How Do Informational Frictions Affect the Firm's Choice of Asset Liquidity? The Effect of SOX Section 404

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January, 2013

Abstract: Although existing theories predict a causal link between informational frictions in financial markets and a firm's choice of asset liquidity, the lack of an exogenous and clean measure of informational frictions hinders the precise identification of this link. Using the discontinuous requirement of financial reporting introduced by Section 404 of the Sarbanes-Oxley Act, we identify a causal effect of informational frictions on the holding of liquid assets. By employing the cash ratio as a measure of corporate liquidity, we show that firms that comply with Section 404 and provide more reliable information to the financial markets reduce their holding of liquid assets compared to observationally similar firms. In the cross-section, the reduction in asset liquidity is more pronounced among firms that face financial constraints and agency conflicts, consistent with such firms having a high opportunity cost of funds. Finally, firms that comply with Section 404 and hold less cash present a higher expenditure in R&D relative to firms not complying with the rule. This difference sheds light on the opportunity cost of holding cash.

*I am grateful to Radhakrishnan Gopalan, Ohad Kadan, Mark T. Leary and Anjan Thakor and to participants of the Brown Bag Seminar at the Olin Business School for their helpful and valuable comments on an earlier draft. I alone am responsible for any errors.

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1 Motivation

How do informational frictions affect the firm's choice of asset liquidity? While the holding of liquid assets is irrelevant for a firm's value in a frictionless world, information-based theories provide a rationale for the holding of liquid assets. Informational frictions in financial markets such as non-verifiable information (Hart and Moore (1988) and Stein (2002)), moral hazard (Thakor (1990), Holmstrom and Tirole (1997)), adverse selection (Stiglitz and Weiss (1981); Myers and Majluf (1984)) or agency problems arising from unobservable managerial actions (Jensen (1986)) may introduce a gap between the cost of internal and external funds. In spite of the lack of a liquidity premium and the opportunity cost entailed by the holding of liquid assets, firms that face a higher cost of external funds induced by informational frictions may find the holding of saleable assets more profitable to self-finance future valuable projects, cope with adverse shocks, or increase the access to external funds by easing contracting.[1] Along these lines, Williamson (1988), Thakor (1990), Shleifer and Vishny (1992), Kim et al. (1998) and Opler et al. (1999) argue that a firm's optimal investment in liquidity will increase with its cost of external financing and the extent of its financial constraints induced by informational frictions in financial markets.

This paper investigates the relationship between the amount of liquid assets held by small public firms and the informational frictions faced by them in financial markets. The difficulties in the identification of this link are twofold. First, the challenge is to isolate an exogenous change in the firm's information environment that is unrelated to its fundamentals. The usual proxies for a firm's informational frictions such as size (Ozkan and Ozkan (2004)), credit rating status (Opler et al. (1999)) and R&D intensity (Harford (1999); Opler et al. (1999); Dittmar et al. (2003)), to name a few, are likely to be correlated with omitted variables that may also affect the firm's investment in liquid assets, thereby resulting in the extraction of ambiguous inference.[2] Likewise, omitted variables, such

[1] The holding of liquid assets may also alleviate contractibility problems given that those assets may sustain a higher debt and increase the (liquidation) value captured by creditors in the default state; Shleifer and Vishny (1992).

[2] For example, firms with high degrees of product specialization and high R&D expenditures may be considered more

as the existence of private benefits of control, that affect the hoarding of liquid assets (Jensen (1986)) as well as the firm's decision to address informational frictions (Healy and Palepu (2001)) impedes the observation and identification of an effect. Second, the holding of liquid assets on the firm's balance sheet may itself affect the extent of information asymmetries about the firm by reducing valuation uncertainty (Gopalan et al. (2012)) and introduce a reverse causality problem in the analysis.[3]

This paper addresses these challenges in the estimation by exploiting the discontinuity in the accuracy of the financial reporting for small public firms introduced by Section 404 of the Sarbanes-Oxley (SOX) Act. Such a discontinuity induces an exogenous variation in the firm's information environment that permits the claim of a causal link. Section 404 of the SOX Act requires the management of firms with a public float of more than US $75 million to disclose a Manager Report (MR) on a yearly basis that certifies the quality of the firm's internal financial reporting.[4] In such a report, the management is required to identify the potential risks in the firm's Internal Control over Financial Reporting (ICFR) that may lead to financial misrepresentation or fraud and to provide a list of controls aimed at reducing the impact of these risks in financial reporting. An independent auditor's opinion has to be included in the firm's end-of-year financial statement, and it must attest to the effectiveness of the controls and risk identification.[5]

This non-linearity in the compliance requirement provides a clean and exogenous change in the firm's information environment that is unrelated to other attributes of the firm (apart from its public float).[6] Extensive literature in accounting establishes the importance of compliance with Section 404

opaque. Yet, the firm's level of R&D may also capture other determinants of corporate liquidity such as investment opportunities or costs of financial distress (Opler and Titman (1994)). Likewise, the use of other proxy measures of informational asymmetries such as size, market-to-book, credit rating status, among others, may be also subject to various forms of confounding.

[3]This poses a challenge to the estimation because the reverse causality predicts a negative relationship between the holding of liquid assets and the firm's informational frictions (less valuation uncertainty), as suggested by Gopalan et al. (2012) whereas the expected relationship of informational frictions and asset liquidity is positive as predicted by Kim et al. (1998) and Opler et al. (1999).

[4]Public Float is defined as market value of equity held by non-affiliates as of the second fiscal quarter. According to the SEC release No. 33-7391 of 1997 SEC, A person shall be deemed not to be an affiliate for purposes of this section if the person: (i) is not the beneficial owner, directly or indirectly, of more than 10% of any class of equity securities of the issuer; (ii) is not an officer of the issuer; and (iii) is not a director of the issuer.

[5]The independent auditor has to disclose in his (public) attestation report whether there is a material weakness, significant weakness, or no material weakness in the firm's internal reporting process.

[6]This occurs if the assignment variable is not perfectly manipulated (Imbens and Lemieux (2008)); Lee and Lemieux

in increasing the accuracy of financial reports (Arping and Sautner (2010), Iliev (2010) and Singer and You (2011)).[7] This literature also conveys the accuracy of firms' financial reports (Jayaraman (2008), Bhattacharya et al. (2012)) and compliance with Section 404 in reducing the extent of informational asymmetries in financial markets between insiders and outsiders or improving stock liquidity (Alexander et al. (2010)).

This paper exploits this change in the extent of firms' informational frictions in financial markets introduced by Section 404 and compares firms with a public float just above $75 million to firms with a public float just below $75 million. Specifically, we employ a regression discontinuity design to mitigate the effect of omitted variables and estimate the causal effect of informational frictions on the firm's choice of assets. The treatment group is composed of firms that comply with Section 404 for the first time during any year between 2005 to 2010. The counterfactual group is composed of the firms that did not file a report in the current and previous year of the analysis. As an example of our design, consider two observationally similar small public firms (i.e, close to the $75 million threshold) that were not required to comply with the rule in the year prior to the of the analysis; one with a public float above $75 million and the other with a public float below $75 million. By comparing the holding of liquid assets of the firm on each side of the threshold, it can be assessed whether a change in the firm's informational environment caused by compliance with Section 404 led to changes in the choice of assets for firms with almost identical characteristics.

We find that the firms that report a public float of more than $75 million and are required to comply with the rule tend to have a holding of cash that is 6.2% to 8.3% lower compared with that of firms below the disclosure threshold. This result is robust to the choice of the asset liquidity measure and is conditional on observable characteristics of the firm that may affect a firm's choice of asset

(2009)). Previous studies such as Gao et al. (2009) and Nondorf et al. (2012) have documented the potential manipulation of the firm's public float to avoid compliance. Compared to this previous literature, compelling evidence of a manipulation of the assignment variable is not found in our sample

[7] These studies find that firms that were required to comply with Section 404 had significant lower (discretionary) accruals and higher predictive power of current earnings over future earnings which suggest an improvement in earnings and financial reporting quality.

liquidity such as proxies for investment opportunities, R&D, acquisitions, dividends, and leverage (Opler et al. (1999)). [8] The results are also robust to the choice of the estimation window and to the inclusion of control variables that capture the (potential) manipulation of the firm's compliance likelihood, such as changes in the payout that may reduce the stock price, non-affiliates ownership, and hence, the firm's public float.[9]

For the average firm in our sample, this effect represents a decline in cash holdings in the amount of $9.5 million. Relative to the cost of compliance with Section 404 highlighted by previous studies, our documented effect is economically larger suggesting the firm's active decision to reduce its corporate liquidity beyond potential increases in expenditures arising from the compliance.[10] These results are consistent with the hypothesis that firms that face informational asymmetries in financial markets and experience a higher cost of external financing encounter larger incentives to invest in internal funds.

Through additional tests, the manner in which the change in the firm's choice of liquid assets is affected by other changing attributes of the firm owing to compliance is analyzed. If other attributes of the firm, affecting the choice of asset liquidity, change simultaneously with compliance the reduction in the holdings of liquid assets may not be completely attributed to a change in the firm's informational frictions. To address these concerns, the base specification is re-estimated by including changes in the attributes of the firm such as the firm's size, market value of equity and market-to-book that may also affect its incentives to hoard liquid assets. Across specifications, the results are qualitative similar. Finally, to investigate if the difference in the decision to retain liquid assets between the

[8] As additional measures of corporate liquidity, the base measure of asset liquidity is extended by incorporating other liquid assets that are close substitutes to cash such as working capital, current assets or semi-liquid assets (e.g., tangible assets). These additional measures of asset liquidity allow the estimation of the effect of informational frictions on choosing cash as well as other liquid assets. For instance, compared with cash holdings, the hoarding of other saleable assets, such as property, plant, and equipment, inventory or current assets, may also provide liquidity to the firm, increase the firm's access to external capital markets (Williamson (1988), Shleifer and Vishny (1992)) and decrease the firm's investment policy distortion by easing contractibility problems (Almeida and Campello (2007) and Campello and Giambona (2012)). We employ the weighted liquidity measures proposed by Gopalan et al. (2012) and the cash liquidation value of operating assets computed by Berger et al. (1996) which gauges the cash liquidation value of a group of tangible assets that can be captured by bondholders in the event of default.

[9] The manipulation of the firm's public float may bias the estimate of the effect because firms with low or negative benefit of compliance will avoid the compliance requirement by manipulating their public float.

[10] Iliev (2010) documents an increase of $697,890 in audit costs for firms complying with the rule while Krishnan et al. (2008) document an average cost of compliance with Section 404 of $2.2 million.

control and treatment groups is attributed to spurious causes, the treatment effect is estimated one and two years before compliance. No difference is documented among groups prior to compliance enabling the attribution of the reduction in the holding of liquid assets to compliance with SOX 404.

This paper also analyzes the varying effect of informational frictions on the holdings of liquid assets in the cross section. Firms with tighter financial constraints and agency conflicts may hold additional liquid assets as precautionary savings or to increase managerial discretion, respectively, and therefore incur a higher opportunity from holding these assets. As compliance with Section 404 reduces informational asymmetries between insiders and outsiders, eases the access to external capital markets and reduces information-related agency conflicts, a larger decrease in the holding of liquid assets is expected among firms that face such frictions. Consistent with this hypothesis, a greater decrease is observed in the holding of liquid assets among firms with ex-ante severe financial constraints and agency conflicts when using the financial constraints indexes proposed by Lamont et al. (2001) and Whited and Wu (2006) and inside ownership as a measure of agency conflicts, respectively. For instance, firms with low inside ownership experience a 9.5% to 10.6% decrease in asset liquidity, whereas firms with high inside ownership experience a 5.7%to 8.2% decrease. Our results highlight the importance of asset liquidity for financially constrained firms. Furthermore, this larger decrease in the holding of liquid assets as a result of the compliance among this group of firms is consistent with the hypothesis that those firms face a higher opportunity cost of holding liquid assets to fund future valuable projects. The higher opportunity cost borne by these firms also indicates the extent of their marginal return of investments (Denis and Sibilkov (2010))and their larger benefits from compliance.

Finally, the response of corporate expenditure to compliance with Section 404 is analyzed. The reduction in the extent of a firm's informational frictions in financial markets owing to compliance may enable the firm to redeploy the additional cash saved from reducing the amount of liquid assets. This paper considers R&D, leverage, acquisitions and payout as types of corporate expenditures. Compared with previous studies that document a negative effect of compliance with the SOX Act on the firm's

investment, we find an increase in the firm's R&D owing to compliance with Section 404.[11] Firms that reduce their holdings of liquid assets increase their R&D expenditure by 5% of total assets relative to firms not complying. For the average firm in our sample, this increment represents an increase of $6 million; which is similar in magnitude to the decrease in the holding of liquid assets owing to compliance. Nevertheless, different from previous studies, the change in the firm's investment is a result of a reduction in the cost of capital, rather than an increase in the management's liability. No difference is observed in terms of the other three corporate expenditures analyzed.

Our paper contributes to the literature on the determinants of corporate liquidity. Previous studies have documented a positive relationship between the firm's holding of cash and the extent of informational asymmetries measured by its R&D intensity (Opler et al. (1999), Dittmar et al. (2003) and Harford et al. (2008)), market-to-book ratio (Harford (1999), Dittmar et al. (2003)), lack of a bond rating (Opler et al. (1999)), smaller size (Ozkan and Ozkan (2004)), and lower payout ratio (Bates et al. (2009)). Similarly, Dittmar et al. (2003) and Ozkan and Ozkan (2004) document an increase in the firm's cash ratio as a result of agency conflicts while Harford (1999); Opler et al. (1999) and Bates et al. (2009) do not find support for such a relationship. Our study is different from the aforementioned studies in three key respects. First, unlike previous papers that focus on cash and marketable securities, this paper focuses on more comprehensive measure of asset liquidity that capture the effect of assets other than cash in a firm's precautionary savings. Second, it employs a measure of the firm's informational frictions that is not contaminated by other attributes affecting the firm's choice of asset liquidity. Third, a novel identification strategy is used that attenuates the concerns of an omitted-variable-bias in the estimation.

Our study also complements the literature on the benefits of compliance with Section 404 of the SOX Act. The documented benefits include increased accuracy in the firm's financial reporting (Iliev (2010) and Arping and Sautner (2010)), a decrease in the cost of capital (Ashbaugh-Skaife

[11] Bargeron et al. (2010) and Kang et al. (2010)

et al. (2008)), and an increase in the stock's liquidity (Alexander et al. (2010)). On the other hand, this paper documents that an improvement in a firm's access to external capital markets owing to compliance causes a reduction in its precautionary savings. While previous studies such as Bargeron et al. (2010) and Kang et al. (2010) have documented a negative effect of the SOX Act enactment on corporate risk taking and investment, this paper also documents an increase in the firm's R&D expenditure owing to compliance, caused by the easier access to external capital markets. The paper further adds to this literature by highlighting the effectiveness of the reduction of a firm's agency problems by documenting a greater decrease in the holdings of asset liquidity among firms with low inside ownership.

The remainder of the paper proceeds as follows. Section II discusses the identification strategy and the institutional background of the Section 404(b) of the SOX Act. Section III discusses the data from our sample and describes the data collection process. Section IV analyzes the effect of the compliance of the SOX Section 404 on the firms' investment in liquid assets and discusses the robustness of the results, while Section V analyzes the variation of the effect in the cross section. Section VI analyzes the response of corporate expenditure to compliance. Section VII concludes.

2 The Link Between Informational Frictions and the Holding of Liquid Assets

This section presents the institutional background and disclosure requirements imposed by Section 404 of SOX, discusses the manner in which compliance affects the firm's informational environment and presents how such a change impacts the firm's incentives to hoard liquid assets.

2.1 Section 404 Implementation and Description

In the aftermath of corporate scandals, the Sarbanes-Oxley Act, enacted in July 2002, introduced a major set of changes in the disclosure requirements for public firms; these were designed to increase the protection of the investor and the strengthening of accounting rules. As part of this law, Section 404 required all firms, subject to the rule, to file a Management Report (MR), which includes the manager's opinion of the quality of the firm's Internal Control over Financial Reporting (ICFR). In this report, management must identify the potential risks in the financial reporting of significant accounts, disclosures, components, and locations that may lead to significant financial misrepresentation or fraud. Further, it is required to base its evaluation of the effectiveness of the company's ICFR on a suitable, recognized control framework, such as that of the Committee of Sponsoring Organizations (COSO). Examples of risks include the inaccurate recordings of sales (returns), misreporting of earned compensation, or inclusion of unusable raw materials as part of inventory. Moreover, each MR must include a list of controls/contingencies that aim to reduce and prevent the impact of these risks on the firm's financial statement. Finally, an independent auditor, whose opinion has to be included in the firm's end of year financial statement, must attest to the effectiveness of the controls and risk identification.[12]

All public firms were required to comply with Section 404 and file their MR, along with the auditor attestation, for the fiscal year ending on or after November 15, 2004. Nevertheless, small firms, defined by a rule based on the market value of equity held by non-affiliates as of the second fiscal quarter (referred to as public float), that did not exceed $75 million were exempt from compliance.[13] These firms were granted an additional extension and were required to file their first MR and auditor attestation for the fiscal year ending on or after December 15, 2007 and June 15, 2010 respectively.

