The Sarbanes Oxley Act and Firm Cash Holding

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Corporate Cash Holding and Board Structure

Abstract

In this paper, we establish a causal relationship between corporate governance, corporate cash holding practices and marginal value of corporate cash reserves taking advantage of the Sarbanes-Oxley Act as a quasi-experiment and difference-in-differences methods to control for both observed and unobserved firm heterogeneity. We find that firms with weak board independence in 2001 increased their cash holdings more and experienced higher growth in marginal value of cash reserves after the SOX. The effect of changes in corporate governance on corporate cash holding practices and marginal value of corporate cash reserves depends on several factors including financial constraints and existence of effective external monitoring.

Keywords: Corporate Cash Holding, Corporate Governance, the Sarbanes-Oxley Act, Board Structure, Marginal Value of Corporate Cash Reserves

1. Introduction

In this paper, we investigate the effect of changes in corporate governance on corporate cash holding practices and marginal value of corporate cash reserves utilizing of the Sarbanes-Oxley Act (hereafter, SOX) which enhances board independence but doesn't affect other variables influencing corporate cash holding practices as a quasi-experiment (Guo and Masulis, 2012).

In the perfect capital market, cash holding is a zero net present value investment and a firm's decision about how to use internal funds do not affect firm value since firms can freely access the capital market to finance any positive net present value project without any friction (Modigliani and Miller, 1958). However, this value irrelevance proposition of Modigliani and Miller is frequently violated in reality. When a firm seeks external financing, it has to bear sizable transaction costs arising from several ubiquitous factors including information asymmetry, taxes and bankruptcy costs in the actual capital market. Thus, a firm's cash holding practices may have significant value consequences.

Theory of the firm suggests another within-a-firm channel whereby a firm's cash holding practices may influence firm value. As a nexus of contracts, prevalent are conflicts of interest between upper-level managers and shareholders within a firm (Jensen and Meckling, 1976). While these managers are contractually liable to maximize shareholders' wealth, they often have strong preferences for increasing their own utility at the expense of shareholders unless effective corporate governance circumvents managers' opportunistic behavior diverging from shareholders' interests. Likewise, effective corporate governance may limit a manager's ability to pursue private benefits by squandering cash at her discretion (Jensen, 1986; Stultz, 1990), increasing marginal value of corporate cash reserves.

Previous studies report inconsistent evidence on the aforementioned relationship between corporate governance, corporate cash holding practices and marginal value of corporate cash reserves. For example, Dittmar and Mahrt-Smith (2007) show that corporate governance increases firm value by affecting corporate cash holding practices and poorly governed firms

3

spend excess cash more quickly compared with firms with good corporate governance. Furthermore, they show that poorly governed firms make inefficient investments with their excess cash reserves. Pinkowitz, Stultz and Williamson (2006) provide similar evidence in their cross-country analysis. On the other hand, Harford (1999) and Opler, Pinkowitz, Stultz and Williamson (1999) find that there is no significant relationship between corporate cash holding practice and firm-level corporate governance. Thus, a causal relationship between corporate governance and corporate cash holding practices is still not clear in the previous literature and is still an open empirical question.

In this paper, we revisit this issue by taking advantage of the SOX as a quasi-experiment. The SOX is an interesting avenue of inquiry on this issue for the following reasons. First, the SOX provides a useful laboratory since, after the passage of the SOX, the New York Stock Exchange (NYSE) and NASDAQ amended their listing standards to raise the required percentage of independent directors on corporate boards (Chhaochharia and Grinstein, 2009; Guo and Masulis, 2012). Taking advantage of the SOX, we employ difference-in-differences methods to control for both observed and unobserved firm heterogeneity, which helps us enormously to establish a causal relationship between corporate governance, corporate cash holding practices and marginal value of corporate cash reserves. Furthermore, this unique feature of the SOX allows us to investigate the substitutability between internal and external corporate governance mechanisms in terms of their effects on corporate cash holding practices and on marginal value of corporate cash reserves since only corporate boards are affected by passage of the SOX.

Our overall results support the hypothesis that corporate governance significantly affects corporate cash holding practices and increases marginal value of corporate cash holdings. First, we find that firms with weak board independence as proxied by a dummy variable for a firm not having a majority of independent directors on the board in 2001 increase their cash holdings more compared with firms with strong board independence in 2001 after the SOX. This finding suggests that better corporate governance motivates firms to hold larger cash reserves since firms

with weak board independence in 2001 are the ones which are critically affected by new listing standards resulting from the SOX. This finding further suggests that better corporate governance allows firms to adopt more flexible cash holding practices. Second, the effect of corporate governance improvement on corporate cash holding practices and marginal of cash reserves is weaker for firms which are more tightly financially constrained. This finding further confirms our hypothesis that better corporate governance motivates firms to hold larger cash reserves since managers of financially constrained firms are less able to squander their cash reserves and the effects of corporate governance improvement on corporate cash holding practices are expected to be less significant for these firms. Third, we find that the aforementioned effect of corporate governance improvement on corporate cash holding practices and marginal of cash reserves is found to be significant only for firms which are subject to weaker external monitoring. This finding suggests that internal governance mechanisms and internal governance mechanisms are in a substitutive relationship. Fourth, we find that firms with weaker board independence in 2001 experience higher growth in marginal value of cash reserves compared with firms with strong board independence in 2001 after the SOX. This finding suggests that corporate governance improvement reduces managerial moral hazard problem in terms of deploying internal funds.

