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The Debt-Equity Choice When Regulatory Thresholds are Based on Equity Values: Evidence from SOX 404

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ABSTRACT: When larger market values of equity result in being subject to costly regulation, firms have incentives to shift their sources of financing toward debt and away from equity. We use the Sarbanes-Oxley Act of 2002 (SOX) as a setting to provide evidence of such incentives. Smaller firms were granted several reprieves and eventually exempted from the internal control audit requirements of SOX Section 404, which many consider the most costly and onerous aspect of SOX. Using a difference-in-differences design, we show that relative to control firms, firms just below the regulatory threshold have increased propensities to issue debt, decreased propensities to issue equity, and increased leverage levels in the post-SOX period. These results are consistent with firms altering their financing choices to maintain their exempt status and demonstrate an economic consequence of regulatory regimes that are tiered by equity values.

Keywords: regulatory thresholds; debt-equity choice; financing; SOX 404; internal controls.

I. INTRODUCTION

The scaling of regulation for firms of different sizes is a longstanding feature of many regulatory regimes and has become increasingly common in recent years (e.g., Bradford 2004; Gates and Leuschner 2007; Anginer, Narayanan, Schipani, and Seyhun 2012; Schwartz 2014). Within the context of U.S. securities regulation, tiered requirements and exemptions for smaller firms date back to the original federal securities regulations of the 1930s, and compliance thresholds are often linked to the market value of firms' common equity (Advisory Committee on Smaller Public Companies [ACSPC] 2006; Dixon, Gates, Kapur, Seabury, and Talley 2007). Such exemptions have recently taken on increased prominence as smaller firms have been granted multiple reprieves from the costly and controversial internal control reporting requirements of Section 404 of the Sarbanes-Oxley Act of 2002 (hereafter, SOX 404). In this paper, we use the setting of SOX 404 to provide evidence that basing regulatory thresholds on equity values creates incentives for firms to shift their sources of finance away from common equity and toward debt.

SOX 404 requires management and the financial statement auditor to formally document, test, and report publicly in the annual Form 10-K on the effectiveness of internal controls over financial reporting. The costs of complying with this requirement are substantial and include a significant fixed component, making them especially burdensome for small firms (e.g., Engel, Hayes, and Wang 2007; Kamar, Karaca-Mandic, and Talley 2007; SEC 2009; Alexander, Bauguess, Bernile, Lee, and Marietta-Westberg 2013). As a result, the Securities and Exchange Commission (SEC) delayed the implementation of SOX 404 several times, and the Dodd-Frank Act of 2010 eventually granted a permanent exemption from the auditor attestation

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Supplemental material can be accessed by clicking the link in Appendix B.

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requirement for non-accelerated filers, which are firms with public float of less than $75 million.[1] Consistent with SOX 404 imposing net costs on such firms, Zhang (2007) and Iliev (2010) document positive stock market reactions for non-accelerated filers around announcement dates of the various delays in SOX 404 implementation.

The costs of complying with SOX 404 create incentives for firms to retain their status as non-accelerated filers. Prior literature suggests that some non-accelerated filers retain their status by depressing the overall size of the firm (e.g., by reducing investments, increasing payouts, or managing earnings down, as in Gao, Wu, and Zimmerman [2009] and Nondorf, Singer, and You [2012]), or by manipulating reported public float (Gao 2016). As we detail in Section II, these activities either result in firms staying small—thus, being prohibitively costly for firms with valuable growth opportunities—or are limited to firms with particular ownership structures and certain levels of market capitalization. Gao et al. (2009, 500) point out that "[O]nly firms that believe the costs of Section 404 compliance outweigh the benefits of the future growth opportunities" are likely to stay small. By contrast, we propose that strategic financing choices provide a mechanism that allows firms to both pursue growth opportunities and avoid triggering SOX 404 compliance.

The role for financing choices stems from the fact that the SOX 404 threshold is based on one particular source of financing rather than a measure of overall firm size. Only common equity affects public float (and, thus, non-accelerated filer status). To the extent that firms can fund growth with debt instead of equity, they need not stay small to avoid SOX 404.

The traditional trade-off theory of capital structure views financing choices as a balancing of various costs and benefits of debt versus equity (e.g., financial distress, tax, and agency considerations; see Graham and Leary [2011] for a review). The SOX 404 exemption can affect that balance and the resulting financing choices of firms near the threshold by making additional common equity relatively more costly and additional debt relatively less costly. Consistent with that view, we expect the tiered structure of SOX 404 to increase the likelihood that non-accelerated filers fund growth by issuing debt instead of common stock.

Funding growth with debt, however, can also entail costs. Deadweight costs of financial distress, asset substitution, debt overhang problems, and loss of flexibility from covenant restrictions all tend to increase with debt usage, particularly for firms with valuable investment opportunities (Jensen and Meckling 1976; Myers 1977; Jensen 1986; van Binsbergen, Graham, and Yang 2010). Managers of high-growth firms may also view crossing the threshold in the relatively near term as inevitable, reducing the value of avoidance. How firms balance these various trade-offs against exemption from SOX 404 is ultimately an empirical question.

We provide evidence on this question by comparing the sources of finance used by non-accelerated filers to those of a control sample of accelerated filers. Accelerated filers provide a useful control group due to the asymmetric way in which the $75 million threshold is applied. Once classified as an accelerated filer, a firm remains an accelerated filer (and hence subject to SOX 404) unless it subsequently satisfies more stringent requirements that apply for exiting accelerated filer status (detailed in Section II). Therefore, the incentives created by the $75 million threshold apply uniquely to non-accelerated filers.

Our post-SOX test period begins in June 2003, just after the first float-based deferral of SOX 404 was announced by the SEC, and runs through 2012, the most recent data at the time of our analysis. We also use a pre-SOX control period, spanning 1996 (when 10-K filings become widely available in the SEC's EDGAR system) through 2001 (prior to the legislative activity that led to SOX). Our empirical tests are then based on a difference-in-differences design where we examine how differences between the financing choices of non-accelerated filers and control firms change from the pre-SOX period to the post-SOX period.

We focus our main tests on firms with public float between $50 million and $100 million to ensure that the non-accelerated filers and control firms are reasonably similar in size (Iliev 2010). We also limit the sample to firms that access significant amounts of external capital (greater than 5 percent of total assets) to isolate financing choices that are most likely intended to fund growth and investment (Leary and Roberts 2010).

Our results are consistent with SOX 404 exemptions creating incentives for smaller firms to favor debt over common equity to maintain their non-accelerated filer status. Controlling for other relevant factors, we find that the likelihood of issuing common stock decreases by 19.4 percent in the post-SOX period among non-accelerated filers that access external financing (and, thus, the likelihood of issuing debt instead of stock increases by 19.4 percent) relative to control firms. This effect is economically significant relative to the unconditional likelihood of issuing common stock, which is 47.0 percent in our sample (53.0 percent issue debt). These results are generally strongest among firms with high market-to-book ratios, which is consistent with strategic financing choices being particularly beneficial for firms with valuable investment opportunities. We also find that non-accelerated filers that later switch status lose their relative preference for debt after they become accelerated filers.

Because our sample is an unbalanced panel, we take measures to ensure that our results are not attributable to shifting sample composition. We examine subsamples of (1) only firms that remain in the public equity markets in both the pre- and post-SOX periods, and (2) only firms that appear in our sample in both periods. In both cases, we find results similar to our full sample.

[1] Public float is the aggregate market value of a company's outstanding common equity held by non-affiliates. An affiliate is "a person that directly, or indirectly through one or more intermediaries, controls, or is controlled by, or is under common control with" the issuer (17 CFR 240.12b-2).

Our results are also robust to a number of sensitivity tests. Of particular note, we ensure that the control firms do not drive the results, which is a possibility if SOX 404 compliance leads to improved information environments and decreases in accelerated filers' cost of equity versus debt. To that end, we control for several aspects of firms' general information environments and information asymmetry, and we employ three alternate control groups that are not subject to SOX 404 (small non-accelerated filers far from the threshold; firms listed in Canada; and foreign firms listed in the U.S. during a period when they were exempt from SOX 404). The outcome in each case is consistent with our main results.

We also consider several other control groups of different-sized firms, a control group of non-accelerated filers that voluntarily comply with SOX 404, and a specification without any control firms. In all cases, the results are consistent with the main results. The results are similarly robust to several alternate measures of common stock and debt issuance, and to a restricted sample period of three years before and after SOX.

We also perform two sets of falsification tests. The first set falsely assumes different pseudo-event years and the second set falsely assumes different pseudo thresholds for public float. The results are insignificant in all cases.

Finally, we conduct three supplementary analyses that corroborate and extend our primary results. First, we examine leverage levels and find that leverage increases by 5.1 percent in the post-SOX period for non-accelerated filers relative to control firms (the sample mean for leverage is 25 percent). Thus, the effects of SOX 404 exemptions on incremental financing decisions appear to manifest in significantly higher levels of leverage for non-accelerated filers.

Second, we consider additional (non-debt) sources of financing that do not affect public float. Consistent with our debt results, we find that the likelihoods of using operating leases and preferred stock instead of common stock both increase for non-accelerated filers relative to control firms, by 1.9 and 4.2 percent, respectively. These effects are modest in an absolute sense, but are notable relative to the unconditional likelihood of engaging in the two activities (12.0 and 4.4 percent, respectively, in our sample).

Third, we expand the sample to include all firms with public float between $50 million and $100 million, regardless of whether they access external financing. This enables us to examine the overall extent to which non-accelerated filers replace the relative decrease in common stock issuance with other sources of financing (as opposed to not financing instead). We find that common stock issuance decreases by 10.0 percent during the post-SOX period for non-accelerated filers relative to control firms. The corresponding change for debt issuance is an increase of 5.6 percent. When we consider operating leases and preferred stock, along with debt, this second figure increases to 6.9 percent. Taken together, these results suggest that roughly two-thirds of the decrease in common stock issuance is replaced by increased reliance on other forms of financing that do not have a direct impact on public float.

Our paper makes three primary contributions. First, we document that basing regulatory thresholds on public float can tilt the financing choices of firms near the threshold toward debt and increase their leverage levels. These results should be informative to regulators when designing appropriate threshold measures for scaled regulation.[2] These results also extend prior literature on threshold avoidance (Gao et al. 2009; Nondorf et al. 2012; Gao 2016) by demonstrating that firms need not stay small or pass up valuable investment opportunities to retain regulatory exemptions. Strategic financing choices provide a widely available (although not costless) mechanism to fund growth while avoiding thresholds based on public float.

Second, our evidence adds to the literature on the economic consequences of SOX. Such evidence remains important as policy makers continue to debate SOX 404 exemptions and the related threshold (e.g., Rubin 2019; SEC 2019). Previous studies investigate consequences for deregistrations (Engel et al. 2007; Leuz, Triantis, and Wang 2008), cross-listings (Piotroski and Srinivasan 2008; Li 2014), equity values (Zhang 2007; Chhaochharia and Grinstein 2007), investments (Kang, Liu, and Qi 2010; Albuquerque and Zhu 2019), and the market for corporate control (Chhaochharia, Otto, and Vig 2011). We document a previously unidentified economic consequence, namely, that non-accelerated filers, particularly those with valuable investment opportunities, increase their reliance on debt financing to avoid compliance with SOX 404.

Finally, we contribute to the literature on corporate financing decisions and capital structure more generally, particularly as it relates to smaller firms (e.g., Frank and Goyal 2003; Beck, Demirgüç-Kunt, and Maksimovic 2008; Covas and Den Haan 2011). Corporate financial policy is an issue of central importance in financial economics because it affects the distribution of value between shareholders and creditors, and Myers (2003) stresses that the factors influencing financing choices are likely to depend heavily on firms' specific circumstances.[3] We provide evidence that nearby regulatory thresholds can be a significant factor in the debt-equity choice.

[2] For example, the SEC recently released a proposal to expand the eligibility for "smaller reporting company" status and the associated scaled disclosure requirements (SEC 2016). The proposal solicits feedback on whether to base the eligibility threshold on public float or some other measure of firm size (SEC 2016, 24–28). Our results highlight a potential consequence of using public float.

[3] Myers (2003, 217) argues: "There is no universal theory of capital structure, and no reason to expect one. There are useful conditional theories, however. The theories differ in their relative emphasis on the factors that could affect the choice between debt and equity … Each factor could be dominant for some firms or in some circumstances, yet unimportant elsewhere."

II. BACKGROUND AND RESEARCH QUESTIONS

Scaled Regulation

Scaled requirements are a pervasive part of the regulatory landscape, appearing in fields as diverse as environmental regulation, employment law, and health insurance regulation (Gates and Leuschner 2007), and in various countries (e.g., Black, Jang, and Kim 2006; Bernard, Burgstahler, and Kaya 2018; Kajüter, Klassmann, and Nienhaus 2019). Scaling is typically motivated by arguments that compliance costs for smaller firms outweigh the corresponding benefits to the public interest. In the U.S., the 1980 Regulatory Flexibility Act (5 U.S.C. 601–612) compels federal agencies to analyze the impact of their regulatory actions on small firms and, where that impact is significant, pursue less burdensome alternatives or exemptions.