[12] In his attestation report, the independent auditor has to disclose whether there is a Material Weakness, Significant Weakness, or No Material Weakness in the firm's internal reporting process.

[13] According to the SEC release No. 33-7391 of 1997 SEC: A person shall be deemed not to be an affiliate for purposes of this section if the person: (i) is not the beneficial owner, directly or indirectly, of more than 10% of any class of equity securities of the issuer; (ii) is not an officer of the issuer; and (iii) is not a director of the issuer

This additional disclosure requirement alters the degree of the informational frictions in financial markets for small public firms. A large literature in accounting establishes the importance of internal controls audits in increasing the accuracy of firm financial reports. For instance, Iliev (2010) and Singer and You (2011) document a decrease in discretionary accruals that is four times the average earnings of the firm and therefore document an improvement in earnings quality as a result of compliance with Section 404. Alexander et al. (2010) report a decrease in the bid-ask spread for firms above the threshold suggesting a reduction in the extent of informational frictions in financial markets for these firms. Likewise, Ashbaugh-Skaife et al. (2008) document a reduction in the firm's cost of capital for firms that comply with SOX 404. In their sample, firms that comply with Section 404 experience a cost of equity that is 200 basis points lower compared to firms below the threshold; difference that is caused by the reduction in the informational asymmetries of the firm. This literature also highlights the importance of reporting quality in reducing the asymmetries of information between insiders and outsiders (Jayaraman (2008) and Bhattacharya et al. (2012)) and the extent of the manager's private benefits of control (Gopalan and Jayaraman (2012)). In sum, as documented by previous literature, compelling evidence suggests a reduction in the relative opaqueness of the firm resulting from compliance with Section 404. Moreover, this discontinuity creates a counterfactual group (the set of nonaccelerated filers) that enables us to control for concurrent events, such as the demise of A. Andersen or post-Enron investor uncertainty that may have affected the availability of external funds and the firm's decision to invest in internal funds, (Leuz (2007) and Hochberg et al. (2002)).

The compliance requirement with Section 404 provides a clear and clean measure of the change in the firm's informational environment that is not related to other attributes of the firm and that is locally random provided the firm's public float is not perfectly manipulated. In the next section, we analyze how such a change in the firm's informational environment may affect its choice of asset liquidity.

2.2 Impact on Corporate Liquidity

To understand why the attestation requirement can impact the firm's decision to retain liquid assets, we review the previous literature and discuss its implications.

In the presence of private or non-verifiable information, the firm's access to external capital markets may be limited. Myers and Majluf (1984) argue that private information of the company's prospects and value results in a stock underpricing that renders the issuance of equity less attractive, inducing the company to forgo profitable investment projects. Stiglitz and Weiss (1981) analyze the effect of the private information of the firm's project on the availability of external funds. The risk of the project unbeknown to the lender induces a credit rationing in equilibrium where a fraction of borrowers do not receive financing even if they are willing to pay a higher interest rate. Finally, as Hart and Moore (1988), Holmstrom and Tirole (1997) and Stein (2002) argue, the lack of a complete contingent contract, a credible commitment, or verifiable information may also increase the risk borne by the lender and result in fewer funds supplied to the firm.

As the firm's access to external capital may be limited or more costly, in the presence of these informational frictions, the holding of cash as precautionary savings or redeployable assets may be advantageous to prevent corporate expenditure distortions. Informational asymmetries lead firms to establish a financing hierarchy, in which internal funds are less costly and preferred to external finance. This results in a positive relationship between holdings of liquid assets and the extent of the firm's informational frictions (Myers and Majluf (1984)). Kim et al. (1998) study the firm's decision to invest in liquidity when costly external financing and predict that the optimal investment in liquidity is increasing in the cost of external. Thakor (1990) argues that firms that resort to external financing from uninformed investors may accumulate more cash to increase the likelihood of undertaking future investment projects or select projects that payoff faster to increase the level of corporate liquidity. Finally, Holmstrom and Tirole (1997) analyze the effect of moral hazard on the access to external

finance and highlight the positive relationship between the amount of (pledgeable) internal capital required to raise external finance and the extent of the moral hazard problem.

In a similar fashion, firms that face informational frictions may find the holding of other liquid assets besides cash (such as working capital, or semiliquid assets such as tangible assets) more profitable to reduce contractibility problems, increase the access to external capital markets and alleviate the effect of financing constraints on corporate expenditure. Williamson (1988) posits that assets that are more liquid and that are less costly to monitor and liquidate for bondholders increase the amount of capital that firms can borrow. In a similar manner, Shleifer and Vishny (1992) argue that the holdings of assets with a low expected cost of liquidation allow companies to contract more debt, easing the firm's access to external capital markets. Benmelech et al. (2005) study the impact of the liquidation value of assets on the amount of debt contracted and find a positive link between the amount of the loan and the asset liquidation value. Almeida and Campello (2007) study the impact of the cash liquidation value of operating assets in the firm's investment-cash flow sensitivity and find a negative effect among financially constrained firms, suggesting a positive effect of asset liquidity in the firm's ability to alleviate the impact of financing constraints. Finally, Sibilkov (2009) tests the effect of the liquidation value of assets on the firm's capital structure and finds a positive relationship between leverage and asset liquidity, suggesting the importance of liquidation costs in the firm's access to external finance.

In sum, existing theories predict a positive effect of a firm's extent of its informational frictions on the holding of liquid assets (as precautionary savings). Firms that face such frictions may choose to incur the opportunity cost of holding assets without a liquidity premium so as to fund future valuable projects. On the opposite, firms that encounter less informational frictions in financial markets may choose to divest part of their liquid assets and shift corporate investment towards assets with higher return. In the next section, we describe our sample and explain our identification strategy and empirical design.

3 Sample and Descriptive Statistics

From COMPUSTAT, we obtain firms' financial information, auditor's opinion and filing of a Management Report. First, our focus is on the set of firms that reported a book value of equity (COMPUSTAT Item # 60) between \$0 and \$425 million during 2005 to 2010.[14] Similar to Harford (1999); Opler et al. (1999), and Bates et al. (2009), we exclude financial and public utilities firms (SIC codes 6000 to 6999 and 4900 to 4999 respectively) from our analysis, since they may be subject to different regulatory regimes not allowing them to freely adjust their holdings of liquid assets such as cash. Moreover, the focus of this paper is on U.S. public firms to ensure that all the companies in our sample are required to comply with Section 404 upon reaching the \$75 million threshold for the first time.[15] Thus, this procedure involves 26,285 observations. Further, we focus on the set of firms that reported an equity book value between \$0 and \$150 million in any year during 2005 to 2010; for this group of firms, their accelerated filer status (that determines the compliance requirement)and public float are collected from their respective annual 10-K filings.[16] This leaves information for 2,124 observations. In the base estimation, we limit our attention to the set of firms that reported a public float between \$50 and \$100 million (the results are robust to the choice of bin width). Finally, for this set of firms, we collect the information about the share of management and board ownership from the firms' proxy statements. Our procedure yields a final number of 397 observations for the base estimation.[17]

We focus our analysis on one main dependent variables (the respective COMPUSTAT annual data item is included parenthetically). We gauge a firm's corporate liquidity as the ratio of cash and

[14] Previous studies (Iliev (2010), Zhu and Albuquerque (2012)) employ the same quasi-natural experiment and focus of the effect of the first MR, filed in 2004, on audit costs and investment. In this study, our analysis focuses on the data from the year 2005 to 2010 to avoid early misreporting owing to the lack of acquaintance with the law. For instance, as shown by Iliev (2010), from 2002 to 2004, 6.5% of firms in his sample reported being accelerated even though they were not. Similarly, 9.4% of the firms in his sample reported being nonaccelerated despite having a public float above \$75 million.

[15] Foreign firms are also required to comply with Section 404; however, the disclosure and attestation threshold for this group of firms is \$700 million instead of \$75 million.

[16] Each firm must report in the first page of its annual 10-K the market value of non-voting stock held by non-affiliates and their filing status.

[17] Our sample size is comparable to other studies. Iliev (2010) analyzes the effect of SOX 404 on shareholders' wealth using a sample of 301 companies. Zhu and Albuquerque (2012) arrive at a final number of observations of 277.

marketable securities to assets, referred to as *Cash Ratio*. (#1/#6). However, for robustness tests, we employ three additional measures of asset liquidity. First, we measure a firm's asset liquidity as the cash liquidation value of operating assets computed by Berger et al. (1996). They compute the liquidation of one dollar invested in account receivables; inventory; and net property, plant, and equipment. In their sample, a firm in liquidation recovers 71.5% of its book value of assets in Account Receivables (#2), 54.7% in Inventory (#3) and 53.5% in Net PPE (#8). Furthermore, as in Almeida and Campello (2007), we add to it cash and related securities. This second measure, referred to as *Liquidity 2* gauges the value that can be captured by creditors (in the event of default), and therefore captures the firm's capacity to contract with outsiders as well as the firm's precautionary savings. Further, this variable allows us to focus on a measure of the liquidation value of assets that does not vary with industry movements, thereby allowing us to attribute any change in liquidity to a change in the firm itself rather than to industry changes in general.[18] Second, as in Gopalan et al. (2012), we construct two firm level weighted measures of asset liquidity. In each of these two measures, assets in a firm's balance sheet (such as cash and marketable securities, current assets and tangible assets) are weighted by their relative importance in the provision of liquidity to the firm. These two additional measures are referred to as *Liquidity 3* and *Liquidity 4*. The four measures of asset liquidity are described below:

$$CashRatio_{it} = [Cash\&Eq._{it}]/[TotalAssets_{it}] \tag{1}$$

$$Liquidity2_{it} = [0.715 * Receivables_{it} + 0.547 * Inventory_{it} + 0.535 * NetPPE_{it} + Cash\&Eq._{it}]/[TotalAssets_{it}] \tag{2}$$

$$Liquidity3_{it} = [Cash\&Eq._{it} + 0.75 * (CurrentAssets_{it} - Cash\&Eq._{it})]/[TotalAssets_{it}] \tag{3}$$

[18] Ortiz-Molina and Phillips (2010) measure asset liquidity by the number of industry rivals with access to debt markets or by the value of intra-industry M&A and the industry average net of cash leverage. Sibilkov (2009) measures a given firm's asset liquidity by the value of the corporate transactions in an industry divided by the total book value of assets.

$$Liquidity4_{it} = [Cash\&Eq._{it} + 0.75 * (CurrentAssets_{it} - Cash\&Eq._{it})]/[TotalAssets_{it}] + [0.5 * NetPPE_{it}]/[TotalAssets_{it}] \quad (4)$$

We include a set of control variables that may also affect a firm's choice of liquidity; we use a subset of the controls proposed by Opler et al. (1999)), and Bates et al. (2009). We measure the firm's investment opportunity set by its ratio of *R&D to Assets* and by its *Market-to-book Ratio*. A positive relationship between the holding of a liquid structure of assets and a firm's growth opportunities is expected. We measure a firm's degree of financial constraints by its *Leverage* ratio and whether the firm is a dividend payer (a dividend paying firm is presumed to have a better access to capital markets). A negative relationship between a firm's financial constraints and asset liquidity is expected. Firms with lower transaction costs from the holding of liquid assets (economies of scale) are expected to have a smaller amount of asset liquidity. We measure economies of scale by a firm's *Size* and by its *Market Value of Equity*. Further, we include a firm's *Acquisition to Assets* to control for other type of corporate expenditures that may negatively affect the choice of corporate liquidity. Finally, we measure a firm's likelihood of agency conflict by the shares of *Management and Director Ownership*. Appendix A provides a detailed description of the variables and their construction.

We focus on the set of firms that are "close" to the $75 million compliance threshold and that did not file a Management Report and Auditor Attestation as part of their 10-K Annual Report in the previous year of operation. This ensures that only comparable firms are included in the estimation.[19] We consider a firm's transition from a nonaccelerated filer to an accelerated filer status as the change in that firm's accuracy in its financial reporting and change in the extent of a firm's financial frictions. Table I, column (1) and (2), show the descriptive statistics for the total set of firms in the base estimation window, for the period 2005 to 2010. Except for our measures of asset liquidity, we report

[19]This restriction avoids the inclusion of larger firms (intrinsically different) experiencing a negative shock in their market value of equity that temporarily reduces their public float below $100 million. These firms experiencing such a transitory shock may bias the estimate as these firms may have different characteristics (access to external capital markets, size, asset structure) compared to firms that comply for the first time with section 404

the summary statistics of the firms prior to a change in its acceleration status, if any. Column (3) and (4) report the summary statistics of firms that attained accelerated status in the current period. Column (5) and (6) report the summary statistics of firms that remained nonaccelerated filers.

Focusing in the entire sample, that includes both control and treatment group, the average firm *size* and *market capitalization* is $127 million and $112 million, respectively, consistent with firms in the sample being relatively small compared to the COMPUSTAT universe. Similar to the findings of Bates et al. (2009), the average holding of cash and marketable securities as a percentage of total assets is 25.2%. Using the three additional measures of asset liquidity, the average holding of liquid assets ranges from 51% to 61%, suggesting their relative importance in capturing corporate liquidity for firms in our sample (besides cash). While some differences are observed, the treatment and control group are observationally similar along several dimension. Specifically, a comparison between the average *capital expenditure*, *R&D*, *leverage*, likelihood of *financing constraints* and *acquisitions*, to name a few, reveals observationally similar characteristics. However, the treatment group contain relatively larger firms in terms of *total assets*, smaller *market-to-book* ratio and greater *market capitalization*. Finally, focusing on the measures of asset liquidity at the time of compliance, the set of firms that switched their status and attained accelerated status exhibit lower holdings of liquid assets compared to firms not required to comply with the rule. Specifically, firms above the $75 million threshold hold 7.6% less cash and cash equivalents compared to observationally similar firms below the compliance threshold. In a similar manner, the difference in the additional measures of asset liquidity between treatment and control group at the time of compliance ranges from 5.4% to 6.1%. Such a difference reveals the potential role that informational frictions in financial markets play in the firm's determination of asset liquidity.

In the empirical design, the set of firms that attain for the first time an accelerated filer status in the current period constitutes our treatment group whereas our control group consists of firms that remain nonaccelerated filers in the year of the analysis. While these two groups may include

observationally similar firms, the latter may include a subset of firms filling an MR even when they are not required to do so (referred to as voluntary compliers). To the extent that the benefits gleaned by voluntary compliers may be different from the benefits of compliers, the inclusion of this set of firms in our control group may introduce a bias in our estimate. Yet, if voluntary compliers and the set of firms required to comply with the rule (referred to as compliers) are similar in terms of their observable characteristics, no difference in terms of the benefit(s) of compliance should be expected between these two groups of firms, reducing concerns about a bias in our estimate. In our sample 71.2% of the firms are classified as compliers, whereas 25.92% of the firms in our subset sample filed an MR when they were not required to do so.[20]

Table II reports the summary statistics of compliers and voluntary compliers in the period before their switch in status (if any) and sheds light on the potential differences between these two groups and, therefore, on the existence of a bias in our estimates. Voluntary disclosers are on average larger in terms of their *market value of equity* and have a greater set of investment opportunities (measured by the firm's *market-to-book ratio*) which suggests the existence of additional benefits of compliance with Section 404 among this group of firms compared to firms required to do so. Nevertheless, the fact that other attributes (such as *leverage*, *R&D* expenditure and *assets*) are statistically similar among these groups of firms suggests that voluntary compliers and compliers should be expected to enjoy no substantial difference in treatment. Indeed, specific to Section 404, consistent with the hypothesis that voluntary compliers are not intrinsically different from compliers, the relatively larger frequency of firms complying voluntarily may be in part explained by the uncertainty in the first date of compliance with the rule. Originally, the first date of compliance with Section 404 for nonaccelerated filers was scheduled for April 15, 2005, but was delayed until December 15, 2007 and finally pushed back until June 15, 2010. This uncertainty in the rule may have induced firms to file voluntarily a MR in anticipation of the enactment of the rule before the announcement of the first date of compliance

[20] The frequency of compliance and non-compliance documented herein is comparable to that found in previous studies. For example, in Iliev (2010), 9.5% of the firms reported being accelerated filers while their public float was below the threshold of $75 million

extension. This may have led to a large number of voluntary compliers with characteristics similar to firms complying with the rule only when they were required to do so. As additional test, to check if this may bias the results, we perform our analysis with and without the set of firms complying voluntarily with the rule, and our results are qualitatively similar across different measures of asset liquidity. Therefore, the fact that a large proportion of firms comply voluntarily with the rule may not introduce a bias in our estimation and suggests that the benefit of the attestation requirement is intrinsically equal among compliers and voluntary compliers.[21]

4 The Response of Holdings of Liquid Assets to Compliance with Section 404

4.1 Graphical and Nonparametric Analysis

Figures 1 presents the average *cash ratio* for firms close to the disclosure threshold. The vertical solid line represents the $75 million disclosure threshold. The estimation of the treatment is computed by comparing the right and left intercept of the outcome variable, which in our case is the firm's cash ratio. Firms close to the disclosure requirement are considered to be observationally similar. Since for firms near the threshold it is a matter of luck where they land, the distance between the average corporate liquidity for firms below and above the threshold represents the estimated treatment effect. However, due to the nonlinearities of outcome variables in the neighborhood of the disclosure threshold, the use of the sample average, not accounting for such nonlinear form may result in a bias in the estimate. To address this concerns, we include in our specification a second order polynomial to capture such nonlinearities. Focusing on 1, we observe a decrease in the holdings of cash that is approximately 9% of the firm's total assets for firms above the disclosure threshold. In the Appendix B, Figures 10 to 12

[21] Although the effect cannot be identified among firms complying voluntarily with the rule due to the existence of potential omitted variables affecting their decision

present the average holding of liquid assets for the three additional measures of corporate liquidity. The results are similar. Across the three measures, firms that reveal more accurate information to financial markets have a lower corporate liquidity, compared to firms below the threshold, considered as relatively more opaque.