Our paper contributes to the literature in several significant ways. First, we provide endogeneity-free evidence that better corporate governance leads to more flexible corporate cash holding practices and greater marginal value of corporate cash holdings. Clear evidence on the causal relationship between corporate governance and corporate cash holding practices and marginal value of corporate cash reserves is still scarce in the extant literature. We exploit unique feature of the SOX to isolate a shock to corporate boards enhancing board independence. Second, our paper identify several factors which influence the causal relationship between corporate governance, corporate cash holding and marginal value of corporate cash reserves, which will help deepen our understanding of causes and consequences of corporate cash holding practices. Third, taking advantage of the SOX as a quasi-experiment, we provide evidence on the

substitutability between internal and external corporate governance mechanisms. Improvement in internal corporate governance mechanism impacts corporate cash holding practices only when the firm is subject to weak external monitoring. Direction of the interaction between internal and external governance mechanisms is not obvious *ex ante* but understanding how internal governance mechanisms interact with external governance mechanisms is necessary when we view evaluate corporate governance of a firm as a portfolio of internal and external governance mechanisms (Barber and Liang, 2008).

The remainder of this paper proceeds as follows. First, we develop our main hypotheses and their testable implications. Second, we provide information about the data construction procedure and empirical methodologies we employ in this paper. Third, we describe sample characteristics and discuss empirical results. Finally, we conclude the paper.

2. Development of hypothesis

In this section, we develop several hypotheses concerning the causal relationship between corporate governance and corporate cash holding practices and marginal value of cash reserves.

Agency theory predicts that self-interested managers are more likely to squander excess cash reserves in the present to fund pet projects or consume perquisites rather than hold them for future investment (Jensen and Meckling, 1976; Harford, Mansai and Maxwell, 2008). Furthermore, John and Knyazeva (2006) suggest that poorly governed firms may choose to rely on pre-commitment to dividend payments for the purpose of diluting significant managerial moral hazard problem due to poor corporate governance, which results in small cash reserves maintained by such firms. On the other hand, Stultz (1990) and Harford, Mansai and Maxwell (2008) suggest that good corporate governance may increase corporate cash holding since shareholders who are aware of diluted managerial moral hazard problem due to good corporate governance allows managers to hold larger cash reserves for the purpose of overcoming underinvestment problem in the presence

of costly frictions in the external financing. The aforementioned arguments lead to the following hypothesis:

H1. Firms with weak board independence in 2001 will increase their cash holdings more compared with firms with strong board independence in 2001 after the SOX.

As a firm is financially more constrained, a manager's ability to squander excess cash reserves to seek private benefits and consume perquisites will be limited. Furthermore, cash holdings are more valuable to financially constrained firms since for these firms external financing is more costly, which aggravates costs of manager's squandering cash for private benefit seeking (Denis and Sibilkov, 2007). Therefore, the effect of corporate governance improvement on corporate cash holding practices and marginal value of cash reserves will be smaller for financially constrained firms. The aforementioned arguments lead to the following hypothesis:

H2. For firms which are more tightly financially constrained, the aforementioned effect of the passage of the SOX on corporate cash holding in H1 will be smaller.

The SOX affects only a very specific type of internal corporate governance mechanism, namely corporate boards. Thus, we may consider how interaction between internal corporate governance mechanisms and external corporate governance mechanisms influence the effects of corporate governance improvement on corporate cash holding practices and marginal value of cash reserves. In this paper, we choose representative classes of outside corporate governance mechanism including institutional blockholders, public pension funds and GIM-index. Previous studies including Shleifer and Vishny (1986) and Holderness (2003) suggest that blockholders have strong incentives and more excellent ability to provide valuable monitoring services to a

firm. GIM-index is good proxy for intensities of external monitoring and pressures since, as GIM-index is higher, managers are entrenched from outside market for corporate control and thus market for corporate control is less effective as a monitoring mechanism for these firms (Gompers, Ishii and Metrick, 2003). Therefore, a firm will significantly increase its cash holding as corporate governance improves after the SOX only when they do not have in-place blockholders which effectively monitor managers and discipline managers if they indulge in an opportunistic behavior. The aforementioned arguments lead to the following hypothesis:

H3. For firms which were subject to weaker external monitoring in 2001, the aforementioned effect of the SOX on corporate cash holding practices in H1 will be smaller.

The arguments we have made thus far concerning the effect of corporate governance improvement on corporate cash holding practices can be directly applied to the effects of corporate governance improvement on marginal value of corporate cash reserves since, when managerial moral hazard problems are severe, size of corporate cash reserves will lead to poor firm performance and thus the financial markets will apply value discount on a firm with large size of cash reserves and poor corporate governance (Harford, Kecskés and Mansi, 2012). The aforementioned arguments lead to the following hypothesis:

H4. Firms with weak board independence in 2001 will experience higher growth in marginal value of cash reserves compared with firms with strong board independence in 2001 after the SOX.

3. Sample construction

Our data source for boards of directors comes from RiskMetrics (formerly called IRRC), The database contains directors' information of S&P 1500 firms. We obtain the accounting data from

Compustat, the stock return from CRSP, the Gompers, Ishii and Metrick (2003) index from RiskMetrics and shareholdings by institutional investors from Thomson's 13f filings database.

Our sample spans from the year 1996 to 2006. We begin our sample in 1996 since the board data is available since 1996. Our sample consists of all US firms for which we have non-missing director independence data on RiskMetircs in 2001 to determine whether a firm is affected or unaffected by the regulation. Consistent with the previous literature, we exclude firms in the financial service industries (SIC 6000-6999) and in the utility sector (SIC 4900-4999). We require the firms to be listed on NYSE or NASDAQ from 2001 until 2004 to make sure that firms are subject to the regulation and the results are not driven by firms entering or leaving the sample before or after the implementation of regulation. The final sample of firms is comprised of 849 firms with 8059 firm-year observations.

Following Guo and Masulis (2001), we use board structure in the year 2001 to identify whether firms are affected by the new listing rules. The NYSE and NASDAQ required firms with nonclassified boards to comply with the new listing rules during their first annual meeting after January 15, 2004, but no later than October 31, 2004. For firms with classified board, the compliance deadline is the second annual meeting after January 15, 2004, but no later than December 31, 2005. However, many firms began to make board structure changes before the compliance deadlines. Guo and Masulis (2001) argue that board structure in year 2001 represents the most recent board structures that were not influenced by anticipation of new listing rules.

