Accounting Restatements and Corporate Cash Policy

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Abstract

Using a difference-in-differences approach, we find that firms' cash holdings significantly increase after announcements of irregularity-related restatements. The increase is more pronounced for firms with a higher precautionary saving demand. Irregularity firms also deploy more excess cash to investment and dividends after the restatements. In addition, we find that the market value of cash holdings increases after restatements. Overall, our results suggest that firms increase cash holdings after restatements because cash reserves become more valuable safeguards against future shortfalls of internal funds. Our study contributes to the literature on the effect of financial reporting credibility on real corporate decisions.

Key words: restatement; financial reporting credibility; cash holdings; fund allocation; precautionary saving; real effect

1. Introduction

In a perfect capital market, firms have no need to reserve liquidity such as cash, because they can always raise external capital when needed. Due to market frictions such as information asymmetry and moral hazard, however, raising external finance from the spot market in the future is costly (Jensen & Meckling, 1976; Myers & Majluf, 1984). Therefore, there is a "precautionary saving motive" (Keynes, 1936) to hoard cash to safeguard against future cash flow shortfalls (Holmstrom & Tirole, 1998). The precautionary saving theory suggests that firms should hold more cash when information asymmetry between the firms and outside investors is greater (Opler, Pinkowitz, Stulz & Williamson, 1999). A fundamental objective of financial reporting is to reduce this information asymmetry. However, there is little empirical research on how financial reporting quality affects a firm's cash policy.

This study aims to fill this gap by examining the change in corporate cash holdings after accounting restatements. The perceived information asymmetry between managers and outside investors increases after restatement because financial reporting loses credibility (e.g., Chen, Cheng & Lo, 2014). Thus, raising external finance from the spot market in the future becomes more costly and difficult, and cash reserves are more valuable as insurance against future shortfalls of internal funds. According to the precautionary saving theory, firms should therefore reserve more cash after restatements. However, internal and external mechanisms to control managers are also tightened after restatement announcements (e.g., Farber, 2005; Cheng & Farber, 2008; Hennes, Leone & Miller, 2008). This more restrictive control may force managers to pay out excessive cash, leading to a lower level of cash holdings (Faleye, 2004). It may also increase cash holdings by reducing overinvestments (Harford, Mansi & Maxwell, 2008). Thus, the effect of accounting

restatements on corporate cash holdings is ultimately an empirical question and may not be uniform across all firms.

To test the effect of accounting restatements on corporate cash policy, we construct a final sample including 949 firms that announced accounting restatements between 1997 and 2006 (GAO, 2003; 2006). Following Hennes et al. (2008), we partition the restatements into those related to accounting irregularities and those related to errors. Our final sample contains 270 irregularity-related restatements and 679 error-related ones. To ensure that any change in cash holdings after restatement is not driven by an inter-temporal trend in cash holdings (Bates, Kahle & Stulz, 2009), we match each restatement firm to a non-restatement firm based on a propensity score and conduct a difference-in-differences (DID) test. To minimize matching bias, we include a variety of covariates that are associated with accounting restatements and corporate cash holdings to estimate the propensity score (Heckman, Ichimura, & Todd, 1998).

We find that the announcement of accounting restatements has a statistically significant effect on firms' cash holdings. In particular, we find that the increase in cash holdings for the restatement firms after the announcement of the restatements is significantly higher than the contemporaneous increase in cash for the matched non-restatement firms. We also find that the effect is concentrated in the irregularity sample and is insignificant in the error sample after controlling for other determinants of cash holdings. This evidence is consistent with the findings of prior empirical studies that irregularity restatements cause more damage to financial reporting credibility than error restatements (e.g., Hennes et al., 2008; Chen, Cheng & Lo, 2013). The effect is also economically significant. The increase in cash holdings after the announcement of an irregularity restatement is 0.034 (3.4% of the total assets) higher than the contemporaneous increase in cash

for the control firms. Using average cash holdings before restatements as a benchmark, the relative increase in cash holdings for the irregularity firms is 20% higher than that for the control firms.