While Figure 1 documents a decrease in the unconditional mean of the holdings of cash, the results may be sensitive to the choice of the estimation window. Larger estimation windows may increase the bias in the estimate as firms with different attributes may be included in the estimation. A narrower estimation window will result in a low number of observations affecting the power of the estimation. To address this concern, we provide a nonparametric estimate of the treatment effect using the optimal bin width proposed by Imbens and Kalyanaraman (2012) that minimizes the expected bias and increases efficiency. The optimal bin width for the cash ratio as dependent variable is $3 million. Using a kernel regression and a local polynomial regression in these windows, we find a negative effect of compliance with Section 404 on the firm's cash holdings that is significant at the 5% level.[22]

Although the kernel regression proposed by Imbens and Kalyanaraman (2012) enables us to assess the effect of the attestation and filing requirement on the amount of liquid assets held by the firm, the estimate of the treatment effect may include some noise. Imbens and Lemieux (2008) point out, in finite samples (as in our case), the bandwidth selected to reduce bias may not encompass a sufficient number of observations that may result in unreliable estimates. For this reason, we will focus our attention on the parametric analysis, as explained below.

Table I documents a degree of heterogeneity in the characteristics of nonaccelerated and accelerated firms. Firms that attained an accelerated filer status were those that had, on average, a lower investment opportunity set (measured by the *market-to-book*); a lower propensity to *pay dividends*; a lower *payout* and a larger size (measured by *total assets*), compared to firms that remained accelerated

[22]The estimated treatment effect using a triangular kernel and second order polynomial is -1. Nevertheless, due to the different weights attached to each observation in the estimation, the interpretation of these results may be difficult.

filers. These results suggest that in order to estimate the effect of compliance on a firm's choice of asset liquidity, we must control for variations in other confounding characteristics that may impact the estimation.

4.2 Regression Discontinuity Design

The regression discontinuity design is based on the assignment to treatment that is determined by the value of a forcing variable that may be on either side of a fixed threshold. Provided the relationship between the forcing variable and the potential outcome is discontinuous, a change in the conditional expectation of the outcome, given the forcing variable, is interpreted as evidence of a causal effect on the part of the treatment. In our setting, the requirement to file and attest an MR corresponds to our treatment and firms that are not required to comply (i.e., nonaccelerated filers) constitute our counter-factual group. To the extent that assignment into the treatment group is determined by a firm's public float and the forcing variable cannot be perfectly manipulated, the probability of receiving the treatment is discontinuous at the threshold. Thus, our research design fits the sharp regression discontinuity design. Specifically, for the set of firms that did not disclose an MR in the previous period, we focus on the effect of the first treatment on their choice of asset liquidity. Our treatment variable $Accelerated\_Filer_{it}$ takes the value of 1 if the firm did not file an MR in the previous year and is required to file an MR in the current period (i.e., the firm obtained accelerated filer status in the current year); otherwise, our treatment variable takes the value of 0, if the firm remained a nonaccelerated filer.

Our base empirical model used to estimate the effect of asymmetric information on a firm's choice

of assets is:

$$Y_{it} = \beta_0 + \beta_1 * Accelerated\_Filer_{it} + \beta_2 * (PFL_{it}) + \beta_3 * (PFL_{it})^2 + \delta' X_{i,t-1} + \alpha_1 * Industry_i + \alpha_2 * Year_t + e_{it} \quad (5)$$
$$if\ Accelerated\_Filer_{i,t-1} = 0\ \&\ PFL_t \in [75-k; 75+k]$$

where Y_{it} is one of the measures of asset liquidity of firm i at the end of period t, X_{it-1} is a vector of control variables, PFL_{it} is the firm's i public float in the year of the analysis t, α_1 and α_2 represents time and industry fixed effects and e_{it} is a random error term. Moreover, we include a second-degree polynomial, to capture any nonlinearity in the relationship between a firm's public float and its holding of liquid assets.[23] Lastly, k represents the size of the estimation window. We consider for our base estimation a window of \$25 million (i.e, firms that reported a public float between \$50 and \$100 million). Our interest is in the coefficient β_1, which represents the effect of the change in the extent of a firm's informational frictions in financial markets (i.e., the requirement of compliance with Section 404 of SOX) on the firm's choice to invest in liquid assets.

The motivation behind our model specification comes from two sources, the first of which is the existence of other factors that may also affect a firm's choice of asset structure. Previous studies have highlighted the role of other variables in the determination of a firm's holding of liquid assets. We include firm *Size*, to capture a firm's diseconomies of scale arising from the holding of liquid assets. A firm's *leverage* captures its ability to raise external funds. *Market-to-book* ratio and *R&D* captures the set of investment opportunities and the cost of financial distress, respectively. Finally, we include a dummy variable that takes the value of 1 if the firm is a *dividend payer*, as well as the firm's expenditure on *acquisitions*, to capture other uses of funds that may negatively affect the firm's holding of liquid assets. As a robustness test, we estimate our model in equation (5), without the set

[23]The results are qualitatively similar if using a third or fourth-degree polynomial. This polynomial smoothing function helps avoiding to attribute to a nonlinearity the discontinuity in our outcome variable Lee and Lemieux (2009).

of controls; we find the results to be consistent. The second motivation for our empirical specification is the nonlinearity of the compliance requirement, which enables us to identify the effect of compliance under very mild conditions. Provided the treatment is locally randomized, the difference in the holding of liquid assets between firms above and below the threshold, captured by the coefficient β_1, can be attributed to changes in a firms' reporting accuracy.

The coefficient β_1 provides a consistent and unbiased estimate, provided three main identifying assumptions are satisfied. First, the threshold should not be perfectly manipulated, in order to argue a local randomization of the treatment (Lee and Lemieux (2009), Imbens and Lemieux (2008)). In our case, public firms around the $75 million threshold should not be able to control in a timely manner their public float, so as to avoid the need to comply with the regulation. Second, firms above or below the threshold are required to have similar observable and unobservable characteristics. The inclusion of firms with different characteristics (i.e., firms that are not sufficiently close to the threshold) may induce an estimation bias, as firms below the threshold may not represent a valid counter-factual. Third, compliance with Section 404 may not affect other attributes of the firm that may itself affect the firm's holding of liquid assets. In such a case, a change in a firm's holdings of liquid assets may not be completely be attributed to compliance. The next two subsections discuss the key identifying assumptions that validate of our design.

4.2.1 Threshold Manipulation

Section 404 of SOX generates a local randomization of the treatment, provided a firm's public float cannot be perfectly manipulated. Nonetheless, a firm may have incentives to reduce and manipulate the market value of non-affiliates and avoid compliance with Section 404, for two reasons. First, an incumbent manager with private benefits of control may find a reduction in the public float advantageous in avoiding more accurate monitoring from outsiders; monitoring that may ultimately reduce

his or her private consumption or discretion (Healy and Palepu (2001). Second, shareholders may also want to avoid the treatment if they perceive compliance as a negative NPV project. Indeed, Krishnan et al. (2008), DeFond et al. (2011), Iliev (2010) each suggest that Section 404 imposes net costs on shareholders and bondholders.[24] Consistent with the view that firms may find the avoidance of compliance profitable, Nondorf et al. (2012) and Gao et al. (2009) provide evidence that firms below the threshold tend to reduce their investment, disclose more bad news, report lower earnings in the second quarter (quarter where the public float is recorded), change policy so as to increase their payout, and decrease the number of shares of non-affiliates, all in an effort to reduce their public float and avoid compliance with the rule.

In light of these findings, if firms in the control group are affecting the stock price or the ownership held by nonaffiliates by increasing their payout ratio, nonaccelerated filers below the $75-million threshold that retained their status are expected to have a higher *payout* (dividends and repurchases) and lower investment, compared to nonaccelerated filers whose filing status had changed. As shown in Table I, no ex-ante statistical difference exists between these two groups of firms in terms of payout ratio or investment expenditures; this suggests that the firms within our sample are not modifying their corporate policy so as to remain below the disclosure threshold. Further, our results hold even after controlling for the firm's change in its payout ratio that may capture the firm's ability to avoid compliance. As another test, as argued by McCrary (2008), if firms are actively manipulating their forcing variable, the proportion of firms just below the $75 million threshold would be expected to be higher, compared to the proportion of firms just above the threshold. Figure 2 plots the distribution of firms' public float values in our sample from 2005 to 2010. Figure 3 presents the results of the test proposed by McCrary (2008); the bold line therein represents the estimation of the frequency, and the faded line represents the 95% confidence interval.[25] We find no statistical evidence of a higher density

[24] For instance, Iliev (2010) find that firms filing a MR had a buy and hold return that is 17% lower that those of nonfilers over a 2 year period starting from the announcement of the rule and ending after the filing of the 2004 annual report. DeFond et al. (2011) document a 15.93 to 21.31 basis point increase in the yield of corporate bonds for firms complying with SOX Section 404

[25] The test proposed by McCrary (2008) reports the statistical significance of the difference between the expected value of the frequency and the observed frequency

of firms just below the threshold. While previous studies have documented firms' manipulation of their public floats for the fiscal years 2004 and 2005, we find here no evidence of such a manipulation while using a dataset of firms for 2005 to 2010.[26]

4.2.2 Continuity in firm level observable characteristics and statistical similarity among groups

Table I reports the summary statistics for firms in our control and treatment group. As observed, in the $25 million estimation window, the set of firms that switched their status and the set of firms that remained nonaccelerated filers have on average similar ex ante characteristics, except for *size* and *market-to-book*. We control for these ex-ante attributes to capture any heterogeneity in the firm's size prior to compliance. The regression discontinuity design allows us to attribute the effect of a change in a firm's holding of liquid assets to the attestation requirement, provided the treatment does not affect other characteristics of the firm. In such a case, the effect of the discontinuity on the holding of liquid assets may not be directly caused by the treatment, but rather by a shift in a firm's characteristics. Table III reports the contemporaneous characteristics of firms at the moment of the change of status, if any. As observed, using a $25 million estimation window, except for firm size (which naturally correlates with a firm's public float), no large shift is observed among the two groups of firms at the 95% level. This result validates our design, as it enables us to attribute a change in a firm's choice of assets to compliance with the treatment. For robustness, we estimate our base specification including the change in the firm's *assets* and *market value of equity* as controls. As argued by Opler et al. (1999), larger firms have lower holdings of liquid assets owing to the smaller transactions costs faced by such firms; our results remain materially the same after.

[26] The absence of a threshold manipulation in our sample stems from the larger number of periods included. While a firm may reduce its investment, increase its payout ratio and forfeit projects so as to avoid compliance, the recurrent decrease in investment and size may result in a prohibitive cumulative cost that may surpass the cost of compliance, leading firms to decide to comply with Section 404 owing to the relatively smaller cost of doing so.

4.3 Primary Results

Table IV presents the results of our base estimation of equation (5) while using *cash ratio* as dependent variable. We focus on the set of firms that each had a public float of between $50 million and $100 million and which did not disclose an MR in their previous period. All specifications include a second-degree polynomial, to capture nonlinearities between a firm's public float and the dependent variable. We include year fixed-effects, to capture the effect of the economic cycle on a firm's decision to hoard cash; also, we include industry fixed-effects, to capture any difference in the average corporate liquidity across industries. The first column in Table IV reports the estimate of the effect of compliance with Section 404 on the firm's choice of liquid assets without including the set of controls. A firm in our sample that becomes an accelerated filer experiences a 8.30% decrease in its *cash ratio*. For the average firm in our sample, this drop represents a $10.50-million decrease in the holding of cash. Column (2) reports the results of our base specification including a subset of the determinants of corporate liquidity, including those of Opler et al. (1999) and Bates et al. (2009) among others. Consistent with prior studies, higher *leverage* and larger *size*, *acquisitions*, and *dividend payments* decrease a firm's holding of liquid assets, while *R&D* is positively associated with the hoarding of cash. However, as shown in column (1), the inclusion of this set of controls does not significantly affect the magnitude and significance of our estimate. Using this set of controls, the conditional difference in the holding of liquid assets for firms required to comply and firms that are not required to do so is 7.5%. the significance of the estimate is unaffected by the inclusion of controls in the estimation. Further, column (3) reports the estimate of compliance, controlling for a firm's ex-ante growth opportunities measured by a firm's *market-to book-ratio*. As expected the firm's investment opportunities and its holdings of cash are positively related. In terms of the treatment effect, the magnitude of the coefficient is unchanged, compared to column (2). This result suggests that informational frictions in financial markets play a major role in a firm's decision to hoard liquid assets as precautionary savings, besides the extent of its investment opportunities.

Column (4) estimates the effect of compliance with Section 404 taking into consideration the potential manipulation of the market value of equity held by outsiders to avoid compliance, by including the change in the firm's *payout*. Increases in the firm's *payout* are negatively correlated with the firm's *cash ratio*, yet the correlation is not significant. Further, the inclusion of this additional control increases the magnitude of the effect of compliance in 1% compared to the base scenario reported in column (2) while the significance of the coefficient is unaffected. This result suggests the existence of a negative effect of compliance in the firm's cash ratio beyond the potential bias, if any, arising from the potential manipulation of the firm's public float. Column (5) controls for the decrease in the firm's *market-to-book* for compliers, as documented in Table III and the change in the firm's *market value of equity* that may negatively affect the firm's transaction costs and the incentives to hoard cash. Such a reduction in the measure of the firm's investment opportunities for compliers may also reduce the firm's incentives to hoard cash as precautionary savings and may potentially bias the estimate. The estimated treatment effect remains negative and significant.

While we find a significant decrease in the holding of cash, our findings may overestimate the true effect of the compliance requirement on a firm's choice of corporate liquidity. Studies such as Iliev (2010) have documented a per-firm increase of $697,890 in audit costs, resulting from compliance with SOX, Section 404. Likewise, the SEC estimates a total cost of compliance of $769,266 for each firm below the threshold in 2007 and $1,093,225 for each firm above the threshold. Yet, despite the increased audit cost that may negatively affect a firm's holdings of cash, our findings suggest an active reduction in firms' cash to asset ratios.

Table V presents our base estimation results (Table IV, column (2)) while using the three additional measures of corporate liquidity as the dependent variable. These measures include the cash liquidation value of operating assets that gauges the value captured by creditors in the event of default and current assets that capture the effect of other redeployable assets besides cash on the provision of liquidity to the firm. Overall, our results are consistent with our previous findings; firms complying with the rule

and that experience lower informational frictions in financial markets decrease their holdings of liquid assets. As a fraction of the firm's total assets, this decline ranges from 6.2% to 8.3% and is statistically significant across all specifications. Relative to the estimated treatment effect documented in Table IV, no large difference is observed between estimates. While the holding of other assets besides cash may also provide additional liquidity to the firm, the similar magnitude across estimates suggests the prominent role of cash in the determination of corporate liquidity.

In summary, a firm's holdings of cash (corporate liquidity) and asset liquidity decline significantly in response to an improvement in the firm's informational environment. As information frictions may reduce a firm's access to capital markets, the holding of liquid assets in the form of cash or assets with a high liquidation value become less valuable. In the next section, the robustness of these findings is discussed.

4.4 Robustness Tests

While the sharp regression discontinuity design provides a convenient setting to isolate the change of the firm's informational frictions in financial markets from attributes of the firm, the choice of the bandwidth including non comparable firms and the sensitivity of our result to the choice of the estimation window may increase the concern of a bias in our estimate. The existence of a difference in the holding of liquid assets between control and treatment group before compliance, may arise the concern of an spurious result. Finally, specifically to our sample, the significant proportion of voluntary compliers may also introduce a bias in our estimation. This section addresses these potential concerns.

One potential concern is the robustness of our results to the choice of the bandwidth. In our base specification, we select an estimation window of $25 million. Nevertheless, such a window may include firms that may not be comparable leading to a bias in the estimate. To address this concern, we re-estimate equation (5) using different estimation windows. Figure 4 reports the estimated treatment

effect using cash ratio as the dependent variable. The x-axis represents the size of the estimation window. For example, an estimation window of $20 million includes firms that reported a public float between $55 and $95 million the y-axis reports the point estimate of the treatment effect. The dashed line on each figure represents the 95% confidence interval. The estimate of the treatment effect is statistically negative while using different estimations windows. These results suggest that the effect of compliance with Section 404 on the firm's cash ratio is robust to the choice of the estimation window. Figures 13-15 in the Appendix B report the sensitivity of the estimation using the additional measures of asset liquidity. Likewise, the estimated treatment effect on the firm's choice to invest in liquid assets is negative, suggesting therefore the robustness of the results.