A firm is assigned to a treatment group if it does not comply with the new listing rule on board independence in year 2001 and to a control group otherwise. Board independence is measured as the ratio of the number of independent directors to total board size. RiskMetrics' independence standard is higher than that of NYSE and NASDAQ. Specifically, NYSE and NASDAQ allow former employees to be independent directors if the employment has been terminated at least three years ago while RiskMetircs considers such directors as linked (gray) directors. And NYSE and NASDAQ allow independent directors to have insignificant business

transactions with the firm while RiskMetrics requires independent directors to have no business transactions with the firm at all. We reclassify nonindependent directors as independent directors if they were former employees of a firm and at least three years have passed since the termination of their employment. However, we cannot reclassify nonindependendent directors as independent directors if their business transactions are insignificant since the size of the business transactions are not observed. Thus, our adjusted standard is still higher than that of NYSE and NASDAQ.

4. Empirical strategies

To examine how changes of corporate governance affect a firm's cash holding practices and the value of an additional dollar of cash to equityholders, we use the following difference-in-difference (DID) specification:

$$\begin{aligned}
Cash\ Holdings_{it} = \ &\beta_1 \times Dummy(per_{ind} < 0.5\ '01)_i \times Post\_SOX \\
&+ [\beta_2 \times Dummy(ind_{audit} = 0\ '01)_i \times Post\_SOX \\
&+ \beta_3 \times Dummy(ind_{compensation} = 0\ '01)_i \times Post\_SOX \\
&+ \beta_4 \times Dummy(ind_{nomination} = 0\ '01)_i \times Post\_SOX] \\
&+ \beta_5 X_{it} + \varepsilon_{it}
\end{aligned}$$

In the above specification, $Cash\ Holdings_{it}$ is firm i's cash holdings at year t. β_1 is the change in the cash holdings of the firms that did not have a majority of independent directors on the board at 2001 in the post-SOX period compared to the cash holdings of the firms that had a majority of independent directors. β_1 is our primary coefficient of interest. $Dummy(per_{ind} < 0.5\ '01)_i$ is a dummy variable that equals to one if the firm did not have a majority of independent directors on the board in 2001, and zero otherwise. $Post - SOX$ is a dummy that equals to one if year t is 2003 or thereafter, and zero otherwise. We also include the interaction terms listed in the brackets to account for the effects of committee independence on cash holdings. $\beta_2(\beta_3, \beta_4)$ represent the change in the cash holdings of the firms whose audit (compensation, nomination) committees were not fully independent at 2001 in the post-SOX

period compared to the cash holdings of the firms who had fully independent audit (compensation, nomination) committee. *Dummy(ind_audit=0 '01)$_i$ (Dummy(ind_ compensation=0 '01)$_i$, Dummy(ind_nomination =0 '01)$_i$)* is a dummy variable that equals to one if the firm did not have a fully independent audit(compensation, nomination) committee on the board in 2001, and zero otherwise.

The control variables in the cash holdings regressions are motivated by the variables used in Liu and Mauer (2011). The control variables are as follows: log firm size is measured by natural logarithm of the book value of net assets measured in 2006 dollars; market-to-book asset ratio is computed as the ratio of the book value of net assets minus the book value of equity plus the market value of equity to the book value of net assets; cash flow/net assets is calculated as the ratio of earnings after interest, dividends and taxes but before depreciation to the book value of net assets; NWC/assets is the ratio of net working capital to the book value of net assets; capex/net assets is the ratio of capital expenditures to the book value of net assets; leverage is computed as the sum of long-term debt and debt in current liabilities divided by the book value of net assets; industry sigma is measured by the mean of the standard deviations of cash flow/net assets over 10 years for firms in the same industry, where industries are defined by two-digit SIC codes; dividend dummy is an indicator variable that equals to one in years in which a firm pays a common dividend and zero otherwise; R&D/sale is the ratio of research and development expenditure to sales. If research and development expenditure is missing, the ratio is set equal to zero; acquisition activity is measured by the ratio of expenditures on acquisitions to the book value of net assets; related debt dummy is an indicator variable that equals one if S&P credit rating is between "C" and "AAA" and zero otherwise. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the effect of outliers. Following Chhaochharia and Grinstein (2009), we interact each control variable with two dummy variables for whether the observation belongs to pre-SOX (at or before 2002) period or post-SOX (2003 or thereafter) period to account for the potential change in cash holdings for all firms as a result of the corporate

scandals. The estimation includes firm fixed effects, year fixed effects and industry fixed effects. In all our regressions, standard errors are adjusted for heteroscedasticity.

We use the methodology developed in Faulkender and Wang (2006) to estimate impact of board independence on the value of an additional dollar of cash to equityholders. The regression equation is specified as follows:

$$r_{i,t} - R_{i,t}^B = \gamma_0 + \gamma_1 \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_2 Post\_SOX + \gamma_3 Dummy(per_{ind} < 0.5\ '01)_i$$

$$+ \gamma_4 Dummy(per_{ind} < 0.5\ '01)_i \times Post\_SOX + \gamma_5 Post\_SOX \times \frac{\Delta C_{i,t}}{M_{i,t-1}}$$

$$+ \gamma_6 Dummy(per_{ind} < 0.5\ '01)_i \times Post\_SOX \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_7 \frac{\Delta E_{i,t}}{M_{i,t-1}}$$

$$+ \gamma_8 \frac{\Delta NA_{i,t}}{M_{i,t-1}} + \gamma_9 \frac{\Delta RD_{i,t}}{M_{i,t-1}} + \gamma_{10} \frac{\Delta I_{i,t}}{M_{i,t-1}} + \gamma_{11} \frac{\Delta D_{i,t}}{M_{i,t-1}} + \gamma_{12} \frac{C_{i,t}}{M_{i,t-1}} + \gamma_{13} L_{i,t}$$