Scaling is especially common in securities regulation. Examples include exemptions from filing requirements for firms with less than $10 million in assets (17 CFR 240.12g-1), small security issues under Regulation D and Regulation A (17 CFR 230.501 et seq.; 17 CFR 230.251 et seq.), and scaled disclosure requirements and extended filing deadlines for "smaller reporting companies" (17 CFR 229.10f; 17 CFR 249.310). In this paper, we focus on SOX 404 because it has been especially costly and controversial for smaller firms; it is far-reaching, in that it applies on an ongoing basis to all firms listed on U.S. exchanges other than those qualifying for exemption; and the exemption threshold is linked to one particular source of financing—common equity—which could affect the debt-equity choice when firms raise external capital.

SOX 404

The legislative deliberations that led to SOX began in early 2002, and SOX was signed into law by President George W. Bush in July 2002 (Pub. L. No. 107-204).[4] Much of the subsequent controversy surrounding SOX has centered on Section 404, which creates two new requirements. Section 404(a) requires management to document and provide an annual assessment of the effectiveness of internal controls over financial reporting, and Section 404(b) requires the firm's financial statement auditor to also assess and opine on the effectiveness of those controls. As originally passed, SOX did not distinguish between large and small firms.

In developing implementation guidance, the SEC responded to concerns about the costs and lead-time necessary to comply with the Section 404 requirements by delaying the initial compliance dates, particularly for smaller firms that qualify as non-accelerated filers. The primary factor that determines a firm's status as a non-accelerated or accelerated filer is public float: only firms with public float less than $75 million qualify as non-accelerated filers.[5] On May 27, 2003, the SEC voted to phase in the original SOX 404 implementation deadlines at June 15, 2004 for accelerated filers and delay them until April 15, 2005 for non-accelerated filers (SEC 2003). In February 2004, the deadlines were deferred until November 15, 2004 for accelerated filers and July 15, 2005 for non-accelerated filers (SEC 2004).

Implementation of SOX 404 began November 15, 2004 for accelerated filers, but cost concerns, especially related to the audit requirement, motivated the SEC to issue several more deferments for non-accelerated filers.[6] Ultimately, non-accelerated filers began complying with SOX 404(a) (management's report) as of December 15, 2007 and were permanently exempted from 404(b) (auditor's report) by the Dodd-Frank Act of 2010 (Pub. L. No. 111-203).

Research Questions

Compliance with SOX 404 entails significant costs. Iliev (2010) and Kinney and Shepardson (2011) find that audit fees roughly double for firms in their first year of SOX 404(b) compliance. Both studies stress that other compliance-related costs (e.g., management time, consulting fees, litigation risk), while difficult to measure, can also be significant. Evidence from an SEC (2009) survey indicates that such costs represent more than half of total SOX 404 compliance costs, suggesting that overall costs are substantial and even temporary reprieves can be valuable. Iliev (2010) estimates that for firms near the threshold, a three-year delay in compliance increases market value by about 5 percent, and permanent exemption is worth

[4] SOX was intended to help restore investor confidence in the aftermath of high-profile accounting scandals at Enron and WorldCom. See Hamilton and Trautman (2002) for the legislative history of SOX.

[5] The formal definition of accelerated filer is in 17 CFR 240.12b-2. Non-accelerated filer status was created to exempt small firms from separate SEC regulations that accelerated the filing deadlines for periodic reports (Bryant-Kutcher, Peng, and Weber 2013).

[6] The interested reader can find a detailed discussion of the various extensions in SEC (2011).

between 12 and 35 percent. While compliance costs in general have tended to decrease over time, they remain significant, particularly for smaller firms (e.g., Heller 2015; Ettredge, Sherwood, and Sun 2018).[7]

The tiered requirements of SOX 404, combined with the costly nature of compliance, create incentives for firms to maintain their non-accelerated filer status. These incentives are reinforced by the asymmetric way that the threshold is applied: firms enter accelerated filer status if their public float exceeds $75 million, but exit is restricted to firms whose public float drops below $50 million (SEC 2005b).[8] Thus, the incentives created by the $75 million threshold apply uniquely to non-accelerated filers. Because this threshold is tied to the value of common stock, we expect that non-accelerated filers seeking external financing are likely to shift their sources of that financing away from common stock and toward debt.

We also expect the shift away from equity and toward debt to be particularly strong among firms with the most valuable investment opportunities sets. Two reasons underlie this expectation. First, absent regulatory considerations, lower-growth firms tend to rely less on equity and more on debt financing (e.g., Frank and Goyal 2009) and, thus, their capacity to shift away from equity is lower. Second, alternative strategies for avoiding the SOX 404 threshold are likely to be more costly for higher-growth firms. For example, passing up investment opportunities is more costly when those opportunities are particularly valuable; increasing dividends or share repurchases is more costly for growth firms, who tend to have greater cash needs; and artificially lowering reported earnings or disclosing bad news is more costly for growth firms that are likely to access capital markets in the future.

Shifting toward debt, however, also entails costs. Asset substitution and debt overhang problems, loss of flexibility from debt covenant restrictions, and deadweight costs of financial distress are all increasing in debt usage, especially for growth firms (e.g., Jensen and Meckling 1976; Myers 1977; Jensen 1986; van Binsbergen et al. 2010). In addition, if managers of growing firms view crossing the threshold in the near future as inevitable, then the value of avoiding it in the current year is reduced. These forces all work against our predictions, leaving the question of how firms balance them against exemption from SOX 404 as an empirical issue.

Relation to Prior Literature

Gao et al. (2009) also examine SOX 404 avoidance, focusing on firms' incentives to stay small. They consider strategies such as decreasing investments, increasing payouts, and managing earnings downward. They emphasize that these actions are unlikely to be attractive to firms with profitable growth opportunities. We focus on such firms. By design, our sample is comprised of firms that raise significant capital to fund investments and growth, which contrasts sharply with Gao et al.'s (2009) focus on staying small.[9]

Nondorf et al. (2012) similarly report that firms near the public float threshold manage earnings downward to depress public float. They also find some weak evidence of insider trading around float measurement dates. They do not examine strategic financing choices.

Gao (2016) suggests that firms can manage their reported public float by exercising discretion over how they classify blockholders as affiliates. While using such discretion could be a low-cost way to manage reported float, as Gao (2016) acknowledges, it is constrained by firms' particular ownership structures (it hinges on blockholders with ownership in the gray area between 5 and 10 percent), and it is likely to be limited in scale relative to financing choices.[10]

We extend this prior literature by considering strategic financing choices as a mechanism that is widely available and does not require drastic actions, such as deregistration or passing up valuable investment opportunities. While some firms may stay small to avoid SOX 404, those with valuable opportunities can continue to fund investment and growth, yet still avoid, or at least postpone, crossing the compliance threshold.[11]

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[7] Our focus on costs is not meant to imply that SOX is without benefits (e.g., Coates and Srinivasan 2014; Ge, Koester, and McVay 2017; Kravet, McVay, and Weber 2018). However, only a small proportion of non-accelerated filers voluntarily comply with Section 404 (e.g., Cassell, Myers, and Zhou 2013), suggesting that the vast majority of these firms view the costs as exceeding the benefits. Iliev (2010) and Dharmapala (2016) document discontinuities in the distribution of public float around $75 million, which is also consistent with firms near the threshold viewing the costs of compliance as outweighing the benefits.

[8] Prior to 2005, exit from accelerated filer status was restricted to firms with both public float and revenues dropping below $25 million for two consecutive years (SEC 2002).

[9] For example, the firms in our sample of common stock and debt issuers have median growth rates for total assets of 20 percent, compared to −1.0 percent for non-issuers in Compustat with similar public float. In the Online Appendix, Table A1 provides more detail on these and other measures of growth, as well as the market-to-book ratio, which serves as a forward-looking measure of firms' investment opportunities sets (see Appendix B for the link to the downloadable file).

[10] Gao (2016) also observes that underreporting float is only useful to firms with market cap above $75 million. In untabulated tests, we repeat our analysis after dropping non-accelerated filers with market cap above $75 million. The results are similar to those reported in the paper.

[11] Despite raising significant capital, more than 80 percent of the non-accelerated filers in our sample maintain that status in year t+1. Roughly two-thirds are still non-accelerated filers in year t+5.

III. RESEARCH DESIGN

Basic Model and Variable Measurement

Our interest is in whether the tiered structure of SOX 404 affects the *sources* of financing that firms choose when raising capital. Therefore, our primary analysis centers on the debt-equity choice among a sample of firms that access external financing. We employ a difference-in-differences design, which simultaneously controls for temporal factors (with a control group) and group-specific factors (with a control period). Model (1) summarizes our basic approach (firm and time subscripts suppressed):

$$COMSTK\_ISSUE = \alpha_{ind} + \delta_{year} + \beta_1 POST + \beta_2 NAF + \beta_3 (POST \times NAF) + \sum \beta_j CONTROLS_j + \varepsilon \quad (1)$$

COMSTK_ISSUE is an indicator set to 1 for firm-years that are issuers of common stock, and 0 for firm-years that are issuers of debt, but not common stock.[12] We identify issuers of common stock as those firm-years with net issuances greater than 5 percent of total assets, where net issuances are measured as cash generated from stock sales less cash used in stock repurchases. The 5 percent cutoff keeps the focus on firms that raise significant amounts of new capital to fund investments (Hovakimian, Opler, and Titman 2001; Leary and Roberts 2010). Cash flows from common and preferred stock are typically combined in Compustat, our data source. Therefore, for firms with preferred stock, we subtract changes in preferred stock as reported on the balance sheet from total cash from stock issuance to isolate the portion attributable to common stock (all variables are defined in detail in Appendix A).

Similarly, we identify debt issuers as those firm-years with net issuances of debt greater than 5 percent of total assets. Net debt issuance is measured as the change in long-term debt (both current and long-term portions) from the balance sheet (Hovakimian et al. 2001; Leary and Roberts 2010). This measure captures both public and private debt, as well as capital leases, which are effectively a form of long-term debt financing without associated cash inflows. We also consider several alternative measures of common stock and debt issuance later in Section V.

Among the independent variables in (1), *POST* is a binary variable set to 1 for the post-SOX test period, and 0 for the pre-SOX control period; *NAF* is a binary variable set to 1 for non-accelerated filers, and 0 for control firms; and *CONTROLS* represents a vector of additional control variables that we discuss in more detail below. We also include industry and year fixed effects, represented by α_{ind} and δ_{year}, respectively, to control for any systematic differences in financing choices across industries and fiscal years.[13]

The independent variable of primary interest in (1) is the interaction between *POST* and *NAF*. The coefficient on this variable, β_3, indicates whether differences in the propensity to finance with common stock between non-accelerated filers and control firms differ in the post-SOX test period from the pre-SOX control period. Based on our arguments from Section II, we expect non-accelerated filers to decrease their relative propensity to issue equity after SOX and increase their relative propensity to issue debt and, thus, we predict β_3 to be negative.

Control Variables

We draw on the large literature in finance and include controls for factors commonly identified as being important determinants of the debt-equity choice (e.g., Hovakimian et al. 2001; Hovakimian et al. 2004; Hovakimian 2004; Lewellen 2006; Frank and Goyal 2009; Leary and Roberts 2010). The two traditional views in the finance literature are the trade-off theory and the pecking order theory. The trade-off theory views financing choices as a balancing of the tax benefits of debt with bankruptcy costs and other agency considerations. We control for the tax benefits of debt using the marginal tax rate (*MTR*) measure from Blouin, Core, and Guay (2010). Larger and more mature firms are expected to have larger debt capacities and more stable cash flows, thus reducing expected bankruptcy costs. We control for these effects with the natural log of total assets (*LN_ASSETS*) and firm age (*AGE*). We also include the ratio of tangible to total assets (*TANGIBLE*), as firms with more tangible assets likely have more available collateral for borrowing. Firms with unique assets and products have higher bankruptcy costs; we account for this factor with the ratio of research and development expense to sales (*RD_SALES*).

[12] Similar to Leary and Roberts (2010), we code *COMSTK_ISSUE* as 1 for all firm-years that issue common stock, regardless of whether they also issue debt. Our results are not sensitive to this choice. See Online Appendix Table A2 for evidence that dual issuers tend to be closer to common stock issuers than to debt issuers on most dimensions (see, also, A. Hovakimian, G. Hovakimian, and Tehranian 2004) and that our regression results are robust to either excluding dual issuers or classifying them based on which source of financing is larger.

[13] The industry fixed effects are based on one-digit SIC codes to reduce problems of perfect prediction that arise in two-digit SIC industries with few observations. Our main results are unaffected by this choice. The year fixed effects and other annual measures throughout the paper are based on Compustat fiscal years.

