns 2, 3, 5). Columns 4 and 6 show that while SBIs have longer Part IIIs in their annual reports because they are much less likely to refer readers to DEF14A, their DEF14A filings are 25% smaller than those of non-SBIs. Given the likely costs in time, resources and transparency of disclosure in 10-Ks, the differences in size and length between the SBI and non-SBI annual reports are economically meaningful.

1.4.1 Other public firm regulations

Although the regulations we study capture the two fundamental aspects of the Securities Act of 1933, it is important to note that they do not encompass all regulations faced by public firms. For example, we do not study regulations related to securities exchange and trading, which are regulated by the Securities Exchange Act of 1934. We also do not study industry-specific regulations, such as regulations on financial institutions (e.g., Dodd-Frank Act) or mining safety regulations on mining companies. Lastly, our methodology precludes us from studying uniformly implemented regulations that are not threshold-based such as Reg FD and options expensing requirements.[21]

2 Empirical Facts

2.1 Bunching at Regulatory Thresholds

Figure 1 shows the distributions of firms' public float around the three regulatory thresholds detailed in Section 1.2. The left panels plot the CDFs and the right panels plot the histograms. If there is bunching in public float, the CDF should be steeper before the cutoff and flatter after the cutoff, leading to a bulge in the distribution relative to the counterfactual CDF without bunching. Further, the histogram should also show a sharp drop in density after the cutoff than before it. Figure 1 shows just such a pattern. For all three thresholds, the CDF in bunching years is more concave than that in non-bunching years, generating a clearly visible gap between the two. The histograms

information on management, compensation and insider transactions. Part IV contains exhibits and footnotes.

[21] Appendix Table A.3 provides a list of other major SEC regulations that are not threshold-based.

also show a sharp drop in the density of firms' public float after the cutoffs in bunching years and a smooth density around the cutoffs in non-bunching years. These bunching patterns themselves suggest that the regulations triggered by these thresholds are *on average* costly for firms, so that they are willing to avoid them.[22] In contrast, in Figure 2, we find no bunching nor differences in float distributions across bunching and non-bunching years around three placebo thresholds unrelated to any regulations. These placebo figures suggest that the float distribution in non-bunching years serves as a good counterfactual for the distribution in bunching years.[23] Our bunching estimators exploit these bunching patterns to estimate the implied regulatory benefits associated with staying below the regulatory cutoffs.

2.2 How Firms Manipulate Public Float

In this section, we examine how firms manipulate their public float, which directly informs how we model the costs of bunching in Section 3.1. Firms can 1) reduce investment, 2) increase debt, or 3) increase inside ownership to fund the reduction in pubic float. The first margin concerns firms' operations while the latter two concern the financing side of firms' balance sheet. If a firm reduces equity without increasing debt, its operation (and thus investment) would need to shrink. On the other hand, if a firm keeps its operations constant, a shortfall in equity will need to be filled with debt, leading to higher leverage. Alternatively, firms could keep both leverage and investment constant and only adjust the fraction of shares held by insiders vis-à-vis public investors.

To test the above margins, we compare the characteristics of firms just above and just below each threshold. If, for example, firms manipulate float by substituting debt for equity, we should observe that bunching firms on average have higher leverage than similar non-bunching firms. Given that bunching firms tend to concentrate just below the threshold, we should also observe that firms just below the threshold have higher leverage on average than firms just above it. One concern with the above comparison is that firms on the two sides of the threshold may be inherently different due to their size differences. To address this, we further compare the differences in bunching and non-bunching years. In non-bunching years, any differences between firms above and below threshold

[22] The bunching patterns do not imply that regulatory compliance is on net costly for *all* firms. For example, some firms may find it beneficial to voluntarily comply even if they are below the threshold. This may happen if the signaling value of voluntary compliance outweighs the costs of compliance.

[23] We examine alternative ways to estimate counterfactual float distribution in Section 6.3

should reflect their inherent differences, rather than the outcome of manipulation. Hence, we estimate the following specification on a small window of firms around each of the three thresholds:

$$Y_{i,t} = \theta \times \textit{Below threshold}_{i,t} + \beta \times \textit{Below threshold}_{i,t} \times \textit{Bunching years}_t + \boldsymbol{X_{i,t}} + \varepsilon_{i,t} \qquad (1)$$

where $\textit{Below threshold}_{i,t}$ indicates a firm's public float being below threshold, $\textit{Bunching years}_t$ indicates treated years as in Table 3, and $\boldsymbol{X_{i,t}}$ is a vector of controls that include industry fixed effects, year fixed effects, and the lagged dependent variable. The dependent variable $Y_{i,t}$ is book leverage, investment, or fraction of non-affiliated shares (i.e., one minus the fraction of closely-held shares). We do not include firm fixed effects because most firms show up only once in our narrow window sample. As such, our comparisons are largely cross-sectional rather than within-firm.[24]

Table 2 reports the estimation results where each panel considers a different threshold. Column 1 shows that public float distortion leads to increases in book leverage. In contrast, the remaining columns show that firms neither alter their investment nor insider ownership around the threshold changes. Column 2 considers the standard CAPEX-based measure of investment. Columns 3 and 4 use alternative measures of investment that incorporate intangibles such as R&D and SG&A (Ewens et al., 2020). The signs are as predicted in some specifications, but lack statistical and economic significance. The final column reports the change in insider ownership result. The coefficient estimates are statistically and economically insignificant. Table A.4 further shows that bunching firms do not change other aspects of their operation such as total assets, tangibility, profitability, or asset turnover.[25] These results suggest that firms mainly manipulate through leverage while keeping their operations constant. This is likely due to the fact investment is often lumpy and irreversible, while leverage can be adjusted in a more granular manner. In the following exercise, we infer the regulatory costs based on the adjustment of leverage.

3 Bunching Estimator of Regulatory Costs

This section lays out the bunching estimator that we use to quantify regulatory costs.

[24] It is worth noting that no matter which margin firms use, they need to increase payouts (dividends or repurchases) to reduce public float. In column 1 of Table A.4, we confirm that in bunching years firms just below the thresholds have higher total payouts than firms just above.

[25] We also find that bunching firms are more likely to strategically release bad news in Q2.

3.1 Model

Suppose there is a set of firms indexed by the optimal equity that they would like to choose in the absence of regulatory distortions, z. Since we find that firms do not manipulate insider ownership, we use equity and public float interchangeably in the model. Now a regulation imposes a cost of k if a firm's equity is above $\overline{e}$. Firms choose the quantity of equity e relative to the undistorted level z to maximize its payoff:

$$\max_{e} -\Phi\left(e-z\right) - k\mathbf{1}_{\{e\geq \underline{e}\}}. \tag{2}$$

The first term of the payoff function, Φ, captures the costs that a firm incurs if its actual equity e deviates from its undistorted optimum z. Motivated by the empirical findings in Section 2 that firms bunch by substituting debt for equity, Φ can be interpreted as the capital structure distortion costs. We obtain the functional form of Φ from Binsbergen et al. (2010, 2011):[26]

$$\Phi(e-z) = \frac{1}{2}\beta\eta q z r^2 \left(1-\frac{e}{z}\right)^2 \tag{3}$$

where e is the actual equity; z is the optimal equity in the absence of regulatory distortion; β is the slope of marginal cost curve of debt, which is estimated to be 4.733 by Binsbergen et al. (2010, 2011); η is public float-to-book asset ratio; q is Tobin's Q; r is interest rate on debt. In Section 6.5, we show that our estimates are robust to using an alternative leverage distortion cost function from Korteweg (2010).

The second term of the payoff function (2), $k\mathbf{1}_{\{e\geq \underline{e}\}}$, is the cost of regulation. If a firm's equity is above a regulatory threshold, $\underline{e}$, then the firm is subject to that regulation which imposes a cost of k. For now, we treat k as a constant parameter. We will allow k to vary with firm size in Section 4.2.

Figure 3 shows the optimal choice of equity under different scenarios. Figure 3a shows that, in the absence of the regulation, firms choose the optimal equity amount $e = z$ to minimize capital structure distortion. However, after the regulation is introduced, the payoff function is shifted

[26] Binsbergen et al. (2010, 2011) estimate marginal cost of debt functions for individual firm-years from variations in the tax benefits of debt. They then simulate the marginal benefit functions of debt according to the tax code. The cost of leverage distortion is the triangular area between the marginal cost and marginal benefit curves of leverage as shown in Figure 1 of Binsbergen et al. (2011), or $\frac{1}{2}\beta\left(\Delta IOB\right)^2 v$, where IOB is interest over book assets a, and v is firm value. Using the notations in this paper, the leverage distortion cost for a firm with optimal float z bunching at e is $\Phi\left(e-z\right) = \frac{1}{2}\beta\left(\Delta IOB\right)^2 v = \frac{1}{2}\beta\left(\frac{r(e-z)}{a}\right)^2 qa = \frac{1}{2}\beta r^2 \frac{z}{a}\left(\frac{e}{z}-1\right)^2 qz = \frac{1}{2}\beta r^2 \eta q z\left(1-\frac{e}{z}\right)^2$.

downward by k in the region where the equity is above the regulatory threshold, as shown by Figure 3b. The discrete jump in regulatory costs creates an incentive to bunch. Specifically, firms just above the regulatory threshold find it more profitable to reduce their equity to $\underline{e}$ and avoid the regulatory costs. However, bunching is costly because of the costs from sub-optimal leverage, $\Phi(e-z)$. The loss in firm value is an increasing function of the undistorted equity because larger firms need to reduce more equity to bunch below the threshold, thus leading to larger loss in firm value. Figure 3c shows that if a firm's undistorted equity is far larger than the threshold, then it chooses not to bunch and to instead incur the regulatory costs, k. There exists a marginal firm that is indifferent between bunching and incurring regulatory costs, as shown in Figure 3d. The indifference condition of the marginal firm reveals the regulatory costs. Formally, regulatory costs can be calculated as follows:

$$k = \Phi(\underline{e} - \overline{e}) \tag{4}$$

where $\underline{e}$ is the regulatory threshold and $\overline{e}$ is the undistorted equity of the marginal firm that is indifferent between bunching or not bunching. If we know the size of the marginal firm $\overline{e}$, we can estimate the regulatory cost parameter k.

So far, our discussion holds the undistorted equity z constant for each firm. However, the model also applies to a setting where z grows over time. In this case, firms decide whether to bunch each year, depending on how far the undistorted optimal equity in that year is from the regulatory threshold. If the undistorted optimal equity exceeds the regulatory threshold by a small amount, the firm will bunch at the threshold. The firm may stop bunching after a few years when the undistorted optimal equity has grown much larger and it becomes too costly to bunch. The implicit assumption is that firms do not have to commit to a bunching decision. Instead, they can decide whether to bunch period by period. This assumption is reasonable because firms can adjust their public floats regularly by changing their payout policy. This assumption is also consistent with Figure A.1, which shows that most firms stay below the threshold for just a few years.

3.2 Interpretation of k

The parameter k captures both the direct costs of regulation, including fees to lawyers and accountants and costs of investing in internal control system, and the indirect costs, including competition

effect of disclosing proprietary information, productivity loss from diverting resources from operation to compliance, and any constraints regulations impose on firms operating decisions. The indirect costs are typically difficult to measure because they are not recorded in financial statements. However, indirect costs affect firms' bunching decision, so they can be estimated via a revealed preference approach. The parameter k may also include benefits of regulation for those in compliance. For instance, better disclosure can reduce a firm's cost of capital. Thus, the parameter k should be interpreted as the net cost of regulation: compliance costs net of the benefits from compliance. We do not attempt to separately identify compliance costs and the benefits of compliance, because for firms' compliance decisions or their public-private choice, what matters is the net costs. Importantly, our net cost estimate does not incorporate the social benefits of regulations, such as the effects on competition, investor welfare, and other general equilibrium outcomes. Instead, our estimate provides a useful input for policy makers to compare against the social benefits of regulations.

3.3 Estimation

We estimate the marginal firm $\overline{e}$ by applying a bunching estimator to the distribution of the public float. In a classic bunching setting, such as Saez (2010) and Kleven and Waseem (2013), agents would bunch exactly at the regulatory threshold, creating a sharp spike at the regulatory threshold in the PDF, as shown in Figure 4a. The size of the density spike can be used to infer the marginal agent. However, in our setting, firms cannot perfectly control their public float due to share price fluctuations. Firms may also "overshoot" and bunch far below the threshold to avoid crossing the threshold due to share price appreciations. As a result, the bunching pattern is quite fuzzy, as shown in the right panel of Figure 1. We thus use the fuzzy bunching estimator developed by Alvero and Xiao (2020). Intuitively, bunching creates a bulge in the CDF, as shown in Figure 4b. The fuzzy bunching estimator uses the area of this bunching bulge to infer the marginal firm $\overline{e}$. Formally, the bunching range $\Delta e \equiv \overline{e} - \underline{e}$ is given by:

$$\widehat{\Delta e} = \sqrt{\frac{2A}{f_0\left(\underline{e}\right)}}, \tag{5}$$

where $A \equiv \int (F(e) - F_0(e))\, de$ is the bunching area, and F and F_0 are the actual and counterfactual CDFs, respectively.[27] In the estimation, we also allow for the possibility that a fraction α of firms is subject to optimization frictions. α can be estimated using the following formula:

$$\hat{\alpha} = \frac{2\left(F(\overline{e}) - F(\underline{e})\right)}{f_0(\underline{e})(\overline{e} - \underline{e})} - 1. \tag{6}$$

The bunching range Δe adjusted for optimization frictions is given by:

$$\widehat{\Delta e} = \sqrt{\frac{2A}{(1-\alpha) f_0(\underline{e})}}. \tag{7}$$

3.4 Estimation Samples

We estimate the above bunching model on samples of firms around each of our three regulatory thresholds. For each threshold, we use the years since its introduction as the "bunching sample" and examine the distribution of firms' public float around that threshold. We also construct the "non-bunching sample" using years before the threshold's introduction or after its expiration, which gives the counterfactual distribution of firms' public float in the absence of bunching incentives.[28]

Specifically, to analyze firms' bunching below the \$25m threshold, we focus on firms that were small business issuers in the previous fiscal year and will be eligible this year if public float stays below \$25m. These are the firms with less than \$25m gross revenue in the current and previous fiscal years and whose public float is less than \$25m in the previous fiscal year. The sample period to construct the bunching distribution (bunching period) is 1994 to 2007. Since scaled disclosure was extended from firms below \$25m float to those below \$75m in 2008, the \$25M cutoff no longer applies after 2008. The sample period to construct the non-bunching distribution (non-bunching period) is thus 2009 to 2018.[29]

To exploit the \$75m threshold, we focus on non-accelerated filer firms that had less than \$75m

[27] The intuition of the fuzzy bunching estimator is the following: the bunching area can be approximated by a triangle with a height of $f_0 \Delta e$ and a base of Δe. The area of the triangle is then $A = f_0(\Delta e)^2/2$, from which we can then solve the bunching range.

[28] Alternatively, we can construct the counterfactual distribution by fitting a smooth polynomial to the density distribution in the bunching sample after excluding the observations around the threshold. In Section 6, we demonstrate the robustness of our results to this alternative estimation of counterfactual distributions.

[29] We exclude the transitioning year 2008 from our non-bunching period because firms could still choose to file as a small business issuer in 2008 if their fiscal year ends after December 15th. Theoretically, we could also use the years before the introduction of this threshold (i.e., pre-1992) as the non-bunching period, but this precedes the introduction of EDGAR, which precludes from collecting public float data.

public float in the previous fiscal year. We focus on the bunching period of 2003 to 2007 to identify the combined value of SOX 404 internal control exemption plus delayed filing of 10-Ks and 10-Qs. Our non-bunching period is 1994 to 2002.

Last, we analyze firms' bunching around the $700m threshold for Emerging Growth Company status. We obtain all IPOs from 1997 to 2018 from Jay Ritter's website (Ritter, 2020), the Kenney-Patton IPO Database (Kenney and Patton, 2013), and SDC. We restrict the sample to U.S. issuers with a positive public float after IPO. To focus on the firms with the strongest bunching incentives, we restrict to firms that were EGC-eligible in the previous year, i.e., firm-years with less than $1 billion gross revenue in the previous and current fiscal years,[30] and with less than $700m public float in the previous fiscal year. Additionally, we restrict to the first three years after IPO since firms have the strongest incentives to bunch for EGC benefits when they are newly public (Alsabah and Moon, 2020). Our bunching period is from 2012 to 2018 and our non-bunching period is from 1997 to 2011.

We use firms that are just above the float of the marginal bunching firm in the bunching period to parameterize the cost of capital structure distortion, Φ. In Section 6, we show that our estimates are similar if we use firms *around* the float of the marginal bunching firm to obtain these parameters. We do not use data in non-bunching period because these financial ratios can vary significantly with market conditions.

4 Estimation Results

4.1 Baseline Results

Table 3 reports the bunching estimates of regulatory costs for each of the three thresholds. We first examine the $25m threshold in column 1, which identifies the costs of enhanced disclosure. We find that the marginal firm that is indifferent between bunching and not bunching has a $27m undistorted public float. Bunching of this marginal firm leads to an increase in leverage ratio of 5.6 percentage points. The indifference condition of this marginal firm implies that the annual regulatory costs associated with enhanced disclosure are around $0.026 million per year. The present value of these regulatory costs account for 0.62% of the marginal bunching firm's firm

[30] The gross revenue threshold was adjusted to $1.07 billion from 2017 onward.

value.