$$+ \gamma_{14} \frac{NF_{i,t}}{M_{i,t-1}} + \gamma_{15} \frac{C_{i,t}}{M_{i,t-1}} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_{16} L_{i,t} \frac{\Delta C_{i,t}}{M_{i,t-1}} + \varepsilon_{i,t}$$

where ΔX_{it} indicates a change in variable X for firm i over year t-1 to year t. To avoid having the largest firms dominate the results, the 1-year lagged market value of equity ($M_{i,t-1}$) is used as the scaling variable. The independent variable include: cash and marketable securities ($C_{i,t}$), earnings before extraordinary items ($E_{i,t}$), net assets ($NA_{i,t}$), research and development expense ($RD_{i,t}$), interest expense ($I_{i,t}$), common dividends ($D_{i,t}$), long-term debt plus in current liabilities divided by the market value of equity at time t-1 ($L_{i,t}$), and net financing ($NF_{i,t}$). The dependent variable is the excess stock return, the difference between firm i's stock return during fiscal year t ($r_{i,t}$) and the stock i's benchmark return at year t ($R_{i,t}^B$).. We calculate the benchmark return by annualizing the monthly returns from the Fama and French (1993) 25 size and book-to-market portfolio the firm belongs to each month. The regression is run as OLS with robust standard errors. γ_6 is our primary coefficient of interest. γ_6 measures the differential effect of cash holdings on the value of

an additional dollar of cash for the noncompliant firms in the post-SOX period relative to compliant firms.

5. Empirical results

5.1. Sample characteristics

Panel A in Table 1 reports the summary statistics for the characteristics of the firms in the full sample. The mean and median value of percent of independent directors is 69.05% and 71.43% respectively, well over the majority requirement. Panel B of Table 2 compares the characteristics of the firms with less than majority independent boards (treatment firms), with those of the firms with majority independent boards (control firms) in year 2001. We also report the differences between their means. The mean value of percent of independent directors for treatment firms is 36.10%, while the mean value of percent of independent directors for control firms is 72.02%. The difference is highly significant at 1% level. The treatment firms on average have smaller boards, smaller total assets, smaller sales and lower leverage than control firms. However, t-test statistic shows that treatment firms are not significantly different from control firms in terms of cash holdings and market to book ratio.

5.2. The effects of increases in board independence on corporate cash holding practices after the SOX

Table 2 reports the results of DID regressions of cash holdings on increases in board independence after the SOX. We test whether firms which didn't have a majority of independent directors on their boards in the year of 2001 increased their cash holdings more rapidly compared with firms which had a majority of independent directors on their boards after the SOX or not. The variable of our primary interest is the interaction of a dummy variable for a firm which didn't have a majority of independent directors on its board in the year of 2001 (Dummy(per_ind<0.5 '01)) and a dummy variable for the year after the SOX (Post-SOX). The coefficient of this

interaction is significantly positive in column 1, implying that firms which didn't have a majority of independent directors on their boards in the year of 2001 increased their cash holdings after the SOX more compared with firms which had a majority of independent directors on their boards in the years 2001. These results are consistent with our hypothesis 1 which suggests that better corporate governance allows managers to hold more cash holdings and thus make a flexible cash management possible. In column 2, we test whether the presence of other important internal governance mechanisms, namely fully independent audit committee, compensation committee and nomination committee influence allow firms to increase cash holdings more after the SOX or not. The coefficient on Dummy(per_ind<0.5 '01) * Post-SOX is still significantly positive in column 2. However, the coefficient on the interaction of a dummy variable for a firm without a fully independent nominating committee (Dummy(ind_nominating=0 '01)) and a dummy variable for a year after the SOX (Post-SOX) is insignificant. Even though the existence of fully independent nominating committee implies that the CEO cannot exert her influence on nomination of new directors and guarantees the effectiveness of boards as monitors, our result shows that the effect of the existence of a fully independent nominating committee on corporate cash holding practices is insignificant. Interestingly, the coefficient on the interaction of a dummy variable for a firm without a fully independent audit committee (Dummy(ind_audit=0 '01)) and a dummy variable for a year after the SOX (Post-SOX) is significantly negative. Note that Dummy(ind_audit=0 '01)(Dummy(ind_compendation=0 '01), Dummy (ind_nomination=0 '01)) is a dummy variable that equals to one if the firm "did not" have a fully independent audit(compensation, nomination) committee on the board in the year of 2001, and zero otherwise. Thus, our results show that, when a firm has a fully independent audit committee, the firm increased its cash holding more after the SOX, but when a firm has a fully independent compensation committee, the firm increase its cash holding less after the SOX. These results may be caused by the fact that CEOs sometimes exercise their powers on the compensation committees and force the compensation committees to adopt sub-optimal incentive schemes

which allow CEOs to extract rents for themselves at the expense of shareholders (Bebchuk, Fried and Walker, 2002; Finkelstein and Hambrick, 1996).

5.3. The effects of financial constraints on the causal relationship between increases in board independence on corporate cash holding practices after the SOX

Table 3 reports the results of DID regressions of cash holdings on increases in board independence after the SOX conditional on financial constraints. The coefficient on Dummy(per_ind<0.5 '01) * Post-SOX is significantly positive in columns (1), (2) and (4) as is in Table 2. The variable of our primary interest is the triple interaction of a dummy variable for a financially constrained firm, Dummy(per_ind<0.5 '01) and Post-SOX. The coefficient on this interaction is significantly negative. This result is consistent with hypothesis 2 which states that firms with weak board independence will increase its cash holding more after the SOX compared with firms with strong board independence but this causal relationship between board independence and corporate cash holding after the SOX is smaller for financially constrained firms possibly because financial constraints limit a manager's ability to squander cash reserves.