An agency-related benefit of debt is its ability to constrain free cash flow problems, especially for profitable firms (Jensen 1986). We control for this effect by including return on assets (*ROA*) and an indicator for loss firms (*LOSS*). Agency conflicts can also increase the relative costs of debt for firms with valuable investment opportunities by contributing to asset substitution and debt overhang problems (Jensen and Meckling 1976; Myers 1977). We control for investment opportunities with the market-to-book ratio (*MTB*).

The pecking order theory predicts that information asymmetry creates adverse selection problems that are particularly severe for equity, leading to a preference for debt when firms need external financing (Myers 1984; Myers and Majluf 1984). Adverse selection is expected to be more problematic for firms with relatively low asset tangibility and large investments in research and development, as management's information advantage over outside capital providers is likely to be larger. Thus, the variables *TANGIBLE* and *RD_SALES*, discussed above, also control for this effect. Prior literature also suggests that adverse selection costs can vary with recent stock price performance, and documents that firms tend to issue equity following periods of positive returns (e.g., Lucas and McDonald 1990; Baker and Wurgler 2002). We include the stock price change over the previous year (*PRICE_CHG*) to control for this effect.

We also control for the deviation of a firm's leverage from the industry-year median (*LEV_DEV*). Firms with leverage that is already high relative to their industry peers are more likely to choose common stock for their additional financing needs (Frank and Goyal 2009).

IV. SAMPLE AND DESCRIPTIVE STATISTICS

Sample Selection

We begin with all U.S. firm-years in Compustat with data available to construct our variables. Our pre-SOX control period spans January 1, 1996–December 31, 2001, and the post-SOX test period spans June 1, 2003–December 31, 2012. We end the control period prior to the regulatory deliberations that led to SOX, and we begin the test period just after the SEC first announced it would delay compliance for non-accelerated filers (see Section II).

For our main tests, we keep only firm-years with either common stock or debt issuances (e.g., Hovakimian et al. 2001; Hovakimian 2004; Lewellen 2006), although we relax this constraint later. To avoid the effect of other regulations on financing choices, we remove utilities and financial institutions (SIC 4900–4999, 6000–6999). We also remove any observations with either current or lagged total assets that are negative because many of our variables are deflated by total assets. To ensure that our control firms are reasonably similar in size to the non-accelerated filers, we retain only firm-years with lagged public float between $50 million and $100 million. We collect public float data using a PHP program to scrape the information from 10-K filings in the SEC's EDGAR system (see the Online Appendix for details). This process yields 1,434 firm-years.

We next identify non-accelerated filers and control firms. We measure filer status as of year $t-1$ to capture firms' debt-equity incentives for year t. For the post-SOX period, we obtain filer status from Audit Analytics.[14] For the pre-SOX period, we create a pseudo filer status based on the cutoff later applied by the SEC: firms with public float below $75 million in $t-1$ and all previous years in EDGAR are classified as non-accelerated filers; firms with public float greater than $75 million in $t-1$ or any previous year in EDGAR are classified as control firms.

Finally, using Audit Analytics, we identify and remove 107 firm-years from non-accelerated filers that voluntarily submit their internal controls to outside audit, because these firms do not have the same incentives as other non-accelerated filers to maintain their filer status. Our main sample is, thus, comprised of 1,327 firm-year observations, which includes 448 from non-accelerated filers and 879 from accelerated filers (control firms), representing 398 and 697 unique firms, respectively.[15]

Descriptive Statistics

We provide descriptive statistics for the full sample in Table 1, Panel A. To mitigate the influence of extreme observations, we winsorize continuous variables at the top and bottom percentiles of their respective distributions (except for *FLOAT*, which is already constrained). Roughly 47 percent of firm-years are issuers of common stock (*COMSTK_ISSUE*=1) and, by design, the rest are issuers of debt. Also by design, our sample firms are relatively small, with a median value for *LN_ASSETS* of 4.341 (which translates to total assets of about $77 million). The values of other variables also reflect the concentration of our sample in smaller, younger, and

[14] As a check on the Audit Analytics filer status data, we compare the status to reported public float. We identify 31 observations with public float above $75 million that Audit Analytics classifies as non-accelerated filers. We reclassify these observations as accelerated filers, although our results are not sensitive to this adjustment. See the Online Appendix for more discussion.

[15] The final sample includes three observations from fiscal 2003 (year-ends of May 2004, which Compustat codes as fiscal 2003). We include these three observations with fiscal 2004 for purposes of fixed effects and other annual measures throughout the paper. Our results are very similar if we drop them instead.

TABLE 1
Descriptive Statistics

Panel A: Full Sample

Variable	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
COMSTK_ISSUE	0.470	0.499	0.000	0.000	1.000
PRICE_CHG	1.396	1.168	0.762	1.098	1.617
MTB	3.228	4.029	1.231	1.806	3.339
LEV_DEV	0.049	0.192	−0.049	−0.005	0.129
ROA	−0.148	0.514	−0.282	0.041	0.131
LOSS	0.482	0.500	0.000	0.000	1.000
LN_ASSETS	4.267	1.264	3.414	4.341	5.093
TANGIBLE	0.263	0.231	0.082	0.194	0.373
RD_SALES	2.620	15.050	0.000	0.006	0.158
MTR	0.222	0.120	0.097	0.278	0.330
AGE	12.850	10.000	6.000	10.000	17.000
LEV	0.249	0.247	0.034	0.172	0.389
FLOAT	73.278	14.932	59.780	73.086	86.537

Panel B: Variable Means by Group and Period

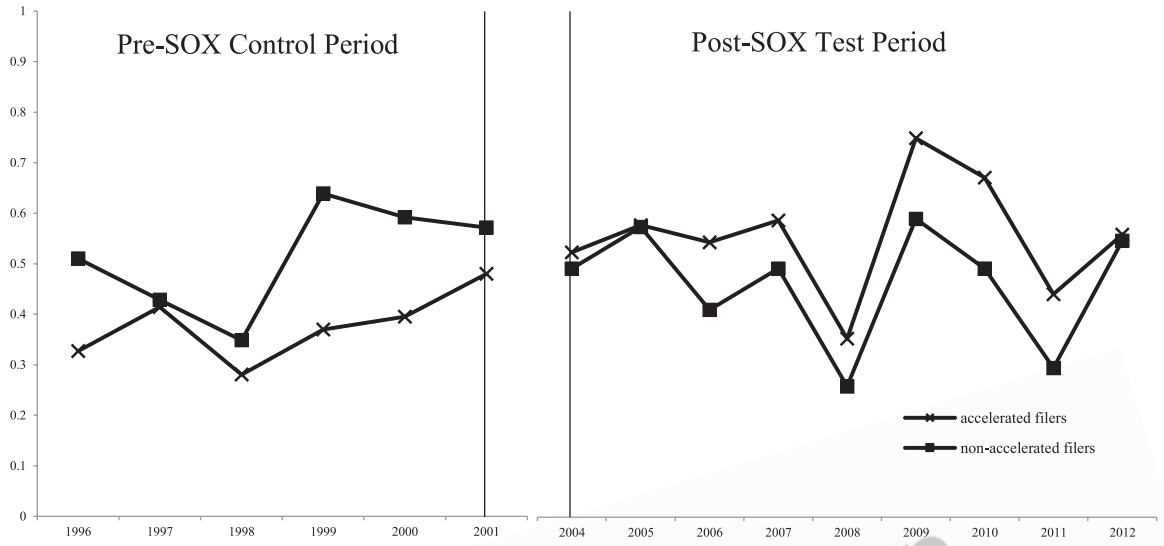
	Post-SOX Test Period			Pre-SOX Control Period			
Variable	Non-Accelerated Filers (n = 157) (1)	Control Firms (n = 413) (2)	Difference (3) = (1) − (2)	Non-Accelerated Filers (n = 291) (4)	Control Firms (n = 466) (5)	Difference (6) = (4) − (5)	Difference-in-Differences (7) = (3) − (6)
COMSTK_ISSUE	0.471	0.569	−0.098**	0.485	0.373	0.112***	−0.210***
PRICE_CHG	1.387	1.405	−0.018	1.633	1.244	0.389***	−0.407***
MTB	3.816	3.187	0.629	3.329	3.001	0.328	0.301
LEV_DEV	0.012	0.067	−0.055***	0.026	0.060	−0.034**	−0.021
ROA	−0.306	−0.219	−0.087	−0.098	−0.064	−0.034	−0.053
LOSS	0.586	0.615	−0.029	0.381	0.393	−0.012	−0.017
LN_ASSETS	3.768	4.504	−0.736***	3.924	4.440	−0.516***	−0.220
TANGIBLE	0.212	0.232	−0.020	0.279	0.297	−0.018	−0.002
RD_SALES	3.574	4.638	−1.064	0.919	1.573	−0.654	−0.410
MTR	0.174	0.180	−0.006	0.252	0.256	−0.004	−0.002
AGE	16.540	15.350	1.190	9.756	11.320	−1.564**	2.754**
LEV	0.219	0.215	0.004	0.257	0.284	−0.027	0.031
FLOAT	61.261	78.929	−17.668***	60.132	80.529	−20.397***	2.729*

***, **, * Indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively, determined by two-tailed tests.
The sample is 1,327 U.S. firm-year observations from 1996 to 2012 that have public float between $50 million and $100 million and issue common stock or debt in amounts equal to or greater than 5 percent of lagged total assets. Utilities, financial services, and firms that voluntarily comply with SOX 404 are omitted.
Variables are defined in Appendix A.

growing firms that are raising external capital. For example, the median market-to-book ratio is 1.806, nearly half the sample reports a loss, and the median firm age is ten years. The mean and median values of public float (*FLOAT*) are about $73 million.

In Panel B of Table 1, we present the means of the variables separately for the non-accelerated filers and control firms by time period. During the post-SOX period, non-accelerated filers are significantly less likely than control firms to issue common stock (*COMSTK_ISSUE*). This is consistent with our expectation that common stock becomes relatively less attractive for non-accelerated filers once the SOX 404 threshold is in place. This conclusion is reinforced by the control period, where we observe the opposite relation: prior to SOX, non-accelerated filers were more likely than control firms to issue common stock. The difference-in-differences for *COMSTK_ISSUE* is −21.0 percent and is statistically significant at $p < 0.01$.

FIGURE 1
Proportion of Firms Raising External Capital that are Net Issuers of Common Stock



The sample is 1,327 U.S. firm-year observations with public float between $50 million and $100 million and that raise external capital through debt or common stock issuance, including 448 observations from non-accelerated filers and 879 from accelerated filers. The figure plots trends across fiscal years in common stock issuance (the mean of *COMSTK_ISSUE*) separately for the two groups. The pre-SOX period spans January 1, 1996–December 31, 2001. The post-SOX period spans June 1, 2003–December 31, 2012. Because there are only three observations in the sample from fiscal 2003 (year-ends of May 2004), we include those observations with fiscal 2004 (two are non-accelerated filers, one is an accelerated filer, and all three issue debt).

A similar pattern emerges in Figure 1, where we plot the yearly trends in common stock issuance across the sample period separately for non-accelerated filers and controls firms. The non-accelerated filers have larger proportions of firms issuing common stock in each of the pre-SOX years. This relation flips after SOX, however, as the non-accelerated filers are less likely to issue common stock than control firms in each of the post-SOX years.[16]

Returning to Table 1, Panel B, the other variables are generally similar for the non-accelerated filers and control firms, with a few exceptions. The non-accelerated filers tend to have lower total assets (*LN_ASSETS*) and industry-adjusted leverage (*LEV_DEV*), and in the pre-SOX period, they have larger changes in stock price (*PRICE_CHG*) and are younger (*AGE*), relative to the control firms. These differences are consistent with smaller and younger firms having lower debt capacity (e.g., Hovakimian et al. 2004; Leary and Roberts 2010), and they are largely attributable to the float-based threshold that separates the two sets of firms (*FLOAT*, of course, differs across the groups by design). Even with our focus on a relatively narrow sample band around the threshold, some difference in size (and other variables related to size) is inevitable. We note, however, that the difference-in-differences is insignificant for all control variables other than stock price change (*PRICE_CHG*) and firm age (*AGE*).[17]

Taken together, the descriptive statistics in Table 1 and the trends in Figure 1 are consistent with our prediction that non-accelerated filers become less likely to issue equity (more likely to issue debt) than control firms in the post-SOX period. They also highlight the importance of our research design. On a univariate basis, there is no significant change in non-accelerated filers' propensity to issue common stock (Table 1, Panel B). This type of simple comparison, however, should be viewed with caution because it makes no allowance for either firm-year-specific or temporal factors that affect financing choices. Both of these considerations are important. As we detail later in Section V, the decrease in non-accelerated filers' propensity to issue common stock is significant once we include firm-year-specific control variables (even without control firms). We also find that a wide range of alternate control groups increase their propensity to issue common stock in the post-SOX period, similar to our main control group. This suggests that other temporal factors could also potentially obscure the effect of SOX on non-accelerated filers in univariate comparisons. Our regressions control for both firm-year-specific and temporal factors. We now turn to those regressions.