The precautionary saving theory contends that firms' cash holdings are more sensitive to information asymmetry when the risk of a future shortfall of internal funds, i.e., the demand for precautionary saving, is higher (Acharya, Almeida & Campello, 2007). Prior research suggests that the demand for precautionary saving is higher when a firm has more volatile operating cash flows (Opler et al., 1999) and more volatile investment opportunities (Duchin, 2010), and when operating cash flow and investment opportunities tend to arrive at different times (Acharya et al., 2007; Duchin, 2010). We construct a composite measure of precautionary saving demand as the mean value of the percentile ranks of three variables: industry volatility of operating cash flows, industry volatility of investment opportunities, and the negative industry correlation between operating cash flows and investment opportunities. We then partition the irregularity firms into two subsamples based on this composite measure and examine how the change in cash holdings varies across the two subsamples. Consistent with the precautionary saving theory, we find that the effect of the irregularity-related restatements on cash holdings is highly significant for the firms with a high demand for precautionary saving. The effect is smaller, and statistically insignificant, for the firms with a low demand for precautionary saving.

We conduct several tests to check the robustness of our results. First, accounting restatements may reduce firms' access to lines of credit (e.g., Graham, Li & Qiu, 2008; Li & Radhakrishnan, 2013), which can substitute for cash holdings as a source of liquidity (e.g., Holmstrom & Tirole, 1998; Lins, Servaes & Tufano, 2010). We then examine whether the irregularity firms simply increase cash to substitute for lines of credit. We find that our main results continue to hold when we further control for the unused portion of lines of credit or use total liquidity reserves, defined

as cash plus unused lines of credit, as the dependent variable. Thus, the effect of irregularity restatements on cash holdings is unlikely to be driven solely by substitution between cash and lines of credit.

Second, we address the concern that the restatement firms and the matched control firms may have had different trends of cash holdings even before the restatements (Roberts & Whited, 2011). We examine the change in cash holdings around pseudo restatement years. Specifically, we pick year T (T = 2 to 7) before the actual restatement year as the pseudo restatement year. In general, we do not find that the irregularity firms have more pronounced increases in cash holdings than the control firms after the pseudo restatement year for the pooled sample or for the subsamples partitioned by precautionary saving demand.

An alternative hypothesis to the precautionary saving theory is the strengthened shareholder control hypothesis. This hypothesis argues that because shareholders have more restrictive control over managers after restatements (e.g., Farber, 2005), firms are less likely to waste cash and shareholders may allow managers to hold more cash (Harford et al., 2008). To the extent that the cash saved by reducing overinvestment is not paid out to investors, one should observe an increase in cash holdings after the restatements. While these two hypotheses are not necessarily exclusive to each other, we conduct two tests to distinguish them.

First, we examine whether the effect of irregularity restatements on cash holdings differs between firms that replace their CEO/CFO and those do not. As firms that replace their management team are more likely to cut overinvestment, the strengthened shareholder control hypothesis predicts a more pronounced increase in cash holdings for irregularity firms that replace their CEO/CFO. In contrast, prior literature finds that firms' replacement of their CEO/CFO helps restore equity investors' confidence (Chen et al., 2014), although it is not effective in reducing the

adverse effect on the cost of debt (Chava, Huang & Johnson, 2012). Therefore, the precautionary saving hypothesis predicts that irregularity firms that replace their CEO/CFO should have a less pronounced (or similar) increase in cash holdings compared with those without CEO/CFO turnover. We find that the effect of restatements on cash holdings is larger for the irregularity firms without CEO/CFO turnover, and is statistically insignificant for the irregularity firms that replace their CEO/CFO. This finding supports the precautionary saving hypothesis and is inconsistent with the strengthened shareholder control hypothesis.

Second, we examine whether and how irregularity firms change the way they deploy excess cash after restatements. We find that compared with the control firms, irregularity firms significantly increase their investment-to-excess-cash sensitivity. This evidence is consistent with the notion that cash holdings are more valuable in mitigating underinvestment for more financially constrained firms (Denis & Sibilkov, 2010), supporting the precautionary saving hypothesis. In contrast, the evidence is inconsistent with the notion that more restrictive control over managers reduces overinvestment of cash reserves. We also find more pronounced increase in the payout-to-excess-cash sensitivity for the irregularity firms. This evidence is also consistent with the notion that irregularity firms have higher demand to use dividends to address investor concerns over exacerbated information asymmetry (Hail, Tahoun & Wang, 2014). However, this finding does not support the view that shareholders allow managers to hold more cash after the restatements because they have more control.

Finally, we examine the change in the market value of cash holdings after restatements. We find that the increase in market value of cash holdings after restatements is more pronounced for the irregularity firms than for the control firms. This result further supports the notion that cash

reserves are more valuable to the irregularity firms in mitigating underinvestment problems after restatements.