Column 2 reports the estimation for the $75m threshold in the 2003–2007 period. This threshold relates to the regulatory costs of SOX 404 and accelerated filing deadlines. Here, the marginal bunching firm has an undistorted float of $95m. Bunching of this marginal firm leads to an increase in leverage ratio of 10.8 percentage points. The indifference condition of this marginal firm implies that the annual regulatory costs associated with SOX 404 compliance and accelerated filing are $0.122 million per year. The present value of these annual regulatory costs account for 0.73% of the marginal bunching firm's firm value.

Lastly, column 3 reports the estimates for the $700m threshold, which identifies regulatory costs of losing EGC status. The estimates show that the marginal bunching firm has an undistorted float of $838m . Bunching of this marginal firm leads to an increase in leverage ratio of 7.3 percentage points. The magnitude of this leverage change is close to that documented in Alsabah and Moon (2020). The indifference condition of this marginal bunching firm implies that the annual regulatory costs associated with losing EGC benefits are around $0.71 million per year. The present value of these annual regulatory costs represents 0.8% of the marginal bunching firm's firm value.

To further facilitate the interpretation of the magnitude of our estimated regulatory costs, we benchmark these costs against the total assets and profits of the marginal bunching firm. Table 4 report the results. For the marginal firm that bunches for the $25m threshold, annual enhanced disclosure costs around 0.18% of its total assets and 7.8% of EBITDA. For the marginal firm bunching for the $75m threshold, annual SOX 404 compliance and accelerated filing cost 0.1% of its total assets, 1.3% of EBITDA, and 6.3% of net income. Finally, for the newly public marginal firm bunching for the $700m threshold, the annual cost of losing all EGC benefits (a combination of disclosure and internal control reliefs) amounts to 0.13% of its total assets, 2.3% of EBITDA, and 7.1% of net income. These results suggest that small firms as well as newly public firms face particularly high regulatory costs as a percentage of their size and profit.

4.2 Extrapolation

Our approach provides an estimate of the regulatory costs facing the marginal bunching firms. In this section, we extrapolate these estimates to other firms. The extrapolation exploits the extent to which each of these regulatory costs are variable (i.e., proportional to size) versus fixed. If the

regulatory costs are all fixed costs, then all firms have the same regulatory costs as the marginal firm regardless of firm size. However, if the regulatory costs are all variable, then the regulatory costs should scale proportionally with firm size. Formally, we can extrapolate the regulatory costs from the marginal bunching firm to a firm of public float e using the following equation:

$$\ln k = \ln \overline{k} + \kappa(\ln e - \ln \overline{e}) \tag{8}$$

where $\overline{e}$ is the float of the marginal bunching firm, $\overline{k}$ is the regulatory costs of the marginal firm estimated in Table 3, and κ is the elasticity of regulatory costs to the public float.[31]

We estimate κ using two sets of data. First, we use surveyed SOX 404 compliance costs from the SEC study (SEC, 2011) to estimate their relationship with firms' public float.[32] Note that we do not require firms to truthfully report compliance costs in the survey data — the self-reported costs could be biased. We simply require that firms do not bias the variable and fixed components differentially, which is a much weaker assumption. Second, we use the relationship between pre-SOX audit fees from Audit Analytics and firms' public float to estimate the cost structure of disclosure compliance. Pre-SOX audit fees mainly capture financial reporting costs and does not include internal control costs. Third, we use the relationship between post-SOX audit fees, which capture both disclosure and internal control costs, and firms' public float to approximate the cost structure of EGC benefits.[33] We estimate the following relationship between reported regulatory costs and firms' public float:

$$\ln(\text{compliance costs}_{i,t}) = \kappa \ln(\text{public float}_{i,t}) + \delta_t + \epsilon_{i,t}. \tag{9}$$

Table 5 reports the estimates based on equation (9). Panel A reports the results for surveyed SOX 404 compliance costs. Column 1 estimates the elasticity of 404(b) audit fees to public float to be 0.432. We obtain an estimate of 0.456 when looking at the total SOX 404 compliance costs in column 5, which we use as our estimate of κ. Columns 1 and 2 of Panel B reports the relationship

[31] We use a log-on-log model to extrapolate because data shows that compliance costs and float follow this relationship (see Figure A.2).

[32] The SEC study only reports the average itemized compliance costs by public float interval and time period. We treat each float interval-period as one observation and weight the observations by the number of responding firms.

[33] In both cases, we exclude from Audit Analytics data firm-years that are exempted from the relevant regulation.

between pre-SOX audit fees and public float. Based on the coefficient for audit fees in column 1, we estimate the elasticity of disclosure cost to public float to be 0.412. Although we do not have data on reported values of EGC benefits, we can approximate its cost structure using post-SOX audit fees, which capture both disclosure and internal control costs. Column 3 of Panel B reports the relationship between post-SOX audit fees and public float. The coefficient estimate implies an elasticity of combined disclosure and internal control cost to public float of 0.423, which reassuringly lies between the elasticity for disclosure costs and internal control costs.

4.3 Regulatory Costs across Firms and Over Time

Using the estimated elasticities, we can compute the regulatory costs for companies with known public float. For example, for the median U.S. firm with a public float of $102m, it faces annual enhanced disclosure costs of $0.045m, SOX 404 compliance costs of $0.126m, and combined costs of disclosure and internal governance captured by EGC benefits of $0.293m. These costs translate to 0.3%, 0.9%, and 2.1% of the firm's annual EBITDA, respectively. Using a 7% discount rate, their present values are respectively 0.6%, 1.8%, and 4.1% of the firms' public float. These regulatory costs are therefore economically meaningful for an average US public company.[34]

The extrapolation also allows a comparison of the cost estimates across the three thresholds. For example, we can extrapolate the values of scaled disclosure and SOX 404 exemption from the corresponding thresholds to the marginal firm bunching for $700m for EGC benefits. This yields a combined value of $0.44m for the marginal EGC bunching firm. This value is lower than the estimated total EGC benefits of $0.71m. Such a difference can be attributed to the fact that EGC benefits include not only scaled disclosure, 404(b) exemption and delayed filing, but also shorter financial history disclosure in registration statement, delayed compliance with new accounting rules, and the ability to use test-the-waters communications with investors when issuing securities. Our estimates suggest that these latter benefits could be highly valuable for newly public firms.

We next examine the variations of the estimated regulatory costs across firms and over time. Figure 5 shows a heatmap of annual regulatory costs as a percentage of firm's EBITDA. We find that smaller firms face heavier regulatory burden than larger firms in the early sample period.[35]

[34]Note that the median U.S. public firm is relatively small ($102m float) and bears greater regulatory costs as a fraction of their size relative to larger firms.

[35]Similar patterns hold when we scale regulatory costs by firms' public float as shown in Figure A.3.

For example, at the beginning of our sample period, firms with $10m float spend 10.5% of their EBITDA on regulatory costs per year. In contrast, firms around $1 billion float spend 0.13% of EBITDA on regulatory costs. After SOX in 2002, medium-sized firms ($75m–$700m) experienced a large jump in regulatory costs relative to their size and profit. The regulatory burden on medium and small firms were greatly lifted by the 2012 JOBS Act.

Next, we aggregate our identified regulatory costs across all public firms in the U.S. and plot out the aggregate trends. Figure 6 shows the time series for aggregate regulatory costs in dollar and as a percentage of aggregate EBITDA. We find that the aggregate regulatory costs increased from $2 billion in late 1990s to almost $4 billion in 2018. There is a substantial jump after SOX, followed by a dip during financial crisis. Regulatory costs as a percentage of EBITDA increased from 0.15% before SOX to 0.23% after SOX. Since 2005, there has been a steady decline. Interestingly, JOBS Act did not lead to a noticeable decline in aggregate regulatory costs, likely because it only affects a small number of newly public firms. By 2018, regulatory costs relative to EBITDA have dropped to their pre-SOX levels.

4.4 Comparing with Existing Estimates

How do our estimates compare with existing estimates from surveys and previous research? A few caveats are noted before any such comparison. First, existing evidence is limited due to the challenge in accurately identifying regulatory costs so it is often difficult to find an exact counterpart for our estimate. Second, some existing evidence is based on surveys on firms or CEOs. As shown by Parker (2018) and Alvero et al. (2020), firms may have incentives to over-report their compliance costs in surveys in order to seek regulatory relief. Third, our bunching estimator estimates the *net* costs of regulation (i.e., compliance costs minus the benefits of compliance due to lower costs of capital from improved governance). In contrast, existing databases or research often report the gross compliance costs.

With the above caveats in mind, we first examine the regulatory costs of the scaled disclosure. Using a structural model, Cheynel and Liu-Watts (2020) estimates an average disclosure costs of about 0.26% of total assets. When applied to the marginal bunching firm's total assets of $14.7m, this translates to a comparable annual disclosure costs of $0.038m. Next, the Audit Analytics data provides pre-SOX audit fees, which we use as a proxy for the direct costs of financial disclosure. We

focus on the pre-SOX era because audit fees in that period capture expense for financial auditing and not costs for post-SOX internal control compliance. For firms with asset size of the marginal bunching firms, the median audit fee is \$0.078m. Our estimate of \$0.026m for the value of scaled disclosure has the same order of magnitude as these alternative estimates. Our number is smaller because scaled disclosure does not cover all disclosure items.[36] In addition, our estimate captures the net disclosure cost after taking into account the potential benefits of enhanced disclosure available to firms.

Second, we estimate the net benefits of SOX 404 exemption to be \$0.122m per year for the marginal bunching firm with a \$94.6m float. Survey results from the SEC (2011) report and Alexander et al. (2013) show that firms with public float between \$75m and \$250m face a median SOX 404 compliance cost of \$0.51m, out of which \$0.15m are 404(b) audit fees. Alternatively, we can use within-firm increase in audit fees around SOX as another proxy of direct internal control costs. For firms around the size of the marginal bunching firm, the median audit fee increases from 2000–2001 to 2003–2007 is \$0.14m. Using a fuzzy regression discontinuity design, Iliev (2010) finds that SOX 404 increased audit fees by 98%, which, applied to the median pre-SOX audit fees of \$0.135m for firms of similar size to the marginal bunching firm, translates to \$0.132m. Overall, these numbers are larger but have the same order of magnitude as our estimates.

Finally, we estimate the net benefits of EGC status to be \$0.713m per year for a marginal bunching firm of \$838m float. Unfortunately, there are no existing estimates of EGC benefits from surveys or research. The closest is the Lewis and White (2020) survey of a small group of biotech firms that lost their EGC status. They report an average 404(b) compliance cost of \$0.8m, with \$0.41m in audit fees, \$0.19m in external consultant fees, and \$0.2m in internal labor. Given that 404(b) exemption is a subset of the benefits enjoyed by EGCs (though an important component), our estimate of \$0.713m can be considered as lower, which could again be explained by our measure capturing net benefits and/or firms over-reporting regulatory costs in surveys.

[36] One could use our estimate in Table A.2 to scale up our enhanced disclosure cost: All else equal, SBI filers have 10-Ks and DEF14As that are about 25% shorter than non-SBI filers. Assuming homogeneous disclosure cost for all disclosure items, the full disclosure cost for our marginal bunching firm is around \$0.1m per year, or about 2.5% of firm value based on present value. This value is likely a lower bound as it does not incorporate overhead costs that are invariant to disclosure length.

4.5 How Regulators Can Use Our Estimates

Our estimates are of interest to regulators, who routinely conduct cost-benefit analysis on existing regulations. Our bunching approach complements existing methods to estimate regulatory costs, such as surveying firms or reduced-form regression analysis on firms' reported data. Because the bunching approach estimates regulatory costs from firms' revealed preference, it is not prone to misreporting concerns in surveys. Furthermore, the bunching approach applies to settings in which reduced-form regressions may be biased by firms' strategic responses to regulations. Our estimates can also inform the rule-making of new regulatory proposals when the new rules bear similarity to existing ones, or when regulators conduct pilot experiments on a subset of firms. That said, for brand new regulations without precedents or any reference data from experiments, the bunching approach cannot be used for ex-ante cost-benefit analysis.

5 Regulatory Costs and the Disappearing Public Firms

In this section, we examine how much our estimated regulatory costs can explain the disappearing public firms puzzle. We explore both the entry to and exit from public market. Doidge et al. (2017) show that each margin accounts for roughly half of the disappearing public firms in the last few decades.

5.1 Regulatory Costs and the IPO Volume

We model the probability for firm i to go public in year t using a logit model:

$$\Pr(\text{IPO})_{i,t} = \frac{\exp\left(\beta \ln k_{i,t} + \gamma X_{i,t}\right)}{1 + \exp\left(\beta \ln k_{i,t} + \gamma X_{i,t}\right)}. \tag{10}$$

where $k_{i,t}$ is the regulatory costs borne by firm i in year t if it chooses to go public. The vector $X_{i,t}$ contains firm characteristics that affect the net benefits of IPO.

We estimate the above logit model using maximum likelihood on a panel of 21,066 U.S. venture capital(VC)-backed firms from 1992 to 2018, of which 1,957 went public. To ensure a clean risk-set of potential IPOs, we track startups from their first VC round until exit or failure. As VC-backed startups are an important source of IPOs (e.g. Ritter, 2020), this sample

provides a reasonable risk-set of private firm-years that face going public decisions. We estimate public float upon IPO from last round valuation using the following equation: $Public\ Float_{i,t} = Last\ valuation_{i,t} \times \text{Avg}(\frac{Primary\ shares \times Share\ price}{Pre\text{-}money\ valuation})_t \times \text{Avg}(\frac{Secondary\ shares + Primary\ shares}{Primary\ shares})_t$. We obtain the average ratio of raised amount to pre-money valuation from VentureSource and the average ratio of tradable shares (i.e., primary plus secondary) to primary shares from SDC. Both ratios are estimated at the yearly level. If a startup's valuation is missing in a given year, we linearly extrapolate using two known valuations. Startups with no reported valuations are excluded from the sample. We control for total financing raised, years since first VC round, and dummies for firms' headquarter state. We also include industry-year fixed effects to absorb sectoral shocks and changes in regulations that apply uniformly to all firms.

Table 6 presents the estimated results. Columns 1 and 2 presents the logit coefficients and the marginal effects, respectively. We find that a one-standard-deviation increase in our estimated regulatory costs is associated with a 7% decrease in the probability of a VC-backed firm going public in a year. We also find that years since first round negatively predicts IPO likelihood. The result that regulatory costs significantly impact private firms' decision to go public echoes the findings in Aghamolla and Thakor (2019) and Lowry et al. (2017). However, this is the first sensitivity estimation of the IPO decision to the dollar value of regulatory costs, rather than its response to a specific regulatory reform.

Using the estimated model, we conduct a set of counterfactual analyses of IPO outcomes by varying the regulatory costs $k_{i,t}$ after 2000, the period that witnessed dramatically lower numbers of IPOs. Columns 1 and 2 of Table 7 present the IPO outcomes before and after 2000 in the data. Columns 3 to 5 present the IPO outcomes after 2000 in three counterfactual scenarios. First, we consider a counterfactual scenario without SOX.[37] Column 3 of Table 7 shows that there is a slight increase in the probability of IPO and IPO volumes. In particular, removing SOX only increases average annual IPO likelihood post 2000 from 0.95% to 0.96%. The result may appear surprising given that the costs of SOX 404 are substantial. However, further investigation reveals that, in our sample, 82% of VC-backed firm would have a public float below SOX 404 exemption threshold upon IPO, which suggests that most VC-backed firms would be exempted from SOX 404 if going public. This finding is also consistent with Gao et al. (2013) and Doidge et al. (2013), who argue

[37] Panel B of Table A.6 summarizes the regulatory burden borne by firms in different size group under this scenario.

that the decline in IPOs is unlikely to be driven by SOX.

Column 5 of Table 7 considers a scenario where we set all regulatory costs identified in Table 3 to zero. Removing these regulatory costs would increase post-2000 IPO likelihood among VC-backed firms from 0.95% to 1.4%. The average yearly number of VC-backed IPOs over 2000–2018 would increase from 50.2 to 70.6. While the effects are substantial, they still fall short of explaining the dramatic decrease in IPO volume after 2000. Removing all identified regulations increases average annual IPO likelihood post 2000 by 0.445%, which, compared with the 6% drop in IPO likelihood from before to after 2000, explains only 7.4% of the decline in IPO likelihood. Similarly, removing all regulatory costs after 2000 increases the average yearly number of IPOs over this period by 20.4, which offsets only 22% of the decrease in yearly IPO volume from pre-2000 to post-2000.

Prior research such as Dambra et al. (2015) finds that the IPO market partially recovered after 2012 passage of the JOBS Act. We examine how much of the recovery in IPOs can be explained by the reduction in the regulatory costs. To this end, we consider a scenario where the JOBS Act is absent in column 2 of Table 7. We show that, had JOBS Act not passed, the average annual IPO likelihood among VC-backed firms after 2000 would decrease from 0.95% to 0.74%. Further, the total number of VC-backed IPOs after 2000 would drop from 912 to 711, and the aggregate public float of these IPO firms decrease from $339b to $314b. The decline in the number of IPOs translates to an average 28.7 fewer IPOs per year over the period of 2012 to 2018, when JOBS Act was in effect. This estimate is somewhat larger than that of Dambra et al. (2015), who show that JOBS Act has led to 21 additional IPOs per year using a very different empirical methodology.