[16] While these general patterns are informative, caution should be used in interpreting the results for individual years because the number of observations tends to be small. For example, the average number of annual observations for the non-accelerated filers is less than 30.

[17] To help ensure that our results are not attributable to size differences, we also employ alternate control groups of similar- and smaller-sized firms, and we conduct placebo tests around pseudo thresholds (detailed in Section V). In untabulated tests, we also include additional controls for the linear, quadratic, and cubic forms of public float, as in Iliev (2010). These controls do not affect our results.

V. RESULTS

Main Results

Table 2 presents the main results. We estimate Model (1) using logistic regression. We do not tabulate the coefficient for the post-SOX indicator (*POST*) in our various regression tables because it only has meaning with reference to the other years represented by fixed effects. We cluster standard errors at the firm level.

For the full sample in Table 2, Column (1), the estimated coefficient on *NAF* is insignificant, which indicates that once other factors are controlled for, non-accelerated filers and control firms are similar in their propensities to issue common stock during the pre-SOX period. The two groups begin to diverge, however, in the post-SOX period. The coefficient on *POST* × *NAF* is negative (−1.345) and statistically significant ($p < 0.01$). The associated marginal effect indicates that in the post-SOX period, the likelihood of non-accelerated filers issuing common stock decreases by 19.4 percent relative to control firms. The effect, therefore, is both statistically and economically significant (the sample mean of *COMSTK_ISSUE* is 47.0 percent).

The results for the control variables are largely consistent with prior literature. Firms with higher leverage than their industry peers and those with recent stock price increases and accounting losses are more likely to finance with common stock; older firms and those with more total assets and higher marginal tax rates are more likely to issue debt instead of stock.[18]

Because our sample takes the form of repeated cross-sections (i.e., an unbalanced panel), we also consider the possibility that the results could be affected by shifts in sample composition. This could be a concern if, for example, our treatment (the advent of SOX) somehow causes differences in the likelihood that accelerated and non-accelerated filers enter or exit the sample in a way that also relates to their financing choices. We address this possibility in Columns (2) and (3) of Table 2. In Column (2), we eliminate any sample firms that deregister prior to SOX or go public after SOX, by requiring firms to have financial statement information in Compustat and stock price data in CRSP in both the pre- and post-SOX periods. In Column (3), we further constrain the sample to only firms that meet all the main sample criteria in both periods (e.g., issue common stock or debt, lagged public float between $50 million and $100 million). In both columns, the coefficient on *POST* × *NAF* is negative and significant ($p < 0.05$), with marginal effects of −16.6 and −28.0 percent, respectively.[19] These results demonstrate that the full sample results are not driven by changes in sample composition.

Overall, the results in Table 2 are consistent with the tiered structure of SOX creating incentives for non-accelerated filers to favor debt over common stock. Because the results are similar across the various samples, we focus our remaining analyses on the full sample.

Growth Option Subsamples

In Table 3, we examine how the debt-equity choice around the SOX 404 threshold varies with firms' investment opportunities. We use the beginning-of-year market-to-book ratio as a proxy for investment opportunities and sort our sample into terciles. We then reestimate Model (1) separately for each market-to-book tercile and report the results in Panel A.[20] For brevity, we tabulate only the coefficients of interest. The estimated coefficient on *POST* × *NAF* is negative for each group, but it is insignificant for the lowest market-to-book group, significant at $p < 0.05$ for the middle group, and significant at $p < 0.01$ for the highest market-to-book group. The difference between the interaction coefficients for the lowest and highest market-to-book groups (−0.661 and −2.085) is significant at $p < 0.10$. The estimated marginal effects for the interaction term show a similar pattern across the terciles, with values of −7.0, −18.5, and −23.6 percent for the lowest, middle, and highest market-to-book groups, respectively.

In Panel B of Table 3, we conduct a similar analysis, but this time with the tercile cutoffs determined annually, which accounts for trends in market-to-book ratios over time. We base these annual cutoffs on all available firms in Compustat.[21] We again find a pattern of increasing statistical and economic significance across the market-to-book groups.

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[18] In an untabulated analysis, we expand Model (1) to include additional controls from Leary and Roberts (2010): anticipated investment, anticipated cash flows, cash flow volatility, working capital, indicators for dividend payers and firms with reported research and development, Altman's Z-score, and financing deficits (see Leary and Roberts [2010] for detailed definitions). The associated data requirements reduce the sample by more than 20 percent and the additional variables are generally insignificant, but the interaction of *POST* and *NAF* remains negative and significant ($p < 0.01$), with a marginal effect of −17.5 percent.

[19] We also constrain this subsample further by retaining only the latest pre-SOX firm-year and the earliest post-SOX firm-year for each unique firm. These constraints reduce the sample to a balanced panel of 138 observations. The results (untabulated) are similar to those in Table 2: the coefficient on *POST* × *NAF* remains negative and significant ($p < 0.05$), with a marginal effect of −33.9 percent.

[20] The sort here is conducted over our full sample, rather than by year. This approach allows us to capture both cross-sectional and temporal variation in growth opportunities (e.g., in periods of expansion, more firms might have high growth opportunities). In Panel B, we use annual sorts.

[21] We use all Compustat firms, rather than only our sample, to create the annual cutoffs because our sample is relatively small once separated into individual years, leading to highly volatile annual tercile cutoffs. The higher MTB groups in Panel B have more observations, consistent with our sample tending to be growth firms.

TABLE 2

Common Stock versus Debt Issuance

Variable	Pred. Sign	(1) Full Sample Coefficient (Standard Error)	(2) Firms with Publicly Traded Stock in Both Pre- and Post-SOX Periods Coefficient (Standard Error)	(3) Firms Appearing in Sample in Both Pre- and Post-SOX Periods Coefficient (Standard Error)
NAF		0.184	0.137	1.697**
		(0.197)	(0.273)	(0.809)
POST × *NAF*	–	−1.345***	−1.133***	−2.516**
		(0.359)	(0.454)	(1.158)
PRICE_CHG		0.263***	0.225**	−0.253
		(0.082)	(0.114)	(0.291)
MTB		−0.031	0.107	0.122
		(0.049)	(0.072)	(0.125)
LEV_DEV		1.339**	1.202*	−0.540
		(0.543)	(0.670)	(1.726)
ROA		−0.257	−0.385	1.303
		(0.242)	(0.397)	(1.827)
LOSS		0.739***	0.582**	0.644
		(0.212)	(0.267)	(0.796)
LN_ASSETS		−0.954***	−0.746***	−0.128
		(0.152)	(0.202)	(0.532)
TANGIBLE		0.196	0.193	−3.169*
		(0.397)	(0.553)	(1.782)
RD_SALES		0.084	0.092	0.124*
		(0.058)	(0.067)	(0.069)
MTR		−3.617***	−3.549**	−11.936*
		(1.080)	(1.446)	(6.289)
AGE		−0.028***	−0.020*	−0.128***
		(0.009)	(0.011)	(0.042)
Industry Fixed Effects		Yes	Yes	Yes
Year Fixed Effects		Yes	Yes	Yes
Firm Clustering		Yes	Yes	Yes
Estimation		Logit	Logit	Logit
n		1,327	820	174
Pseudo R^2		36.1%	34.8%	47.5%
Area under ROC curve		0.874	0.867	0.921
Marginal effect of *POST* × *NAF*		−0.194	−0.166	−0.280

***, **, * Indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively, determined by one-tailed tests for test variables with a predicted sign, and two-tailed tests otherwise.
The dependent variable is *COMSTK_ISSUE*. Marginal effects are the averages across the effects evaluated at each individual sample observation, computed as in Ai and Norton (2003) and Norton, Wang, and Ai (2004). We omit one year fixed effect for Column (3) due to its perfect correlation with the dependent variable.
Variables are defined in Appendix A.

Overall, the evidence from Table 3 suggests that our main results tend to be particularly strong among firms with highly valuable growth options. This is consistent with firms with less valuable investment opportunities already relying more on debt in the absence of regulatory considerations and, thus, having less capacity to reduce their equity usage, and also with strategic financing choices being particularly beneficial for firms with valuable growth options.

TABLE 3

Common Stock versus Debt Issuance for Groups Sorted on Market-to-Book

Panel A: Tercile Cutoffs Based on Full Sample

Variable	Pred. Sign	Tercile 1 (Lowest MTB) Coefficient (Standard Error)	Tercile 2 Coefficient (Standard Error)	Tercile 3 (Highest MTB) Coefficient (Standard Error)
POST × *NAF*	–	−0.661	−1.159**	−2.085***
		(0.706)	(0.660)	(0.662)
Controls from Table 2		Yes	Yes	Yes
Industry Fixed Effects		Yes	Yes	Yes
Year Fixed Effects		Yes	Yes	Yes
Firm Clustering		Yes	Yes	Yes
Estimation		Logit	Logit	Logit
n		442	442	443
Pseudo R^2		19.6%	30.1%	27.5%
Area under ROC curve		0.789	0.852	0.838
Marginal effect of *POST* × *NAF*		−0.070	−0.185	−0.236
Z-stat for test of equality of *POST* × *NAF* coefficients, high versus low MTB terciles (p value)		1.47* (0.070)		

Panel B: Tercile Cutoffs Determined Annually Based on All Compustat Firms

Variable	Pred. Sign	Tercile 1 (Lowest MTB) Coefficient (Standard Error)	Tercile 2 Coefficient (Standard Error)	Tercile 3 (Highest MTB) Coefficient (Standard Error)
POST × *NAF*	–	0.723	−1.115**	-1.838***
		(0.989)	(0.632)	(0.516)
Controls from Table 2		Yes	Yes	Yes
Industry Fixed Effects		Yes	Yes	Yes
Year Fixed Effects		Yes	Yes	Yes
Firm Clustering		Yes	Yes	Yes
Estimation		Logit	Logit	Logit
n		262	440	625
Pseudo R^2		28.8%	24.8%	30.3%
Area under ROC curve		0.838	0.814	0.853
Marginal effect of *POST* × *NAF*		0.098	−0.151	-0.227
Z-stat for test of equality of *POST* × *NAF* coefficients, high versus low MTB terciles (p value)		−2.26** (0.012)		

***, **, * Indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively, determined by one-tailed tests.
The dependent variable is *COMSTK_ISSUE*. The sample is sorted into terciles using beginning-of-year market-to-book values. In Panel A, the tercile cutoffs are determined by sorting our full sample of firm-years. In Panel B, the tercile cutoffs are determined annually based on all available firms in Compustat. Marginal effects are computed as in Ai and Norton (2003) and Norton et al. (2004). For Tercile 2 of Panel A, we omit one industry fixed effect due to its perfect correlation with the dependent variable. For Tercile 1 of Panel B, we omit one year fixed effect due to its perfect correlation with the dependent variable.
Variables are defined in Appendix A.

Firms that Switch Filing Status

Our main hypothesis implies that non-accelerated filers that later become accelerated filers, perhaps despite relying on debt financing, will lose their preference for debt. We consider this implication by comparing non-accelerated filers that switch filing status to those that do not.

For this analysis, we focus on the post-SOX period and narrow our sample to firms that issued debt or common stock in year *t*–2 as non-accelerated filers. We choose *t*–2 to maintain a tight timeframe and help ensure that the firms are reasonably

TABLE 4

Firms that Switch Filing Status during the Post-SOX Period

Panel A: Firms that Issue Debt as Non-Accelerated Filers in *t*–2

		Financing Choice in Year *t*		
		Common Stock	**Debt Only**	**Total**
Firms that become accelerated filers in *t*–1	n	6	5	11
	%	54.5%	45.5%	100.0%
Firms that remain non-accelerated filers	n	3	11	14
	%	21.4%	78.6%	100.0%
p-value for test of equality for the proportions that issue common stock				0.043

Panel B: Firms that Issue Common Stock as Non-Accelerated Filers in *t*–2

		Financing Choice in Year *t*		
		Common Stock	**Debt Only**	**Total**
Firms that become accelerated filers in *t*–1	n	9	8	17
	%	52.9%	47.1%	100.0%
Firms that remain non-accelerated filers	n	13	6	19
	%	68.4%	31.6%	100.0%
p-value for test of equality for the proportions that issue common stock				0.342

This table compares the frequency of common stock issuances between non-accelerated filers that change to accelerated filers and those that maintain non-accelerated filer status, conditional on whether the initial issuance was debt or common stock. In Panel A (Panel B), the sample is comprised of post-SOX observations from firms that issue debt (common stock) as non-accelerated filers in year *t*–2, some of which become accelerated filers in *t*–1, and some of which remain non-accelerated filers. We then compare these firms' financing choices in year *t*. The p-value in Panel A is one-tailed, based on the prediction that debt issuers will lose their relative preference for debt after becoming non-accelerated filers. We make no prediction for Panel B and, thus, the p-value there is two-sided.

comparable in their previous issuance years. Some of these firms switch to accelerated filers in year *t*–1, and the rest remain non-accelerated filers. We then examine whether their financing choices in year *t* differ.[22]

To hold constant the initial financing choice, we focus first on the 25 firms that issued debt in *t*–2. Table 4, Panel A reports the results. Of the 11 that switch, six (54.5 percent) choose equity after becoming accelerated filers. By contrast, only three of the 14 that remain non-accelerated filers (21.4 percent) choose equity. The difference in these proportions (33.1 percent) is significant at $p < 0.05$. While this result corroborates our main results, the sample here is quite small. Readers should view it in light of that limitation.[23]

For completeness, we also examine the firms that issued common stock in *t*–2. The expectation here is less clear. These firms' previous choice to issue common stock suggests that they view the benefits of avoiding SOX 404 as relatively low. As such, it is unclear that changing to accelerated filer will affect their choice of subsequent financing. Panel B of Table 4 reports the results. The proportion of these firms that issue common stock after switching to accelerated filer is not significantly different from that of those that remain non-accelerated filers ($p = 0.34$).[24]

[22] As in our main tests, accelerated filer status from *t*–1 is used to classify firms that issue in year *t*. We do not require the previous issuance instances (i.e., from year *t*–2) to appear in our main sample, because such a requirement reduces the sample to only seven firms and leaves the analysis infeasible.