This paper makes several important contributions to the literature. First, we contribute to the understanding of the economic consequences of financial reporting credibility in general and accounting restatements in particular. Quite a few studies along this line examine the capital market consequences of accounting restatements.[1] Our paper contributes by showing how accounting restatements affect the corporate cash policy. Cash policy is an important element of corporate liquidity management, which is central to the practice of corporate finance and consumes a large proportion of the chief financial officer's time (Tirole, 2006). Recent studies highlight that liquidity management has a significant effect on a firm's investment and performance (e.g., Campello et al., 2010; Duchin et al., 2010; Fresard, 2010). Our paper enhances the understanding of how financial reporting credibility affects real managerial decisions (Dechow, Ge & Schrand, 2010; Biddle, Hilary & Verdi, 2009).

McNichols & Stubben (2008) find that irregularity firms overinvest in the misreporting period because misreported earnings distort managers' assessments of investment opportunities, and the overinvestment is corrected after the restatements. Nevertheless, they do not directly examine cash policy. Moreover, it is not obvious that a decrease in overinvestment will necessarily lead to a higher level of cash holdings, because the funds saved from cuts in investment may be used to reduce external financing or distributed to investors. Our analysis of changes in financial decisions shows that this is exactly the case when irregularity firms have excess cash. Furthermore, we show

[1] See, for example, Anderson & Yohn (2002), Palmrose et al. (2004), Hennes et al. (2008), Wilson (2008), Hirschey et al. (2010), Badertscher et al. (2011), Hribar & Jenkins (2004), Graham et al.(2008), Shi & Zhang (2008), Kravet & Shevlin (2010), Chava et al. (2012), Wang, Xie & Zhu (2011), and Chen et al. (2014).

that the effect of restatements on cash holdings is actually smaller for the irregularity firms that experience a larger decrease in overinvestment after the restatements.

Second, our paper contributes to the finance literature by providing additional evidence on how corporate cash holdings change with information asymmetry between managers and outside investors. Agency theory and the precautionary saving theory are two important theories in the finance literature used to explain corporate cash holdings (e.g., Opler et al., 1999). Most empirical studies testing the precautionary saving theory examine cross-sectional variations in firm characteristics that suggest information asymmetry between managers and outside capital providers. We examine corporate cash policy change after a shock in information asymmetry driven by restatements that significantly reduce accounting information credibility, and thus provide more direct evidence supporting the precautionary saving theory.

The rest of this paper is organized as follows. Section 2 develops the hypothesis. Section 3 describes the sample selection procedure and research design. Section 4 presents the empirical results of the effect of accounting restatements on cash holdings. Section 5 conducts additional analyses to distinguish between the precautionary saving and the strengthened shareholder control hypotheses. Section 6 examines the change in the market value of cash holdings after the restatements. Section 7 concludes the paper.

2. Related literature and hypothesis development

2.1. Accounting restatements and corporate cash holdings

A prominent explanation for corporate cash holdings is the precautionary saving theory (Keynes, 1936; Kim, Mauer & Sherman, 1998; Opler et al., 1999; Almeida et al., 2011; Bates et al., 2009, Duchin, 2010). Due to market frictions such as information asymmetry and moral

hazards, firms have limited access to external financing (Jensen & Meckling, 1976; Myers & Majluf, 1984). Thus, they may not be able to raise enough funds from a future spot market when the need arises (Holmstrom & Tirole, 1998).[2] Therefore, the firms must reserve liquidity, or use "pre-committed" sources of funds such as cash to meet their future liquidity needs. Essentially, cash reserves are an insurance against future shortfalls of internal funds (Acharya et al., 2007). Cash reserves benefit firms by reducing the deadweight loss of underinvestment due to costly external finance in future periods. However, carrying cash is also costly as it means that the firms have to forgo profitable investment opportunities in the current period. Therefore, optimal cash holdings equate the marginal benefit of reducing future underinvestment and the marginal cost of forgoing current valuable investment opportunities. The marginal benefit of cash holdings increases as information asymmetry worsens. This is because future external finance becomes more costly and difficult, which leads to a greater potential deadweight loss of underinvestment (Opler et al., 1999). Therefore, other things being equal, higher information asymmetry and future external financing costs lead firms to increase cash holdings, or, more generally, increase investment in liquid assets and reduce that in illiquid assets (Almeida et al., 2011).