Figure 7 shows our yearly counterfactual estimates for three outcomes: average regulatory costs facing potential IPO firms, IPO probability, and yearly number of IPOs. These figures confirm the limited role played by SOX 404 and the significant impact of JOBS Act on IPO volumes after 2012. Further, as shown in Panels B and C of Figure 7, even when we remove all identifiable regulatory costs after 2000, there is still a strong declining trend in IPO likelihood and volume. This result suggests that regulatory cost itself is unlikely to explain the full magnitude of IPO declines in the U.S. over the past two decades.[38] Non-regulatory factors, such as decline in business dynamism (Decker et al., 2016), shifting investment to intangibles (Kahle and Stulz, 2017;

[38]In Section 6.8, we show that our IPO results are similar if we allow firms to make IPO decisions based on the present value of future regulatory costs rather the annual costs upon IPO.

Doidge, Kahle, Karolyi, and Stulz, 2018), abundant private equity financing (Ewens and Farre-Mensa, 2020), changing economies of scale and scope (Gao, Ritter, and Zhu, 2013), and changing acquisition behavior (Gao, Ritter, and Zhu, 2013; Eckbo and Lithell, 2021) are likely to play a more important role.

5.2 Regulatory Costs and the Going Private Transactions

We also estimate the effect of regulatory costs on public firms' decision to go private. We model the probability of going private using the following logit specification:

$$\Pr(\text{GoingPrivate})_{i,t} = \frac{\exp\left(\beta \ln k_{i,t} + \gamma X_{i,t}\right)}{1 + \exp\left(\beta \ln k_{i,t} + \gamma X_{i,t}\right)}. \tag{11}$$

where $k_{i,t}$ is the regulatory costs borne by firm i in year t if it stays public. The vector $X_{i,t}$ contains lagged firm characteristics that affect the net benefits of going private, including log public float, book leverage, log total assets, ROA, investment-to-asset ratio, log sales growth, market-to-book ratio, annual stock return, log number of analysts, and institutional ownership. We also include state fixed effects as well as industry-year fixed effects to absorb industry-level shocks and non-threshold-based regulatory changes that apply to all firms.

We estimate the above logit model of going private decisions on a panel of 4,217 U.S. public firms from 1995 to 2017. Following Bharath and Dittmar (2010), we identify going private transactions using 13e-3 filings. Sample inclusion requires that these filings are followed by a filing of Form 15 or Form 25 within the next two years to ensure that the security was indeed de-registered. This yields 949 going private transactions, out of which 674 can be matched to Compustat firms with non-missing control variables.

Table 8 presents the logit regression results. Consistent with the prior literature, lower market cap, growth, valuation, stock return, analyst coverage, and institution ownership predict higher probability of going private, while lower leverage and profitability predict the opposite. However, we do not find regulatory costs to be a significant factor in public firms' going private decisions. Instead, the sign of the coefficient is the opposite: higher regulatory costs slightly reduces the probability of going private. This null result echoes the mixed findings in prior literature on the effect of SOX on going private transactions (Engel et al., 2007; Leuz, 2007; Leuz et al., 2008;

Bartlett III, 2009), and could be explained by the fact that some of the regulatory costs are upfront and irreversible (e.g., setting up internal control system). Hence, these costs will be sunk costs for public firms' going private decisions but will enter into private firms' going public decisions. Further, many PE deals are motivated by financial or operational engineering reasons (Kaplan, 1989; Guo et al., 2011; Bernstein and Sheen, 2016), rather than avoidance of regulatory costs.

5.3 Summary

Overall, we find that regulatory cost appears to affect firms' public-vs-private choice mainly through their going public rather than going private decisions. However, quantitatively, regulatory costs only explain a small fraction of the disappeared IPOs, in contrast to the popular claim by practitioners. Instead, our results are consistent with the view of Gao et al. (2013) and Doidge et al. (2013), who suggest that the regulatory changes in the early 2000s did not appear to cause the disappearance of public firms. Other non-regulatory factors likely played a more important role.

We caveat our analysis with three notes. First, our results concern the effects of regulations identifiable in our bunching estimation, i.e., threshold-based regulations. Our counterfactual analysis leaves out regulations that are not threshold-based as reviewed in Table A.3. Nevertheless, our analysis covers the major regulatory changes that are often attributed to the decline in public firms, such as SOX. It is worth noting that the presence of non-threshold-based regulations would not bias our estimate of the sensitivity of going public (private) decisions to regulatory costs, because their effects are absorbed by time fixed effects. Second, the counterfactual analysis offers useful comparative statics on the relation between regulatory costs and IPO volumes. However, these regulations may generate social benefits to the overall public market. Our counterfactual analysis should not be interpreted as a welfare analysis of these regulations on the overall IPO market because we only vary the (net) costs of regulation but not their social benefits. Third, our IPO counterfactuals use a sample of VC-backed firms, which represent around 50% of all IPOs. Non-VC-backed firms may have different sensitivity to regulatory costs when making their IPO decisions. Caveats aside, the counterfactual exercises provide informative results on the debate on the cause of the disappearing IPO puzzle.

6 Robustness and Further Analyses

In this section, we demonstrate that our results are robust to a variety of alternative assumptions, sampling choice, or consideration of alternative regulations. We also conduct a few further analyses.

6.1 Alternative Regulations around Thresholds

In addition to the regulations discussed in Section 1.2, the \$75m and \$700m thresholds were also associated with some benefits in security issuance if firms are *above* these thresholds. We examine whether these regulations may significantly bias our estimates.

First, before 2008, firms above \$75m float enjoyed shelf registration, which streamlines and accelerates security issuance (Gustafson and Iliev, 2017). However, this cutoff was eliminated in 2008 when SEC extended shelf registration to all firms.[39] Hence, before 2008, shelf registration may introduce an incentive to bunch above \$75m, leading to a potential downward bias in our estimate. To address this, we use 2008-2018 as an alternative bunching period for the \$75m threshold. One complication is that "Smaller Reporting Companies" were also introduced in 2008, which extended scaled disclosure from firms below \$25m to those below \$75m. Therefore, relative to the period of 2003-2007, 2008-2018 additionally identifies the value of scaled disclosure, but without a downward bias from shelf registration. Given we already know the value of scaled disclosure, we can back out the residual value of shelf registration and examine whether it is economically meaningful.

Table A.7 reports the estimates for the \$75m threshold using the alternative bunching period of 2008-2018. We find that, over this period, the regulatory costs associated with being above \$75m is \$0.156m per year. This is \$0.034m higher than our estimate of \$0.122m over the 2003-2007 period. Extrapolating our estimate of scaled disclosure to firms bunching for \$75m yields a value of scaled disclosure of \$0.044m. This implies that, for firms around \$75m, the value of shelf registration is -\$0.01m (=0.034-0.044) per year, which is economically and statistically insignificant. This suggests that shelf registration has a minimal impact on our estimate.

Second, since December 1, 2005, firms above \$700m float enjoy the Well-Known Seasoned Issuer (WKSI) status (Clinton et al., 2014), which allows for streamlined and faster security issuance. This rule may again create a reverse bunching incentive and a potential downward bias in our estimate.

[39] See the final rule titled "Revisions to the Eligibility Requirements for Primary Security Offerings on Form S-3 and F-3," SEC Release No. 33-8878, December 19, 2007.

However, our estimate for EGC benefits from the $700m threshold is unlikely to be affected because we focus on newly public firms that have little immediate need for a seasoned equity offering. Indeed, Figure A.4 shows no bunching above $700m from 2006 to 2011, the period of WKSI and pre-EGC (relative to 1997–2005). This result suggests that any WKSI benefits for newly public firms are minimal and in turn, that our EGC benefit estimate is unlikely to be biased.

6.2 Dropping Financial and Utility Firms

Our main analyses include financial and utility firms because they face the same SEC regulations as other firms and thus have the same bunching incentives, even though they may be subject to other additional regulations. Nevertheless, Table A.8 presents our main estimations dropping financial and utility firms (SIC code 6000-6999 and 4900-4949) from our samples. We find that the cost of full disclosure is the same as our main estimate. The cost of SOX 404 compliance and the cost losing EGC benefits are 22% and 10% smaller than the estimates on the full sample, respectively. This suggests that financial and utility firms face higher internal control costs and (or) higher disclosure costs associated with security issuance.

6.3 Alternative Counterfactual Distributions

We address two potential concerns with counterfactual distributions. First, although bunching estimator itself does not rely on the assumption that the threshold-based regulatory change is unanticipated, anticipation may affect the counterfactual distribution of the running variable estimated from the non-bunching period. To address this concern, we investigate whether our results are robust to dropping the two years before each of the three regulatory changes. Specifically, for the $75m and $700m thresholds, we drop the two years before the thresholds were introduced (i.e., 2001–2002 for $75m and 2010–2011 for $700m). For the $25m threshold, we drop the last two years before the $25m threshold expires. Table A.9 presents the results. We find that the estimates are very similar to our main results, with slightly smaller disclosure cost and EGC benefits, and a slightly higher 404 compliance cost.

Second, one might be concerned that the firm size distribution might be different in the non-bunching period compared with the bunching period. In Figure 2, we showed that the distributions of public float are almost identical across bunching and non-bunching periods around placebo

thresholds unrelated to any regulations. This suggests that the float distribution in the non-bunching period provides a reasonably good counterfactual. To further address the concern about counterfactual distribution, we follow the bunching literature to estimate an alternative counterfactual distribution using only the post-regulation period (i.e., the bunching period) (Kleven, 2016). Specifically, we fit a smooth polynomial to the distribution after excluding the observations around the regulatory threshold. Table A.10 presents the results. The estimates are similar to our main results.

6.4 Alternative Parameter Choices

Our main estimation uses firms just above the float of the marginal bunching firm in the bunching period to obtain the undistorted parameters of η, q, and r. Although these firms are uncontaminated by potential bunching incentives because they are above the marginal bunching firm, one could argue that they are slightly larger than the marginal bunching firm. In Table A.11, we show that our estimates are similar if we use firms *around* the float of the marginal bunching firm to obtain these parameters, though the estimate for EGC benefits is somewhat larger.

We also demonstrate the robustness of our results to alternative estimates of β—the marginal cost of debt. Our baseline β value comes from Binsbergen et al. (2010), who estimate it for all Compustat firms. One may be concerned that firms in our bunching samples may have very different β. We thus re-estimate β following the methodology in Binsbergen et al. (2010) on subsamples of firms around the three thresholds. As shown in Table A.12, the local β is 4.637, 5.130 and 6.192 for firms around each of the three thresholds. These values are not too different from our baseline β value of 4.733.

6.5 Alternative Cost Function of Leverage Distortion

Our main estimation relies on the marginal cost of debt function from Binsbergen et al. (2010) to estimate leverage distortion costs. To demonstrate robustness, we show that our estimates are similar if we instead use the net benefits to leverage function from Korteweg (2010) to compute leverage distortion costs. Korteweg (2010) estimates the net benefits of debt as a function of leverage and covariates by generalizing the Modigliani-Miller beta levering and firm valuation formulas and exploiting observed variation in stock and bond betas and valuations. Despite the different

approach, Korteweg (2010) estimates similar net benefits to leverage as Binsbergen et al. (2010). Table A.13 present our bunching estimates based on Korteweg (2010). Specifically, we obtain parameters from firms just above our marginal bunching firms and feed them into the net benefits to leverage function estimated in Korteweg (2010). The leverage distortion cost is then calculated as the decrease in the net benefits to leverage as one moves from the optimal leverage to the distorted leverage (Appendix A.2 provides more details). As shown in Panel A of Table A.13, our regulatory cost estimates are similar to those in Table 3.

6.6 Agency Issues

Our model assumes that managers choose whether to bunch to maximize firm value. One may worry that this assumption may be violated for firms with substantial agency issues. A priori, the bias from agency issues can be either positive or negative. On the one hand, entrenched managers may be averse to taking on additional debt to bunch, leading to a downward bias in our estimates. On the other hand, regulatory compliance may be more costly to managers than to shareholders, leading to an upward bias. To address this concern, we re-estimate the regulatory costs excluding firms that may have severe agency issues. In particular, we drop firms in the bottom decile of institutional ownership and firms in the bottom decile of board independence. The results are reported in Table A.14. The estimates are similar to our baseline estimates.

6.7 Other Impacts of Float Distortion

In this section we examine potential alternative impacts of float distortion: shrinking operations or strategically releasing bad news that depresses stock prices.[40] Table A.4 tests these different margins using the same specification as in Table 2. Columns 1-4 focus on various operational outcomes such as total assets, tangibility, asset turnover, and profitability. We find no significant changes in these outcomes. This lack of operational changes is consistent with no investment changes found in Table 2. Column 5 examines strategic news release using news data from RavenPack. Specifically, we calculate the fraction of bad news released in the second fiscal quarter, where bad news is defined

[40]Theoretically firms can also manipulate their quarterly earnings to influence stock prices. However, second quarter earnings are typically announced after the end of the second quarter (i.e., when public float is computed), making such manipulation infeasible for most firms.

as news with a RavenPack sentiment score below 50.[41] We find that, in the years where a regulation is effective, firms below the regulatory threshold are more likely to release bad news in the second fiscal quarter to depress their stock prices. As a placebo test, we also show that such finding does not exist for news released in the third fiscal quarter, which is after the date firms calculate public float.[42] Overall, these results together with those in Table 2 suggest that firms keep their public float below threshold through increasing payouts or releasing bad news, while using debt to fill the equity with unchanged operations.

6.8 Dynamic Considerations in IPO Analysis

In our baseline estimation, we relate the IPO decision to the immediate regulatory cost that a firm faces when it goes public. We now show that our IPO results are robust to firms' dynamic expectations about future regulatory costs. In Panel A of Table A.15, we reproduce the IPO predictive regression using the present value of future regulatory costs, rather than annual costs upon IPO. We project the public float of potential IPO firms for seven years (the average duration IPO firms stay public in our sample) after IPO, using float growth rates estimated from newly public firms. We then calculate yearly regulatory costs based on the corresponding float and the regulations prevailing in the potential IPO year.[43] Last, we compute the present value of these yearly regulatory costs using a 7% discount rate to arrive at the variable *PV of regulatory costs*. Panel B of Table A.15 shows the simulated IPO counterfactuals. We find results similar to those in Tables 6 and 7. A one-standard-deviation increases in the present value of regulatory costs reduces IPO likelihood by 7.5% relative to the mean. Removing SOX continues to have a minimal effect on IPO volumes while JOBS Act significantly boosted IPOs after 2012. Removing all regulatory costs explains 9.4% of the post-2000 decline in IPO likelihood and 28.3% of the decline in the yearly number of IPOs.

[41] The RavenPack Event Sentiment Score has a value between 0 and 100, with 50 indicating neutral sentiment and higher values indicating more positive news. The score is determined by systematically matching stories categorized by financial experts as having a positive or negative impact, which is then fed into RavenPack's proprietary algorithm.

[42] It is unclear whether these news release are short-term or have a long-run impact on firms' equity value. If it is the latter case, firms will presumably need to fill the equity shortfall with debt to keep investment constant, as documented in Section 2.2

[43] Hence, we assume firms extrapolate the current regulations into the future.

7 Conclusion

This paper studies the connection between regulatory costs and firms' public-vs-private choice by exploiting a regulatory quirk: many rules trigger when a firm's public float exceeds a threshold. We find that firms increase their leverage to move their public float below the thresholds. We estimate regulatory costs from the extent of this avoidance using a revealed preference approach. We find that the regulatory costs of being a public firm are substantial: various disclosure and internal governance rules lead to a total compliance cost of 4.1% of the market capitalization for a median U.S. public firm. Regulatory costs have greater impact on private firms' IPO decisions than on public firms' going private decisions. However, heightened regulatory costs only explain a small fraction of the decline in the number of public firms over the last two decades. Our results suggest that non-regulatory factors likely played an more important role in explaining the decline in the number of U.S. public firms. Our regulatory cost estimates also provide important input to regulator's cost-benefit analyses.