Another potential concern is the existence of a difference in the holdings of liquid assets between control and treatment group before compliance, introducing a bias in the results and resulting in a spurious regression. To address this concern, we run a placebo test and estimate the treatment effect in the year prior to compliance. Table VI presents the results. Columns (1) to (4) reports the conditional difference in the four measures of asset liquidity in the year before compliance. Similar to equation (5) the treatment variable is $Placebo_{i,t-1}$ which is a dummy variable that takes the value of 1 if the firm will comply with Section 404 for the first time in the next period. Otherwise, the variable takes the value of 0. Focusing on the coefficient of $Placebo_{i,t-1}$, no significance difference exists between control and treatment group in the year before compliance. This enables us to attribute the decrease in the outcome variables observed at the time of compliance to Section 404 of SOX. Figure 5 presents the graph of the conditional *cash ratio* between treatment and counter-factual 2 years prior to compliance to one year after compliance. Time 0 represents the date of the first compliance. Consistent with the findings in Table VI, no statistical difference is observed. The results are similar using the other measures of asset liquidity (not reported).

A final potential concern is the impact of the large fraction of voluntary compliers on the magnitude of the estimated local treatment effect. To the extent that those firms experience a different benefit

of compliance despite the increase in the audit cost, the inclusion of this set of voluntary compliers may bias the estimate. Table VII reports the estimates excluding voluntary compliers. Using the base specification, the effect among firms complying with the rule is negative and significant in three out of four cases, yet the magnitude is reduced in 2% relative to the base case as reported in Tables IV and V. These results suggest that despite the existence of additional benefits for voluntary compliers, the benefits for these two groups are statistically similar.[27]

5 Cross Sectional Variation

5.1 Cross Sectional Response

As the previous section focuses on the consequence of the first filing of an MR on the holding of liquid assets, a cross-sectional variation of the treatment effect is expected. Besides reducing the amount of information asymmetries between insiders and outsiders, compliance with SOX 404 may also reduce information-related agency conflicts and financing constraints. Since the holding of liquid assets may constitute precautionary savings, the magnitude of its decrease is projected to vary with the degree of a firm's financial constraints. Likewise, since the holding of liquid assets may be the result of an agency problem, the treatment effect may vary with the firm's ex-ante information related agency conflicts. Therefore, compared with firms with less severe financial frictions, for firms in which financial constraints and agency problems motivate the holding of asset liquidity, a larger decrease in their holdings of liquid assets is expected. Specifically, the higher opportunity cost entailed in the holding of additional liquidity assets may led these firms to decrease in a larger magnitude their holding of liquid assets. This section tests these hypotheses by using variables that capture the intensity of a firm's financial constraints and its potential agency problems. This method enables us to better understand the extent to which additional disclosure requirements, such as (attestation of) the MR,

[27] However, the effect can not be identified for the group of voluntary compliers.

help mitigate financing frictions or agency conflicts.

5.2 Financial Constraints and Agency Proxies

We examine how ex ante financial frictions and agency conflicts affect the decrease in the amount of liquid assets held by a firm as a result of its first compliance with Section 404. We offer two measures of the firm's financial constraints. First, we capture the degree of its financial constraints with the linearization of the Kaplan and Zingales' Index proposed by Lamont et al. (2001). We replicate their methodology and estimate the KZ index as follows:

$$\begin{aligned} KZIndex = &-1.002 * CashFlow/AT + 0.238 * Mtob + 3.139 * Leverage \\ &-39.368 * Dividends/AT - 1.315 * CashHoldings/AT \end{aligned} \tag{6}$$

This index captures the likelihood of a firm's current financial constraints. As observed, firms with higher cash flows and higher dividends will be less financially pressured, while those with higher leverage and higher investment opportunities will, more likely, be constrained. The set of firms in the first quartile of the distribution in terms of the Index are considered financially unconstrained and those above it are regarded as having more difficulty accessing debt markets.[28] Second, we compute the index proposed by Whited and Wu (2006). The index of Whited and Wu, like that of Kaplan and Zingales, measures the likelihood of financial constraints. The WW Index is computed as follows:

$$\begin{aligned} WWIndex = &-0.091 * (CashFlow)/AT - 0.062 * DividendPayer + 0.021 * LongTermDebt/AT \\ &-0.044 * ln(AT) + 0.102 * IndustrySalesGrowth - 0.035 * SalesGrowth \end{aligned} \tag{7}$$

[28] Our sub sample consists of the firms for which we have complete information for our base specification.

Firms with a higher index value are considered relatively more financially constrained. We exclude a firm's industry sales growth from the index computation, but we include industry fixed-effects and yearly fixed-effects in our estimations. As discussed by Whited and Wu (2006), the WW index may provide a better measure of a firm's financial constraints. Since the WW Index does not include the firm's market-to-book ratio, which contains a (potential) measurement error as a proxy for the firm's investment opportunities, this index may provide a better classification of firms with attributes associated with financial constraints. Provided that compliance with Section 404 affects the quality of the information available from the firm, and therefore, eases its access to capital markets, the decrease in the holding of liquid assets is expected to be larger among firms with ex-ante tighter financial constraints as these firms may hoard ex-ante additional liquidity.

The literature has suggested the existence of a firm's bond rating and payout ratio as proxies for its access to external capital markets. However, in this paper, we do not employ such measures because of their low variation in the cross section of our subsample. Less than 10% of the firms in the $25 million window have a credit rating, and approximately 70% of those in our sample do not have a (strictly) positive payout ratio. Likewise, the use of the firm's sales and net income as measures of financial constraints may result in a misleading estimation of the treatment effect in our setting. To the extent that sales and net income capture the firm's past performance and past holding of additional liquidity, any difference in the treatment effect among firms with high/low net income/sales can be attributed to a reversion to the mean problem rather than to financial constraints.

Finally, we measure the likelihood of a firm's potential agency conflict by the ownership share of management and directors. This measure is motivated by Jensen (1986), who suggests that the incentives of the manager to increase his private benefit decreases with his firm ownership. As such, firms with agency problems would prefer to retain excess cash rather than to distribute it to investors. Since the opportunity cost of this cash retention is internalized by the manager as his stock ownership increases, firms with higher managerial ownership will be less likely to suffer from managerial agency

problems. In our subsample, a firm with management and director ownership less than our subsample mean is considered as experiencing an agency problem. Provided that compliance with Section 404 affects information related agency problems by reducing managerial discretion in the internal reporting, the decrease in the holding of liquid assets is expected to be larger among firms with ex ante lower inside ownership.

5.3 Empirical Specification

To analyze the cross sectional variation of the response of corporate liquidity, we expand our main specification in (5) by introducing an interaction term that captures the ex- ante characteristic of the firm before attaining accelerated status. Specifically, we estimate the following model:

$$\begin{aligned} Y_{it} = \beta_0 + \beta_1 * AcceleratedFiler_{it} + \pi_1 * Char_{it-1} * AcceleratedFiler_{it} + \pi_2 * Char_{it-1} + \delta' X_{i,t-1} \\ + \beta_2 * (PFL_{it}) + \beta_3 * (PFL_{it})^2 + \alpha_1 * Industry_i + \alpha_2 * Year_t + e_{it} \\ if\ Accelerated\_Filer_{i,t-1} = 0\ \&\ PFL_t \in [75-k; 75+k] \end{aligned} \tag{8}$$

Our coefficient of interest is π_1. The variable $Char_{it-1}$ is a binary variable that captures the extent of a firm's ex-ante financial constraints or agency problems before the switch in its status, if any. If the firm had a management ownership less than 18% or if the KZ or WW Index is in the first quartile of the distribution in the previous period, the variable $Char_{it-1}$ takes the value of 1; otherwise, it takes the value of zero.[29] We expect a larger decrease in asset liquidity for firms with ex-ante agency conflicts or financial constraints; the coefficient π_1 is expected to be negative and statistically significant.

[29] We focus on the same sub sample as in Table IV

We measure the incentives of a firm to hold additional liquidity in the period prior to the switch in its status. This procedure allows us to reduce the potential endogeneity problem arising from the correlation between the firm's characteristics and the adoption of the treatment. We focus on the set of firms whose public float is between \$50 and \$100 million in the period when the firm switches its status, if any. Nevertheless, as compared to our base specification, we exclude the firm's leverage and size from our set of controls so as to avoid any multicolinearity between the controls and the financing constraints indexes. Similar to our main estimation, our results are robust to the change of the bin width and the inclusion and exclusion of controls. Finally, we include year and industry fixed effects and a polynomial smooth function, as in Tables IV and V.

5.4 Results

The results of our analysis are displayed in Tables VIII and IX. For clarity in the exposition, we only report the estimate of the coefficients β_1 and $\beta_1 + \pi_1$. Further, we convey their significance and the value of the F-statistic in parentheses.

Table VIII, panel A, indicates the effect of compliance with Section 404 using the KZ Index as a measure of ex-ante financial constraints. Columns (1) trough (4) report the estimated treatment effect for firms considered as ex-ante financially financially constrained or not for the four liquidity measures. As observed, no statistical effect is documented in the holdings of liquid assets for firms with ex-ante lower financing constraints. Conversely, in three out of four cases, the decrease is statistically significant and larger in magnitude for firms with relative difficult access to external capital markets. Table VIII, Panel B, reports similar results using the WW Index. Relative to the findings in Table IV, the decrease for firms with tighter financing constraints is larger, and ranges from 8.5% to 20%. Our results suggest that the holding of additional liquidity is more costly for firms that face more difficulties in the access to external capital markets. As holding additional liquidity entails a larger

opportunity cost, the decrease in liquidity is also larger for these firms. The fact that constrained firms bear this additional cost of holding liquid assets before compliance indicates the extent of their marginal investment benefits and the potentially profitable use of these funds, consistent with the findings of Denis and Sibilkov (2010).

Turning to our last proxy, we analyze whether the management's incentives to hoard liquidity affect the firm's response to the first compliance with Section 404 of SOX. Table IX presents the result of our estimation for the four measures of corporate liquidity. Except for *cash ratio*, the decrease in corporate liquidity is more pronounced for firms with ex ante agency conflicts and statistically different between group in one case; such a difference ranges from 3% to 5% percent of total assets. This difference in the decrease of the holding of liquid assets for firms with high agency conflicts highlights the larger cost borne by these firms while hoarding those assets and the profitability of their alternative use. These results are also an indirect test of the agency conflicts hypothesis to explain the holding of liquid assets. While previous studies have suggested that agency may not serve this explanatory function (Opler et al. (1999); Bates et al. (2009)), our results imply that agency may be a determinant of the firm's corporate liquidity as in Harford (1999) and Dittmar et al. (2003).

6 Change in Corporate Expenditure

This section investigates whether a firms corporate expenditure is affected by the firms first compliance with the Section 404 of the SOX Act. The reduction in the extent of the firm's informational frictions in financial markets owing to compliance may enable it to redeploy the additional cash saved from reducing the amount of liquid assets. These additional funds may be employed by the firm to reduce leverage, increase shareholder's payout through an increase in dividends or stock buy back, increase the expenditure on acquisitions or investments. To analyze the response of these types of corporate expenditures, the following regression is estimated:

$$Y_{it} = \beta_o + \beta_1 * Accelerated\_Filer_{it} + \beta_2 * (PFL_{it}) + \beta_3 * (PFL_{it})^2$$
$$+\alpha_1 * Industry_i + \alpha_2 * Year_t + e_{it} \quad (9)$$
$$if\ Accelerated\_Filer_{i,t-1} = 0\ \&\ PFL_t \in [75-k; 75+k]$$

Where Y_{it} is one of the four type of corporate expenditures discussed above. Similar to the specification in equation (5), yearly fixed effects and two-digit industry dummy are used to capture the differences in leverage and investments (among others), across industries. Figure 6 to Figure 9 report the estimation of the coefficient β_1 that gauges the difference in leverage, acquisitions to assets, payout and R&D, respectively, between firms complying with the rule and those that are not required to do so. The size of the estimation window is reported on the horizontal axis. For instance, an estimation window of $20 million includes firm that had a public float between $55 and $95 million. *R&D*expenses and *Payout* are normalized by total assets to ease comparison between groups. From Figure 6 to 8, the difference in the *Leverage*, *Acquisitions to assets* and *Payout* between firms above and below the threshold is not significant. Nevertheless, as observed in Figure 9, firms that comply with Section 404 have a larger expenditure in R&D relative to observationally similar firms not complying with the rule. This difference can be interpreted as the opportunity cost from holding liquid assets since firms below the threshold may give away the opportunity to invest by holding liquid assets. Focusing on the $25 million estimation window, the increase in this type of expenditure represents 5% of total assets or $6 million for the average firm in the sample. Consistent with the reduction in the cost of equity owing to compliance, firms above the threshold increase their marginal investment in response to the reduction in the marginal cost of capital.

This result also sheds light on the effect of SOX (404) on the firm's incentives to undertake risk. Previous studies such as Litvak (2007), Bargeron et al. (2010) and Kang et al. (2010) have documented

a negative effect of SOX 404 on the firm's investment policy, caused by the increase in managerial liability resulting from the implementation of SOX. Nevertheless, as pointed out by studies such as Leuz (2007), the challenge in this studies is the lack of a counter factual group that impedes the delineation of a causal link. Nevertheless, in our setting, the set of firms not required to comply with SOX 404 constitutes the control group, allowing us to identify the effect. Compared to this literature, we document an increase in R&D owing to compliance. Yet, such an increase is a result of the cash saved from reducing the amount of liquid assets rather than increases in managerial liability.

7 Conclusion

This study employs compliance with Section 404 of SOX as an exogenous shock to a firm's information environment. Using a regression discontinuity design and an asset liquidity measure that includes cash and the cash liquidation value of operating assets, we find a decrease in the holding of liquid assets that ranges from 7.12% to 9.18%. This decline is concentrated among firms with severe agency conflicts and financial constraints. Additionally, the cash saved from reducing the amount of liquid assets is redeployed to increase R&D, resulting in a measure of the opportunity cost from holding liquid assets and also sheds light on the effect of SOX (404) on the firm's incentives to undertake risk. The study's key contribution to existing literature is that it provides an uncontaminated measure of a firm's informational frictions as well as the estimation of a causal effect of these frictions on a firm's choice of internal funds. An interesting direction for further research would be to analyze the impact of compliance with Section 404 on the marginal value of cash holdings. While the hoarding of additional liquidity may be redundant in increasing the value of a firm complying with the rule, the reduction of a firm's informational environment may also improve shareholder monitoring and therefore increase the marginal value of cash. Tests of market responses to such compliance would provide information on the relative importance of informational asymmetries and underinvestment compared to agency

stories of inefficient investments in the determination of the marginal value of cash and other liquid assets.

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Table I: **Summary Statistics, Control and Treatment groups, Prior to Compliance**

Table I presents summary statistics one year prior to compliance - averages, [medians] and (standard errors) - for three samples. The Entire Sample consists of all firms that did not file a Management Report in the previous year and that reported a public float between $50 and $100 million in the year of the analysis, between 2005 to 2010. The Treatment group sample consists of all the firms that did not file a Management in the previous period, attained accelerated filer status in the current period and reported a public float between $50 and $100 million in the year of the analysis, between 2005 to 2010. The control group consists of the set of firms that did not file a Management Report in the previous period, have a nonaccelerated filer status in the current period and reported $50 and $100 million in the year of the analysis, between 2005 to 2010. Variable definitions appear in Appendix A.

	Entire Sample		Treatment Group		Control Group		
Variable	Mean [Median] **(1)**	(SE) **(2)**	Mean [Median] **(3)**	(SE) **(4)**	Mean [Median] **(5)**	(SE) **(6)**	Diff. **(7)**
Cash Ratio$_t$	0.252	(0.012)	0.190	(0.025)	0.266	(0.014)	-0.076**
	[0.174]		[0.109]		[0.188]		
Liquidity 2$_t$	0.557	(0.009)	0.511	(0.020)	0.567	(0.010)	-0.056**
	[0.556]		[0.529]		[0.564]		
Liquidity 3$_t$	0.510	(0.012)	0.460	(0.025)	0.521	(0.014)	-0.061*
	[0.515]		[0.474]		[0.542]		
Liquidity 4$_t$	0.614	(0.009)	0.570	(0.021)	0.623	(0.010)	-0.054**
	[0.625]		[0.588]		[0.639]		
Market-to-Book Ratio$_{t-1}$	2.032	(0.077)	1.593	(0.091)	2.127	(0.091)	-0.534***
	[1.514]		[1.350]		[1.564]		
$R\&D_{t-1}/Assets_{t-1}$	0.055	(0.006)	0.052	(0.011)	0.056	(0.007)	-0.004
	[0.006]		[0.011]		[0.006]		
$Payout_{t-1}/Assets_{t-1}$	0.010	(0.017)	-0.006	(0.013)	0.012	(0.021)	-0.018
	[0.000]		[0.000]		[0.000]		
$Leverage_{t-1}$	0.128	(0.008)	0.147	(0.018)	0.125	(0.009)	0.023
	[0.056]		[0.097]		[0.050]		
Dividend Payer$_{t-1}$	0.209	(0.020)	0.161	(0.044)	0.220	(0.023)	-0.058
	[0.000]		[0.000]		[0.000]		
Total Assets$_{t-1}$	127.008	(7.109)	178.510	(18.588)	115.855	(7.522)	62.655***
	[86.818]		[131.785]		[80.121]		
Market Value of Equity$_{t-1}$	112.782	(4.226)	134.523	(11.612)	108.073	(4.450)	29.449***
	[88.528]		[105.091]		[87.030]		
$Acquisitions_{t-1}/Assets_{t-1}$	0.026	(0.003)	0.036	(0.011)	0.024	(0.004)	0.011
	[0.000]		[0.000]		[0.000]		
Inside Ownership$_{t-1}$	0.152	(0.013)	0.133	(0.035)	0.155	(0.014)	-0.022
	[0.077]		[0.065]		[0.081]		
WW Index$_{t-1}$	0.352	(0.092)	0.377	(0.159)	0.347	(0.108)	0.030
	[-0.113]		[-0.047]		[-0.133]		
KZ Index$_{t-1}$	0.277	(0.090)	0.544	(0.080)	0.219	(0.108)	0.325
	[0.380]		[0.434]		[0.333]		
Observations	378		64		314		

Table II: **Summary Statistics: Voluntary Compliers and Non-Voluntary Compliers, One year Prior to Compliance**

Table II presents summary statistics - averages, [medians] and (standard errors) - for two samples. The Voluntary Compliers sample consists of all firms that did not file a Management Report in the previous year, reported a public float between $50 and $100 million and filed a Management Report in the year of the analysis when they were not required to comply with the rule, between 2005 to 2010. The Non-Voluntary Compliers sample consists of all the firms that did not file a Management in the previous period, reported a public float between $50 and $100 million in the year of the analysis and that are not required to comply with the Section 404 and do not file a Management Report. Variable definitions appear in Appendix A.