5.4. The effects of intensities of external monitoring on the causal relationship between increases in board independence on corporate cash holding practices after the SOX

Table 4 reports the results of DID regressions of cash holdings on board independence conditional on intensities of external monitoring. The variables of our primary interest are the triple interaction of a dummy variable for the weak external monitoring (Weak Monitoring), Dummy(per_ind<0.5 '01) and Post-SOX and the triple interaction of a dummy variable for the strong external monitoring (High Monitoring), Dummy(per_ind<0.5 '01) and Post-SOX. The coefficient on the triple interaction of Low Monitoring, Dummy(per_ind<0.5 '01) and Post-SOX is significantly positive while the coefficient on the triple interaction of Low Monitoring, Dummy(per_ind<0.5 '01) and Post-SOX is insignificant. These results suggest that only firms

with weak board independence increased their cash holding more compared with firms with strong board independence after the SOX only when they were subject to weak external monitoring in the year of 2001, which is consistent with hypothesis 3. Note that the SOX affects only board independence among a wide array of corporate governance variables. Thus, our results suggest that enhanced internal corporate governance mechanisms may significantly increase corporate cash holding especially when the firm is subject to weak external monitoring, implying a substitutive relationship between internal governance mechanisms and external monitoring.

5.5. The effects of board independence on marginal value of corporate cash reserves after the SOX

Table 5 reports the results of DID regressions of the value of additional dollar of cash on board independence. The variable of our primary interest is the triple interaction of Dummy(per_ind<0.5 '01), Post-SOX and changes in cash holding. The coefficient on this triple interaction is significantly positive. This result suggests that marginal value of cash reserves held by firms with weak board independence in the year of 2001 increased more after the SOX compared with marginal value of cash reserves held by firms with strong board independence. This supports hypothesis 4 and is consistent with hypothesis 1. This is probably because, as corporate governance of a firm improves, its persistent cash holding will be less likely to reflect managerial moral hazard problem and the financial markets will be less likely to apply a value discount to the firm with good corporate governance which holds large amount of cash reserves.

6. Conclusions

In this paper, we investigated how corporate governance affects corporate cash holding practices and marginal value of corporate cash reserves using the SOX as a quasi-experiment. Empirical studies of corporate governance are known to suffer from pervasive endogeneity problems since unobservable factors which are not controlled for in regressions may cause

spurious correlation between corporate governance variables and corporate cash holding practices and marginal value of corporate cash reserves (Gompers, Ishii and Metrick, 2003). Taking advantage of the SOX, we provide endogeneity-free evidence that better corporate governance leads to more flexible and efficient corporate cash holding practices and establish a causal relationship between these variables. We further empirically identify several factors which affect the magnitude of the aforementioned causal relationship between corporate governance and corporate cash holding including financial constraints and intensity of external monitoring.

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Table 1: Summary Statistics and Comparison of Treatment and Control Firms in Year 2001

This table shows the summary statistics for the characteristics of the firms in the full sample and comparison of the characteristics of the firms between treatment and control firms in year 2001. The full sample consists of 849 firms from 1996 to 2006. Panel A reports the summary statistics for the characteristics of the firms in the full sample. Panel B compares the characteristics of the firms with less than majority independent boards (treatment firms), with those of the firms with majority independent boards (control firms) in year 2001. Column (3) contains p-values of t-tests for differences in means of the treatment and control firms. Percent of independent directors is calculated as (number of independent directors/the board size) x 100. Board size is the number of directors on board. Cash holdings is the ratio of cash plus marketable securities to net assets, where net assets is the book value of total assets minus cash plus marketable securities. Market to Book is the ratio of the market value of total assets to the book value of total assets. Leverage is the ratio of long term debt plus debt in current liabilities to the book value of total assets.

Panel A: Summary Statistics						
	Mean	1st Quartile	Median	3rd Quartile	Std. Dev.	N
Percent of independent directors	69.05	58.33	71.43	81.82	16.50	8059
Board size	9.33	8.00	9.00	11.00	2.51	8059
Cash holdings	0.23	0.02	0.07	0.23	0.41	8059
Total Assets ($ mil)	6821.81	662.86	1533.21	4297.30	26547.12	8059
Sales ($ mil)	6130.96	668.14	1565.26	4597.02	17352.16	8059
Market to Book	2.16	1.26	1.66	2.45	1.62	7320
Leverage	0.22	0.07	0.21	0.33	0.17	8034
Panel B: Comparison of Treatment and Control Firms in Year 2001						
	(1)Control		(2)Treatment		(3)P-value	
Percent of independent directors	72.02		36.10		0.00	
Board size	9.16		8.57		0.03	
Cash holdings	0.23		0.28		0.40	
Total Assets ($ mil)	7015.70		2454.10		0.00	
Sales ($ mil)	5862.20		2467.30		0.00	
Market to Book	2.16		2.17		0.95	
Leverage	0.23		0.20		0.09	
N	746		103			

Table 2: Board Independence and Cash Holdings

This table shows the results of regressions of cash holdings on board independence. The sample includes all the firm years from 1996 to 2006 in the full sample. The dependent variable is the ratio of cash plus marketable securities to net assets, where net assets is the book value of total assets minus cash plus marketable securities. Dummy(per_ind<0.5 '01) is a dummy variable that equals to one if the firm did not have a majority of independent directors on the board in 2001, and zero otherwise. Dummy(ind_audit=0 '01)(Dummy(ind_compendation=0 '01), Dummy (ind_nomination=0 '01) is a dummy variable that equals to one if the firm did not have a fully independent audit(compensation, nomination) committee on the board in 2001, and zero otherwise. Other variables are defined in the Appendix. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. T-statistics are in parentheses below parameter estimates. The t-statistics are adjusted for heteroscedasticity.