[23] We also allow the prior issuance to occur in any previous post-SOX year (instead of just *t*–2). The sample increases to 149 observations. The results are similar to Table 4: among the 54 firms that initially issue debt, those that switch to accelerated filer are 19.9 percent more likely to choose equity in year *t* than those that remain non-accelerated filers ($p = 0.05$); the difference is insignificant for the 95 firms that initially issue equity ($p = 0.95$).

[24] In the Online Appendix Table A3, we expand this sample by not requiring either issuance year to be in our main sample and not requiring that the previous issuance occur specifically in year *t*–2. Instead, we simply require switchers to have public float between $50 million and $100 million in the year of the switch and non-switchers to have float in that range at least one year between their two issuance years. The results are consistent with Table 4.

Are the Control Firms Driving the Results?

On a univariate level, the descriptive statistics in Table 1, Panel B do not reveal much of a difference between the financing choices of non-accelerated filers in the pre- and post-SOX periods. We noted earlier that such univariate comparisons should be interpreted cautiously because they do not control for other factors that affect financing choices. However, because our research question revolves around non-accelerated filers, we perform several analyses here to ensure that our difference-in-differences results are not somehow driven by our particular set of control firms.

First, we recognize that SOX 404 compliance may have improved the information environment for our control firms and reduced information asymmetry both between managers and investors (intrinsic information asymmetry) and between differently informed investors (extrinsic information asymmetry). The pecking order theory suggests that information asymmetry makes equity financing particularly costly relative to debt (e.g., Bharath, Pasquariello, and Wu 2009; Petacchi 2015). Thus, if SOX 404 reduces information asymmetry, then compliance could potentially increase equity usage by our control firms.[25] We address this possibility by adding controls for various aspects of the information environment and information asymmetry, and by using alternative control groups that are not subject to SOX 404.

In Table 5, Panel A, we begin by augmenting Model (1) with controls for institutional ownership, analyst following, and return volatility as proxies for firms' general information environments (e.g., Hong, Lim, and Stein 2000; Leuz and Verrecchia 2000; Weber 2009; Cheng, Dhaliwal, and Neamtiu 2011). We also control for abnormal returns around quarterly earnings announcements as a proxy for intrinsic information asymmetry (e.g., Petacchi 2015). In the subsequent columns, we add three proxies for extrinsic information asymmetry: (1) bid-ask spread (e.g., LaFond and Watts 2008; Khan and Watts 2009); (2) Easley, Kiefer, and O'Hara's (1997) measure of the probability of informed trading (PIN), which is based on the imbalance of buy and sell orders;[26] and (3) Llorente, Michaely, Saar, and Wang's (2002) measure of private information trading based on speculative versus hedging trades. For brevity, we tabulate only the variable of interest ($POST \times NAF$) and the new controls, although all models are estimated with the full set of controls from Table 2. In Columns (1) and (4), there is some weak evidence that firms followed by more analysts are more likely to issue equity. Across columns, the information asymmetry variables are all negatively associated with equity issuance, but their statistical significance is mixed. More importantly, the inclusion of these additional variables has a negligible effect on the interaction of *POST* and *NAF*, which, in all cases, remains negative and significant, with marginal effects similar to Table 2.

In Table 5, Panel B, we employ three alternate control groups not subject to SOX 404 (each selected using the same criteria as our main sample, except as described below):

- Non-accelerated filers with lagged public float less than $50 million. Given their greater distance from the regulatory threshold, these firms should have reduced incentives to alter their financing choices.
- Canadian firms that are publicly traded on Canadian exchanges and have lagged market value of equity less than $100 million (public float is not reported for these firms). Canada does not require audits of internal controls, as in SOX 404. Instead, Canada requires management reporting on controls similar to SOX 302, which applies to all U.S. firms (Lu, Richardson, and Salterio 2011).
- Foreign firms that are U.S. registrants, with fiscal year-ends prior to July 15, 2006. Before that date, foreign registrants were not required to comply with SOX 404, regardless of their accelerated filer status (SEC 2005a). For this analysis, we also limit our domestic firms to firm-years before July 15, 2006 and the foreign registrants to those with lagged market value of equity less than $100 million.

Consistent with our main results, the coefficients on $POST \times NAF$ are negative and statistically significant in all three cases, with marginal effects ranging from −10.2 to −18.0 percent.

In the Online Appendix, we also consider several groups of U.S. registrants with different levels of public float as potential control groups. In Online Appendix Table A4, we increase the size of the control firms in increments of $25 million in public float, up to $200 million. We also separate our main control group into firms with public float above and below $75 million (Hayes 2009). Our treatment group is the *only* group that does not become more likely to issue common stock in the post-SOX period, and our regression results hold using each of the control groups.

We also examine non-accelerated filers that voluntarily comply with SOX 404, which we exclude from our primary analysis (see Section IV). Because these firms already comply, they do not have the same incentive to avoid the $75 million threshold.

[25] While some papers have challenged the pecking order theory, as well as the importance of information asymmetry in the debt-equity choice more generally (e.g., Frank and Goyal 2003; Fama and French 2005; Leary and Roberts 2010), we do not take a position in that debate. Our purpose here is merely to ensure that any SOX-induced differences in information asymmetry do not drive our results.

[26] We use the modified version of PIN, as in Brown and Hillegeist (2007). We thank Stephen Brown for making the PIN data available. The PIN data end in 2010 and hence, so does our sample period when including PIN.

TABLE 5

SOX 404 Effects on the Control Group as a Potential Alternative Explanation

Panel A: Controlling for the General Information Environment and Information Asymmetry

Variable	Predicted Sign	(1)	(2)	(3)[a]	(4)
POST × *NAF*	–	−1.359***	−1.358***	−1.357***	−1.361***
		(0.376)	(0.376)	(0.412)	(0.377)
INST_OWN		−0.692	−0.687	−0.148	−0.698
		(0.537)	(0.544)	(0.590)	(0.538)
NUM_ANALYST		0.067*	0.057	0.009	0.067*
		(0.034)	(0.035)	(0.036)	(0.034)
RET_VOLATILITY		7.113	10.055	1.812	6.599
		(6.753)	(6.813)	(6.976)	(6.724)
ABRET		−1.961	−2.441	−4.285**	−1.983
		(1.998)	(2.012)	(2.095)	(2.001)
SPREAD			−12.141**		
			(5.556)		
PIN				−8.920***	
				(1.284)	
SPEC_TRADE					−0.884
					(0.967)
Controls from Table 2		Yes	Yes	Yes	Yes
Industry and Year Fixed Effects		Yes	Yes	Yes	Yes
Firm Clustering		Yes	Yes	Yes	Yes
n		1,256	1,256	1,122	1,256
Pseudo R^2		36.4%	36.7%	38.8%	36.5%
Area under ROC curve		0.875	0.876	0.886	0.876
Marginal effect of *POST* × *NAF*		−0.198	−0.193	−0.192	−0.198

Panel B: Alternate Control Groups Not Subject to SOX 404

Variable	Pred. Sign	Non-Accelerated Filers with Public Float below $50 Million	Canadian Firms with Market Value of Equity below $100 Million	Foreign Registrants with Market Value of Equity below $100 Million[c]
POST × *NAF*	–	−0.524**	−0.815**	−2.594***
		(0.231)	(0.462)	(0.768)
Controls from Table 2[b]		Yes	Yes	Yes
Industry and Year Fixed Effects		Yes	Yes	Yes
Firm Clustering		Yes	Yes	Yes
n		5,262	764	502
Pseudo R^2		16.7%	26.6%	31.3%
Area under ROC curve		0.769	0.831	0.855
Marginal effect of *POST* × *NAF*		−0.102	−0.132	−0.180

***, **, * Indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively, determined by one-tailed tests for test variables with a predicted sign, and two-tailed tests otherwise.

[a] The sample in Panel A, Column (3) ends in 2010 because our PIN data end in 2010.

[b] *MTR* is omitted when Canadian firms or foreign registrants serve as a control group, because marginal tax rate data are generally only available for U.S. firms.

[c] When foreign registrants serve as a control group, the sample is constrained to firm-years prior to July 15, 2006, when foreign firms were exempt from SOX 404 regardless of accelerated filer status.

The dependent variable is *COMSTK_ISSUE*. The models are estimated with logistic regression. Standard errors are reported in parentheses below coefficient estimates. Marginal effects are computed as in Ai and Norton (2003) and Norton et al. (2004).

Variables are defined in Appendix A.

Employing these voluntary compliers as a control group in an untabulated test, we again find that our main group of non-accelerated filers is less likely to issue common stock in the post-SOX period ($p < 0.01$, marginal effect of −26.2 percent).[27]

Finally, we replace the difference-in-differences specification with separate regressions for non-accelerated filers and control firms. Online Appendix Table A5 shows that after controlling for other factors, the non-accelerated filers are significantly less likely to issue common stock in the post-SOX period than in the pre-SOX period ($p < 0.05$, marginal effect of −10.6 percent). These results contrast with the univariate results and highlight the importance of controlling for other factors that affect financing choices. More importantly, these results cannot be attributable to the control firms.[28]

In sum, the results are robust to additional controls for the information environment and information asymmetry, as well as several alternate control groups, including firms exempt from SOX 404, different-sized accelerated filers, and non-accelerated filers that voluntarily comply with SOX 404. They also hold without a control group. The cumulative evidence consistently suggests that our results are unlikely to be an artifact of a particular control group.

Additional Specification Checks

Restricted Sample Period

As a robustness check, we focus on a tighter period around SOX by restricting the sample to three years on either side of SOX (fiscal years ending in 1999–2001 and 2004–2006).[29] The results are tabulated in Online Appendix Table A7. The coefficient on $POST \times NAF$ remains negative and significant ($p < 0.01$, marginal effect of −23.0 percent), and this result is again concentrated in high MTB firms.

Alternate Measures of Common Stock and Debt Issuance

We consider several alternate approaches to identify issuers of common stock and debt. First, instead of 5 percent of beginning total assets as the cutoff, we use 1 percent. Second, we measure debt issuance from the statement of cash flows, as in Bradshaw, Richardson, and Sloan (2006), which is consistent with our measure of stock issuance, but does not capture capital leases. Third, we remeasure common stock issuance as the product of the change in common shares and the average stock price, as in Fama and French (2005). Fourth, also following Fama and French (2005), we remeasure debt issuance as the change in total liabilities. The coefficient on $POST \times NAF$ remains negative and significant ($p < 0.01$) in all cases (untabulated).

Falsification Tests

A key assumption underlying our design is that, absent SOX, changes over time in the choice between common stock and debt would have been similar for non-accelerated filers and control firms. To assess this "parallel trends" assumption, we follow the suggestion of Roberts and Whited (2013) and repeat the analysis on the pre-event years while falsely assuming that the treatment happens in a pseudo-event year. The coefficient on $POST \times NAF$ is insignificant for each of the five possible pseudo-event years, 1997–2001 (p-values range from 0.24 to 0.77).

We also consider pseudo thresholds of $100 million, $125 million, and $150 million of public float. Similar to our main tests, we form samples of firms with public float within a $50 million band centered on each pseudo threshold. We then redefine *NAF* to be equal to 1 for firms below the pseudo threshold, and 0 for firms above it. The coefficient on $POST \times NAF$ is insignificant in all three cases, with p values ranging from 0.45 to 0.86.