	Voluntary Compliers		Non-Voluntary Compliers		
Variable	Mean [Median]	(SE)	Mean [Median]	(SE)	Diff.
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Market-to-Book Ratio$_{t-1}$	2.553 [2.037]	(0.172)	1.931 [1.414]	(0.105)	0.621***
R&D$_{t-1}$/*Assets*$_{t-1}$	0.064 [0.001]	(0.010)	0.052 [0.009]	(0.009)	0.011
Payout$_{t-1}$/*Assets*$_{t-1}$	0.003 [0.000]	(0.011)	-0.019 [0.000]	(0.022)	-0.022
Leverage$_{t-1}$	0.134 [0.053]	(0.017)	0.120 [0.047]	(0.011)	0.013
Dividend Payer$_{t-1}$	0.121 [0.000]	(0.032)	0.265 [0.000]	(0.030)	-0.144***
Total Assets$_{t-1}$	145.786 [94.868]	(17.040)	102.073 [72.702]	(7.540)	43.713***
Market Value of Equity$_{t-1}$	160.630 [120.490]	(10.251)	83.875 [71.582]	(3.383)	76.756***
Acquisitions$_{t-1}$/ *Assets*$_{t-1}$	0.030 [0.000]	(0.007)	0.022 [0.000]	(0.004)	0.007
Inside Ownership$_{t-1}$	0.182 [0.088]	(0.040)	0.145 [0.078]	(0.013)	0.037
WW Index$_{t-1}$	0.673 [-0.113]	(0.285)	0.206 [-0.136]	(0.092)	0.466*
KZ Index$_{t-1}$	0.417 [0.440]	(0.140)	0.126 [0.241]	(0.143)	0.291
Observations	98		212		

Table III: **Summary Statistics for firms in the Control and Treatment groups, Year of Compliance**

Table III presents summary statistics at the time of compliance - averages, [medians] and (standard errors) - for three samples. The Entire Sample consists of all firms that did not file a Management Report in the previous year and that reported a public float between $50 and $100 million in the year of the analysis (between 2005 to 2010). The Treatment group sample consists of all the firms that did not file a Management in the previous period, attained accelerated filer status in the current period and reported a public float between $50 and $100 million in the year of the analysis (between 2005 to 2010). The control group consists of the set of firms that did not file a Management Report in the previous period, have a nonaccelerated filer status in the year of analysis and reported $50 and $100 million in the current period between 2005 to 2010. Variable definitions appear in Appendix A.

	Entire Sample		Treatment Group		Control Group		
Variable	Mean [Median]	(SE)	Mean [Median]	(SE)	Mean [Median]	(SE)	Diff.
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Market-to-Book Ratio$_{t-1}$	1.876 [1.413]	(0.083)	1.620 [1.231]	(0.135)	1.932 [1.480]	(0.096)	-0.311
R&D$_{t-1}$/*Assets*$_{t-1}$	0.057 [0.006]	(0.006)	0.064 [0.007]	(0.018)	0.055 [0.008]	(0.006)	0.009
Payout$_{t-1}$/*Assets*$_{t-1}$	0.050 [0.028]	(0.003)	0.051 [0.027]	(0.008)	0.050 [0.028]	(0.004)	0.001
Leverage$_{t-1}$	0.133 [0.058]	(0.008)	0.148 [0.082]	(0.020)	0.130 [0.052]	(0.009)	0.018
Dividend Payer$_{t-1}$	0.222 [0.000]	(0.021)	0.205 [0.000]	(0.049)	0.226 [0.000]	(0.023)	-0.020
Total Assets$_{t-1}$	143.999 [96.086]	(8.867)	195.498 [147.247]	(20.917)	132.845 [88.492]	(9.691)	62.653***
Market Value of Equity$_{t-1}$	131.074 [93.379]	(6.448)	151.930 [123.954]	(14.364)	126.558 [86.965]	(7.186)	25.371
Acquisitions$_{t-1}$/ *Assets*$_{t-1}$	0.029 [0.000]	(0.004)	0.026 [0.000]	(0.011)	0.029 [0.000]	(0.004)	-0.003
Inside Ownership$_{t-1}$	0.180 [0.091]	(0.028)	0.204 [0.086]	(0.063)	0.176 [0.091]	(0.031)	0.028
WW Index$_{t-1}$	0.447 [-0.110]	(0.117)	0.414 [-0.056]	(0.184)	0.455 [-0.120]	(0.137)	-0.040
KZ Index$_{t-1}$	0.223 [0.315]	(0.095)	0.513 [0.464]	(0.101)	0.161 [0.308]	(0.114)	0.351
Observations	378		68		314		

Table IV: **Impact of Compliance-Cash Ratio**

Table IV presents the estimates from equation (5) using the *Cash Ratio* as the dependent variable. The sample consists of the set of firms that did not file a Management Report in the previous period and that reported a public float between $50 and $100 Million at the time of the switch in status, if any. The variable $Accelerated\ Filer_t$ is a dummy variable that takes the value of 1 of the firm switches its accelerated status and is required to comply for the first time with Section 404. Otherwise, it takes the value of 0. Column (1) reports the estimate of the treatment effect without the inclusion of control variables. Column (2) reports our base specification. Columns (3) and (4)include the firm's market-to-book ratio to control for ex-ante investment opportunities and the change in the firm's payout ratio to control for the possible threshold manipulation, respectively. Column (5) includes the change in the firm's market to book ratio and market value of equity to control for confounding factors. All regressions include a second order polynomial as a smoothing function as well as industry and time fixed effect. Variable definitions appear in Appendix A. ***,**,* denote statistical significance at the 1%, 5% and 10% levels, respectively. Robust standard errors in parenthesis.

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
$Accelerated\ Filer_t$	-0.083**	-0.075***	-0.074***	-0.085***	-0.073***
	(0.039)	(0.027)	(0.027)	(0.027)	(0.028)
$Dividend\ Payer_{t-1}$		-0.070***	-0.068***	-0.058***	-0.069***
		(0.021)	(0.021)	(0.021)	(0.021)
$Leverage_{t-1}$		-0.401***	-0.450***	-0.418***	-0.400***
		(0.061)	(0.064)	(0.062)	(0.062)
$Acquisitions_{t-1}/Assets_{t-1}$		-0.187*	-0.195**	-0.245**	-0.202**
		(0.106)	(0.097)	(0.108)	(0.102)
$R\&D_{t-1}/Assets_{t-1}$		0.751***	0.695***	0.771***	0.751***
		(0.230)	(0.236)	(0.238)	(0.209)
$Log\ Total\ Assets_{t-1}$		-0.056***	-0.018	-0.049***	-0.061***
		(0.018)	(0.027)	(0.018)	(0.018)
Log Market Value of $Equity_{t-1}$		0.035*	-0.000	0.037*	0.051**
		(0.020)	(0.027)	(0.021)	(0.021)
Δ *Log Total* $Assets_{t-1,t}$		0.007	0.008	-0.012	-0.020
		(0.037)	(0.038)	(0.040)	(0.044)
$Market\text{-}to\text{-}Book\ Ratio_{t-1}$			0.025*		
			(0.013)		
$\Delta\ Payout\ Ratio_{t-1,t}$				0.005	
				(0.033)	
Δ *Log Market Value of* $Equity_{t-1,t}$					0.035
					(0.022)
Δ *Market-to-Book* $Ratio_{t-1,t}$					0.006
					(0.011)
Observations	397	382	382	341	382
R-squared	0.107	0.494	0.503	0.521	0.501

Table V: **Impact of Compliance-Other Liquidity Measures**

Table V presents the estimates from equation (5) using three alternative measures of asset liquidity. The sample consists of the set of firms that did not file a Management Report in the previous period and that reported a public float between $50 and $100 Million at the time of the switch in status, if any. The variable *Accelerated Filer*$_t$ is a dummy variable that takes the value of 1 of the firm switches its accelerated status and is required to comply for the first time with Section 404. Otherwise, it takes the value of 0. Column (1) reports the estimates using *Liquidity2* as the dependent variable. Columns (2) and (3) report the estimates using *Liquidity3* and *Liquidity4* as the outcome variable, respectively. All regressions include a second order polynomial as a smoothing function as well as industry and time fixed effect. Variable definitions appear in Appendix A. ***,**,* denote statistical significance at the 1%, 5% and 10% levels, respectively. Robust standard errors in parenthesis.

Variable	**(1)**	**(2)**	**(3)**
Accelerated Filer$_t$	-0.083***	-0.062**	-0.072***
	(0.024)	(0.030)	(0.027)
Dividend Payer$_{t-1}$	-0.001	-0.029	0.001
	(0.018)	(0.021)	(0.018)
Leverage$_{t-1}$	-0.193***	-0.441***	-0.221***
	(0.051)	(0.060)	(0.051)
Acquisitions/Assets$_{t-1}$	-0.432***	-0.239**	-0.387***
	(0.104)	(0.108)	(0.110)
R&D/Assets$_{t-1}$	0.404***	0.404***	0.312***
	(0.121)	(0.140)	(0.102)
Log Total Assets$_{t-1}$	-0.018	-0.052***	-0.032**
	(0.014)	(0.017)	(0.015)
Log Market Value of Equity$_{t-1}$	0.017	0.010	0.017
	(0.015)	(0.017)	(0.015)
Δ *Log Total Assets*$_{t-1,t}$	0.018	-0.003	0.004
	(0.027)	(0.029)	(0.027)
Observations	378	374	374
R-squared	0.355	0.505	0.389

Table VI: **Placebo Test-Estimation of the effect prior to Compliance**

Table VI presents the estimates from equation (5) in the year before the first compliance, if any. The sample consists of the set of firms that did not file a Management Report in the period two years before the first compliance and that reported a public float between $50 and $100 Million in the period before the switch in the status, if any. The variable $Placebo_{t-1}$ is a dummy variable that takes the value of 1 of the firm will switch for the first time its accelerated status in the next period and is required to comply with Section 404. Otherwise, it takes the value of 0. Column (1) reports the estimates using $Cash\ Ratio_{t-1}$ as the dependent variable. Columns (2), (3) and (4) report the estimates using $Liquidity2_{t-1}$, $Liquidity3_{t-1}$ and $Liquidity4_{t-1}$as the outcome variable, respectively. All regressions include a second order polynomial as a smoothing function as well as industry and time fixed effect. Variable definitions appear in Appendix A. ***,**,* denote statistical significance at the 1%, 5% and 10% levels, respectively. Robust standard errors in parenthesis.

Variable	$Cash\ Ratio_{t-1}$ **(1)**	$Liquidity2_{t-1}$ **(2)**	$Liquidity3_{t-1}$ **(3)**	$Liquidity4_{t-1}$ **(4)**
$Placebo_{t-1}$	-0.007	-0.002	-0.026	-0.026
	(0.025)	(0.020)	(0.022)	(0.022)
$Dividend\ Payer_{t-2}$	-0.063***	0.007	-0.040*	-0.040*
	(0.021)	(0.016)	(0.021)	(0.021)
$Leverage_{t-2}$	-0.471***	-0.281***	-0.501***	-0.501***
	(0.072)	(0.059)	(0.080)	(0.080)
$Acquisitions/Assets_{t-2}$	-0.147	-0.475***	-0.202	-0.202
	(0.124)	(0.118)	(0.137)	(0.137)
$R\&D/Assets_{t-2}$	0.765***	0.428***	0.439***	0.439***
	(0.169)	(0.096)	(0.106)	(0.106)
$Log\ Total\ Assets_{t-2}$	-0.064***	-0.016	-0.037**	-0.037**
	(0.016)	(0.014)	(0.016)	(0.016)
Log Market Value of $Equity_{t-2}$	0.051**	0.006	0.016	0.016
	(0.023)	(0.016)	(0.019)	(0.019)
$\Delta\ Log\ Total\ Assets_{t-2,t-1}$	-0.027	-0.026	-0.028	-0.028
	(0.048)	(0.038)	(0.043)	(0.043)
Observations	450	444	442	442
R-squared	0.459	0.310	0.405	0.405

Table VII: **Impact of Voluntary Compliers**

Table VII presents the estimates from equation (5) using the four measures of asset liquidity as dependent variables and excludes voluntary compliers from the estimation. The variable *Accelerated Filer*$_t$ is a dummy variable that takes the value of 1 of the firm switches its accelerated status and is required to comply for the first time with Section 404. Otherwise, it takes the value of 0. Column (1) reports the estimates using *Cash Ratio*$_t$ as the dependent variable. Columns (2), (3) and (4) report the estimates using *Liquidity2*$_t$, *Liquidity3*$_t$ and *Liquidity4*$_t$as the outcome variable, respectively. All regressions include a second order polynomial as a smoothing function as well as industry and time fixed effect. Variable definitions appear in Appendix A. ***,**,* denote statistical significance at the 1%, 5% and 10% levels, respectively. Robust standard errors in parenthesis.

	Cash Ratio$_t$	*Liquidity2*$_t$	*Liquidity3*$_t$	*Liquidity4*$_t$
Variable	**(1)**	**(2)**	**(3)**	**(4)**
Accelerated Filer$_t$	-0.052*	-0.071**	-0.042	-0.057*
	(0.032)	(0.030)	(0.035)	(0.032)
Dividend Payer$_{t-1}$	-0.064***	0.001	-0.023	0.004
	(0.021)	(0.018)	(0.021)	(0.018)
Leverage$_{t-1}$	-0.400***	-0.192***	-0.440***	-0.220***
	(0.061)	(0.051)	(0.059)	(0.051)
Acquisitions/Assets$_{t-1}$	-0.204**	-0.440***	-0.253**	-0.395***
	(0.103)	(0.104)	(0.109)	(0.111)
R&D/Assets$_{t-1}$	0.744***	0.405***	0.396***	0.314***
	(0.228)	(0.122)	(0.137)	(0.103)
Log Total Assets$_{t-1}$	-0.057***	-0.019	-0.054***	-0.033**
	(0.018)	(0.015)	(0.017)	(0.015)
Log Market Value of Equity$_{t-1}$	0.026	0.014	0.003	0.014
	(0.020)	(0.016)	(0.017)	(0.016)
Δ *Log Total Assets*$_{t-1,t}$	-0.002	0.013	-0.011	-0.001
	(0.037)	(0.028)	(0.030)	(0.030)
Observations	282	278	282	284
R-squared	0.496	0.356	0.507	0.390

Table VIII: **Cross-Sectional Variation: Ex-Ante Financial Constraints**

Table VIII presents the estimates of equation (8). Panel A presents the results using the Kaplan and Zingales Index. Panel B presents the results using the Whited and Wu Index. A firm is considered as financially unconstrained if the index in the year before the analysis is in the first quartile of the distribution. Columns (1) to (4) report the treatment effect for these two group of firms for our four measures of corporate liquidity. The treatment effect for ex-ante unconstrained firms is captured by the coefficient β_1. The treatment effect for ex-ante constrained firms is captured by $\beta_1 + \pi_1$. All regression include a second order polynomial as a smoothing function as well as industry and time fixed effect. Variable definitions appear in Appendix A. ***,**,* denote statistical significance at the 1%, 5% and 10% levels, respectively. F-statistic reported in parenthesis.