Dependent Variable: Cash Holdings	(1)	(2)
Dummy(per_ind<0.5 '01) * Post-SOX	0.050***	0.048***
	(3.82)	(3.59)
Dummy(ind_audit=0 '01) * Post-SOX		0.023**
		(2.37)
Dummy(ind_compensation=0 '01) * Post-SOX		-0.020*
		(-1.91)
Dummy(ind_nominating=0 '01) * Post-SOX		-0.008
		(-1.00)
Log firm size * Pre-SOX	-0.221***	-0.221***
	(-16.99)	(-16.96)
Log firm size * Post-SOX	-0.209***	-0.209***
	(-16.36)	(-16.4)
Market to book * Pre-SOX	0.030***	0.030***
	(7.12)	(7.14)
Market to book * Post-SOX	0.056***	0.055***
	(9.12)	(9.09)
Cash flow /net assets * Pre-SOX	0.172	0.171
	(1.52)	(1.51)
Cash flow/net assets * Post-SOX	0.352***	0.355***
	(3.1)	(3.13)
NWC/net assets * Pre-SOX	-0.537***	-0.537***
	(-8.56)	(-8.56)
NWC/net assets * Post-SOX	-0.500***	-0.502***
	(-7.06)	(-7.08)
Capex/net assets * Pre-SOX	-0.185*	-0.186*
	(-1.70)	(-1.71)
Capex/net assets * Post-SOX	-0.050	-0.051
	(-0.37)	(-0.37)
Leverage * Pre-SOX	0.311***	0.310***
	(6.71)	(6.70)

Leverage * Post-SOX	0.234***	0.234***
	(4.50)	(4.48)
Industry sigma * Pre-SOX	0.004	0.004
	(1.38)	(1.35)
Industry sigma * Post-SOX	0.001	0.001
	(0.69)	(0.60)
Dividend dummy * Pre-SOX	0.052***	0.052***
	(5.19)	(5.18)
Dividend dummy * Post-SOX	0.033***	0.033***
	(3.08)	(3.08)
R&D/sales * Pre-SOX	0.489***	0.491***
	(2.70)	(2.71)
R&D/sales * Post-SOX	0.202	0.214
	(1.09)	(1.15)
Acquisition activity * Pre-SOX	-0.156***	-0.158***
	(-3.19)	(-3.23)
Acquisition activity * Post-SOX	-0.271***	-0.274***
	(-3.45)	(-3.48)
Rated debt dummy * Pre-SOX	0.015	0.016
	(1.04)	(1.09)
Rated debt dummy * Post-SOX	0.030*	0.031*
	(1.86)	(1.94)
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Observations	6715	6712
Adjusted R^2	0.86	0.86

Table 3: Board Independence and Cash Holdings Conditional Upon Financial Constraints

This table shows the results of regressions of cash holdings on board independence conditional upon financial constraints. The sample includes all the firm years from 1996 to 2006 in the full sample. The dependent variable is the ratio of cash plus marketable securities to net assets, where net assets is the book value of total assets minus cash plus marketable securities. Dummy(per_ind<0.5 '01) is a dummy variable that equals to one if the firm did not have a majority of independent directors on the board in 2001, and zero otherwise. Proxies for financial constraints used are the zero total payout dummy variable (a dummy variable equals to one if the firm's total payout ratio is zero, and zero otherwise), the no bond rating dummy variable (a dummy variable equals to one if the firm does not have a bond rating but reports long-term debt, and zero otherwise), the no commercial paper rating dummy variable (a dummy variable equals to one if the firm has no commercial paper rating but reports short-term debt, and zero otherwise), and the total assets below median total assets (a dummy variable equals to one if the firm's total assets are below the sample median, and zero otherwise),. Other variables are defined in the Appendix. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. T-statistics are in parentheses below parameter estimates. The t-statistics are adjusted for heteroscedasticity.

Dependent Variable: Cash Holdings	(1) Constrained if zero total payouts	(2) Constrained if no bond rating	(3) Constrained if no cp rating	(4) Constrained if small
Financially constrained dummy	0.005	-0.088***	-0.037***	-0.086***
	(0.43)	(-4.24)	(-3.90)	(-7.70)
Dummy(per_ind<0.5 '01) * Post-SOX	0.041***	0.069***	-0.086***	0.052***
	(3.42)	(4.32)	(4.80)	(2.87)
Financially constrained dummy* Dummy(per_ind<0.5 '01) * Post-SOX	0.043	-0.061***	-0.058***	-0.007
	(1.26)	(-2.61)	(-2.65)	(-0.27)
Log firm size * Pre-SOX	-0.220***	-0.217***	-0.219***	-0.242***
	(-17.00)	(-16.89)	(-16.87)	(-17.82)
Log firm size * Post-SOX	-0.209***	-0.204***	-0.208***	-0.231***
	(-16.41)	(-16.11)	(-16.27)	(-17.11)
Market to book * Pre-SOX	0.030***	0.029***	0.030***	0.029***
	(7.07)	(7.02)	(7.11)	(7.06)
Market to book * Post-SOX	0.056***	0.056***	0.055***	0.055***
	(9.09)	(9.11)	(9.06)	(9.05)
Cash flow /net assets * Pre-SOX	0.171	0.187*	0.178	0.164
	(1.51)	(1.67)	(1.58)	(1.46)
Cash flow/net assets * Post-SOX	0.358***	0.343***	0.348***	0.328***
	(3.17)	(3.03)	(3.08)	(2.91)
NWC/net assets * Pre-SOX	-0.536***	-0.527***	-0.542***	-0.516***
	(-8.55)	(-8.41)	(-8.67)	(-8.45)
NWC/net assets * Post-SOX	-0.502***	-0.485***	-0.517***	-0.486***
	(-7.08)	(-6.78)	(-7.31)	(-7.02)
Capex/net assets * Pre-SOX	-0.186*	-0.186*	-0.190*	-0.178*
	(-1.70)	(-1.71)	(-1.74)	(-1.65)
Capex/net assets * Post-SOX	-0.051	-0.052	-0.070	-0.042
	(-0.38)	(-0.39)	(-0.52)	(-0.31)