Supplemental Analyses

The Effect on Leverage

Our results on the issuance of common stock versus debt suggest that non-accelerated filers' leverage levels are likely to be affected, as well. We quantify this effect by regressing leverage on our difference-in-differences variables, industry and year

[27] The comparison here is confined to the post-SOX period because there was no voluntary compliance in the pre-SOX period. Instead of a difference-in-differences, *NAF* is the variable of interest (because there is only one period in this test, *POST* and its interaction with *NAF* are omitted).

[28] Online Appendix Table A6 further shows that the results for the non-accelerated filers are statistically significant only for the highest growth option terciles, but the differences across terciles are not statistically significant in these smaller samples.

[29] This restricted period ends prior to the financial crisis and other regulatory changes that occurred in 2007 and 2008: Auditing Standard (AS) 5 became effective; non-accelerated filers became subject to SOX 404(a); eligibility for scaled disclosure requirements as a "smaller reporting company" was expanded to include firms with public float up to $75 million; and the likelihood of permanent exemption from SOX 404(b) for non-accelerated filers was increasing as the SEC repeatedly delayed its implementation (indeed, it became permanent in 2010). Some of these changes potentially weaken the incentives to maintain non-accelerated filer status, while others potentially strengthen them, leaving the expected net effect, if any, ambiguous.

TABLE 6

Leverage Regression

Variable	Predicted Sign	Coefficient (Standard Error)
NAF		0.046***
		(0.014)
POST × *NAF*	+	0.051***
		(0.021)
IND_LEV		0.367***
		(0.059)
MTB		0.011***
		(0.001)
ROA		−0.027***
		(0.010)
LN_ASSETS		0.146***
		(0.006)
TANGIBLE		0.064**
		(0.026)
INFLATION		0.542
		(1.184)
PRICE_CHG		−0.014***
		(0.004)
Industry Fixed Effects		Yes
Year Fixed Effects		Yes
Firm Clustering		Yes
Estimation		OLS
n		1,324
Adj R^2		54.2%

***, **, * Indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively, determined by one-tailed tests for test variables with a predicted sign, and two-tailed tests otherwise.
The dependent variable is *LEV*.
Variables are defined in Appendix A.

fixed effects, and control variables, based on Frank and Goyal (2009), who study a comprehensive list of leverage determinants and identify the most reliable factors. Leverage (*LEV*) is the sum of long- and short-term debt, divided by the sum of debt and market value of equity (Frank and Goyal 2003; Leary and Roberts 2010; Welch 2011).[30] The controls include industry-year median leverage (*IND_LEV*), market-to-book ratio (*MTB*), profitability (*ROA*), total assets (*LN_ASSETS*), asset tangibility (*TANGIBLE*), expected inflation (*INFLATION*), and stock price change (*PRICE_CHG*). All variables are detailed in Appendix A.

Table 6 presents the leverage results. The coefficient for *POST* × *NAF* indicates that leverage increases by about 5.1 percent ($p < 0.01$) for non-accelerated filers relative to control firms in the post-SOX period (the unconditional sample mean for *LEV* is 25 percent). Taken together with our main results, the overall evidence is consistent with the float-based SOX 404 compliance threshold creating incentives for non-accelerated filers to make financing choices that lead to economically and statistically significant increases in their leverage.

Operating Leases and Preferred Stock as Additional Sources of External Financing

Similar to debt (and capital leases), operating leases and preferred stock represent alternative sources of external financing that do not have any direct impact on public float. In this section, we expand our analysis to consider these additional

[30] The results are similar if we exclude preferred stock from the denominator. Three observations from our main sample are excluded from this analysis because of missing data for current-year market value of equity.

alternatives. As with debt, we expect that both operating leases and preferred stock become more attractive relative to common stock for non-accelerated filers in the post-SOX period.

We follow Bratten, Choudhary, and Schipper (2013) and estimate the capitalized value of operating leases as the present value of lease commitments for the next five years and the "thereafter" amount, discounted at 8 percent. The "thereafter" amount is treated as an annuity with an amount equal to the fifth-year lease commitment and a term implied by the annuity amount (term = thereafter amount/fifth-year lease commitment). The change in this capitalized value is our measure of new operating lease financing for the year.[31] Net preferred stock issuance is the change in preferred stock reported on the balance sheet (Hovakimian et al. 2001).

Similar to our approach for common stock and debt, we identify firm-years where the use of operating leases or preferred stock exceeds 5 percent of beginning total assets. We then augment our sample with the additional firm-years that use operating leases or preferred stock and that are not already in our main sample. This results in 210 additional observations, bringing the total to 1,537, of which 154 engage in operating leases and 56 issue preferred stock.

To facilitate comparison with our main results in Table 2, we start with a logit model where the dependent variable is set to 1 for firm-years that finance with debt, operating leases, or preferred stock (but not common stock), and 0 for firms that issue common stock. The results are presented in Column (1) of Table 7. The coefficient on $POST \times NAF$ is positive and significant ($p < 0.01$), and the associated marginal effect of 18.8 percent is similar in magnitude to the marginal effect from Table 2.

We then move to a multinomial logit model that allows each of the three alternatives to be considered separately relative to common stock. As common stock issuers serve as the reference group, we expect a positive sign for each of the coefficients on $POST \times NAF$. The results are presented in the final three columns of Table 7. The coefficient on $POST \times NAF$ is positive and significant ($p < 0.01$) in each column. The marginal effects for debt, operating leases, and preferred stock are 12.7, 1.9, and 4.2 percent, respectively. While the marginal effects for operating leases and preferred stock are modest in an absolute sense, they are sizable relative to the overall proportions of sample firms engaging in operating leases and issuing preferred stock (12.0 and 4.4 percent, respectively). These results reinforce the inference that non-accelerated filers obtaining external financing have strong incentives to pursue options that do not directly boost their public float in the post-SOX period. While not as common as debt, this inference extends to operating leases and preferred stock.

Expanding the Sample to Include Non-Issuers

Our main sample is constrained to firms that access external capital, which has the advantage of holding constant the decision to obtain financing and focusing instead on the sources of that financing. We relax that constraint here to examine the extent to which non-accelerated filers replace stock issuance in the post-SOX period with debt issuance. This expands the sample to 3,716 observations.

We then reestimate Model (1) separately for the likelihood of common stock issuance and the likelihood of debt issuance. Table 8 presents the results. For the common stock issuance regression in Column (1), the estimated coefficient on $POST \times NAF$ is negative and significant at $p < 0.01$. We observe the opposite effect for debt issuance in Column (2), where the coefficient on the interaction term is positive and significant at $p < 0.05$. In Column (3), we reestimate the debt regression after also including operating leases and preferred stock. The interaction term is again positive and significant at $p < 0.05$.

Taken together, the results from Table 8 suggest that the decrease in non-accelerated filers' propensities to issue common stock is substantially replaced by increased propensities to access external financing from other sources that do not directly impact public float. The marginal effects indicate that debt alone accounts for slightly more than half of the effect (5.6/−10.0). When operating leases and preferred stock are also considered, the proportion increases to roughly two-thirds (6.9/−10.0).

VI. SUMMARY AND CONCLUSION

We use the setting of SOX 404 to provide evidence on firms' strategic financing choices in response to a tiered regulatory regime where exemptions are based on public float. Firms with public float below $75 million were granted several delays for SOX 404 implementation and were eventually granted permanent exemption from the audit requirement. Because public float hinges on the market value of common equity, such a regulatory structure creates incentives for firms to shift their sources of financing toward debt and away from common equity.

[31] As an alternative, we estimate the capitalized value of operating leases as current rental expense multiplied by 10, following Rampini and Viswanathan (2013). The results are consistent with those using the Bratten et al. (2013) measure.

TABLE 7

Debt, Operating Leases, and Preferred Stock as Alternatives to Common Stock

Variable	Pred. Sign	(1) Likelihood of Financing via Debt, Operating Leases, or Preferred Stock Instead of Common Stock Coeff. (Std. Err.)	(2) Debt Coeff. (Std. Err.)	(3) Operating Lease Coeff. (Std. Err.)	(4) Preferred Stock Coeff. (Std. Err.)
NAF		−0.254	−0.187	−0.510*	−0.269
		(0.181)	(0.198)	(0.282)	(0.417)
POST × *NAF*	+	1.335***	1.255***	1.063***	1.606***
		(0.308)	(0.353)	(0.469)	(0.576)
PRICE_CHG		−0.283***	−0.254***	−0.357***	−0.336
		(0.079)	(0.084)	(0.128)	(0.232)
MTB		0.011	0.002	−0.043	0.016
		(0.046)	(0.058)	(0.065)	(0.082)
LEV_DEV		−1.460***	−1.540***	−2.258***	−0.041
		(0.488)	(0.531)	(0.699)	(0.812)
ROA		−0.060	0.200	1.221*	−0.816**
		(0.253)	(0.323)	(0.626)	(0.412)
LOSS		−0.651***	−0.811***	−0.019	0.347
		(0.197)	(0.220)	(0.296)	(0.429)
LN_ASSETS		0.879***	1.014***	0.600***	0.659***
		(0.138)	(0.156)	(0.178)	(0.249)
TANGIBLE		−0.315	−0.421	−0.069	−0.273
		(0.365)	(0.403)	(0.463)	(0.654)
RD_SALES		−0.057**	−0.127	−0.102**	−0.021
		(0.026)	(0.078)	(0.048)	(0.022)
MTR		3.866***	3.893***	3.756**	−0.070
		(0.964)	(1.128)	(1.510)	(2.015)
AGE		0.023**	0.028***	0.015	−0.013
		(0.009)	(0.009)	(0.012)	(0.020)
Industry Fixed Effects		Yes		Yes	
Year Fixed Effects		Yes		Yes	
Firm Clustering		Yes		Yes	
Estimation		Logit		Multinomial Logit	
n		1,537		1,537	
Pseudo R^2		31.5%		27.6%	
Dep. Var. = 1		913	660	185	68
Marginal Effect of *POST* × *NAF*		0.188	0.127	0.019	0.042

***, **, * Indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively, determined by one-tailed tests for test variables with a predicted sign, and two-tailed tests otherwise.

The dependent variable for the logit model in Column (1) is *DEBT_LEASE_PS*. For the multinomial logit model in Columns (2)–(4), debt, operating leases, and preferred stock are represented by *DEBT_ISSUE, LEASE_USE,* and *PREFSTK_ISSUE,* respectively. The reference group is common stock issuers (*COMSTK_ISSUE*). Firms engaging in two or more activities among debt, operating leases, and preferred stock are classified as financing with the one with the largest amount. Reported marginal effects are averages across the effects evaluated at each individual sample observation.

Variables are defined in Appendix A.

We employ a difference-in-differences design with a control group of firms just above the $75 million threshold. We show that firms below the threshold increase their propensity to be net issuers of debt, and decrease their propensity to be net issuers of common stock in the post-SOX period, relative to control firms. These results are consistent with firms altering their financing choices to maintain their exemption and avoid costly regulation. The results are generally strongest among firms with

TABLE 8

Financing Choices in Expanded Sample Including Firms that Do Not Raise External Capital

Variable	Pred. Sign	(1) Dependent Variable: *COMSTK_ISSUE* Coeff. (Std. Err.)	Pred. Sign	(2) Dependent Variable: *DEBT_ISSUE* Coeff. (Std. Err.)	(3) Dependent Variable: *DEBT_LEASE_PS* Coeff. (Std. Err.)
NAF		0.313*		−0.078	−0.108
		(0.162)		(0.126)	(0.117)
POST × *NAF*	−	−1.143***	+	0.395**	0.391**
		(0.249)		(0.201)	(0.180)
PRICE_CHG		0.320***		0.133***	0.068
		(0.059)		(0.051)	(0.048)
MTB		0.034		−0.036	-0.030
		(0.035)		(0.038)	(0.032)
LEV_DEV		1.444***		0.179	0.078
		(0.374)		(0.258)	(0.230)
ROA		−0.446**		0.224	0.027
		(0.198)		(0.248)	(0.211)
LOSS		0.371**		−0.399***	−0.301***
		(0.157)		(0.130)	(0.114)
LN_ASSETS		−0.885***		0.112	0.027
		(0.107)		(0.080)	(0.071)
TANGIBLE		0.919***		0.334	0.326
		(0.305)		(0.223)	(0.201)
RD_SALES		0.021*		−0.073**	−0.042*
		(0.011)		(0.033)	(0.022)
MTR		−3.919***		1.010	1.018
		(0.780)		(0.802)	(0.676)
AGE		−0.031***		−0.005	−0.008*
		(0.008)		(0.005)	(0.004)
Industry Fixed Effects		Yes		Yes	Yes
Year Fixed Effects		Yes		Yes	Yes
Firm Clustering		Yes		Yes	Yes
Estimation		Logit		Logit	Logit
n		3,716		3,716	3,716
Pseudo R^2		31.3%		6.7%	5.3%
Area under ROC curve		0.862		0.682	0.659
Marginal effect of *POST* × *NAF*		−0.100		0.056	0.069

***, **, * Indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively, determined by one-tailed tests for test variables with a predicted sign, and two-tailed tests otherwise.
The sample for this table is expanded to include firms that do not raise external capital. Marginal effects are computed using the method of Ai and Norton (2003) and Norton et al. (2004).
Variables are defined in Appendix A.

valuable growth opportunities, which is consistent with the strategic financing choice being particularly beneficial for such firms. We also find that firms below the threshold increase their leverage levels in the post-SOX period, as well as their use of operating leases and preferred stock, which do not count toward public float.