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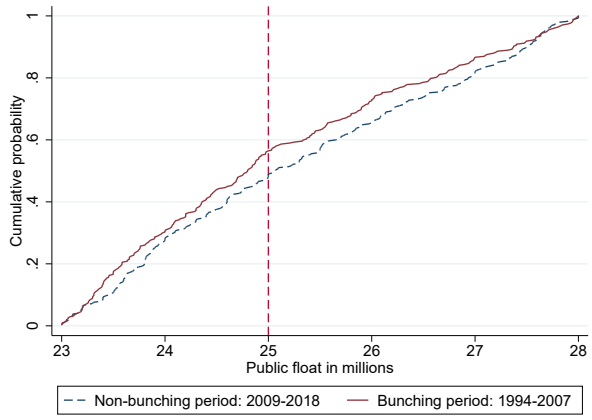
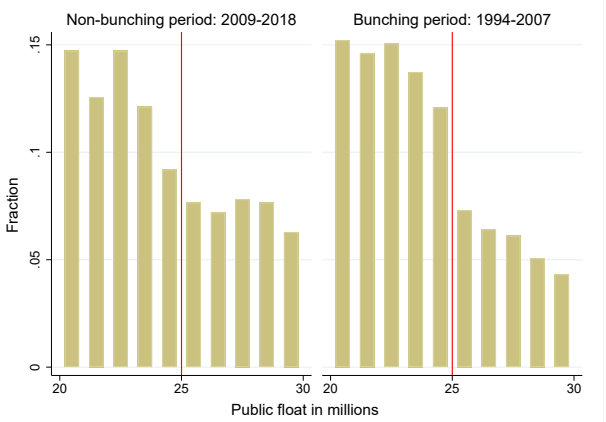
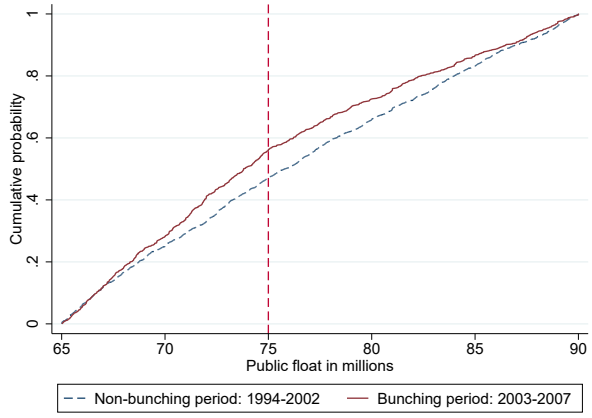
Figure 1: CDFs and Histograms for Public Float around Regulatory Thresholds



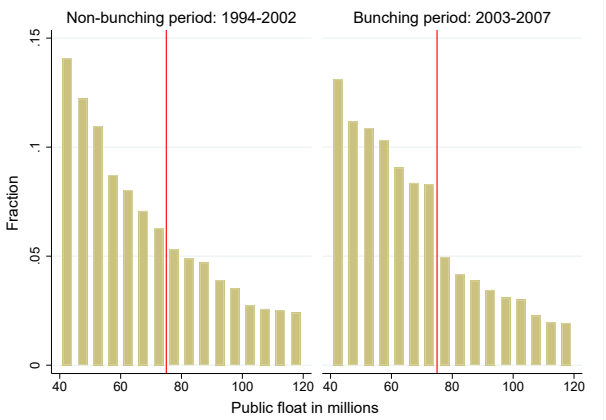
(a) CDF: $25 mil



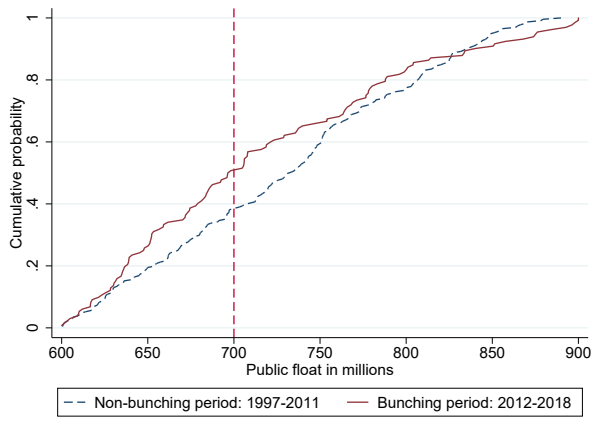
(b) Histogram: $25 mil



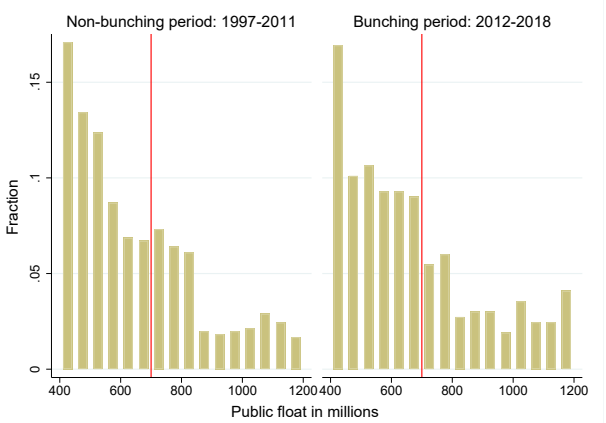
(c) CDF: $75 mil



(d) Histogram: $75 mil



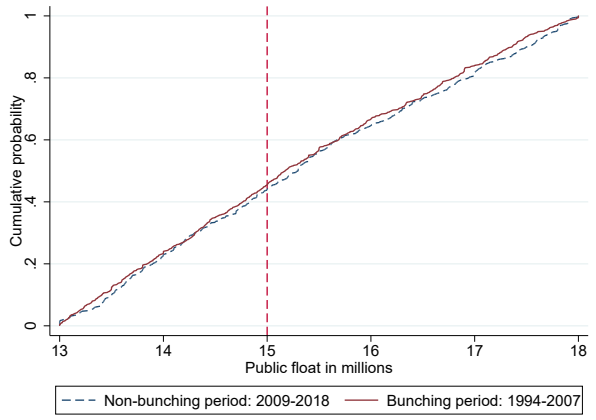
(e) CDF: $700 mil



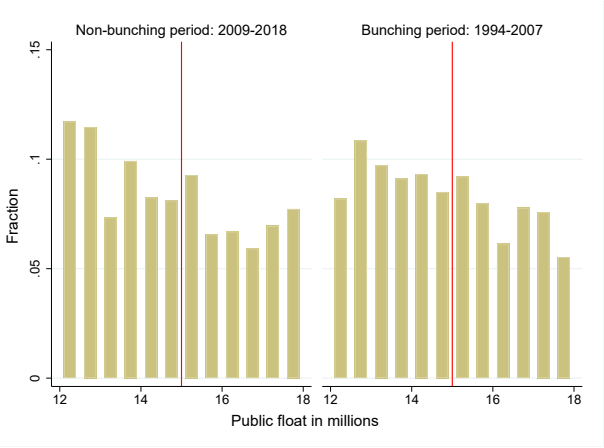
(f) Histogram: $700 mil

These figures show the cumulative density functions and histograms for firms' public float around regulatory thresholds in bunching and non-bunching years. Bunching years are years when the threshold-based regulation was in place. Non-bunching years are years before the regulation is introduced or after it expires.

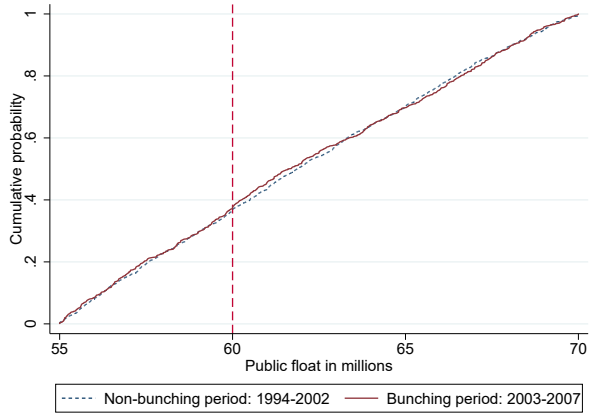
Figure 2: CDFs and Histograms for Public Float around Placebo Thresholds



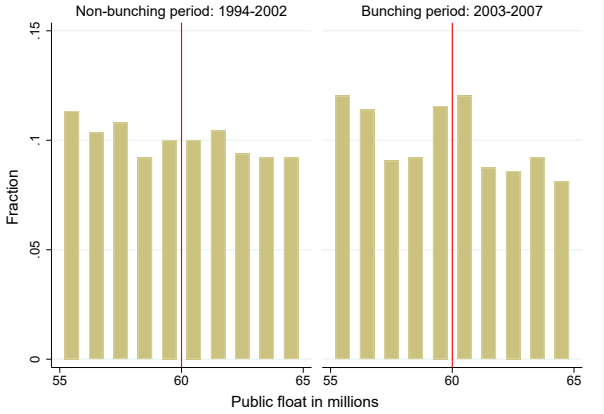
(a) CDF: \$15 mil



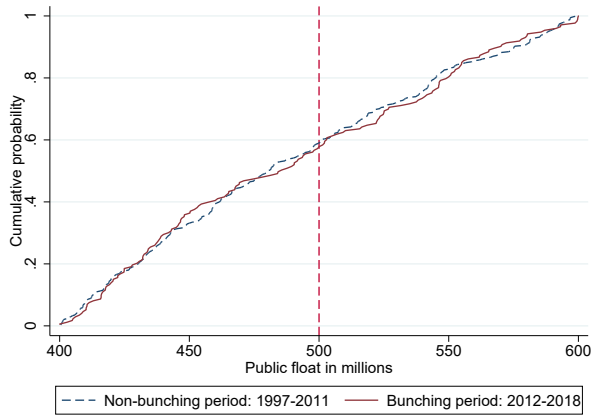
(b) Histogram: \$15 mil



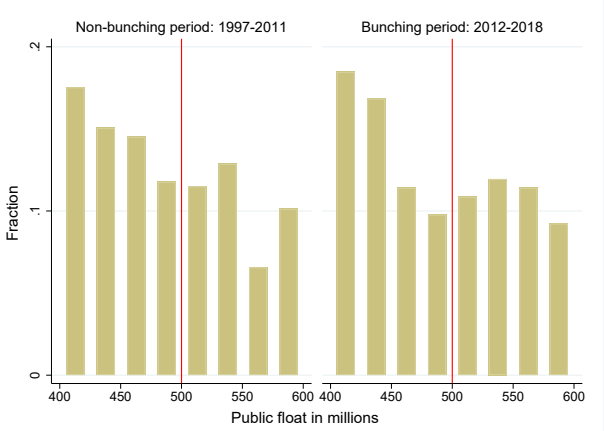
(c) CDF: \$60 mil



(d) Histogram: \$60 mil



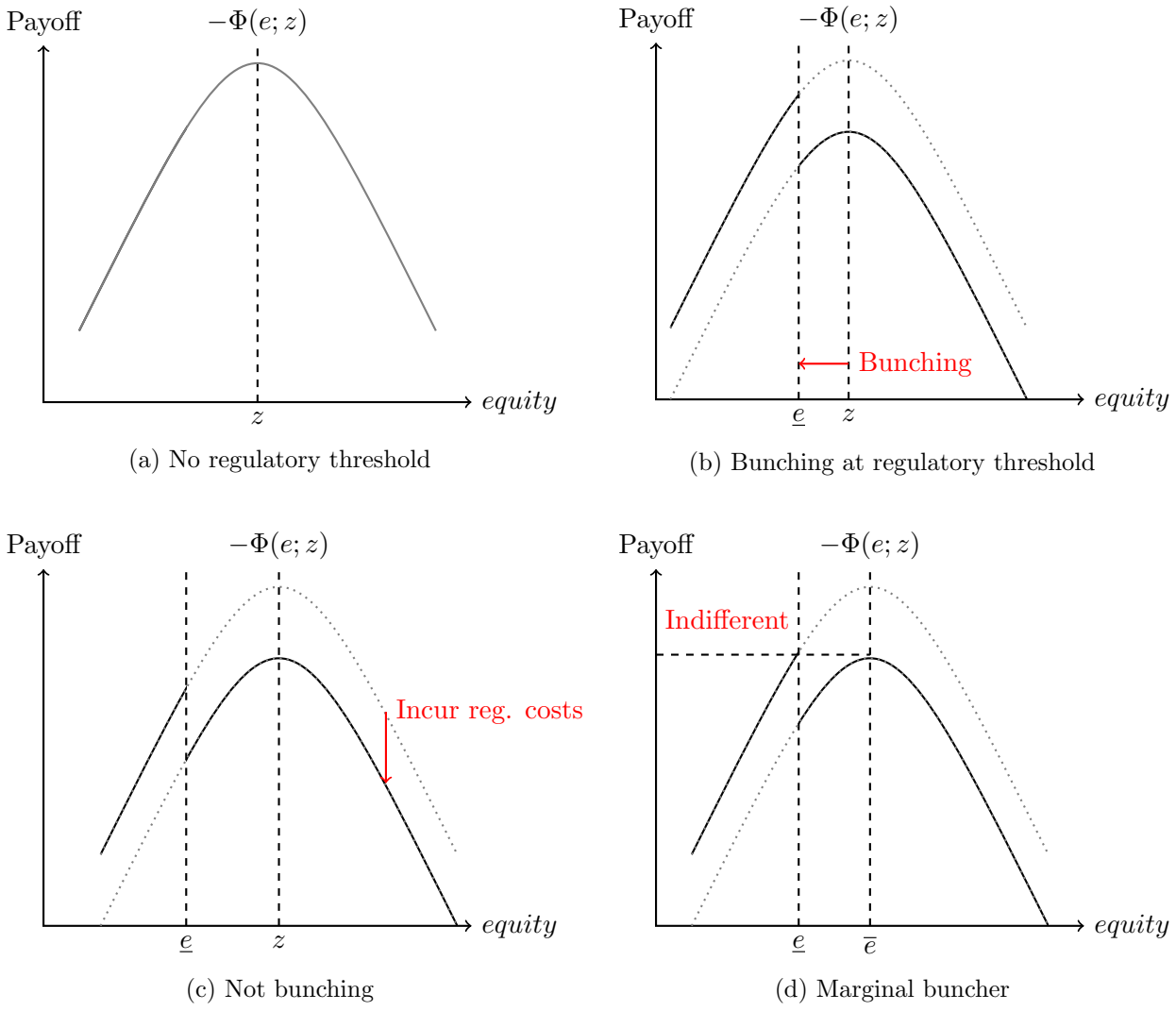
(e) CDF: \$500 mil



(f) Histogram: \$500 mil

These figures show the cumulative density functions and histograms for firms' public float around three placebo thresholds that are below our actual regulatory thresholds: \$15M, \$60M, and \$500M. The samples are based on the same sample periods and filters as those for our main samples, except for public float range.

Figure 3: Firm Payoff as a Function of Public Float



(a) No regulatory threshold

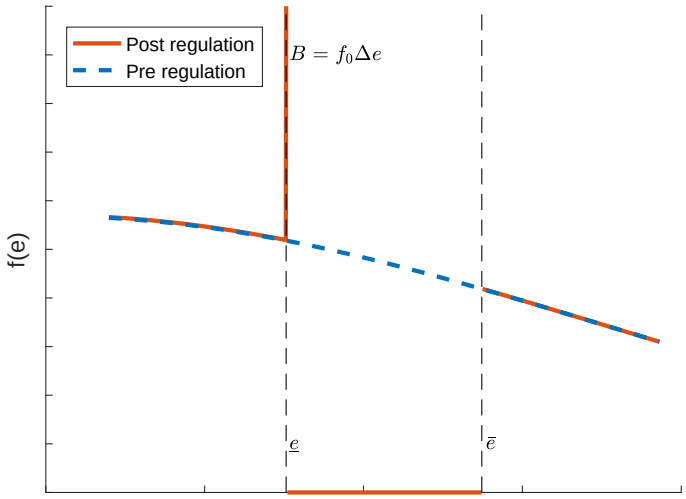
(b) Bunching at regulatory threshold

(c) Not bunching

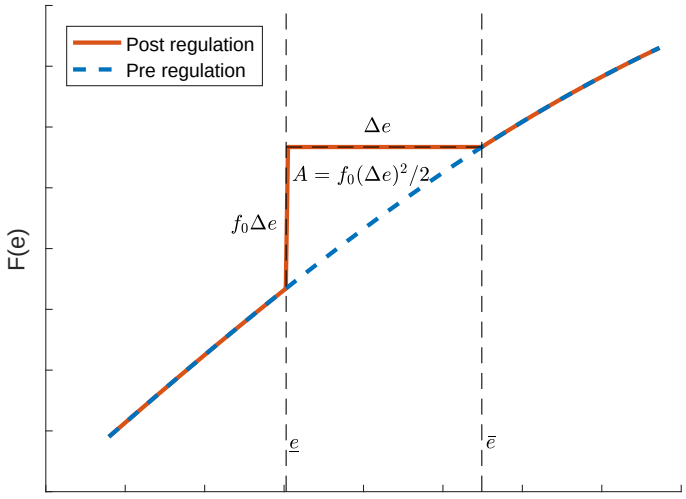
(d) Marginal buncher

This figure illustrates the shape and the slope of a firm's payoff as a function of the public float e. Panel (a) illustrates a concave payoff function in the absence of a regulatory threshold. Panel (b) shows a new payoff function when a regulatory threshold is introduced at $\underline{e}$. The discontinuity in the payoff induces firms whose public float was above the threshold to bunch. Panel (c) shows a firm whose undistorted optimal float is way above the regulatory threshold and therefore who chooses not to bunch. Panel (d) shows a payoff function for the marginal bouncher who is indifferent between bunching and not bunching.