23

Leverage * Pre-SOX	0.311***	0.352***	0.319***	0.311***
	(6.72)	(7.54)	(6.9)	(6.75)
Leverage * Post-SOX	0.234***	0.285***	0.247***	0.231***
	(4.47)	(5.46)	(4.75)	(4.45)
Industry sigma * Pre-SOX	0.004	0.004	0.004	0.004
	(1.41)	(1.35)	(1.37)	(1.12)
Industry sigma * Post-SOX	0.001	0.001	0.001	0.001
	(0.69)	(0.57)	(0.78)	(0.75)
Dividend dummy * Pre-SOX	0.054***	0.052***	0.052***	0.053***
	(4.79)	(5.17)	(5.16)	(5.31)
Dividend dummy * Post-SOX	0.038***	0.032***	0.030***	0.033***
	(3.19)	(3.04)	(2.84)	(3.12)
R&D/sales * Pre-SOX	0.486***	0.514***	0.500***	0.484***
	(2.68)	(2.85)	(2.75)	(2.68)
R&D/sales * Post-SOX	0.199	0.196	0.187	0.194
	(1.07)	(1.06)	(1.01)	(1.05)
Acquisition activity * Pre-SOX	-0.156***	-0.156***	-0.159***	-0.149***
	(-3.18)	(-3.24)	(-3.25)	(-3.08)
Acquisition activity * Post-SOX	-0.272***	-0.264***	-0.265***	-0.264***
	(-3.46)	(-3.38)	(-3.38)	(-3.40)
Rated debt dummy * Pre-SOX	0.015	-0.066***	0.014	0.006
	(1.03)	(-2.74)	(0.98)	(0.44)
Rated debt dummy * Post-SOX	0.030*	-0.056**	0.031**	0.024
	(1.85)	(-2.29)	(1.96)	(1.51)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	6715	6715	6715	6715
Adjusted R^2	0.86	0.86	0.86	0.86

Table 4: Board Independence and External Monitoring

This table shows the regression results analyzing the interaction effect of external monitoring and board independence on cash holdings. The sample includes all the firm years from 1996 to 2006 in the full sample. The dependent variable is the ratio of cash plus marketable securities to net assets, where net assets is the book value of total assets minus cash plus marketable securities. Dummy(per_ind<0.5 '01) is a dummy variable that equals to one if the firm did not have a majority of independent directors on the board in 2001, and zero otherwise. Column (1) uses shareholdings by institutional block-holders (defined as institutional shareholders with more than 5% holdings) and column (2) uses shareholdings by public pension funds as proxies for external monitoring/pressure. In column (3), we use GIM-Index as the proxy for external monitoring/pressure. Low monitoring is a dummy variable that equals one for firms that fall in the bottom quartile of respective monitoring dimension and high monitoring is a dummy variable that equals one for firms that fall in the top quartile of respective monitoring dimension. Other variables are defined in the Appendix. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. T-statistics are in parentheses below parameter estimates. The t-statistics are adjusted for heteroscedasticity.

Dependent variable: Cash Holdings	(1) Block Holders	(2) Public Pension Funds	(3) GIM-Index
Low Monitoring* Dummy(per_ind<0.5 '01) * Post-SOX	0.051** 2.35	0.054** (2.44)	0.104** (2.14)
High Monitoring* Dummy(per_ind<0.5 '01) * Post-SOX	-0.025 (-0.68)	0.015 (0.51)	-0.007 (0.31)
Log firm size * Pre-SOX	-0.220*** (-16.78)	-0.221*** (-16.86)	-0.211*** (-15.77)
Log firm size * Post-SOX	-0.209*** (-16.22)	-0.209*** (-16.23)	-0.203*** (-15.14)
Market to book * Pre-SOX	0.030*** (7.07)	0.029*** (7.06)	0.029*** (6.84)
Market to book * Post-SOX	0.056*** (9.12)	-0.056*** (9.15)	0.054*** (8.20)
Cash flow /net assets * Pre-SOX	0.177 (1.56)	0.174 (1.53)	0.087 (0.76)
Cash flow/net assets * Post-SOX	0.346*** (3.05)	0.342*** (3.01)	0.292** (2.39)
NWC/net assets * Pre-SOX	-0.538*** (-8.56)	-0.539*** (-8.57)	-0.566*** (-8.67)
NWC/net assets * Post-SOX	-0.501*** (-7.05)	-0.495*** (-6.97)	-0.528*** (-7.07)
Capex/net assets * Pre-SOX	-0.191* (-1.75)	-0.193* (-1.77)	-0.141 (-1.26)
Capex/net assets * Post-SOX	-0.045 (-0.33)	-0.044 (-0.32)	0.074 (0.52)
Leverage * Pre-SOX	0.311***	0.312***	0.271***

	(6.68)	(6.70)	(5.72)
Leverage * Post-SOX	0.234***	0.234***	0.201***
	(4.49)	(4.51)	(3.67)
Industry sigma * Pre-SOX	0.005	0.005	0.004
	(1.51)	(1.50)	(1.42)
Industry sigma * Post-SOX	0.001	0.001	0.002
	(0.61)	(0.68)	(1.15)
Dividend dummy * Pre-SOX	0.054***	0.055***	0.049***
	(5.28)	(5.40)	(4.77)
Dividend dummy * Post-SOX	0.033***	0.032***	0.026**
	(3.11)	(3.02)	(2.39)
R&D/sales * Pre-SOX	0.494***	0.490***	0.430**
	(2.72)	(2.70)	(2.18)
R&D/sales * Post-SOX	0.197	0.197	0.206
	(1.06)	(1.06)	(1.05)
Acquisition activity * Pre-SOX	-0.157***	-0.158***	-0.157***
	(-3.20)	(-3.22)	(-3.22)
Acquisition activity * Post-SOX	-0.268***	-0.267***	-0.262***
	(-3.41)	(-3.39)	(-3.14)
Rated debt dummy * Pre-SOX	0.014	0.014	0.011
	(0.94)	(0.95)	(0.82)
Rated debt dummy * Post-SOX	0.027*	0.028*	0.029*
	(1.70)	(1.71)	(1.74)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Observations	6688	6688	6152
Adjusted R^2	0.86	0.86	0.85

Table 5: Board Independence and the Value of Cash

This table shows the regression results for the value regression on board independence. The sample includes all the firm years from 1996 to 2006 in the full sample. The dependent variable is the excess stock return during fiscal year t. Dummy(per_ind<0.5 '01) is a dummy variable that equals to one if the firm did not have a majority of independent directors on the board in 2001, and zero otherwise. Other variables are defined in the Appendix. All variables except dummy variables are scaled by the lagged market value of equity. ΔX is notation for the one-year change. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. T-statistics are in parentheses below parameter estimates. The t-statistics are adjusted for heteroscedasticity.