Our results demonstrate an important consequence of basing regulatory tiers on the value of common equity, which should be informative for future policy debates. To the extent that altered financing choices and extra leverage are costly (e.g., van Binsbergen et al. 2010), our results suggest that bright-line regulatory thresholds can impose costs even on firms that qualify for exemption. By documenting that firms appear to alter their financing choices to avoid SOX 404 compliance, our results also contribute to the literature on the economic consequences of SOX. More generally, they highlight the potentially important role

that regulatory thresholds can play in corporate finance decisions and should be considered by future research on financing choices and capital structure, especially as it relates to smaller firms.

REFERENCES

Advisory Committee on Smaller Public Companies (ACSPC). 2006. *Final Report of the Advisory Committee on Smaller Public Companies to the U.S. Securities and Exchange Commission*. (April 23). Washington, DC: U.S. Securities and Exchange Commission.

Ai, C., and E. Norton. 2003. Interaction terms in logit and probit models. *Economics Letters* 80 (1): 123–129. https://doi.org/10.1016/S0165-1765(03)00032-6

Albuquerque, A., and J. L. Zhu. 2019. Has Section 404 of the Sarbanes-Oxley Act discouraged corporate investment? New evidence from a natural experiment. *Management Science* 65 (7): 3423–3446. https://doi.org/10.1287/mnsc.2018.3090

Alexander, C., S. Bauguess, G. Bernile, Y. Lee, and J. Marietta-Westberg. 2013. Economic effects of SOX Section 404 compliance: A corporate insider perspective. *Journal of Accounting and Economics* 56 (2/3): 267–290. https://doi.org/10.1016/j.jacceco.2013.09.002

Anginer, D., M. P. Narayanan, C. Schipani, and H. Seyhun. 2012. Should size matter when regulating firms? Implications from backdating of executive options. *New York University Journal of Legislation and Public Policy* 15 (1): 1–44.

Baker, M., and J. Wurgler. 2002. Market timing and capital structure. *Journal of Finance* 57 (1): 1–32. https://doi.org/10.1111/1540-6261.00414

Beck, T., A. Demirgüç-Kunt, and V. Maksimovic. 2008. Financing patterns around the world: Are small firms different? *Journal of Financial Economics* 89 (3): 467–487. https://doi.org/10.1016/j.jfineco.2007.10.005

Bernard, D., D. Burgstahler, and D. Kaya. 2018. Size management by European private firms to minimize proprietary costs of disclosure. *Journal of Accounting and Economics* 66 (1): 94–122. https://doi.org/10.1016/j.jacceco.2018.03.001

Bharath, S., P. Pasquariello, and G. Wu. 2009. Does asymmetric information drive capital structure decisions? *Review of Financial Studies* 22 (8): 3211–3243. https://doi.org/10.1093/rfs/hhn076

Black, B., H. Jang, and W. Kim. 2006. Does corporate governance predict firms' market values? Evidence from Korea. *Journal of Law, Economics, and Organization* 22 (2): 366–413. https://doi.org/10.1093/jleo/ewj018

Blouin, J., J. Core, and W. Guay. 2010. Have the tax benefits of debt been overstated? *Journal of Financial Economics* 98 (2): 195–213. https://doi.org/10.1016/j.jfineco.2010.04.005

Bradford, S. 2004. Does size matter? An economic analysis of small business exemptions from regulation. *Journal of Small and Emerging Business Law* 8 (1): 1–37.

Bradshaw, M., S. Richardson, and R. Sloan. 2006. The relation between corporate financing activities, analysts' forecasts and stock returns. *Journal of Accounting and Economics* 42 (1/2): 53–85. https://doi.org/10.1016/j.jacceco.2006.03.004

Bratten, B., P. Choudhary, and K. Schipper. 2013. Evidence that market participants assess recognized and disclosed items similarly when reliability is not an issue. *The Accounting Review* 88 (4): 1179–1210. https://doi.org/10.2308/accr-50421

Brown, S., and S. Hillegeist. 2007. How disclosure quality affects the level of information asymmetry. *Review of Accounting Studies* 12 (2/3): 443–477. https://doi.org/10.1007/s11142-007-9032-5

Bryant-Kutcher, L., E. Peng, and D. Weber. 2013. Regulating the timing of disclosure: Insights from the acceleration of 10-K filing deadlines. *Journal of Accounting and Public Policy* 32 (6): 475–494. https://doi.org/10.1016/j.jaccpubpol.2013.08.003

Cassell, C., L. Myers, and J. Zhou. 2013. *The effect of voluntary internal control audits on the cost of capital*. Working paper, University of Arkansas and University of Hawaii at Manoa.

Cheng, M., D. Dhaliwal, and M. Neamtiu. 2011. Asset securitization, securitization recourse, and information uncertainty. *The Accounting Review* 86 (2): 541–568. https://doi.org/10.2308/accr.00000020

Chhaochharia, V., and Y. Grinstein. 2007. Corporate governance and firm value: The impact of the 2002 governance rules. *Journal of Finance* 62 (4): 1789–1825. https://doi.org/10.1111/j.1540-6261.2007.01257.x

Chhaochharia, V., C. Otto, and V. Vig. 2011. The unintended effects of the Sarbanes-Oxley Act. *Journal of Institutional and Theoretical Economics* 167 (1): 149–164. https://doi.org/10.1628/093245611794656435

Coates, J., and S. Srinivasan. 2014. SOX after ten years: A multidisciplinary review. *Accounting Horizons* 28 (3): 627–671. https://doi.org/10.2308/acch-50759

Covas, F., and W. Den Haan. 2011. The cyclical behavior of debt and equity finance. *American Economic Review* 101 (2): 877–899. https://doi.org/10.1257/aer.101.2.877

Dharmapala, D. 2016. *Estimating the compliance costs of securities regulation: A bunching analysis of Sarbanes-Oxley Section 404(b)*. Working paper, The University of Chicago.

Dixon, L., S. Gates, K. Kapur, S. Seabury, and E. Talley. 2007. The impact of regulation and litigation on small businesses and entrepreneurship: An overview. In *In the Name of Entrepreneurship? The Logic and Effects of Special Regulatory Treatment for Small Business*, edited by Gates, S., and K. Leuschner, 17–68. Santa Monica, CA: Rand.

Easley, D., N. Kiefer, and M. O'Hara. 1997. One day in the life of a very common stock. *Review of Financial Studies* 10 (3): 805–835. https://doi.org/10.1093/rfs/10.3.805

Engel, E., R. Hayes, and X. Wang. 2007. The Sarbanes-Oxley Act and firms' going-private decisions. *Journal of Accounting and Economics* 44 (1/2): 116–145. https://doi.org/10.1016/j.jacceco.2006.07.002

Ettredge, M., M. Sherwood, and L. Sun. 2018. Effects of SOX 404(b) implementation on audit fees by SEC filer size category. *Journal of Accounting and Public Policy* 37 (1): 21–38. https://doi.org/10.1016/j.jaccpubpol.2018.01.004

Fama, E., and K. French. 2005. Financing decisions: Who issues stock? *Journal of Financial Economics* 76 (3): 549–582. https://doi.org/10.1016/j.jfineco.2004.10.003

Frank, M., and V. Goyal. 2003. Testing the pecking order theory of capital structure. *Journal of Financial Economics* 67 (2): 217–248. https://doi.org/10.1016/S0304-405X(02)00252-0

Frank, M., and V. Goyal. 2009. Capital structure decisions: Which factors are reliably important? *Financial Management* 38 (1): 1–37. https://doi.org/10.1111/j.1755-053X.2009.01026.x

Gao, F. 2016. To comply or not to comply: Understanding the discretion in reporting public float and SEC regulations. *Contemporary Accounting Research* 33 (3): 1075–1100. https://doi.org/10.1111/1911-3846.12170

Gao, F., J. Wu, and J. Zimmerman. 2009. Unintended consequences of granting small firms exemptions from securities regulation: Evidence from the Sarbanes-Oxley Act. *Journal of Accounting Research* 47 (2): 459–506. https://doi.org/10.1111/j.1475-679X.2009.00319.x

Gates, S., and K. Leuschner (eds.) 2007. *In the Name of Entrepreneurship? The Logic and Effects of Special Regulatory Treatment for Small Business*. Santa Monica, CA: Rand.

Ge, W., A. Koester, and S. McVay. 2017. Benefits and costs of Sarbanes-Oxley Section 404(b) exemption: Evidence from small firms' internal control disclosures. *Journal of Accounting and Economics* 63 (2/3): 358–384. https://doi.org/10.1016/j.jacceco.2017.01.001

Graham, J., and M. Leary. 2011. A review of empirical capital structure research and directions for the future. *Annual Review of Financial Economics* 3 (1): 309–345. https://doi.org/10.1146/annurev-financial-102710-144821

Hamilton, J., and T. Trautman. 2002. *Sarbanes-Oxley Act of 2002: Law and Explanation*. Chicago, IL: CCH.

Hayes, R. 2009. Discussion of: Unintended consequences of granting small firms exemptions from securities regulation: Evidence from the Sarbanes-Oxley Act. *Journal of Accounting Research* 47 (2): 507–518.

Heller, M. 2015. SOX compliance getting more costly. *CFO* (May 20). Available at: https://www.cfo.com/auditing/2015/05/sox-compliance-getting-costly/

Hong, H., T. Lim, and J. Stein. 2000. Bad news travels slowly: Size, analyst coverage and the profitability of momentum strategies. *Journal of Finance* 55 (1): 265–295. https://doi.org/10.1111/0022-1082.00206

Hovakimian, A. 2004. The role of target leverage in security issues and repurchases. *Journal of Business* 77 (4): 1041–1072. https://doi.org/10.1086/422442

Hovakimian, A., T. Opler, and S. Titman. 2001. The debt-equity choice. *Journal of Financial and Quantitative Analysis* 36 (1): 1–24. https://doi.org/10.2307/2676195

Hovakimian, A., G. Hovakimian, and H. Tehranian. 2004. Determinants of target capital structure: The case of dual debt and equity issues. *Journal of Financial Economics* 71 (3): 517–540. https://doi.org/10.1016/S0304-405X(03)00181-8

Iliev, P. 2010. The effect of SOX Section 404: Costs, earnings quality, and stock prices. *Journal of Finance* 65 (3): 1163–1196. https://doi.org/10.1111/j.1540-6261.2010.01564.x

Jensen, M. 1986. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review* 76 (2): 323–329.

Jensen, M., and W. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3 (4): 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Kajüter, P., F. Klassmann, and M. Nienhaus. 2019. The effect of mandatory quarterly reporting on firm value. *The Accounting Review* 94 (3): 251–277. https://doi.org/10.2308/accr-52212

Kamar, E., P. Karaca-Mandic, and E. Talley. 2007. Sarbanes-Oxley's effects on small firms: What is the evidence? In *In the Name of Entrepreneurship? The Logic and Effects of Special Regulatory Treatment for Small Business*, edited by Gates, S., and K. Leuschner, 143–168. Santa Monica, CA: Rand.