Figure 4: Moments of Distribution Functions Used in Bunching Estimator



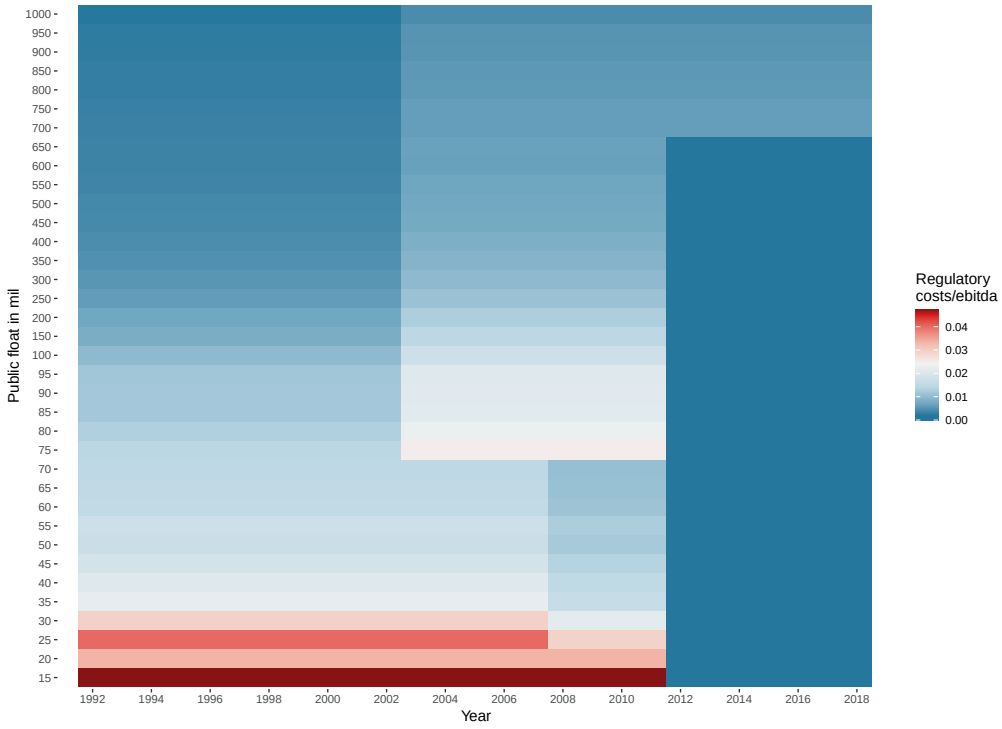
(a) Probability density function



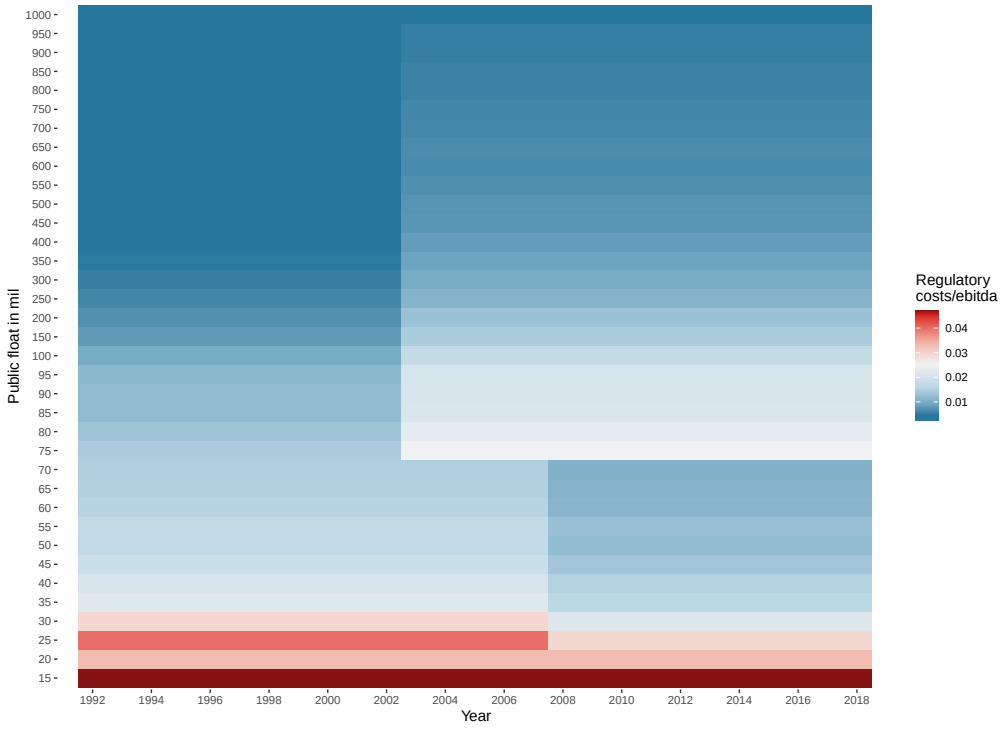
(b) Cumulative distribution function

This figure shows the probability density function (upper panel) and the cumulative distribution function (lower panel) of public float in the presence of bunching. $\underline{e}$ is the regulatory threshold. $\bar{e}$ is the float of the marginal bunching firm. A is the area between the cumulative distribution functions before and after the regulation. α is the fraction of non-optimizing firms.

Figure 5: Estimated Regulatory Costs Scaled by EBITDA



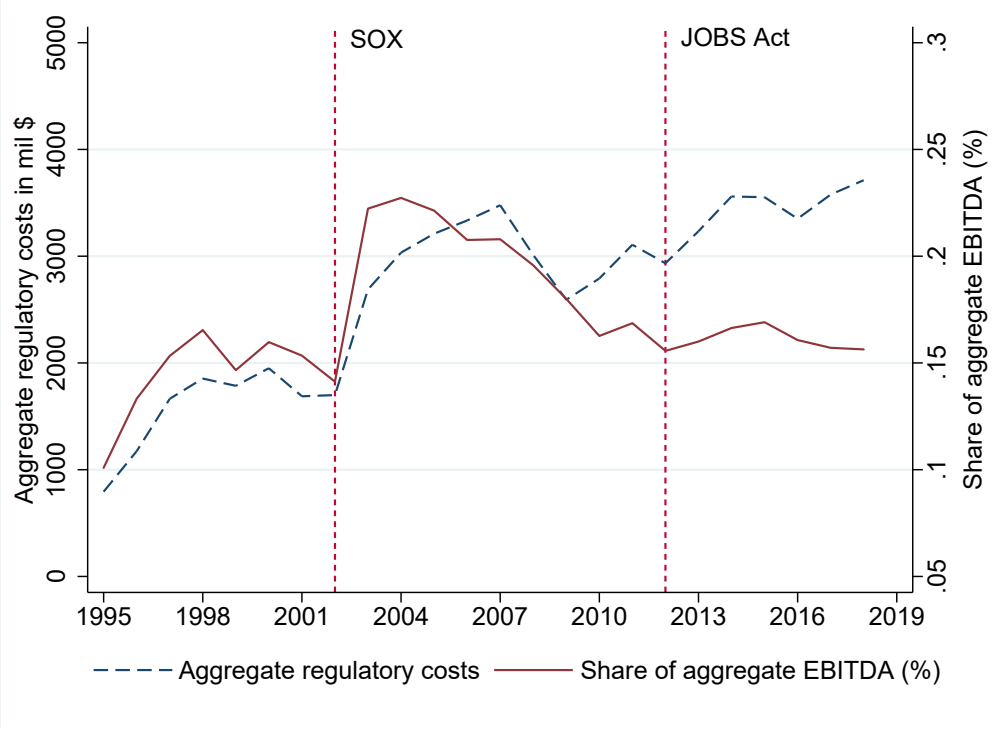
(a) Firms with public age<=5



(b) Firms with public age>5

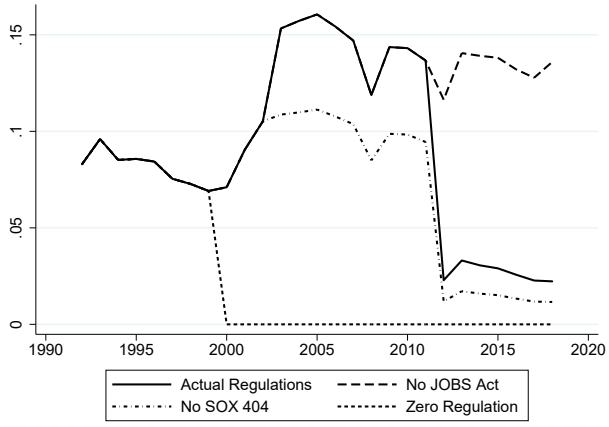
These figures show, by public float and year, the estimated total regulatory costs scaled by firms' EBITDA. Panel A shows it for firms that went public less than 5 years ago. Panel B shows it for firms that went public more than 5 years ago.

Figure 6: Estimated Aggregate Regulatory Costs

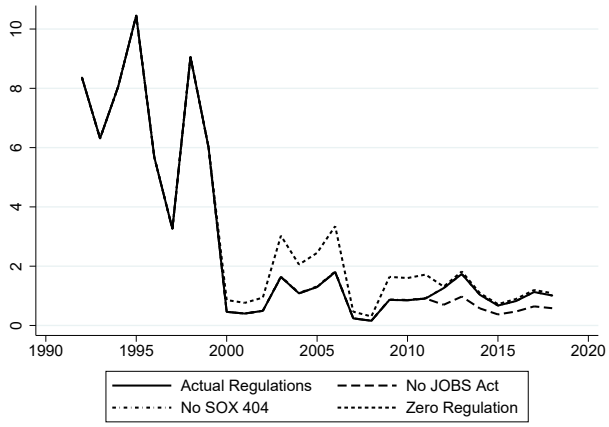


This figure shows the estimated aggregate regulatory costs over time for all public firms with a non-zero public float. The dashed line shows the dollar costs in millions of USD. The solid line shows the percentage share of aggregate regulatory costs relative to aggregate EBITDA.

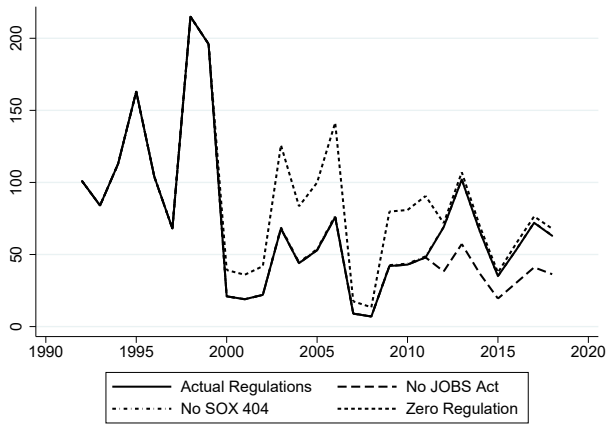
Figure 7: IPO Counterfactual Simulations



(a) Regulatory costs for potential IPO firms ($m)



(b) IPO likelihood



(c) Yearly no. of IPOs

These figures show counterfactual regulatory costs facing potential IPO firms (Panel A), IPO likelihood (Panel B), and the number of IPOs (Panel C) for four regulatory scenarios after 2000: 1) actual, 2) no JOBS Act, 3) no SOX 404, and 4) zero regulation costs. Estimations are based on the model in Table 6 and counterfactual regulation costs in Tables A.5 and A.6.

Table 1: Summary of Regulatory Thresholds

Panel A: Key Public Float Thresholds

Time period	Scaled Disclosure	Non-accelerated filer (NAF)	Exempt from SOX Section 404	Emerging Growth Company (EGC)
1992–2002	< \$25 mil			
2003–2007	< \$25 mil	< \$75 mil	< \$75 mil	
2008–2011	< \$75 mil	< \$75 mil	< \$75 mil	
2012–2018	< \$75 mil	< \$75 mil	< \$75 mil	< \$700 mil

Panel B: Public Float Intervals and Associated Regulatory Benefits

Time Period	< 25 mil	25–75 mil	75–700 mil	> 700 mil	Binding Thresholds
1992–2002	Scaled disclosure	N/A	N/A	N/A	25 for SD
2003–2007	Scaled disclosure + filing delay + 404 exempt	filing delay + 404 exempt	N/A	N/A	25 for SD 75 for 15d+404
2008–2011	Scaled disclosure + filing delay + 404 exempt		N/A	N/A	75 for SD+delay+404
2012–2018	Scaled disclosure + filing delay + 404 exempt + EGC benefits		EGC benefits	N/A	75 for SD+delay+404 700 for EGC

This table summarizes regulatory thresholds used in our paper. Panel A presents the time-varying threshold for each type of regulatory benefits. Panel B summarize the set of regulatory benefits enjoyed by firms in each public float interval. The last column of Panel B summarizes key exploitable thresholds in each time period and the associated benefits each threshold identifies.

Table 2: How Firms Manipulate Public Float

Dep. var.	*Book leverage* (1)	*Investment1* (2)	*Investment2* (3)	*Investment3* (4)	*Non-aff. own.* (5)
			Panel A. $25m threshold		
Below $25m × Bunching years	0.119*	0.019	0.019	0.025	-0.012
	[0.058]	[0.026]	[0.027]	[0.034]	[0.049]
Year FE and SIC2 FE	Yes	Yes	Yes	Yes	Yes
N	1593	1463	1456	1389	800
Adj. R-sq	0.430	0.187	0.226	0.261	0.083
Mean of dep. var.	0.247	0.059	0.132	0.197	0.746
			Panel B. $75m threshold		
Below $75m × Bunching years	0.011**	-0.005	-0.008	-0.010	-0.021
	[0.005]	[0.007]	[0.007]	[0.010]	[0.015]
Year FE and SIC2 FE	Yes	Yes	Yes	Yes	Yes
N	3788	3675	3651	3470	2791
Adj. R-sq	0.511	0.329	0.397	0.397	0.22
Mean of dep. var. in level	0.171	0.051	0.096	0.140	0.724
			Panel C. $700m threshold		
Below $700m × Bunching years	0.068**	-0.012	-0.003	-0.007	-0.016
	[0.029]	[0.014]	[0.025]	[0.035]	[0.017]
Year FE and SIC2 FE	Yes	Yes	Yes	Yes	Yes
N	235	233	227	227	200
Adj. R-sq	0.688	0.585	0.5	0.526	0.370
Mean of dep. var.	0.193	0.074	0.142	0.202	0.758

This table examines how firms manipulate public float around regulatory thresholds. Specifically, we compare book leverage, investment, and non-affiliated ownership between firms just above and those just below the threshold, in bunching and non-bunching years. The three panels correspond to samples around the $25M, $75M, and $700M thresholds, respectively. *Book leverage* is total debt divided by total assets; *Investment*1 is capex divided by lagged total assets; *Investment*2 is (capex + R&D) divided by lagged (total assets + knowledge capital); *Investment*3 is (capex + R&D + γ*SG&A) divided by lagged (total assets + knowledge capital + organizational capital), where γ, knowledge capital, and organizational capital are from Ewens et al. (2020); *Non-aff. own.* is the fraction of shares held by public investors. Samples in the top (middle) (bottom) panel focuses on firms with a public float between $20M and $30M ($60M and $90M) ($630M and $770M). Bunching and non-bunching years are defined in Table 3. All panels include year fixed effects, industry (2-digit SIC) fixed effects, and the lagged dependent variable in year $t-1$. Robust standard errors clustered by industry and year are in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

Table 3: Bunching Estimates of Regulatory Costs

Threshold	\$ 25 mil (1)	\$ 75 mil (2)	\$ 700 mil (3)
		Panel A. Estimates	
Marginal firm ($\overline{e}$) (\$m)	27.044	94.493	838.313
	[0.283]	[2.380]	[5.349]
Regulatory costs (k) (\$m)	0.026	0.122	0.713
	[0.006]	[0.025]	[0.049]
PV(regulatory costs)/Firm value (%)	0.622	0.725	0.772
	[0.153]	[0.147]	[0.053]
Non-bunching fraction (α)	0.480	0.780	0.530
	[0.119]	[0.047]	[0.114]
Δ Leverage	0.056	0.108	0.073
	[0.008]	[0.013]	[0.003]
		Panel B. Parameters	
Public float/Assets (η) (%)	2.000	0.880	1.572
Tobin's Q (q)	2.720	1.680	3.570
Interest rate (r)	0.115	0.093	0.049
		Panel C. Samples	
Bunching sample	1994-2007	2003-2007	2012-2018
Non-bunching sample	2009-2018	1994-2002	1997-2011
Identified regulation	Scaled disclosure	SOX 404+ filing delay	EGC benefits

This table presents the bunching estimation results. *Marginal firm* is the public float of the firm that is indifferent between bunching and not bunching. *Regulatory costs* are the estimated annual costs of regulation k. Regulatory costs are in \$ million. *PV(regulatory costs)/Firm value* is the percentage of the present value of all the future regulatory costs over the total firm value. Bootstrapped standard errors are reported in brackets.

Table 4: Benchmarking Estimated Regulatory Costs

Threshold	$ 25 mil (1)	$ 75 mil (2)	$ 700 mil (3)
Regulatory costs (k)	0.026	0.122	0.713
Identified regulations	Scaled disclosure	SOX 404 + filing delay	EGC benefits
Total assets	14.67	126.39	556.74
EBITDA	0.33	9.31	31.05
Net income	-0.73	1.94	10.00
k/Total assets	0.18%	0.10%	0.13%
k/EBITDA	7.78%	1.31%	2.30%
k/Net income	-3.58%	6.29%	7.13%

This table benchmarks the estimated annual regulation costs k against the marginal bunching firms' total assets, EBITDA, and net income. All numbers are in millions of USD except percentages.

Table 5: Cost Structure Estimation

Panel A: SOX 404 Compliance Costs from SEC Survey

	404(b) audit	Internal labor	Non-labor	Outside labor	Total
	(1)	(2)	(3)	(4)	(5)
Public float (in $mil))	0.432***	0.519***	0.355***	0.337***	0.456***
	[0.014]	[0.032]	[0.018]	[0.023]	[0.028]
Intercept	10.476***	10.516***	9.467***	10.365***	11.554***
	[0.089]	[0.200]	[0.115]	[0.145]	[0.176]
Period FE	Yes	Yes	Yes	Yes	Yes
N	12	12	12	12	12
Adj. R-sq	0.813	0.85	0.946	0.833	0.852
Dep. var. mean	13.2	13.8	11.7	12.5	14.4

Panel B: Audit Fees from Audit Analytics

	Pre-SOX		Post-SOX	
	Audit fees	Total fees	Audit fees	Total fees
	(1)	(2)	(3)	(4)
Public float (in $mil)	0.412***	0.524***	0.423***	0.434***
	[0.027]	[0.027]	[0.019]	[0.019]
Intercept	4.393***	2.964***	5.091***	5.058***
	[0.562]	[0.580]	[0.354]	[0.347]
Year FE	Yes	Yes	Yes	Yes
N	6836	6783	60889	60995
Adj. R-sq	0.426	0.469	0.616	0.624
Dep. var. mean	12.4	13.1	13.3	13.5

This table estimates the cost structure of regulatory compliance costs by relating these costs to firm size, proxied by public float. All dependent and independent variables are log transformed from dollar values. Panel A presents the estimated relationship between firms' public float and self-reported SOX 404 compliance costs based on survey data from SEC (2009) and SEC (2011). Panel B presents the estimated relationship between firms' public float and audit fees from Audit Analytics. Columns 1-2 focus on the pre-SOX period during which audit fees only capture financial auditing costs. The sample includes all firm-years before 2002, except those who benefit from scaled disclosure (i.e. with less than $25 mil in public float). Columns 3-4 focus on the post-SOX period during which audit fees cover both financial auditing costs and internal control attestation costs. The sample includes all firm-years after 2002 except those who benefit from scaled disclosure or 404(b) exemption, i.e. those with less than $75 mil in public float between 2003 and 2011, and those with less than $700 mil in public float and age from IPO less than 5 years after 2012 (eligible for EGC status). Each observation is a size group-period in Panel A and a firm-year in Panel B. Standard errors are clustered by period in Panel A and are clustered by 2-digit SIC code in Panel B.