Panel A: Kaplan and Zingales Index				
Dependent Variable	*Cash Ratio*$_t$	*Liquidity2*$_t$	*Liquidity3*$_t$	*Liquidity4*$_t$
Unconstrained	-0.091	-0.074	-0.006	-0.051
	(0.079)	(0.043)	(0.052)	(0.039)
Constrained	-0.061	-.093***	-.095***	-0.089***
	(0.040)	(0.029)	(0.038)	(0.031)
Difference	0.012	-0.019	-0.089	-0.037
	(0.085)	(0.048)	(0.059)	(0.045)
Panel B: Whited and Wu Index				
Dependent Variable	*Cash Ratio*$_t$	*Liquidity2*$_t$	*Liquidity3*$_t$	*Liquidity4*$_t$
Unconstrained	0.021	-0.062	-0.006	-0.063
	(0.051)	(0.043)	(0.054)	(0.045)
Constrained	-.205***	-0.097***	-0.095**	-0.087**
	(0.043)	(0.031)	(0.040)	(0.032)
Difference	-0.131	-0.035	-0.089	-0.026
	(0.060)	(0.051)	(0.062)	(0.052)

Table IX: **Cross-Sectional Variation: Ex-Ante Agency Conflicts**

Table IX presents the estimates of equation (8) focusing on ex-ante agency conflicts. A firm is considered as encountering ex-ante agency conflicts if the firm's inside ownership, prior to compliance, is below the sample average, otherwise the firm is not considered as having ex-ante agency conflicts. Columns (1) to (4) report the treatment effect for these two group of firms for our four measures of corporate liquidity. The treatment effect for firms with no ex-ante agency conflicts is captured by the coefficient β_1. The treatment effect for with ex-ante agency conflicts is captured by $\beta_1 + \pi_1$. All regression include a second order polynomial as a smoothing function as well as industry and time fixed effect. Variable definitions appear in Appendix A. ***,**,* denote statistical significance at the 1%, 5% and 10% levels, respectively. F-statistic reported in parenthesis.

Panel A: Agency Conflicts				
Dependent Variable	*Cash Ratio*$_t$	*Liquidity2*$_t$	*Liquidity3*$_t$	*Liquidity4*$_t$
No Agency Conflicts	-0.082***	-0.072***	-0.006	-0.057*
	(0.032)	(0.029)	(0.035)	(0.031)
Agency Conflicts	-0.039	-0.106***	-0.095**	-0.101***
	(0.040)	(0.035)	(0.041)	(0.036)
Difference	0.023	-0.034	-0.890**	-0.043
	(0.047)	(0.041)	(0.047)	(0.042)

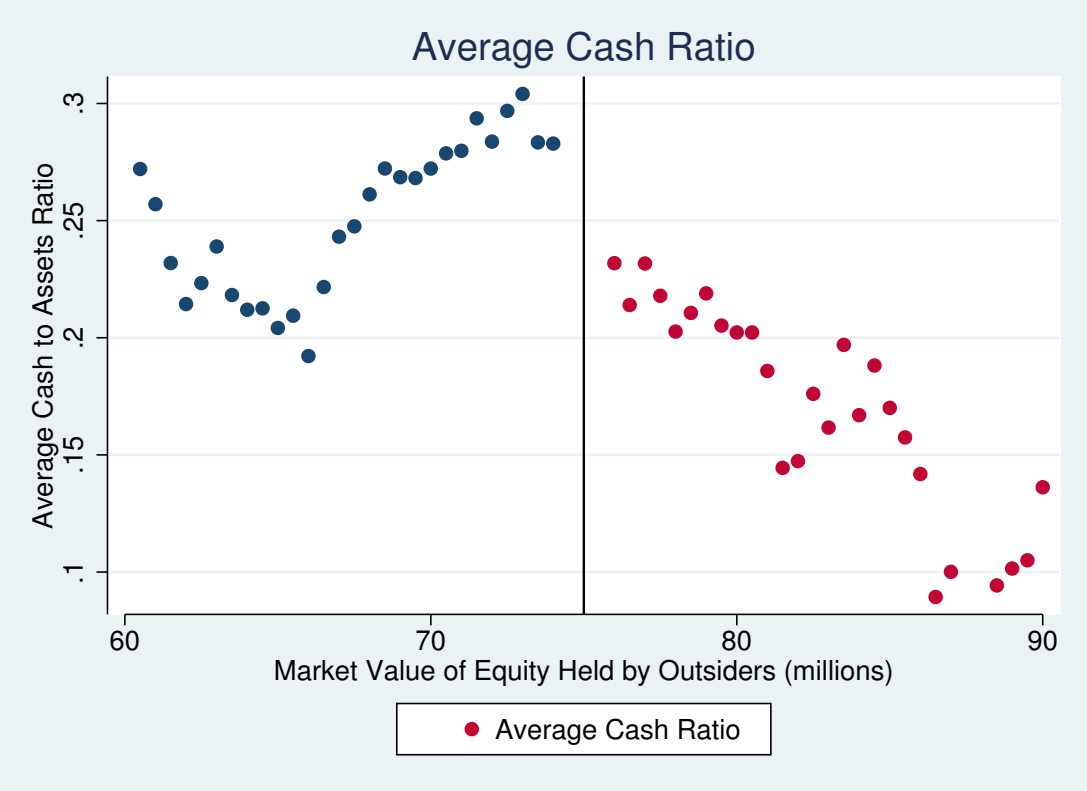

Figure 1: **Average cash ratio**. On the horizontal axis is the public float in millions USD. On the horizontal axis is the average cash ratio. The set of firms with a Market Value of Equity Held by Outsiders above $75 million is the treated group. The set of firms with a Market Value of Equity Held by Outsiders below $75 million represent the control group.

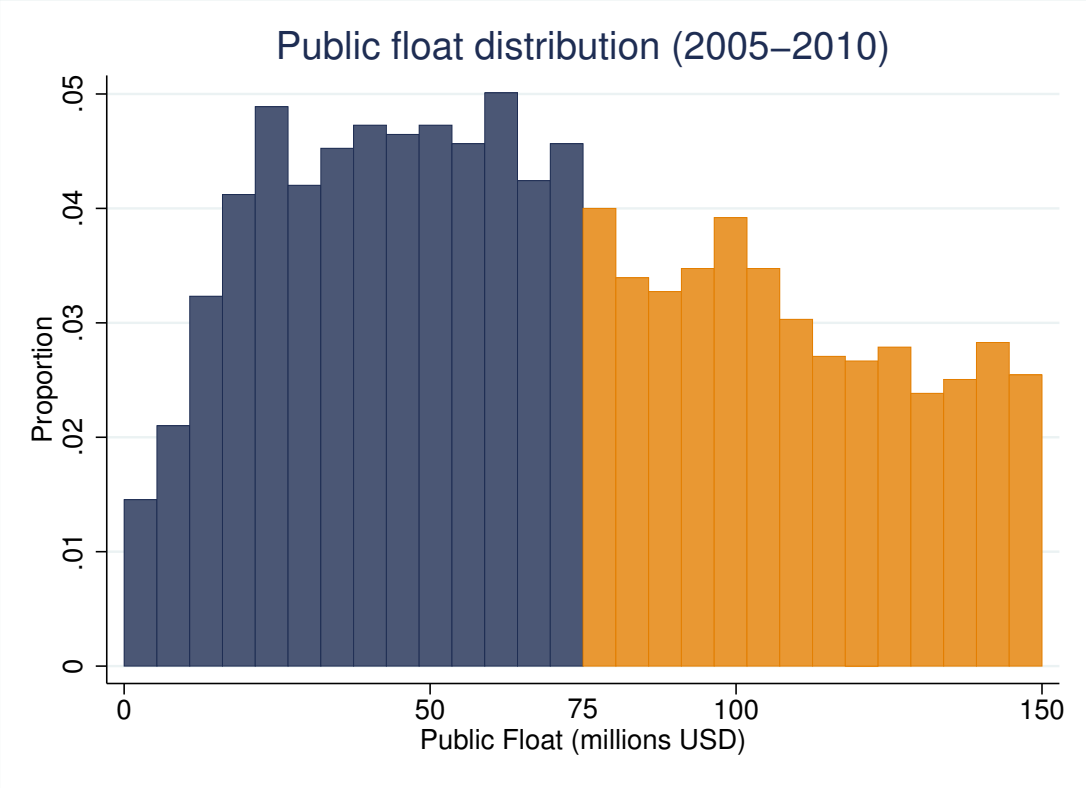

Figure 2: **Public float distribution (2005-2010)**. On the horizontal axis is the public float in millions USD. On the horizontal axis is the frequency of firms. The blue and orange bars represent the density of the firms below and above the disclosure threshold, respectively.

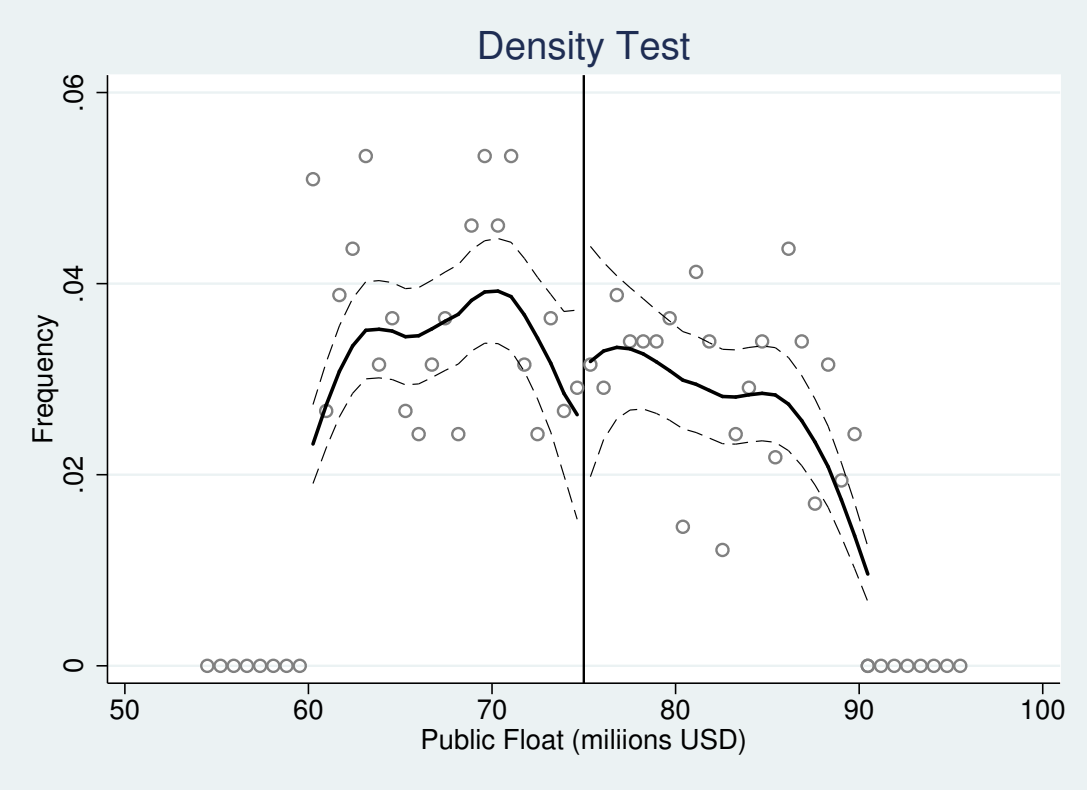

Figure 3: **Density test: public float manipulation (2005-2010)**. This figure presents the result of the public float manipulation density test proposed by McCrary (2008). On the horizontal axis is the public float in millions USD. On the horizontal axis is the frequency of firms.The solid line represents the non-parametric estimate of the frequency. The dashed line represents the 95% confidence interval of such an estimation on each side of the threshold.

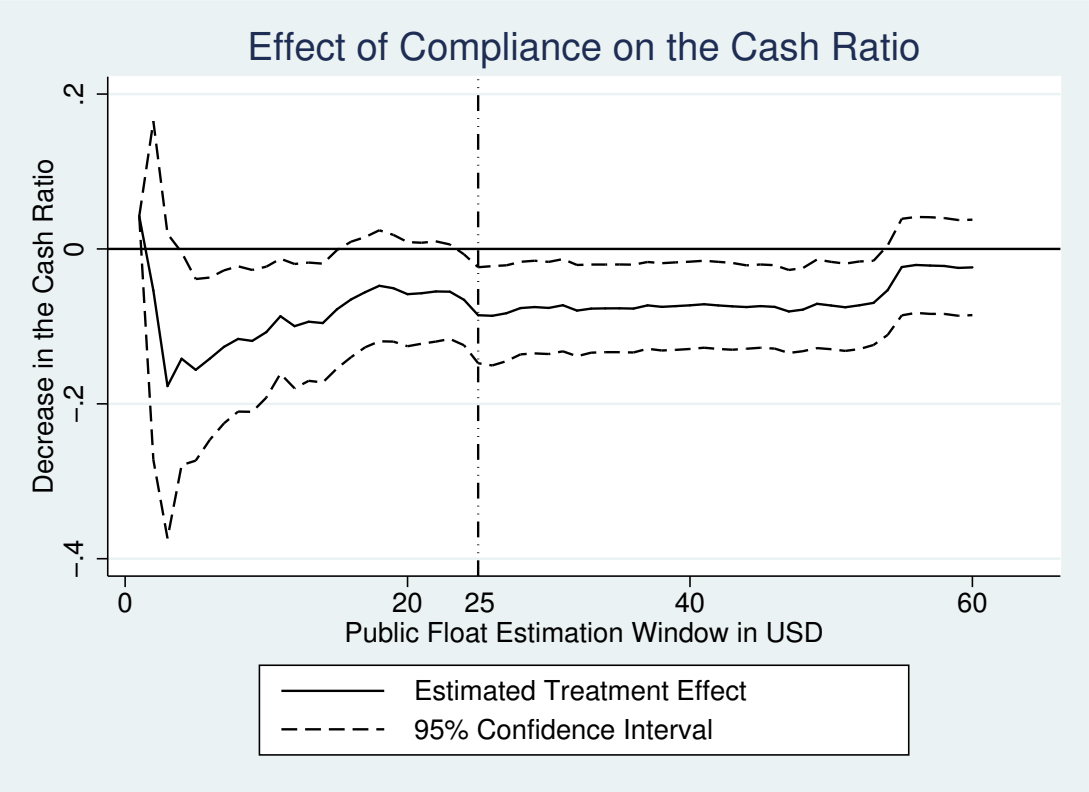

Figure 4: **Estimate-bandwidth sensitivity: Cash Ratio**. On the horizontal axis is the public float estimation window (millions USD). For example, an estimation window of $15 million includes firms that reported a public float between $60 million and $90 million. On the horizontal axis is the estimated treatment effect of compliance with Section 404 on the cash ratio. The solid line represents the estimated effect. The dashed lines represent the 95% confidence interval.The long-dashed line represent the estimate in our base specification ($25 million estimation window), that includes firms that reported a public float between $50 and $100 million.

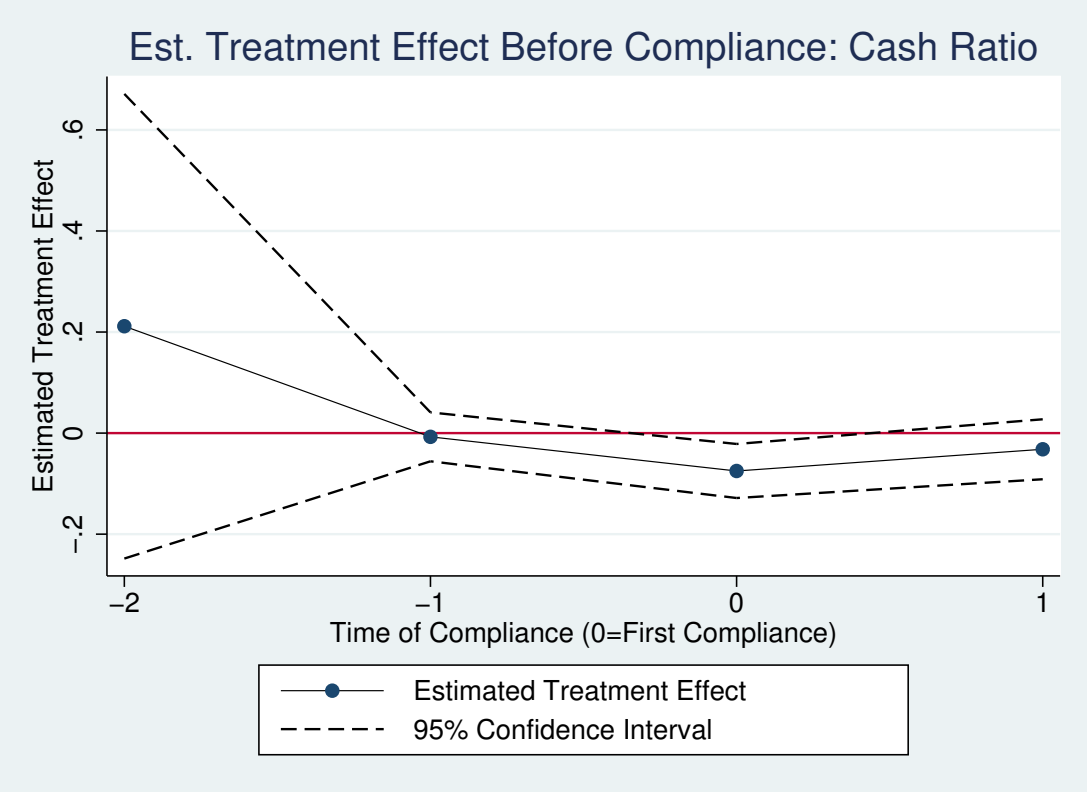

Figure 5: **Treatment Effect Before and After Compliance: Cash Ratio**. On the horizontal axis is the year of the analysis relative to the first date of compliance. 0 represents the first year of compliance. On the vertical axis is the estimated difference between treatment and control group. The dashed line represents the 95% confidence interval