Accounting restatements reveal misstatements in previously issued financial reports. In many cases the misstatements are intentionally made by managers, potentially due to poor governance, weak internal control, and flawed incentive structures (e.g., Beasley, 1996; Farber, 2005; Agrawal & Chadha, 2005; Efendi, Srivastava, & Swanson, 2007; Feng & Li, 2013). Accounting restatements therefore create uncertainty about the reliability and credibility of financial reporting (Palmrose, Richardson & Scholz, 2004). When investors doubt the reliability and credibility of

[2] The need could arise for a variety of reasons such as negative shocks in profitability, investment cost overrun, or arrival of new investment opportunities.

financial reports, they will not rely on information contained therein when making decisions. Consistent with this notion, the information content of earnings announcements significantly declines after the announcement of restatements (Anderson & Yohn, 2002; Chen et al., 2014). One of the fundamental roles of financial reporting is to reduce the information asymmetry between managers and outside capital providers. Thus, restatements exacerbate the information asymmetry perceived by outside investors and increase the cost of external financing. Empirical evidence supports this view (e.g., Hribar & Jenkins, 2004; Kravet & Shevlin, 2010; Wang et al. 2011; Graham et al., 2008; Shi & Zhang, 2012; Chava et al., 2012). The preceding discussion leads to the following hypothesis:

Hypothesis 1: *The level of cash holdings increases after an accounting restatement.*

2.2. Precautionary saving demand and the effect of accounting restatements on cash holdings

The precautionary saving theory predicts that firms hold cash to insure against future shortfalls of internal funds that may prevent them from investing in profitable projects due to costly external finance driven by information asymmetry or other frictions (Opler et al., 1999). According to this theory, corporate cash holdings should be more sensitive to information asymmetry when the risk of internal funds running out in future periods is higher, or the demand for precautionary saving is higher (Acharya et al., 2007). Therefore, the increase in cash holdings after restatements should be greater when the demand for precautionary saving is higher.

The risk of internal funds running out in future periods is determined by the joint distribution of investment opportunities and internal cash flows over time (Acharya et al., 2007; Duchin, 2010). Other things being equal, the risk is larger when the future cash flows and investment opportunities are more volatile, and when future internal funds and investment opportunities tend to arrive at

different times (i.e., the correlation between future cash flows and investment opportunities is low). Consistent with this prediction, extant empirical studies find that firms operating in industries with more volatile operating cash flows and investment opportunities hold more cash (Kim et al., 1998; Opler et al., 1999; Duchin, 2010). In addition, Duchin (2010) finds that diversified firms hold significantly less cash, and the lower cash holdings correspond to a higher cross-division correlation between investment opportunities and operating cash flows. Acharya et al. (2007) find that financially constrained firms save more cash out of their operating cash flows given a lower correlation between operating cash flows and investment opportunities. The above discussion leads to our second hypothesis:

Hypothesis 2: *The increase in the level of cash holdings after accounting restatements is more pronounced for firms that operate in industries with a high demand for precautionary saving.*

3. Research design

3.1. *Sample selection and propensity score matching*

We collect the accounting restatement data from Hennes et al. (2008), which includes the restatements disclosed in the Government Accountability Office (GAO) reports of 2003 and 2006. These reports contain the restatements announced from January 1997 to June 2006. We conduct a DID test to ensure that any change in cash holdings after the accounting restatements is not driven by a time trend in cash holdings (Bates et al., 2009). Specifically, we match each restatement firm with a non-restatement firm based on the propensity score. Following the general guideline to reduce matching bias advised by Heckman et al. (1998), both the variables associated with cash holdings and those associated with restatements are included in the probit model to estimate the propensity score. We also include the levels of and changes in cash holdings in the pre-restatement

periods to ensure the parallel trend assumption (Roberts & Whited, 2011). The details of the matching procedure and the diagnostic statistics are provided in the appendix.