Table 6: Regulatory Costs and IPOs

	IPO	
	(1) Coefficients	(2) Marginal Effects
Regulatory costs (ln)	-0.05607***	-0.00021***
	[0.01671]	[0.00006]
Imputed public float (ln)	0.23825***	0.00089***
	[0.02493]	[0.00011]
Total funding raised (ln)	0.87704***	0.00328***
	[0.03149]	[0.00015]
Years since founding	-0.06631***	-0.00025***
	[0.00833]	[0.00003]
Industry-Year FE	Yes	Yes
State FE	Yes	Yes
Observations	110,666	110,666

This table estimates a logit model of the IPO decision on a panel of VC-backed private firms. The sample is a panel of 21,066 VC-backed firms from first VC round to the year before exit or failure from 1992 to 2018. Columns 1 and 2 present the logit coefficients and the marginal effects, respectively. *Regulatory costs* is the compliance costs estimated from Table 3 and extrapolated to all firm sizes. *Imputed public float* is the implied valuation based on the most recent round of VC financing. *Total funding raised* is the cumulative sum of funding raised from VC. We control for state and year fixed effects. Standard errors are clustered by firm.

Table 7: Counterfactual Simulation of Regulatory Costs and IPOs

	Actual regulation (1)	Actual regulation (2)	No SOX (3)	No JOBS Act (4)	Zero regulation (5)
	Pre-2000	Post-2000			
Regulatory costs ($m)	0.079	0.085	0.061	0.132	0.000
Regulatory costs / Public float (%)	0.509	0.274	0.266	0.509	0.000
IPO probability (%)	6.933	0.954	0.961	0.744	1.399
Yearly no. of IPOs	141.4	50.2	50.5	37.5	70.6
Total no. of IPOs	1044.0	912.0	918.5	711.4	1337.9
Total IPO public float ($b)	105.5	339.4	347.5	314.0	572.6

Column 1 shows the actual IPO outcomes before 2000 and columns 2 to 5 show counterfactual IPO outcomes under different regulatory scenarios after 2000. *Actual regulation* is the baseline scenario based on actual regulations. *No SOX* estimates are based on regulatory costs without SOX (see Panel B of Table A.6). *No JOBS Act* estimates are based on regulatory costs without JOBS Act (see Panel A of Table A.6). *Zero regulation* estimates are based on zero regulatory costs after 2000. *Regulatory costs* is the average annual regulatory costs facing potential IPO firms (i.e., VC-backed firms) in the corresponding period. *Regulatory costs / Public Float* is the average ratio of annual regulatory costs relative to public float for a potential IPO firm in the corresponding period. *IPO probability* is the average predicted probability that a potential IPO candidate will go public in the corresponding period. *Yearly no. of IPOs* is the average yearly predicted total number of IPOs, obtained by summing up predicted IPO probabilities withing each year and take the yearly average over the corresponding period. *Total no. of IPOs* is the predicted total number of IPOs, obtained by summing up predicted IPO probabilities across the sample in the corresponding period. *Total IPO public float* is the predicted aggregate public float of IPO firms over the corresponding period, obtained by weighted summing the public float of potential IPO firms weighted by IPO probabilities.

Table 8: Regulatory Costs and Going Private Transactions

	Going Private	
	(1)	(2)
	Coefficients	Marginal Effects
Regulatory costs (ln)	-0.0422	-0.0003
	[0.0294]	[0.0002]
Public float (ln)	-0.1546***	-0.0010***
	[0.0195]	[0.0002]
Leverage	0.5919***	0.0038***
	[0.1276]	[0.0009]
Total assets (ln)	0.0117	0.0001
	[0.0288]	[0.0002]
ROA	0.6926***	0.0044***
	[0.1418]	[0.0009]
Investment-to-assets	-0.6522	-0.0042
	[0.4899]	[0.0031]
Sales growth	-0.3860***	-0.0025***
	[0.0991]	[0.0006]
M/B	-0.0141**	-0.0001**
	[0.0057]	[0.0000]
Stock return	-0.2915***	-0.0019***
	[0.0677]	[0.0004]
No. of analysts (ln)	-0.1631*	-0.0010*
	[0.0834]	[0.0005]
Institutional ownership	-1.1131***	-0.0071***
	[0.2513]	[0.0016]
Industry-Year FE	Yes	Yes
State FE	Yes	Yes
Observations	43,437	43,437

This table estimates a logit model of going private decisions on a panel of public firms from 1995 to 2017. The sample includes 674 firms that went private during our sample period and 3,543 firms that were public as of 2018. The dependent variable is a dummy equal to one if a firm goes private in the next year. Columns 1 and 2 present the logit coefficients and the marginal effects, respectively. *Regulatory costs* is the compliance costs estimated from Table 3 and extrapolated to all firm sizes. We control for industry (SIC 1-digit)-year fixed effects and state fixed effects. Standard errors are clustered by firm.

Appendix

A.1 Data and Institutional Details

A.1.1 Public Float Data

The regulations we study all use public float to determine eligibility. Under the Securities Exchange Act of 1934, this number is required to be precisely disclosed on the fist page of firms' 10-K filings. Formally, public float is defined as the aggregate worldwide market value of a firm's voting and non-voting common equity held by non-affiliates (i.e., large shareholder or top management).[44] It is computed by multiplying the aggregate worldwide number of shares of voting and non-voting common equity held by non-affiliates by the price at which the common equity was last sold, or the average of the bid and asked prices of the common equity, in the principal market for the common equity.

Before 2002, public float was computed within 60 days of their filing date in accordance with the SEC RIN 3235-AG82.[45] Since the introduction of accelerated filing in 2002 (SEC RIN 3235-AI33), all companies except small business issuers are required to compute public float as of the last business day of a firm's most recently completed second fiscal quarter.[46] This amendment was to give companies enough time to prepare for a potential change in filing status. In particular, a company will be able to determine its public float by looking back at the last business day of its most recently completed second fiscal quarter. This allows companies to know further in advance whether they will become an accelerated filer at the end of their fiscal year and allow them to begin making the appropriate preparations.

We scrape public float information from firms' 10-K filings (including 10-KSB, 10-KT, and 10-K405) using a proprietary Python script custom developed for us. This script locates the sentence disclosing public float using keywords and formatting syntax. The script was adjusted to account for different reporting formats over different time periods. We also extract the date on which public float was computed. We then manually check the scraped numbers against the original

[44] Rule 405 defines an affiliate as a "person that directly, or indirectly through one or more intermediaries, controls, is controlled by, or is under common control with," an issuer. The term "control" is defined in Rule 405 under the Act as "the possession, direct or indirect, of the power to direct or cause the direction of the management and policies of a person, whether through the ownership of voting securities, by contract, or otherwise."

[45] `https://www.sec.gov/rules/final/33-7419.txt`

[46] `https://www.sec.gov/rules/final/33-8128.htm`

filings to verify the accuracy of our data and to further correct a small number of idiosyncratic discrepancies. To the best of our knowledge, this is the largest sample of public float data collected in the literature.

A.1.2 Potential Lobbying and Anticipation of Regulations

Scaled Disclosure and Small Business Issuer. The history of this rule change provides no evidence that the impacted companies significantly lobbied for the new rules well before enactment or during the comment period. The discussion about the changes began in early 1992 when the SEC proposed "Small business initiative." In fact, the SEC itself proposed legislation to both the House and Senate called the Small Business Incentive Act of 1992. The Act[47] was never passed, but the SEC used its power to update the regulations in the spirit of this act. As with all rule changes, the SEC had an open comment period. In response to the comments, the SEC increased the original revenue threshold but otherwise "Regulation S-B is adopted in substantially the same form as proposed." (SEC, 1992, p. 13)

Non-accelerated Filer. Our study of this rule change's history does not show that any of the firms directly effected lobbied for the change, nor were there specific firms or firm types targeted. It was not implemented in response to legislation and instead stemmed from a standard rule-making change the SEC often performs. The SEC proposed the rule first in 1998, but only in April 2002 was the final rule proposal presented to the public. The rule received over 300 public comments from a range of investors and advocacy groups. The SEC's assessment of these comments was general disapproval:

> Most of these commenters believed that any incremental benefit from the speed and extent of acceleration proposed was insufficient to warrant the added burdens on registrants and the risk of diminished disclosure quality, although these commenters generally did not analyze the benefits from the perspective of users of the reports. [...] The most common concern was that the proposed deadlines would negatively affect the quality and accuracy of reports. [...] According to one professional association, two-thirds of its survey respondents expected a reduction in the precision of reported information under the original proposals.

In response to these comments, the SEC lengthened the disclosure windows for annual reports

[47] See `https://www.congress.gov/bill/102nd-congress/house-bill/4938?s=1&r=25`

from an original 60 to 75 days and 30 to 35 days for quarterly reports. The fundamental condition of the accelerated filer definition based on public float did not change and in fact was an artifact of the $75m float threshold implemented in an amendment to the Form S-3 registration in 1992 (Register, 1993).

Emerging Growth Companies. The timeline of the JOBS Act proposal to passage reveals no concerns regarding endogenous timing. The Act was born out of a host of bills passed by the House in November 2011 (e.g. Small Company Capital Formation (H.R. 1070) and Entrepreneur Access to Capital (H.R. 2930)). The Senate followed the passage of one of the House bills with their own proposals focused on crowdfunding. Each sat in the Senate Banking Committee until March 2012. Only in December 2011 did the ECG features emerge in a bill in the House. In March 2012, all the previously passed bills were consolidated into the JOBS Act, which was signed into law in April 2012. We found no evidence of previous attempts to pass this collection of laws.

A.1.3 Smaller Reporting Companies

Another major regulatory change is the introduction of the "smaller reporting company" SRC in 2008 (SEC, 2008b). Originally proposed in 2005, this new category of registered companies had their own scaled disclosure rules. This rule change was a simplification and consolidation of the scaled disclosure regime and Regulation S-B passed in 1992 (see Section 1.2.1). The simplification came in two parts. First, the SEC eliminated all the "SB" filings such as 10-KSB and SB-1s. Next, the commission moved 12 non-financial scaled disclosure requirements from Regulation S-B into the existing Regulation S-K (e.g. executive compensation, use of proceeds, description of business, etc.). Companies with less than $75m public float and $50m in revenue had the option to label themselves a smaller reporting company and selectively disclose the 12 items.[48] Among many limited disclosure options, such reporting companies need only provide 3 (rather than 5) years of business development activities, only provide compensation information on the CEO and two top-paid executives and produce only three of the seven compensation tables required of larger reporting companies. Smaller reporting companies had less stringent disclosure rules about policies for related party transactions.

[48] See Table A.1 for the list of scaled disclosure items. Item 404 of Regulation S-K is the only place where the scaled requirements can be more rigorous for SRC than for larger companies.

This SEC rule change (not legislation) was the part of a multi-year initiative "to provide responsive solutions addressing the special characteristics and needs of smaller companies and their investors."[49] This longer term feature of the rule change mitigates concerns about any lobbying on behalf of the affected firms.

In its report on the rule change, the SEC argued that there would be significance savings in lower compliance costs for smaller reporting companies. The SEC calculated that among those eligible firms that choose to because such a reporting company, the average firm will save over $60,000/year in "internal burden hours and costs."[50] Besides these quantifiable costs, the SEC believed that investors in smaller reporting companies may struggle with determining whether a particular firm has changed its information disclosure. As with the other rule changes, the SEC expected benefits such as streamlining regulation, reducing investor confusion about firm reporting type and "providing flexibility to [...] smaller reporting companies to tailor their disclosure to their investors' needs" would weigh against these costs.

[49] See `https://www.sec.gov/rules/final/2007/33-8876.pdf`

[50] The SEC writes:

> We assume that approximately 50% of the 1,581 companies (or 790 companies) will use the scaled disclosure requirements. For purposes of the Paperwork Reduction Act, we estimate that these 790 smaller reporting companies may save 356,290 internal burden hours and costs in the amount of $47,479,000 by using the scaled disclosure requirements.

A.2 Estimate Leverage Distortion Cost Based on Korteweg (2010)

This section discusses an alternative approach to translate the extent of bunching to the regulatory cost based on Korteweg (2010). Korteweg (2010) estimates the net benefits to debt financing as a fraction of firm value as the following function of leverage L:

$$NetBenefits(L) = a \times L^2 + b \times L + c \tag{12}$$

where a, b, and c are linear functions of several covariates of the marginal bunching firm, which we list in Panel B of Table A.13. Korteweg (2010) estimates the parameters of the above model using a Markov Chain Monte Carlo (MCMC) method and obtains the following results (based on column 4 of his Table III): $a = -0.346 - 0.203PROF + 1.655DEPR - 0.184VOL + 0.149PPE - 0.063MB - 0.052D\_RECESS - 0.006LN(TA)$, $b = 0.143 + 0.539PROF - 1.940DEPR - 0.086VOL + 0.353PPE + 0.002MB - 0.037D\_RECESS - 0.003LN(TA)$, and $c = -0.012 + 0.150PROF - 0.288DEPR - 0.075VOL + 0.078PPE - 0.001MB + 0.004D\_RECESS + 0.001LN(TA)$, where $PROF$ is EBITDA over sales, $DEPR$ is depreciation over book assets; VOL is the standard deviation of $PROF$ growth; PPE is property, plant, and equipment divided by book assets; MB is equity market capitalization divided by book equity; D_RECESS is a dummy indicating NBER recession; $LN(TA)$ is the natural logarithm of total assets in millions; and L is the leverage ratio (i.e., net debt divided by the sum of net debt and market value of equity), bounded below by zero. We calibrate these covariates to the marginal firms and their values can found in Panel B of Table A.13.

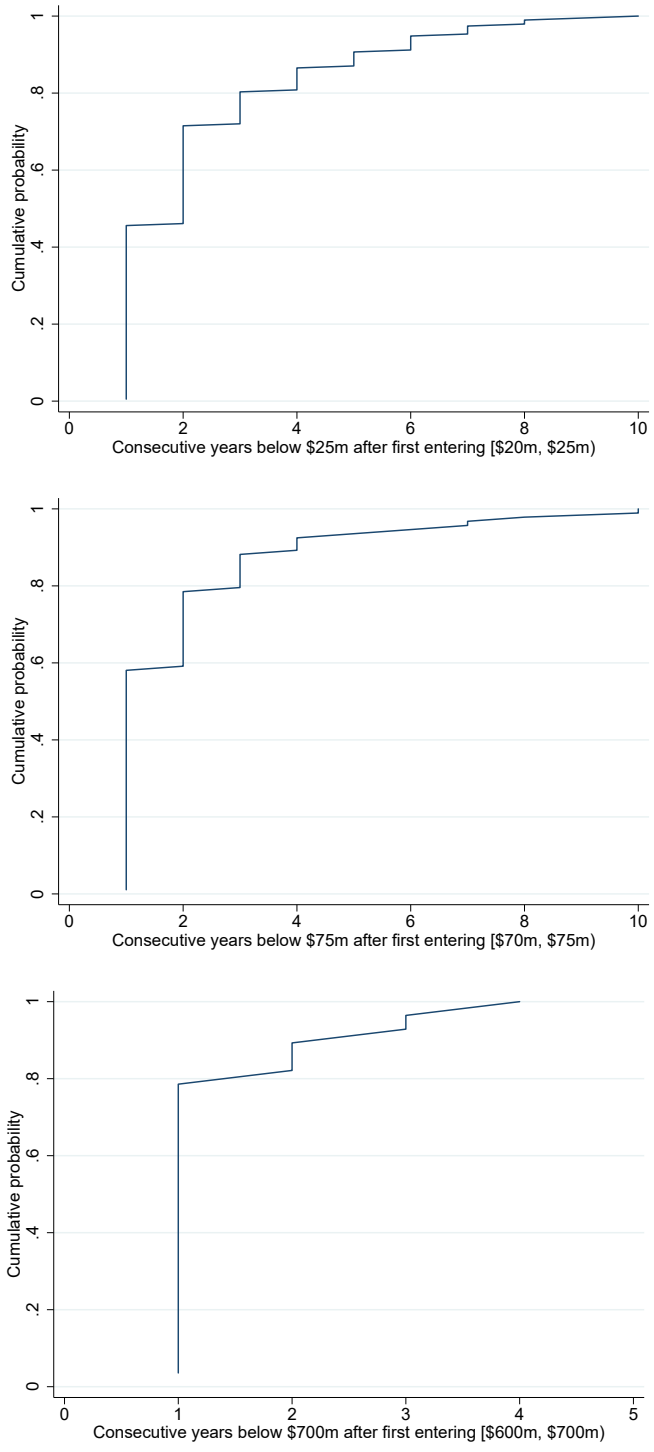
The regulatory cost as a fraction of firm value is given by the leverage distortion cost of the marginal bunching firm:

$$\frac{k}{v} = NetBenefits(L^*) - NetBenefits\left(L^* + \frac{\Delta e}{v}\right), \tag{13}$$

where $L^* \equiv max(0, -\frac{b}{2a})$ is the optimal leverage, and $\frac{\Delta e}{v}$ is the distortion in leverage when the marginal firm bunches at the regulatory threshold.