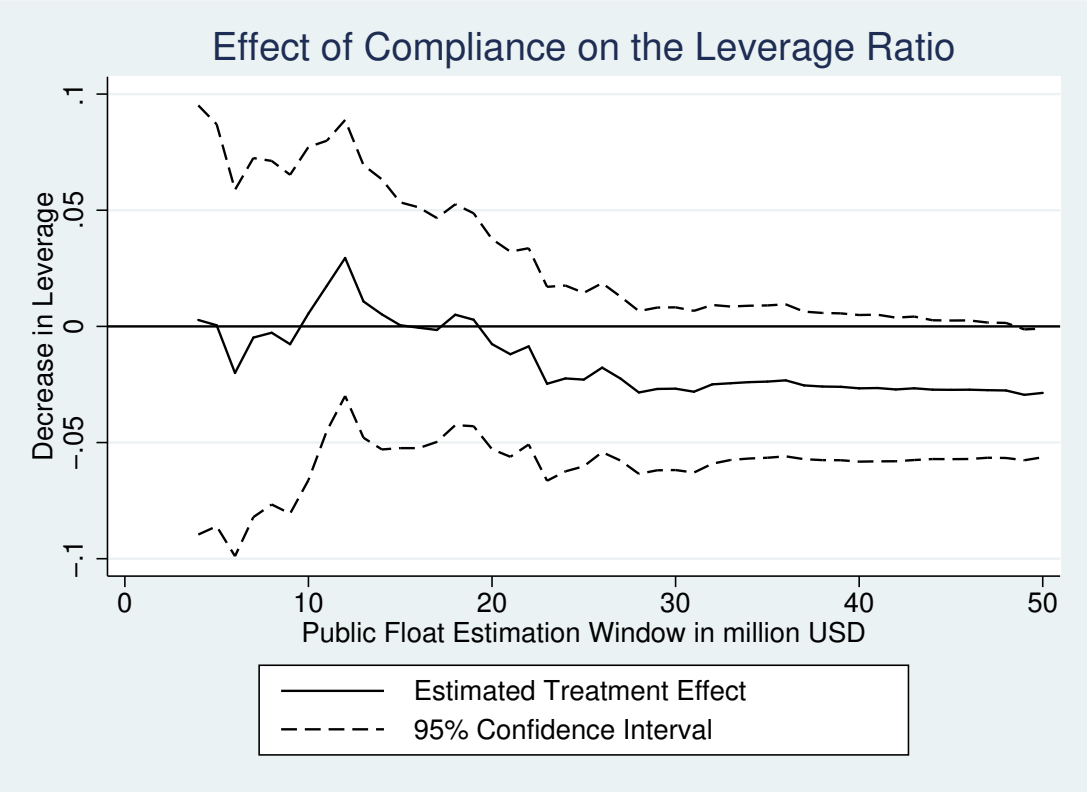

Figure 6: **Estimate-bandwidth sensitivity: Leverage**. On the horizontal axis is the public float estimation window (millions USD). For example, an estimation window of $15 million includes firms that reported a public float between $60 million and $90 million. On the horizontal axis is the estimated treatment effect of compliance with Section 404 on *Leverage*. The solid line represents the estimated effect. The dashed lines represent the 95% confidence interval.The long-dashed line represent the estimate in our base specification ($25 million estimation window), that includes firms that reported a public float between $50 and $100 million.

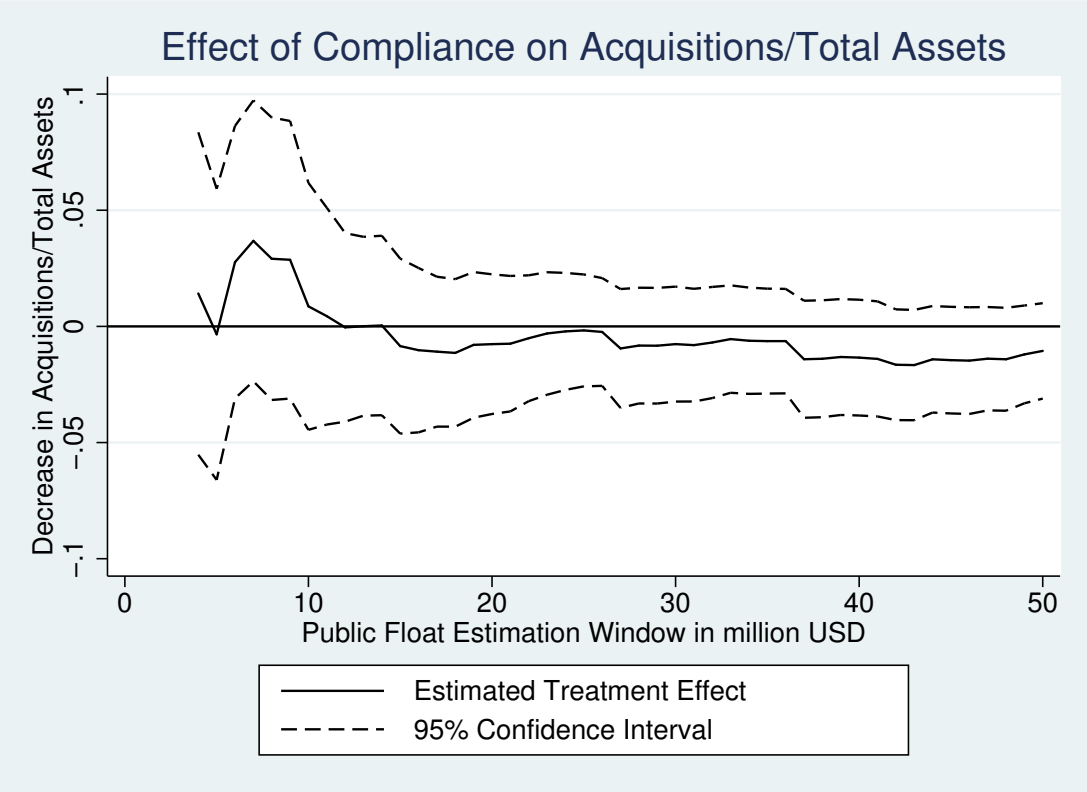

Figure 7: **Estimate-bandwidth sensitivity: Acquisitions to Assets**. On the horizontal axis is the public float estimation window (millions USD). For example, an estimation window of $15 million includes firms that reported a public float between $60 million and $90 million. On the horizontal axis is the estimated treatment effect of compliance with Section 404 on *Acquisitions*. The solid line represents the estimated effect. The dashed lines represent the 95% confidence interval.The long-dashed line represent the estimate in our base specification ($25 million estimation window), that includes firms that reported a public float between $50 and $100 million.

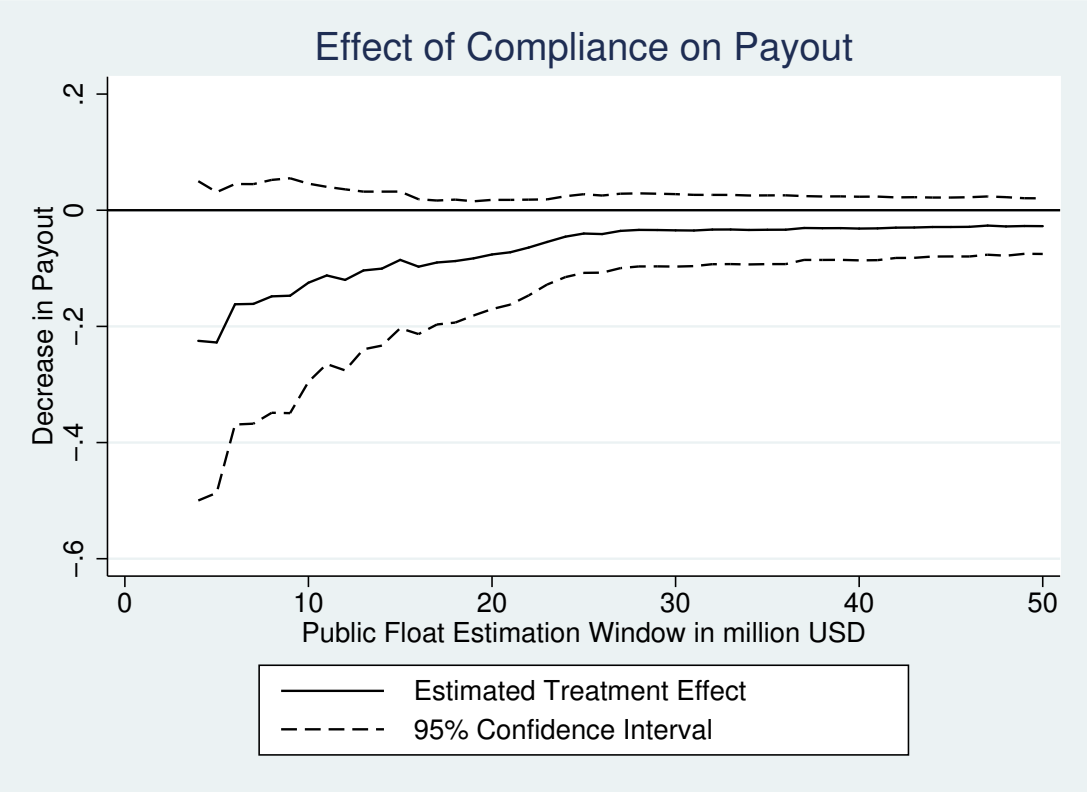

Figure 8: **Estimate-bandwidth sensitivity: Payout to Assets**. On the horizontal axis is the public float estimation window (millions USD). For example, an estimation window of $15 million includes firms that reported a public float between $60 million and $90 million. On the horizontal axis is the estimated treatment effect of compliance with Section 404 on *Payout/Assets*. The solid line represents the estimated effect. The dashed lines represent the 95% confidence interval.The long-dashed line represent the estimate in our base specification ($25 million estimation window), that includes firms that reported a public float between $50 and $100 million.

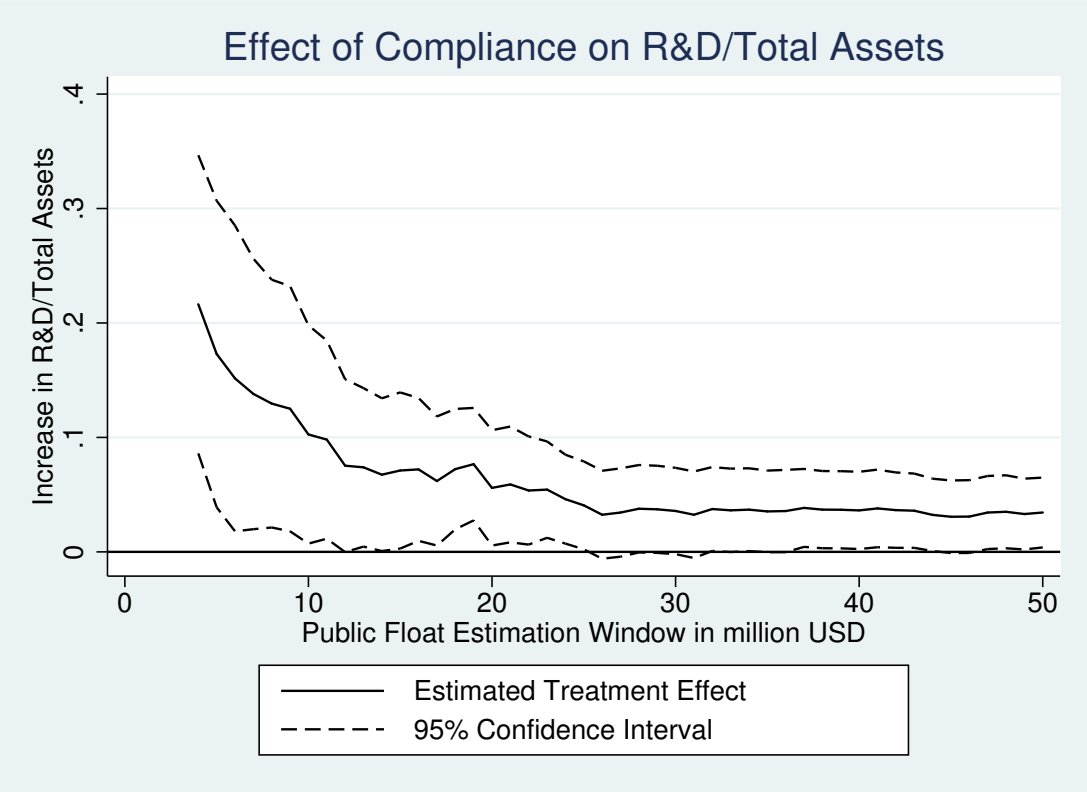

Figure 9: **Estimate-bandwidth sensitivity: R&D to Assets**. On the horizontal axis is the public float estimation window (millions USD). For example, an estimation window of $15 million includes firms that reported a public float between $60 million and $90 million. On the horizontal axis is the estimated treatment effect of compliance with Section 404 on *R&D*. The solid line represents the estimated effect. The dashed lines represent the 95% confidence interval.The long-dashed line represent the estimate in our base specification ($25 million estimation window), that includes firms that reported a public float between $50 and $100 million.

Table X: **Appendix A**

Table A1 presents the description of the variables included in the analysis, their construction and their source.

Variable	**Construction**	**Source**
Cash Ratio	$CashandMarketableSecurities(1)/TotalAssets(6)$	Compustat
Liquidity 2	$(0.715 * Receivables(2) + 0.547 * Inventory(3) + NetPPE(8) + Cash(1))/(Assets(6))$	Compustat
Liquidity 3	$[Cash(1) + 0.75 * (CurrentAssets(4) - Cash(1))]/[TotalAssets(6)]$	Compustat
Liquidity 4	$[Cash(1) + 0.75 * (CurrentAssets(4) - Cash(1)) + 0.5 * NetPPE(8)]/[TotalAssets(6)]$	Compustat
Market to Book Ratio	$(Assets(6) + (NumberofShares(25) * SharePrice(24)) - MarketCapitalization(60) - DeferredTaxes(74))/TotalAssets(6)$	Compustat
R&D/Assets	$(R\&D(46))/Assets(6)$	Compustat
Leverage Ratio	$(LongTermDebt(9) + DebtinCurrentLiabilities(34))/(TotalAssets(6))$	Compustat
Dividend Payer	Takes value of 1 if common dividend payment (21) is positive	Compustat
Payout/Assets	$(CommonDividend(21) + Repurchases(115 - 56))/(Assets(6))$	Compustat
Total Assets	Total Assets (6)	Compustat
Market Value of Equity	$CommonShares(54) * Stockpricefiscalyearend(32)$	Compustat
Sales	Sales(117)	Compustat
Acquisitions to Assets	$Acquisitions(129)/Assets(6)$	Compustat
Inside Ownership	Percentage Ownership of Management and Directors	DEF 14A
Kaplan and Zingales Index	-1.002*CashFlow((13)-(15)-(16)-(21)/(Assets (6))+0.238*Market to Book+3.139*Leverage-39.368*Dividends (21)/Assets(6)-1.315*CashHoldings(1)/Assets(6)	Compustat
Whited and Wu Index	-0.091*CashFlow((13)-(15)-(16)-(21)/Assets(6)-0.062*Div.Payer+0.021*LTDebt(142)/Assets(6)-0.044*ln(Assets(6))+0.102*IndustrySalesGrowth-0.035*SalesGrowth(12)	Compustat

Appendix B

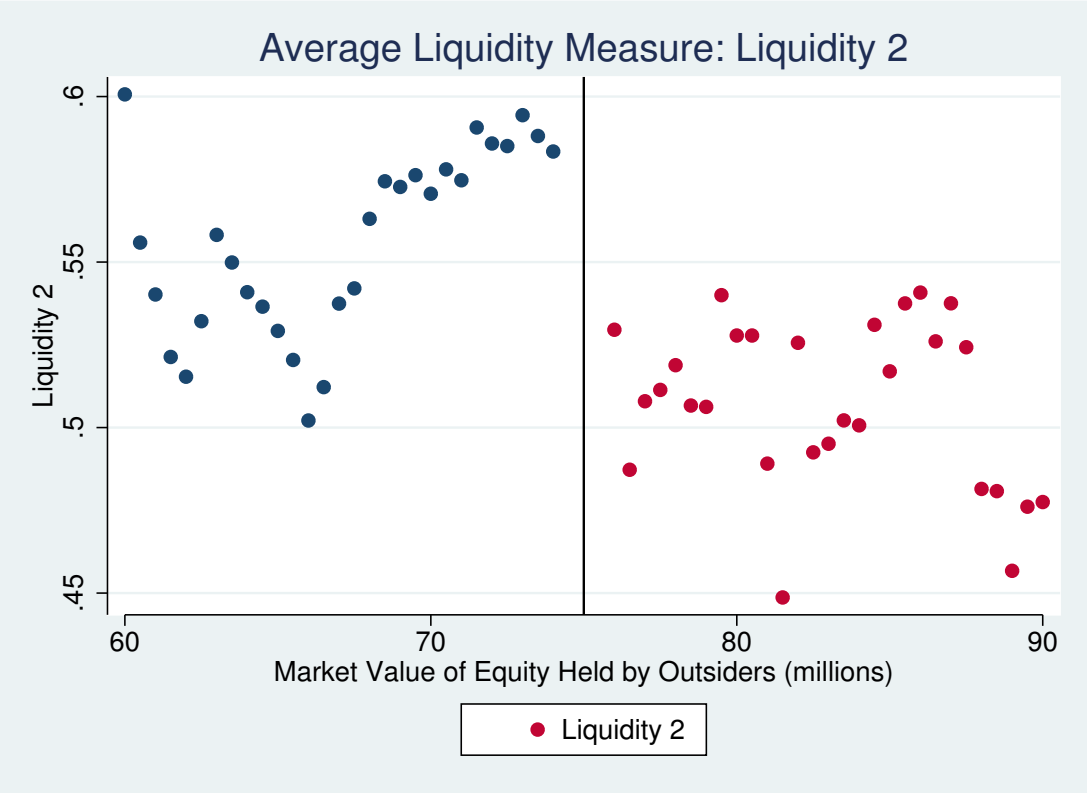

Figure 10: Average asset Liquidity: *Liquidity 2*. On the horizontal axis is the public float in millions USD. On the horizontal axis is the average asset liquidity, using *Liquidity 3* as the measure of corporate liquidity. The dashed line represents the fitted values using a second order polynomial function on each side of the $75 million threshold.