Dependent variable: Excess stock return	
ΔCash	5.028***
	(2.89)
Post-SOX dummy	-0.052***
	(-3.62)
Dummy(per_ind<0.5 '01) * Post-SOX	0.004
	(0.16)
Post-SOX * ΔCash	-1.604
	(-1.57)
Dummy(per_ind<0.5 '01) * Post-SOX * ΔCash	2.184*
	(1.87)
ΔEarnings	1.566***
	(5.97)
ΔNet Assets	0.345***
	(3.26)
ΔR&D	-0.826
	(-0.61)
ΔInterest	-14.805***
	(-5.35)
ΔDividend	0.623
	(1.44)
Lagged Cash	0.507***
	(4.06)
Leverage	0.106
	(1.57)
New Financing	0.206
	(0.48)
Lagged Cash * ΔCash	-9.139***
	(-3.01)
Leverage * ΔCash	-2.634
	(-0.80)
Observations	3979

Adjusted R^2	0.18

Appendix: Definition of Variables

Variables	Definition
Dependent variables	
Cash holdings	Ratio of cash plus marketable securities to net assets, where net assets is the book value of total assets minus cash plus marketable securities CHE/(AT-CHE)
Excess stock return	$r_{it} - R_{it}^B$, where r_{it} is the stock return for firm i during fiscal year t and R_{it}^B is stock i's benchmark return at year t. We calculate the benchmark return by annualizing the monthly returns from the Fama and French 25 size and book-to-market portfolio the firm belongs to each month.
Control variables	
Dummy(per_ind<0.5 '01)	An indicator variable that equals to one if the firm did not have a majority of independent directors on the board in 2001, and zero otherwise
Dummy(ind_audit=0 '01)	An indicator variable that equals to one if the firm did not have a fully independent audit committee on the board in 2001, and zero otherwise
Dummy(ind_compensation=0 '01)	An indicator variable that equals to one if the firm did not have a fully independent compensation committee on the board in 2001, and zero otherwise
Dummy(ind_nomination=0 '01)	An indicator variable that equals to one if the firm did not have a fully independent nomination committee on the board in 2001, and zero otherwise
Post-SOX	An indicator variable that equals one if the observation is in the period at or after 2003 and zero otherwise
Pre-SOX	An indicator variable that equals one if the observation is in the period before 2003 and zero otherwise
Log firm size	Natural logarithm of the book value of net assets measured in 2006 dollars ln(AT-CHE)
Market to book	Ratio of the book value of net assets minus the book value of equity plus the market value of equity to the book value of net assets (AT-CHE-CEQ+CSHO*PRCC_F)/(AT-CHE)
Cash flow /net assets	Ratio of earnings after interest, dividends and taxes but before depreciation to the book value of net assets (OIBDP-XINT-TXT-DVC)/(AT-CHE)
NWC/net assets	Ratio of net working capital to the book value of net assets (ACT-LCT-CHE)/(AT-CHE)

Capex/net assets	Ratio of capital expenditures to the book value of net assets CAPX/(AT-CHE)
Leverage	Sum of long-term debt and debt in current liabilities divided by the book value of net assets (DLTT+DLC)/(AT-CHE)
Industry sigma	Mean of the standard deviations of cash flow/net assets over 10 years for firms in the same industry, where industries are defined by two-digit SIC codes
Dividend dummy	An indicator variable that equals to one in years in which a firm pays a common dividend (DVC) and zero otherwise
R&D/sales	Ratio of research and development expenditure to sales. If research and development expenditure is missing, the ratio is set equal to zero. XRD/SALE
Acquisition activity	Ratio of expenditures on acquisitions to the book value of net assets AQC/(AT-CHE)
Rated debt dummy	An indicator variable that equals one if S&P credit rating (SPLTICRM) is between "C" and "AAA" and zero otherwise
Zero total payouts	An indicator variable equals to one if the firm's total payout ratio (the ratio of dividends plus share repurchases to operating income) is zero, and zero otherwise Total payouts = (DVC+PRSTKC)/OIBDP
No bond rating	An indicator variable that equals to one if the firm does not have a bond rating (DLTT) but reports long-term debt (SPLTICRM), and zero otherwise
No cp rating	An indicator variable equals to one if the firm has no commercial paper rating (DLC) but reports short-term debt (SPSTICRM), and zero otherwise
Small	An indicator variable equals to one if the firm's total assets (AT) are below the sample median, and zero otherwise
Block Holders	Shareholdings by institutional block-holders (defined as institutional shareholders with more than 5% holdings)
Public Pension Funds	Shareholdings by public pension funds
GIM-Index	The Gomper, Ishi and Metricks (2003) index. It is calculated by counting the number of antitakeover provisions of the firm. It varies from 0 to 24.
Cash	Cash plus marketable securities CHE
Dividend	Common dividend DVC
Net assets	Book value of total assets minus cash plus marketable securities

AT-CHE

Interest	XINT
Earnings	Earnings before extraordinary items plus interest, deferred tax credits, and investment tax credits IB+XINT+TXDI+ITCI
New Financing	Sales of common and preferred stock minus stock repurchase plus issuance of long-term debt minus long-term debt reduction SSTK-PRSTKC+DLTIS-DLTR
R&D	Research and development expenditure. If research and development expenditure is missing, it is set equal to zero. XRD