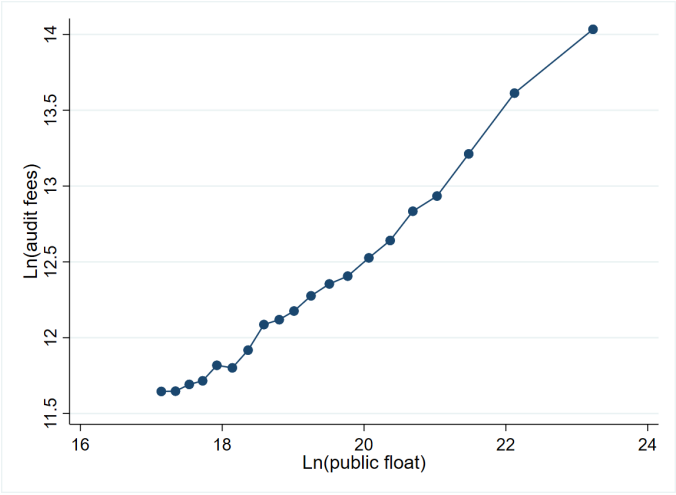
A.3 Appendix Figures and Tables

Figure A.1: Distribution of the Number of Years Firms are Consistently Below Threshold

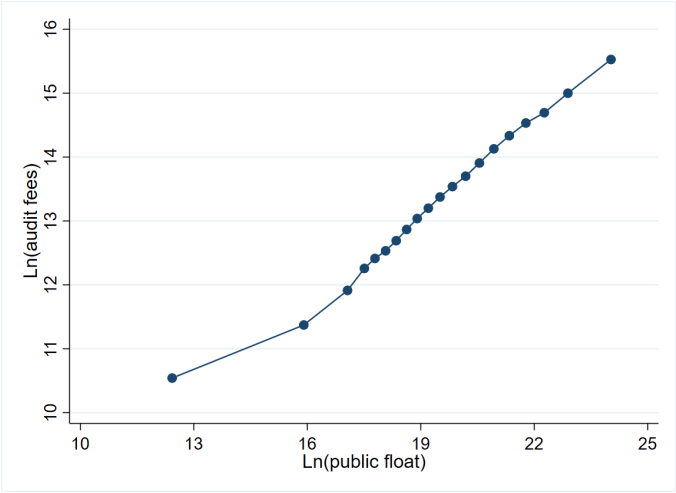


These figures show the cumulative probability function for the number of years firms are consistently below a threshold, after they first enter a small range below the threshold during bunching years.

Figure A.2: Non-Parametric Relationship Between Audit Fees and Public Float



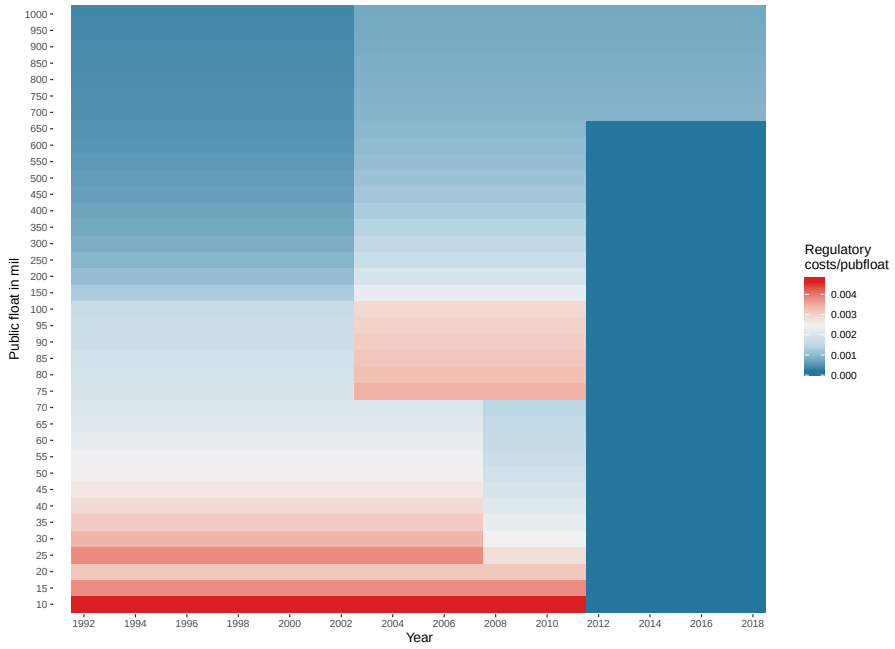
(a) ln(audit fees) and ln(public float) before SOX



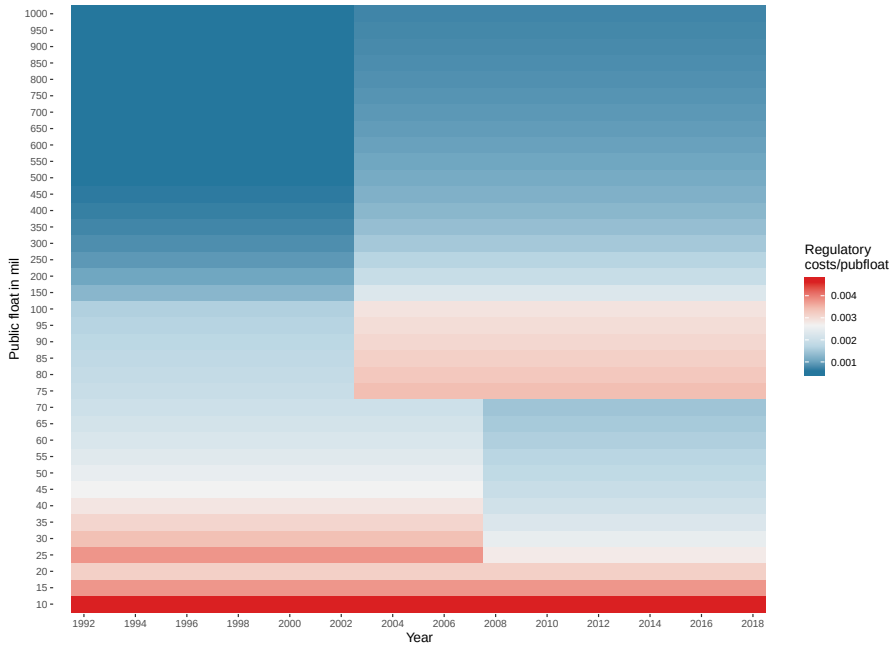
(b) ln(audit fees) and ln(public float) after SOX

These figures show the non-parametric bin-scatter relationship between log audit fees and log public float for both the pre-SOX and the post-SOX periods, removing year fixed effects. Firm-years that are eligible for scaled disclosure, 404(b) exemption, or EGC status are excluded.

Figure A.3: Estimated Regulatory Costs Scaled by Public Float



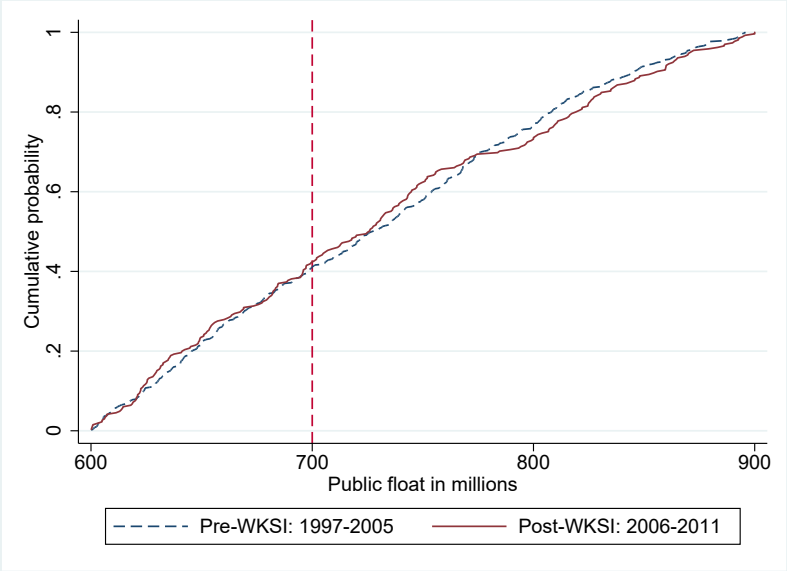
(a) Firms with public age<=5



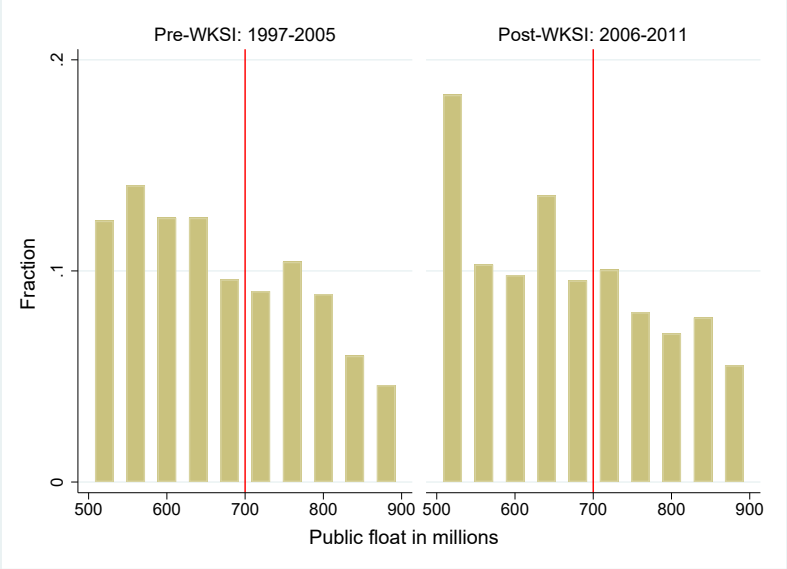
(b) Firms with public age>5

These figures show, by public float and year, the estimated total regulatory costs scaled by firms' public float. Panel A shows it for firms that went public less than 5 years ago. Panel B shows it for firms that went public more than 5 years ago.

Figure A.4: Did WKSI Trigger Bunching Above $700m Threshold?



(a) CDF of float around $700m for newly public firms



(b) Histogram of float around $700m for newly public firms

This figure shows the histogram (Panel A) and CDF (Panel B) of firms' public float around the $700m threshold for firms with public age less than 5 years old. The pre-WKSI period corresponds to years before WKSI ("Well-Kown Seasoned Issuers") was introduced in December 2005. The post-WKSI period corresponds to years after WKSI was introduced but before JOBS Act in 2012.

Table A.1: Scaled Disclosure Items

Reg S-K Items:	
Item 101	Description of business
Item 105	Risk factors
Item 201	Market price of and dividends on registrant's common equity and related stockholder matters
Item 301	Selected financial data
Item 302	Supplementary financial information
Item 303	Management's discussion and analysis of financial condition and results of operations
Item 305	Quantitative and qualitative disclosures about market risk
Item 402	Executive compensation
Item 404	Transactions with related persons, promoters and certain control persons
Item 407	Corporate governance
Item 503	Prospectus summary, risk factors, and ratio of earnings to fixed charges
Item 504	Use of proceeds
Item 601	Exhibits
Reg S-X Items:	
	Shorter financial history
	Relaxed requirement on pro forma and interim financial statements

This table presents the scaled disclosure items for small business issuers (1992-2007) and small reporting companies (2008-). These companies may choose to comply with scaled or non-scaled financial and non-financial item requirements on an item-by-item basis in any one filing. Where the scaled reporting requirement is more rigorous, however, the company must meet the more rigorous standard. Item 404 of Regulation S-K is the only place where the scaled requirements can be more rigorous than the larger company standard. Source: SEC (2008a)

Table A.2: SBI Scaled Disclosure: Impact on 10-K and DEF14A File Size

	10-K size	Part I length	Part II length	Part III length	Part IV length	DEF14A size
	(1)	(2)	(3)	(4)	(5)	(6)
SBI	-0.141***	-11.187***	-9.637***	71.688***	-82.709***	-0.041***
	[0.014]	[1.337]	[1.611]	[3.534]	[2.833]	[0.005]
Public float ($m)	0.008***	0.574***	0.332***	2.110***	0.285*	0.001***
	[0.001]	[0.079]	[0.096]	[0.267]	[0.162]	[0.000]
Ln(sales)	0.031***	0.810	2.954***	0.729	4.765***	-0.002
	[0.007]	[0.644]	[0.770]	[2.048]	[1.187]	[0.003]
Leverage	0.036***	0.715	3.970***	15.419***	6.303***	-0.000
	[0.013]	[1.037]	[1.346]	[3.512]	[2.343]	[0.008]
Sales growth	-0.000	1.105	0.251	7.749***	-2.292	-0.007
	[0.009]	[0.738]	[0.849]	[2.867]	[1.453]	[0.005]
ROA	-0.003	0.096	0.087	-1.630**	-0.513	-0.003*
	[0.002]	[0.172]	[0.210]	[0.717]	[0.313]	[0.002]
NPPE/Assets	-0.039	-0.373	-2.310	-9.154	0.367	-0.029**
	[0.028]	[2.618]	[3.179]	[8.450]	[4.861]	[0.013]
Dep. var. mean	0.508	50.4	49.4	46.5	103.3	0.162
SIC2 FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,883	10,883	10,883	10,883	10,883	6,424

This table compares the size or length of 10-K and DEF14A (proxy statement) filed by SBI and non-SBI firms. Columns 1 and 6 examine file size (in MBs), and columns 2 to 5 examine the length of Parts I to IV of 10-K (string length removed of html and line breaks, scaled by 1000). SBI filers are identified by 10-KSB filings and non-SBI filers are identified by 10-K filings. The sample focuses on the common support where both SBI and non-SBI filers exist: firms with less than $25m float and less than $25m sales between fiscal years 1993 and 2007. All columns control for industry (SIC 2-digit) fixed effects and year fixed effects. Standard errors are clustered by firm.

Table A.3: Major, Non-Threshold Based Regulations

Regulation Name	Year
Regulations on public firms	
Rule 415 (Shelf Registration)	1982
Introduction of Edgar	1993
Ownership Reports and Trading by Officers, Directors and Principal Security Holders	1996
Amendments to Rules on Shareholder Proposals	1998
Amendments to Beneficial Ownership Disclosure	1998
Regulation of Takeovers and Security Holder Communications	1999
Amendments to Rule 9b-1 Relating to the Options Disclosure Document	2000
Selective Disclosure and Insider Trading	2000
Reg FD	2000
FASB ends pooling of interests accounting	2001
Revised Accounting Independence Rule	2000
Option expensing	2004
Regulation National Market System	2005
Regulations on private firms	
Regulation D	1982
Increased asset threshold for exempt from registration from $5m to $10m	1996
National Securities Markets Improvement Act (NSMIA)	1996

This table presents the time line of other major, non-threshold based regulations not considered in our paper.

Table A.4: Other Impacts of Regulatory Avoidance on Firms

Dep. var.	*ln(total payout)* (1)	*ln(total assets)* (2)	*PPE/ assets* (3)	*Sales/ assets* (4)	*Gross profit/ assets* (5)	*Bad news in Q2* (6)	*Bad news in Q3* (7)
				Panel A. $25m threshold			
Below $25m × Bunching years	0.075*	-0.032	-0.012	0.053	0.000	0.019***	0.024
	[0.041]	[0.069]	[0.011]	[0.076]	[0.031]	[0.003]	[0.047]
Year FE and SIC2 FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1603	1603	1566	1589	1582	998	1004
Adj. R-sq	0.401	0.884	0.755	0.469	0.402	0.012	0.008
				Panel B. $75m threshold			
Below $75m × Bunching years	0.039*	-0.02	0.006	0.044	0.018	0.037**	0.02
	[0.022]	[0.051]	[0.005]	[0.034]	[0.021]	[0.016]	[0.024]
Year FE and SIC2 FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3499	3499	3418	3489	3485	2824	2869
Adj. R-sq	0.487	0.912	0.872	0.782	0.613	0.024	0.053
				Panel C. $700m threshold			
Below $700m × Bunching years	0.207*	-0.060	0.013	0.014	0.024	0.122**	0.051
	[0.109]	[0.077]	[0.027]	[0.079]	[0.059]	[0.058]	[0.065]
Year FE and SIC2 FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	235	235	216	235	235	238	244
Adj. R-sq	0.681	0.886	0.868	0.665	0.657	0.021	0.029

This table examines other impacts of regulatory avoidance on firms. Column 1 confirms that firms reduce public float by increasing total payout (dividends plus repurchases). Columns 2-5 examine whether firms manipulate by changing operations such as total assets, tangibility, asset turnover, or ROA. Columns 6-7 examine whether firms manipulate public float by strategically releasing bad news in Q2 before calculating float, but not so in Q3. *Bad news* is the fraction of news released in the 2nd (or 3rd) fiscal quarter that has a RavenPack sentiment score below 50. RavenPack event sentiment score has a value between 0 and 100, with 50 indicating neutral sentiment and higher values indicating more positive news. The score is determined by systematically matching stories categorized by financial experts as having a positive or negative impact, which is then fed into RavenPack's proprietary algorithm. The specifications and samples are the same as those in Table 2. Robust standard errors clustered by industry and year are in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

Table A.5: Total Regulatory Costs

Time Period	<25 mil	25–75 mil	75–700 mil	>700 mil
1992–2002	ER	ER+SD	ER+SD	ER+SD
2003–2007	ER	ER+SD	ER+SD+404+delay	ER+SD+404+delay
2008–2011	ER	ER	ER+SD+404+delay	ER+SD+404+delay
2012–2018 & public age>5	ER	ER	ER+SD+404+delay	ER+SD+404+delay
2012–2018 & public age<=5	0	0	0	ER+SD+404+delay

This table aggregates the different types regulatory costs we identify in the paper by time period and public float interval. It is derived from Table 1. 404(b) denotes the costs of SOX 404(b) compliance; 15d denotes the cost of filing 10-K and 10-Q 15 days earlier; SD denotes the costs of full disclosure relative to scaled disclosure; ER denotes residual costs from losing EGC benefits not covered by 404(b), 15d, or SD: 1) shorter financial history in registration statement, 2) delay in compliance with new accounting standards, and 3) the ability to use test-the-waters communications with institutional investors when issuing securities. Therefore we have, total costs of losing all EGC benefits EGC=ER+SD+404(b)+15d.