Kang, Q., Q. Liu, and R. Qi. 2010. The Sarbanes-Oxley Act and corporate investment: A structural assessment. *Journal of Financial Economics* 96 (2): 291–305. https://doi.org/10.1016/j.jfineco.2010.02.002

Khan, M., and R. Watts. 2009. Estimation and empirical properties of a firm-year measure of accounting conservatism. *Journal of Accounting and Economics* 48 (2/3): 132–150. https://doi.org/10.1016/j.jacceco.2009.08.002

Kinney, W., and M. Shepardson. 2011. Do control effectiveness disclosures require SOX 404(b) internal control audits? A natural experiment with small U.S. public companies. *Journal of Accounting Research* 49 (2): 413–448. https://doi.org/10.1111/j.1475-679X.2011.00400.x

Kravet, T., S. McVay, and D. Weber. 2018. Costs and benefits of internal control audits. Evidence from M&A transactions. *Review of Accounting Studies* 23 (4): 1389–1423. https://doi.org/10.1007/s11142-018-9468-9

LaFond, R., and R. Watts. 2008. The information role of conservatism. *The Accounting Review* 83 (2): 447–478. https://doi.org/10.2308/accr.2008.83.2.447

Leary, M., and M. Roberts. 2010. The pecking order, debt capacity, and information asymmetry. *Journal of Financial Economics* 95 (3): 332–355. https://doi.org/10.1016/j.jfineco.2009.10.009

Leuz, C., and R. Verrecchia. 2000. The economic consequences of increased disclosure. *Journal of Accounting Research* 38 (Supplement): 91–124. https://doi.org/10.2307/2672910

Leuz, C., A. Triantis, and T. Wang. 2008. Why do firms go dark? Causes and economic consequences of voluntary SEC deregistrations. *Journal of Accounting and Economics* 45 (2/3): 181–208. https://doi.org/10.1016/j.jacceco.2008.01.001

Lewellen, K. 2006. Financing decisions when managers are risk averse. *Journal of Financial Economics* 82 (3): 551–589. https://doi.org/10.1016/j.jfineco.2005.06.009

Li, X. 2014. The Sarbanes-Oxley Act and cross-listed foreign private issuers. *Journal of Accounting and Economics* 58 (1): 21–40. https://doi.org/10.1016/j.jacceco.2014.05.001

Llorente, G., R. Michaely, G. Saar, and J. Wang. 2002. Dynamic volume-return relation of individual stocks. *Review of Financial Studies* 15 (4): 1005–1047. https://doi.org/10.1093/rfs/15.4.1005

Lu, H., G. Richardson, and S. Salterio. 2011. Direct and indirect effects of internal control weaknesses on accrual quality: Evidence from a unique Canadian regulatory setting. *Contemporary Accounting Research* 28 (2): 675–707. https://doi.org/10.1111/j.1911-3846.2010.01058.x

Lucas, D., and R. McDonald. 1990. Equity issues and stock price dynamics. *Journal of Finance* 45 (4): 1019–1043. https://doi.org/10.1111/j.1540-6261.1990.tb02425.x

Myers, S. 1977. Determinants of corporate borrowing. *Journal of Financial Economics* 5 (2): 147–175. https://doi.org/10.1016/0304-405X(77)90015-0

Myers, S. 1984. The capital structure puzzle. *Journal of Finance* 39 (3): 574–592. https://doi.org/10.1111/j.1540-6261.1984.tb03646.x

Myers, S. 2003. Financing of corporations. In *Handbook of the Economics of Finance*. Volume 1A, edited by Constantinides, G., M. Harris, and R. Stulz, 215–253. Amsterdam, The Netherlands: Elsevier.

Myers, S., and N. Majluf. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13 (2): 187–221. https://doi.org/10.1016/0304-405X(84)90023-0

Nondorf, M., Z. Singer, and H. You. 2012. A study of firms surrounding the threshold of Sarbanes-Oxley Section 404 compliance. *Advances in Accounting* 28 (1): 96–110. https://doi.org/10.1016/j.adiac.2012.02.009

Norton, E., H. Wang, and C. Ai. 2004. Computing interaction effects and standard errors in logit and probit models. *Stata Journal* 4 (2): 154–167. https://doi.org/10.1177/1536867X0400400206

Petacchi, R. 2015. Information asymmetry and capital structure: Evidence from Regulation FD. *Journal of Accounting and Economics* 59 (2/3): 143–162. https://doi.org/10.1016/j.jacceco.2015.01.002

Piotroski, J., and S. Srinivasan. 2008. Regulation and bonding: The Sarbanes-Oxley Act and the flow of international listings. *Journal of Accounting Research* 46 (2): 383–425. https://doi.org/10.1111/j.1475-679X.2008.00279.x

Rampini, A., and S. Viswanathan. 2013. Collateral and capital structure. *Journal of Financial Economics* 109 (2): 466–492. https://doi.org/10.1016/j.jfineco.2013.03.002

Roberts, M., and T. Whited. 2013. Endogeneity in empirical corporate finance. In *Handbook of the Economics of Finance*, Volume 2A, edited by Constantinides, G., M. Harris, and R. Stulz, 493–572. Amsterdam, The Netherlands: Elsevier.

Rubin, G. 2019. SEC moves to ease audits for smaller companies. *Wall Street Journal* (May 10). Available at: https://www.wsj.com/articles/sec-moves-to-ease-accounting-requirements-for-smaller-companies-11557411945

Schwartz, J. 2014. The law and economics of scaled equity market regulation. *The Journal of Corporation Law* 39 (2): 347–394.

Securities and Exchange Commission (SEC). 2002. *Final Rule: Acceleration of Periodic Report Filing Dates and Disclosure Concerning Website Access to Reports. Release Nos. 33-8128, 34-46464*. Washington, DC: SEC.

Securities and Exchange Commission (SEC). 2003. *SEC Implements Internal Control Provision of Sarbanes-Oxley Act; Adopts Investment Company R&D Safe Harbor. Release 2003-66*. Washington, DC: SEC.

Securities and Exchange Commission (SEC). 2004. *Final Rule: Management's Report on Internal Control over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports. Release Nos. 33-8392, 34-49313*. Washington, DC: SEC.

Securities and Exchange Commission (SEC). 2005a. *Management's Report on Internal Control over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports of Non-Accelerated Filers and Foreign Private Issuers. Release Nos. 33-8545, 34-51293*. Washington, DC: SEC.

Securities and Exchange Commission (SEC). 2005b. *Revisions to Accelerated Filer Definition and Accelerated Deadlines for Filing Periodic Reports. Release Nos. 33-8644, 34-52989*. Washington, DC: SEC.

Securities and Exchange Commission (SEC). 2009. *Study of the Sarbanes-Oxley Act of 2002 Section 404 Internal Control over Financial Reporting Requirements*. Washington, DC: SEC.

Securities and Exchange Commission (SEC). 2011. *Study and Recommendations on Section 404(b) of the Sarbanes-Oxley Act of 2002 for Issuers with Public Float between $75 and $250 Million*. Washington, DC: SEC.

Securities and Exchange Commission (SEC). 2016. *Amendments to the Smaller Reporting Company Definition. Release Nos. 33-10107, 34-78168*. Washington, DC: SEC.

Securities and Exchange Commission (SEC). 2019. *Amendments to the Accelerated Filer and Large Accelerated Filer Definitions. Release No. 34-85814*. Washington, DC: SEC.

van Binsbergen, J., J. Graham, and J. Yang. 2010. The cost of debt. *Journal of Finance* 65 (6): 2089–2136. https://doi.org/10.1111/j.1540-6261.2010.01611.x

Weber, D. 2009. Do analysts and investors fully appreciate the implications of book-tax differences for future earnings? *Contemporary Accounting Research* 26 (4): 1175–1206. https://doi.org/10.1506/car.26.4.7

Welch, I. 2011. Two common problems in capital structure research: The financial-debt-to-asset ratio and issuing activity versus leverage changes. *International Review of Finance* 11 (1): 1–17.

Zhang, I. 2007. Economic consequences of the Sarbanes-Oxley Act of 2002. *Journal of Accounting and Economics* 44 (1/2): 74–115. https://doi.org/10.1016/j.jacceco.2007.02.002

APPENDIX A
Variable Definitions

Panel A: Variables Used in Main Tests

Name	Definition [Compustat Data Items in Brackets]
Dependent Variable	
COMSTK_ISSUE	1 for firm-years with net issuances of common stock greater than or equal to 5 percent of beginning total assets, and 0 otherwise. Net issuance is measured as the proceeds from the sale of stock minus the costs of repurchasing stock, as reported on the statement of cash flows, less the change in preferred stock reported on the balance sheet [SSTK − PRSTKC − Change in PSTKL].
Test Variables	
POST	1 for fiscal years starting on or after June 1, 2003, and 0 for fiscal years ending on or before December 31, 2001.
NAF	Indicator variable for non-accelerated filers. In the post-SOX period, 1 for firms that file as non-accelerated filers or smaller reporting companies in year $t-1$, with public float below $75 million, and 0 otherwise. Filing status obtained from Audit Analytics (variables *HST_IS_ACCEL_FILER* and *HST_IS_SMALL_REPORT*). In the pre-SOX period, 1 for firms with public float below $75 million in their 10-K filing for $t-1$ and all prior years available in EDGAR, and 0 otherwise.
Control Variables	(unless otherwise noted, control variables are measured as of year $t-1$)
PRICE_CHG	Ratio of split-adjusted stock price at the end of year $t-1$ to that at the beginning of year $t-1$ [(PRCC_F/AJEX)/lagged(PRCC_F/AJEX)].
MTB	Ratio of the market value of assets to the book value of assets [(AT − CEQ + CSHO • PRCC_F)/AT].
LEV_DEV	Difference between firm leverage and median industry leverage. Firm leverage is the sum of long-term and short-term debt divided by the market value of debt and equity [(DLTT + DLC)/(DLTT + DLC + CSHO • PRCC_F + PSTKL)]. Industry leverage is among all Compustat firms in the same two-digit SIC industry and in the same fiscal year.
ROA	Income before interest and taxes divided by lagged total assets [(IB + XINT + TXT)/lagged(AT)].
LOSS	1 for firm-years with accounting losses, and 0 otherwise [IB < 0].
LN_ASSETS	Natural logarithm of total assets [ln(AT)].
TANGIBLE	Ratio of tangible assets to total assets [PPENT/AT].
RD_SALES	Ratio of research and development expense to sales [XRD/SALE]. Set to 0 if research and development expense is missing.
MTR	Pre-financing marginal tax rate per Blouin et al. (2010).
AGE	Number of years since firm's first appearance in Compustat.

Panel B: Additional Variables Used in Sensitivity Tests and Supplementary Analyses

Name	Definition [Compustat Data Items in Brackets]
FLOAT	Public float, from year $t-1$ 10-K filing.
INST_OWN	Proportion of common stock held by institutional investors, as reported in Form 13F filings, averaged over the four quarters of year $t-1$. Data from Thomson Reuters.
NUM_ANALYST	Number of unique financial analysts issuing one-year-ahead earnings forecasts for the firm during year $t-1$. Data from I/B/E/S.
RET_VOLATILITY	Standard deviation of daily stock returns over year $t-1$. Data from CRSP.
ABRET	The average of absolute cumulative abnormal returns during the three days around each of the four quarterly earnings announcements for year $t-1$. Abnormal returns are market model residuals, where the market model is estimated over the preannouncement window (−200, −11). Data from CRSP.
SPREAD	Daily closing bid-ask spread divided by daily closing stock price, averaged over year $t-1$. Data from CRSP.
PIN	Modified probability of informed trading (PIN), as in Brown and Hillegeist (2007), for year $t-1$. Data from Stephen Brown's website is available at: http://scholar.rhsmith.umd.edu/sbrown/pin-data
SPEC_TRADE	The extent of speculative versus hedging trade, as measured per the following model from Llorente et al. (2002), estimated using all trading days from year $t-1$: $RET_{d+1} = \beta_0 + \beta_1 RET_d + \beta_2(V_d \times RET_d) + \varepsilon_{d+1}$ where RET_d is daily stock return for day d, and V_d is the log of daily turnover detrended by the average log turnover for the same stock over the prior 200 days. *SPEC_TRADE* takes the value of β_2. Higher values of β_2 reflect more speculative trading (more private information).

(continued on next page)

APPENDIX A (continued)

Name	Definition [Compustat Data Items in Brackets]
LEV	Sum of long-term and short-term debt divided by the market value of debt and equity [(DLTT + DLC)/(DLTT + DLC + CSHO • PRCC_F + PSTKL)].
IND_LEV	Median value of *LEV* among all Compustat firms in the same two-digit SIC industry in year $t-1$.
INFLATION	Expected percentage change in consumer price index over the next year from the Livingston Survey (available at: https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey/historical-data/).
DEBT_ISSUE	1 for firm-years with net borrowing (but not common stock issuance) greater than or equal to 5 percent of beginning total assets, and 0 otherwise. Net borrowing is measured as change in the book value of debt as reported on the balance sheet [change in (DLTT + DLC)].
LEASE_USE	1 for firm-years with changes in the capitalized value of operating leases greater than or equal to 5 percent of beginning total assets, and 0 otherwise. Set to 0 for issuers of common stock. Capitalized value of operating leases is the present value of operating lease commitments for the next five years [MRC1 through MRC5] and the "thereafter" amount [MRCTA], discounted at 8 percent. The "thereafter" amount is treated as an annuity with an amount equal to the fifth-year lease commitment [MRC5] and a term implied by the annuity amount [MRCTA/MRC5].
PREFSTK_ISSUE	1 for firm-years with net issuances of preferred stock (but not common stock) greater than or equal to 5 percent of beginning total assets, and 0 otherwise. Net issuance is measured as the change in the balance of preferred stock as reported on the balance sheet [change in PSTKL].
DEBT_LEASE_PS	Same as *DEBT_ISSUE,* except also set equal to 1 if either *LEASE_USE* = 1 or *PREFSTK_ISSUE* = 1.

APPENDIX B

accr-52518_Online Appendix: http://dx.doi.org/10.2308/accr-52518.s01