Table 1 shows the sample selection procedure. Our initial sample contains 2,705 accounting restatement observations from GAO (2003, 2006). We first delete 203 duplicated restatements and 296 restatements for which the underlying firm cannot be found in Compustat. Second, if a firm announced multiple restatements in the sample period, we only use the first restatement, to ensure that the pre-restatement period is not contaminated by previous restatements. We delete 396 subsequent restatements in this step. Third, we follow the prior literature and further remove 270 restatements from firms in the financial industries (SIC code 6000–6999) and 60 restatements from firms in the utility industries (SIC code 4900–4999). Fourth, following the literature on cash holdings (e.g., Duchin, 2010), we eliminate the firm-year observations for which financial data is missing, cash holdings exceed the value of total assets, total assets and market value of equity are below $10 million, and the growth rate of assets or sales exceeds 100%. This results in another 496 restatements being removed from the sample. Finally, we remove 7 restatements for which matched control firms could not be found and 28 restatements that do not have observations in the post-restatement periods. The above sample selection procedure yields a final sample of 949 restatements, including 679 restatements relating to errors and 270 to irregularities.

[Insert Table 1 here]

3.2. *The baseline regression models*

To examine the change in cash holdings after a restatement, we compare the cash holdings in the three fiscal years after the restatement announcements (i.e., years +1 to +3) with that in the three fiscal years before the announcements (i.e., years −3 to −1). The fiscal year in which the announcement of the restatement is made is defined as year 0. In our main test, we exclude the

observations in year 0 because it is not clear whether a restatement firm has enough time to adjust its cash holdings balance in year 0. Specifically, we estimate the following baseline regression *separately* for the restatement firms and the control firms.

$$CASH_{i,t} = \alpha_i + \beta POST_{i,t} + CONTROLS + \varepsilon_{i,t} \quad (1)$$

where *CASH* is level of cash holdings, defined as cash and short-term investments (Compustat data item *#CHE*) divided by total assets (*#AT*).[3] *POST* is a dummy variable that equals one after the restatement (i.e., years +1 to +3), and zero before the restatement (i.e., years −3 to −1). The effect of the restatements on the level of cash holdings is captured by the difference between the coefficient of *POST* (β) for the restatement firms and control firms.

Following the literature on cash holdings (e.g., Opler et al., 1999; Bates et al., 2009), we include the following control variables that may affect corporate cash holdings. Tobin's Q (*Q*) is the ratio of the market value of total assets to the book value of total assets (*#AT*), with the market value of total assets defined as the book value of total assets plus the difference between the market value of equity (*#PRCC_F*#CSHO*) and the book value of equity (*#CEQ*). Firm size (*SIZE*) is the natural logarithm of total assets. Operating cash flow (*CFO*) is the net operating cash flow (*#OANCF*) scaled by total assets. Net working capital (*NWC*) is the non-cash working capital (*#ACT−#CHE*)−(*#LCT−#DLC*) scaled by total assets. Leverage (*LEV*) is defined as the sum of long-term debt (*#DLTT*) and short-term debt (*#DLC*) divided by total assets. Industry volatility of operating cash flow (*SIGMA*) is defined as the industry median value of the standard deviation of operating cash flow over the previous ten years. Number of business segments (*NSEG*) is the number of business segments with identifiable assets greater than zero. We set *NSEG* to one if its

[3] The results in Tables 3 and 5 are qualitatively similar when we use alternative measures of cash holdings such as (1) natural logarithm of the ratio of cash to non-cash assets; (2) cash scaled by lagged total assets; and (3) cash scaled by total sales.

value is missing. The results are qualitatively similar if we delete the observations missing *NSEG*. Firm age (*AGE*) is the natural logarithm of the number of years since the firm first appeared in Compustat. Finally, we include the firm fixed effect (α_i) to control for the time-invariant unobservable firm heterogeneity. We adjust the standard errors to correct for clustering at both the matched pair (of the restatement and control firms) and year levels (Gow, Ormazabal & Taylor, 2010).

4. Accounting restatements and the level of cash holdings

4.1. Univariate tests

Table 2 shows the results of the univariate tests. For each restatement and the matched control firm, we first compute the average value of *CASH* for the pre-restatement period (years −3 to −1) and the post-restatement period (years +1 to +3). We then compute the change in the firm-specific average value of *CASH* between the pre- and post-restatement periods for the restatement firms and the matched control firms. Finally, we test whether the difference in the change in average *CASH* between the restatement firms and the matched control firms is equal to zero.