Table A.6: Total Regulatory Costs: Counterfactuals

Panel A: Without JOBS Act

Time Period	<25 mil	25–75 mil	75–700 mil	>700 mil
1992–2002	ER	ER+SD	ER+SD	ER+SD
2003–2007	ER	ER+SD	ER+SD+404+delay	ER+SD+404+delay
2008–2011	ER	ER	ER+SD+404+delay	ER+SD+404+delay
2012–2018	ER	ER	ER+SD+404+delay	ER+SD+404+delay

Panel B: Without SOX

Time Period	<25 mil	25–75 mil	75–700 mil	>700 mil
1992–2002	ER	ER+SD	ER+SD	ER+SD
2003–2007	ER	ER+SD	ER+SD+delay	ER+SD+delay
2008–2011	ER	ER	ER+SD+delay	ER+SD+delay
2012–2018 & public age>5	ER	ER	ER+SD+delay	ER+SD+delay
2012–2018 & public age<=5	0	0	0	ER+SD+delay

This table presents counterfactual versions of Table A.5 without JOBS Act (Panel A) and without SOX 404(b) (Panel B)

Table A.7: Alternative Bunching Period for the $75M Threshold

Threshold	$ 75 mil
	Panel A. Estimates
Marginal firm ($\overline{e}$) ($m)	97.414 [1.248]
Regulatory costs (k) ($m)	0.156 [0.015]
PV(regulatory costs)/Firm value (%)	0.902 [0.087]
Non-bunching fraction (α)	0.750 [0.040]
Δ Leverage	0.121 [0.007]
	Panel B. Parameters
Public float/Assets (η) (%)	0.880
Tobin's Q (q)	1.680
Interest rate (r)	0.093
	Panel C. Sample
Bunching sample	2008-2018
Non-bunching sample	1994-2012
Identified regulation	Filing delay + SOX 404 + Scaled discl.

This table presents the bunching estimation results for the $75m threshold using an alternative bunching period 2008 to 2018. *Marginal firm* is the public float of the firm that is indifferent between bunching and not bunching. *Regulatory costs* are the estimated annual costs of regulation k. Regulatory costs are in $ million. *PV/Firm value* is the percentage of the present value of all the future regulatory costs over the total firm value. Bootstrapped standard errors are reported in brackets.

Table A.8: Robustness: Excluding Financial and Utility Firms

Threshold	$ 25 mil (1)	$ 75 mil (2)	$ 700 mil (3)
		Panel A. Estimates	
Marginal firm ($\overline{e}$) ($m)	27.080	91.966	830.673
	[0.582]	[5.553]	[8.763]
Regulatory costs (k) ($m)	0.027	0.095	0.642
	[0.011]	[0.043]	[0.076]
PV(regulatory costs)/Firm value (%)	0.642	0.580	0.702
	[0.253]	[0.264]	[0.083]
Non-bunching fraction (α)	0.550	0.810	0.500
	[0.187]	[0.201]	[0.166]
Δ Leverage	0.056	0.097	0.069
	[0.016]	[0.032]	[0.005]
		Panel B. Parameters	
Public float/Assets (η) (%)	2.000	0.880	1.572
Tobin's Q (q)	2.720	1.680	3.570
Interest rate (r)	0.115	0.093	0.049
		Panel C. Samples	
Bunching sample	1994-2007	2003-2007	2012-2018
Non-bunching sample	2009-2018	1994-2002	1997-2011
Identified regulation	Scaled disclosure	SOX 404+ filing delay	EGC benefits

This table presents a robustness check of our main bunching estimation results by dropping financial or utility firms (SIC code 6000-6999 and 4900-4949). *Marginal firm* is the public float of the firm that is indifferent between bunching and not bunching. *Regulatory costs* are the estimated annual costs of regulation k. Regulatory costs are in $ million. *PV/Firm value* is the percentage of the present value of all the future regulatory costs over the total firm value. Bootstrapped standard errors are reported in brackets.

Table A.9: Robustness: Excluding Two Years Before Regulation Change

Threshold	\$ 25 mil (1)	\$ 75 mil (2)	\$ 700 mil (3)
		Panel A. Estimates	
Marginal firm ($\overline{e}$) (\$m)	26.835 [0.457]	95.374 [1.945]	838.133 [6.331]
Regulatory costs (k) (\$m)	0.021 [0.009]	0.132 [0.022]	0.711 [0.057]
PV(regulatory costs)/Firm value (%)	0.509 [0.210]	0.778 [0.128]	0.770 [0.061]
Non-bunching fraction (α)	0.370 [0.172]	0.760 [0.043]	0.540 [0.121]
Δ Leverage	0.050 [0.013]	0.112 [0.011]	0.073 [0.003]
		Panel B. Parameters	
Public float/Assets (η) (%)	2.000	0.880	1.572
Tobin's Q (q)	2.720	1.680	3.570
Interest rate (r)	0.115	0.093	0.049
		Panel C. Samples	
Bunching sample	1994-2005	2003-2007	2012-2018
Non-bunching sample	2009-2018	1994-2000	1997-2009
Identified regulation	Scaled disclosure	Sox 404+ filing delay	EGC benefits

This table presents a robustness check of our main bunching estimation results by dropping firm-years in the two years before a regulation change. *Marginal firm* is the public float of the firm that is indifferent between bunching and not bunching. *Regulatory costs* are the estimated annual costs of regulation k. Regulatory costs are in \$ million. *PV(regulatory costs)/Firm value* is the percentage of the present value of all the future regulatory costs over the total firm value. Bootstrapped standard errors are reported in brackets.

Table A.10: Robustness: Alternative Counterfactual Distribution

Threshold	$ 25 mil (1)	$ 75 mil (2)	$ 700 mil (3)
		Panel A. Estimates	
Marginal firm ($\overline{e}$) ($m)	26.708	92.694	820.222
	[0.506]	[4.064]	[27.337]
Regulatory costs (k) ($m)	0.019	0.102	0.550
	[0.009]	[0.035]	[0.168]
PV(regulatory costs)/Firm value (%)	0.445	0.621	0.609
	[0.208]	[0.212]	[0.186]
Non-bunching fraction (α)	0.450	0.820	0.670
	[0.154]	[0.099]	[0.167]
Δ Leverage	0.047	0.100	0.065
	[0.014]	[0.023]	[0.015]
		Panel B. Parameters	
Public float/Assets (η) (%)	2.000	0.880	1.572
Tobin's Q (q)	2.720	1.680	3.570
Interest rate (r)	0.115	0.093	0.049
		Panel C. Samples	
Bunching sample	1994-2007	2003-2007	2012-2018
Identified regulation	Scaled disclosure	SOX 404+ filing delay	EGC benefits

This table presents a robustness check of our main bunching estimation results using the counterfactual distribution constructed by fitting a smooth polynomial to the bunching sample excluding observations around the threshold. *Marginal firm* is the public float of the firm that is indifferent between bunching and not bunching. *Regulatory costs* are the estimated annual costs of regulation k. Regulatory costs are in $ million. *PV/Firm value* is the percentage of the present value of all the future regulatory costs over the total firm value. Bootstrapped standard errors are reported in brackets.

Table A.11: Robustness: Alternative Parameter Choices

Threshold	\$ 25 mil (1)	\$ 75 mil (2)	\$ 700 mil (3)
		Panel A. Estimates	
Marginal firm ($\overline{e}$) (\$m)	27.044	94.493	838.313
	[0.283]	[2.380]	[5.349]
Regulatory costs (k) (\$m)	0.030	0.120	0.872
	[0.007]	[0.024]	[0.060]
PV(regulatory costs)/Firm value (%)	0.510	0.750	0.767
	[0.125]	[0.153]	[0.052]
Non-bunching fraction (α)	0.480	0.780	0.530
	[0.119]	[0.047]	[0.114]
Δ Leverage	0.046	0.107	0.069
	[0.006]	[0.013]	[0.003]
		Panel B. Parameters	
Public float/Assets (η) (%)	1.684	0.920	1.445
Tobin's Q (q)	2.741	1.769	3.438
Interest rate (r)	0.133	0.088	0.057
		Panel C. Sample	
Bunching sample	1994-2007	2003-2007	2012-2018
Non-bunching sample	2009-2018	1994-2002	1997-2011
Identified regulation	Scaled disclosure	SOX 404+ filing delay	EGC benefits

This table presents a robustness check of our main bunching estimation results using firms *around* instead of above the float of the marginal bunching firm to obtain parameters q, η, and r. *Marginal firm* is the public float of the firm that is indifferent between bunching and not bunching. *Regulatory costs* are the estimated annual costs of regulation k. Regulatory costs are in \$ million. *PV(regulatory costs)/Firm value* is the percentage of the present value of all the future regulatory costs over the total firm value. Bootstrapped standard errors are reported in brackets.

Table A.12: Robustness: Local Estimates of the Marginal Cost of Debt

	$ 25 mil	$ 75 mil	$ 700 mil
	(1)	(2)	(3)
IOB	4.637***	5.130***	6.192***
	[2.937]	[3.970]	[3.317]
COL	-0.022***	-0.021***	-0.002
	[-3.239]	[-2.773]	[-0.282]
LTA_adj	-0.074**	-0.058**	-0.061**
	[-2.616]	[-2.571]	[-2.090]
BTM	0.015**	0.009	0.007
	[2.219]	[1.244]	[0.447]
INTANG	-0.026***	-0.023***	-0.025***
	[-3.342]	[-3.381]	[-3.410]
CF	0.059***	0.053***	0.036***
	[12.739]	[8.595]	[5.777]
DDIV	0.104***	0.075***	0.067***
	[5.176]	[5.973]	[5.236]
Observations	2,492	3,313	2,594

This table provides alternative estimates for the marginal cost of debt following Binsbergen et al. (2010) for subsample of firms around the three public float thresholds. The variable of interest is expenses over book value (IOB), whose coefficient β is used in our quantification of regulatory costs in equation(**??**). Each column uses a sub-sample of firms with public floats between 0.5 and 2 times of the corresponding threshold. The observed interest expenses over book value (IOB) is instrumented by the area under the marginal benefit curve (AREA). COL is a proxy for firms' collateralizable assets over total book assets, LTA is the log of total assets, BTM is the book-to-market ratio, INTANG is a proxy for firms' intangible assets over total book assets, CF is the cash flows over total book assets, and DDIV indicates whether the firm pays dividends LTCR indicates whether the firm has a S&P long-term debt rating, STCR indicates whether the firm has a S&P short-term debt rating, and CS is the spread between Moody's Baa rating and Moody's Aaa rating. All control variables, except DDIV, LTCR, and STCR are standardized to have mean zero and standard deviation one. DDIV, LTCR, and STCR are binary variables with values {0,1}. Robust, clustered standard errors are reported in parentheses. Standard errors are clustered by both firm and year as in Thompson (2009) and Petersen (2009). Significance at the 10% level is indicated by *, 5% level by **, and 1% level by ***.

Table A.13: Robustness: Cost of Leverage Distortion Based on Korteweg (2010)

Threshold	\$ 25 mil (1)	\$ 75 mil (2)	\$ 700 mil (3)
		Panel A: Estimates	
Marginal firm ($\overline{e}$) (\$m)	27.044	94.493	838.313
	[0.283]	[2.380]	[5.349]
PV(regulatory costs)/Firm value (%)	0.580	0.683	0.770
	[0.145]	[0.137]	[0.053]
Δ Leverage	0.056	0.108	0.073
	[0.008]	[0.013]	[0.003]
		Panel B: Parameters	
PROF	0.106	0.103	-0.266
DEPR	0.041	0.023	0.028
VOL	2.588	0.473	0.785
PPE	0.173	0.089	0.227
MB	5.679	2.249	5.224
D_RECESS	0.064	0.238	0.000
LN(TA)	2.990	4.768	6.639
		Panel C: Samples	
Bunching sample	1994-2007	2003-2007	2012-2018
Non-bunching sample	2009-2018	1994-2002	1997-2011
Identified regulation	Scaled disclosure	SOX 404+ filing delay	EGC benefits

This table demonstrates the robustness of our main bunching estimates to using an alternative cost function of leverage distortion based on Korteweg (2010) (see Appendix A.2 for details on the methodology). Panel A presents the estimates. Panel B shows the parameters that feed into the net benefits to leverage function in Korteweg (2010). The parameters are obtained from firms just above our marginal bunching firms. $PROF$ is EBITDA over sales, $DEPR$ is depreciation over total assets, VOL is volatility in profitability growth, PPE is PPE over total assets, MB is equity market-to-book ratio, D_RECESS is a dummy indicating NBER recession, $LN(TA)$ is the logarithm of total assets. Bootstrapped standard errors are reported in brackets

Table A.14: Robustness: Excluding Firms With Agency Issues

Threshold	\$ 25 mil (1)	\$ 75 mil (2)	\$ 700 mil (3)
		Panel A. Estimates	
Marginal firm ($\overline{e}$) (\$m)	27.408 [0.261]	94.354 [2.305]	837.345 [5.587]
Regulatory costs (k) (\$m)	0.036 [0.007]	0.120 [0.024]	0.704 [0.050]
PV(regulatory costs)/Firm value (%)	0.840 [0.161]	0.717 [0.143]	0.763 [0.055]
Non-bunching fraction (α)	0.450 [0.120]	0.770 [0.047]	0.530 [0.140]
Δ Leverage	0.065 [0.007]	0.107 [0.013]	0.072 [0.003]
		Panel B. Parameters	
Public float/Assets (η) (%)	2.000	0.880	1.572
Tobin's Q (q)	2.720	1.680	3.570
Interest rate (r)	0.115	0.093	0.049
		Panel C. Sample	
Bunching sample	1994-2007	2003-2007	2012-2018
Non-bunching sample	2009-2018	1994-2002	1997-2011
Identified regulation	Scaled disclosure	SOX 404+ filing delay	EGC benefits

This table presents a robustness check of our main bunching estimation results by dropping firms that may have severe agency issues, that is, those with bottom decile institutional ownership and bottom decile of board independence. *Marginal firm* is the public float of the firm that is indifferent between bunching and not bunching. *Regulatory costs* are the estimated annual costs of regulation k. Regulatory costs are in \$ million. *PV(regulatory costs)/Firm value* is the percentage of the present value of all the future regulatory costs over the total firm value. Bootstrapped standard errors are reported in brackets.

Table A.15: Regulatory Costs and Going Public Decisions: Incorporating Dynamics

Panel A: Present Value of Regulatory costs and IPO Decision

	IPO	
	(1) Coefficients	(2) Marginal Effects
PV of regulatory costs (ln)	-0.06498***	-0.00024***
	[0.01556]	[0.00006]
Imputed public float (ln)	0.25235***	0.00094***
	[0.02508]	[0.00011]
Total funding raised (ln)	0.87869***	0.00328***
	[0.03165]	[0.00015]
Years since founding	-0.06678***	-0.00025***
	[0.00831]	[0.00003]
Industry-Year FE	Yes	Yes
State FE	Yes	Yes
Observations	110,666	110,666

Panel B: IPO Counterfactuals

	Actual regulation (1)	Actual regulation (2)	No SOX (3)	No JOBS Act (4)	Zero regulation (5)
	Pre-2000	Post-2000			
Regulatory costs ($m)	0.079	0.085	0.061	0.132	0.000
Regulatory costs / Public float (%)	0.509	0.274	0.266	0.509	0.000
IPO probability (%)	6.933	0.954	0.963	0.726	1.514
Yearly no. of IPOs	141.4	50.2	50.6	36.4	76.0
Total no. of IPOs	1044.0	912.0	920.6	693.7	1447.0
Total IPO public float ($b)	107.9	337.0	346.8	314.3	628.5

Panel A reproduces Table 6 using the present value of future regulatory costs instead of the annual cost upon IPO. Panel B shows IPO counterfactuals based on the estimates in Panel A (analogous to Table 7). We extrapolate the public float of potential IPO firms over a seven year horizon (the average number of years IPO firms stay public in our sample period) based on float growth rates estimated from actual IPO firms. We then calculate yearly regulatory costs based on the corresponding float and the regulations prevailing in the year the firm considers IPO. Last, we calculate the present value of these yearly regulatory costs using a 7% discount rate to arrive at the variable *PV of regulatory costs (ln)*.