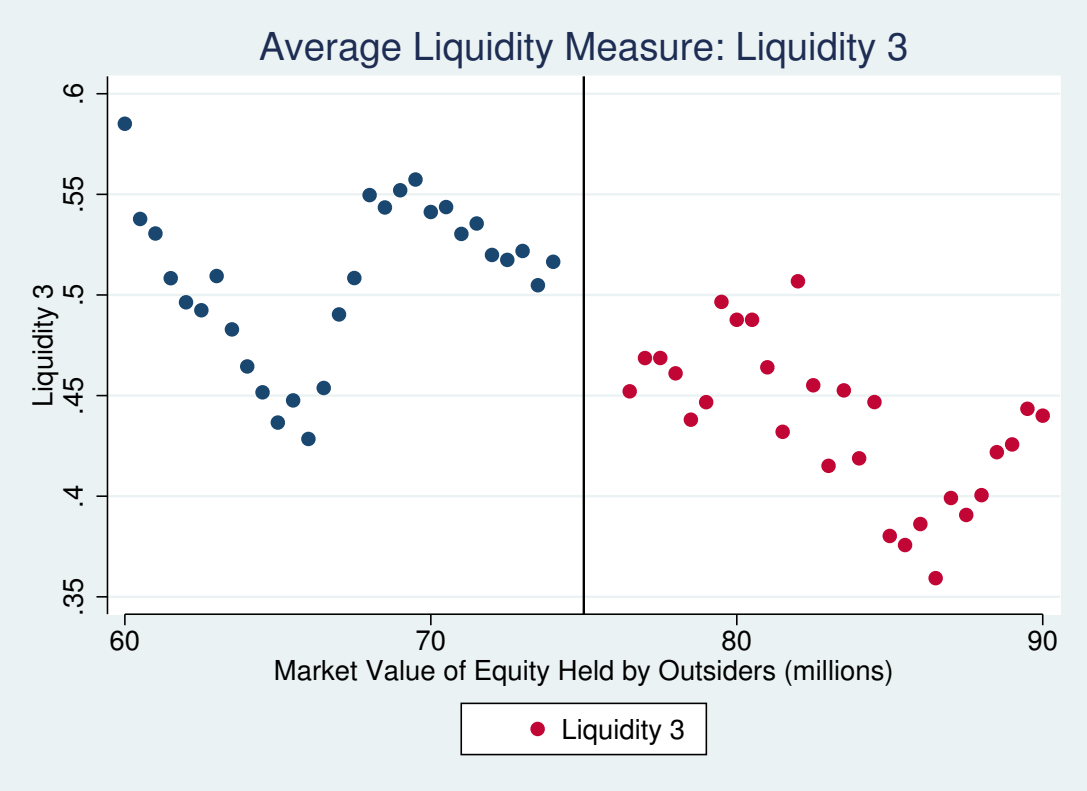

Figure 11: Average asset Liquidity: *Liquidity 3*. On the horizontal axis is the public float in millions USD. On the horizontal axis is the average asset liquidity, using *Liquidity 3* as the measure of corporate liquidity. The dashed line represents the fitted values using a second order polynomial function on each side of the $75 million threshold.

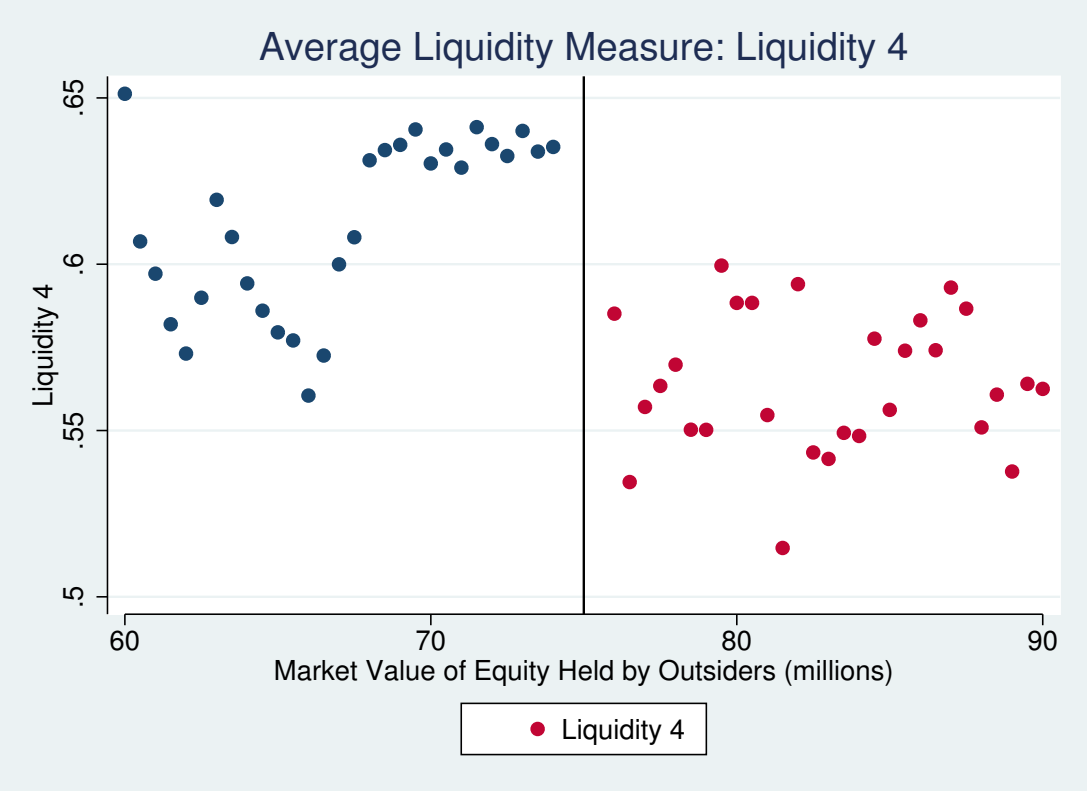

Figure 12: Average asset Liquidity: *Liquidity 4*. On the horizontal axis is the public float in millions USD. On the horizontal axis is the average asset liquidity, using *Liquidity4* as the measure of corporate liquidity. The dashed line represents the fitted values using a second order polynomial function on each side of the $75 million threshold.

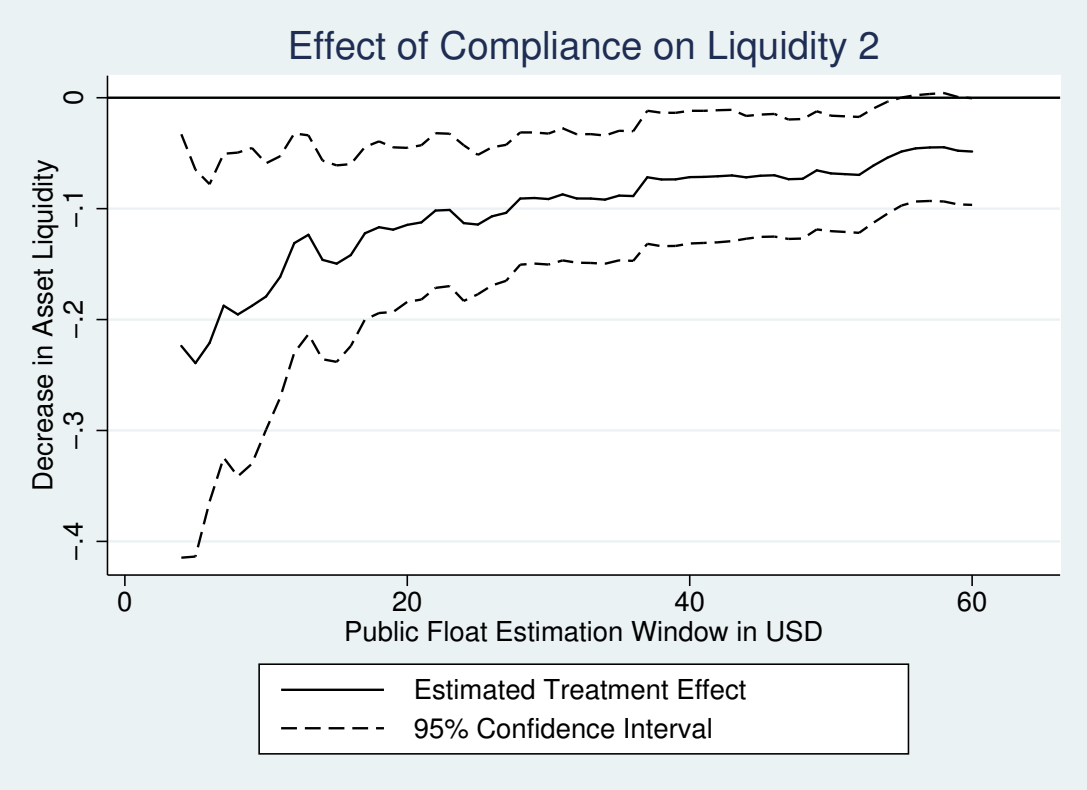

Figure 13: Estimate-bandwidth sensitivity: Asset Liquidity: *Liquidity2*. On the horizontal axis is the public float estimation window (millions USD). On the horizontal axis is the estimated treatment effect of compliance with Section 404 on the outcome variable *Liquidity2*. The solid line represents the estimated effect. The dashed lines represent the 95% confidence interval. The long-dashed line represent the estimate in our base specification ($25 million estimation window), that includes firms that reported a public float between $50 and $100 million.

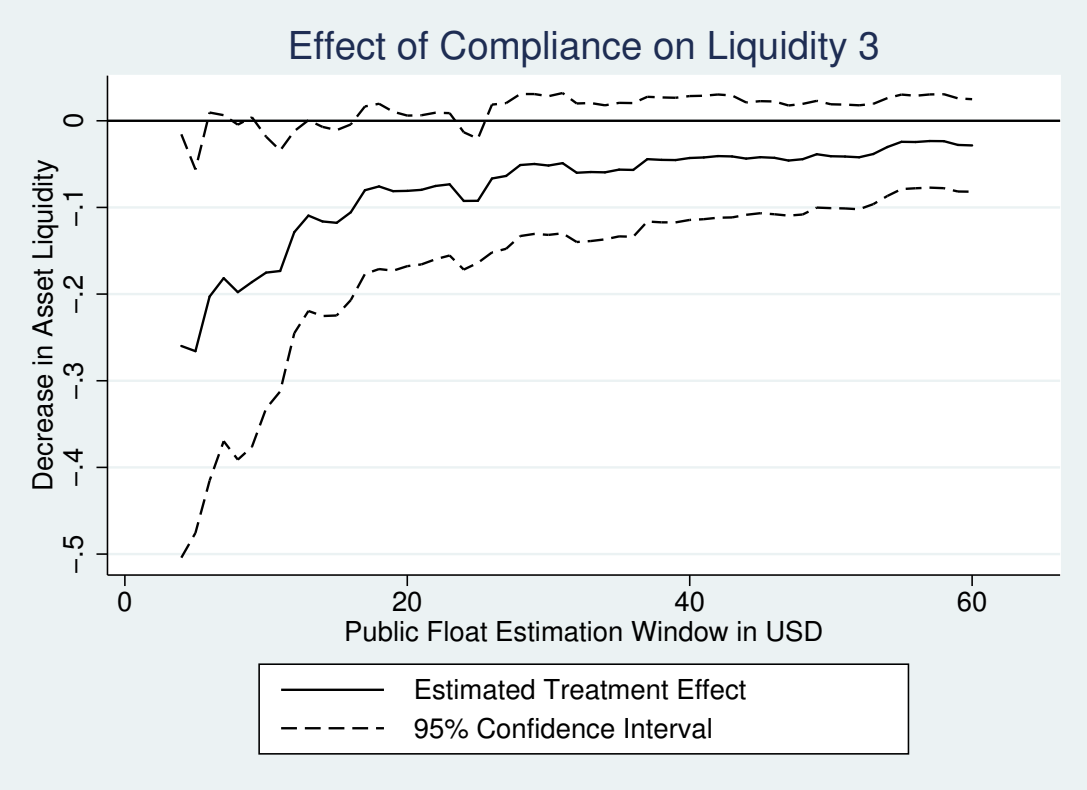

Figure 14: Estimate-bandwidth sensitivity: Asset Liquidity: *Liquidity3*. On the horizontal axis is the public float estimation window (millions USD). On the horizontal axis is the estimated treatment effect of compliance with Section 404 on the outcome variable *Liquidity3*. The solid line represents the estimated effect. The dashed lines represent the 95% confidence interval. The long-dashed line represent the estimate in our base specification ($25 million estimation window), that includes firms that reported a public float between $50 and $100 million.

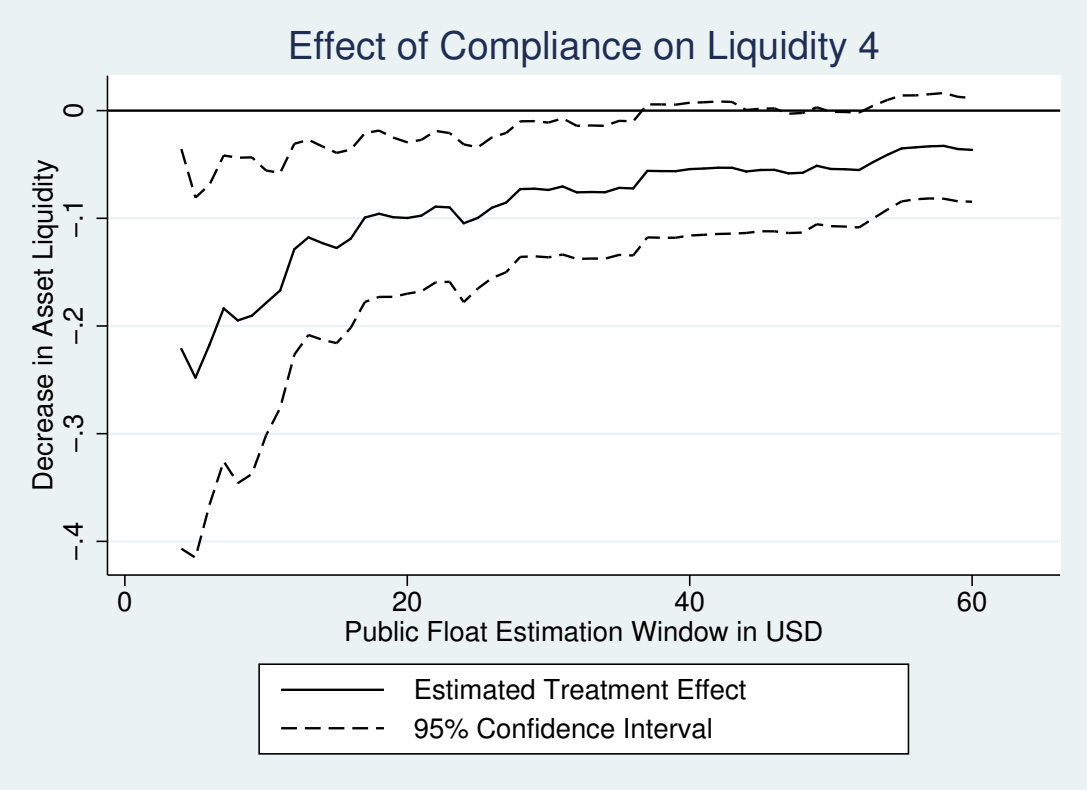

Figure 15: Estimate-bandwidth sensitivity: Asset Liquidity: *Liquidity4*. On the horizontal axis is the public float estimation window (millions USD). On the horizontal axis is the estimated treatment effect of compliance with Section 404 on the outcome variable *Liquidity4*. The solid line represents the estimated effect. The dashed lines represent the 95% confidence interval. The long-dashed line represent the estimate in our base specification ($25 million estimation window), that includes firms that reported a public float between $50 and $100 million.