Panel A shows the results for all restatement firms and their matched control firms. The increase in *CASH* after the restatements for the restatement firms is 0.016 (0.179 – 0.163), significant at the 1% level based on both the *t*-test ($t = 4.58$) and the Wilcoxon rank sum test ($Z = 4.86$). In contrast, there is no significant change in *CASH* between the post- and the pre-restatement periods for the matched control firms. The difference in the change in *CASH* between the restatement firms and the control firms is significant at the 1% level based on the *t*-test and the Wilcoxon rank sum test ($t = 3.22$; $Z = 3.30$). As prior literature reports that irregularity restatements have a more pronounced effect on financial reporting credibility (e.g., Hennes et al., 2008; Chen

et al., 2013, 2014), we repeat the test for the error restatements and the irregularity restatements separately. Panel B shows the results for the error sample and Panel C shows the results for the irregularity sample. The results are similar. The error restatement firms and the irregularity restatement firms both show a significant increase in cash holdings after the restatement. In contrast, the matched control firms do not show any significant change. The difference in the changes in *CASH* between the restatement firms and the matched control firms is also statistically significant.

In summary, the univariate test results suggest that firms significantly increase their cash holdings after restatements. The evidence is consistent with Hypothesis 1. However, the univariate tests do not control for changes in other determinants of corporate cash holdings around the restatements. We conduct multivariate regression analysis in the next section to address this concern.

[Insert Table 2 here]

4.2. Multivariate regression analysis

Table 3 presents the multivariate regression results of the average effects of accounting restatements on corporate cash holdings. Panel A shows the results of the baseline regressions. Columns 1 and 2 show the results for all restatement firms and all matched control firms respectively. Consistent with the univariate test, the coefficient of *POST* in column 1 is significantly positive (0.029, t = 7.21), suggesting a significant increase in cash holdings for the restatement firms after restatements. Consistent with Bates et al. (2009) who document a general increasing trend in cash holdings of US firms, the control firms (column 2) also show a positive coefficient of *POST* (0.011, t = 2.19). The difference in the coefficient of *POST* between the restatement and control firms is highly significant (0.018; p-value = 0.003). This evidence is

consistent with Hypothesis 1 that the restatement firms increase their cash holdings after the restatement announcements.

We then repeat the tests for the sample of restatements related to errors and the sample of restatements related to irregularities separately. Column 3 shows that the errors firms also experience a statistically significant increase in cash holdings. The coefficient of *POST* is significant and positive (0.020, $t = 4.89$). Column 4 shows that the increase in the cash holdings of the matched control firms is also positive and significant (0.011; $t = 1.80$). Inconsistent with the results of the univariate test, the difference in the coefficients of *POST* between the errors firms and the control firms is insignificant (0.009; *p*-value = 0.185). Column 5 shows that the coefficient of *POST* for the irregularity firms is highly significant (0.046, $t = 4.84$). Column 6 shows that the corresponding coefficient for the control firms is lower (0.012, $t = 1.90$). The difference in the coefficients of *POST* is highly significant (0.034; *p*-value = 0.002). Thus, the effect of accounting restatements on cash holdings is concentrated in the irregularity sample after controlling for the other determinants of cash holdings.

The effect of the restatements on the level of cash holdings is also economically significant. For example, the results in columns 5 and 6 suggest that the increase in cash holdings for the irregularity firms after the restatements is 0.034 (0.046 − 0.012), or 3.4% of total assets, greater than the increase for the control firms. Alternatively, the increase in cash holdings over the pre-restatement level is about 20% higher for the irregularity firms than for the control firms.[4]

[4] Note that the level of cash holdings in the pre-restatement period is 0.166 for the irregularity firms and 0.167 for the control firms (see Table 2). Thus, the increase in cash holdings over the pre-restatement level is 27.7% (0.046/0.166) for the irregularity firms and 7.2% (0.012/0.167) for the control firms.

Prior studies also show that cash holdings are associated with investments and dividends (e.g., Opler et al., 1999). In addition, several recent studies show that accounting restatements affect firms' financing behavior (e.g., Graham et al., 2008; Costello & Wittenberg-Moerman, 2011; Chen et al., 2013), which may affect firms' cash holdings (e.g., Harford, Klasa & Maxwell, 2014). In the baseline regression we do not control for investments and dividends, because these variables are jointly determined with cash holdings (Duchin, 2010). As a robustness test, we check whether the results in Panel A hold after controlling for variables related to investments, external finance and dividends. The results are reported in Panel B of Table 3. CPAX is capital expenditure (#*CAPX*) divided by total assets, ACQUISITION is acquisition (#*AQC*) scaled by total assets, R&D is research and development (#*XRD*) scaled by total sales (#*SALE*), and DIV is dividends (#*DVC*) scaled by total assets. DEBT_XFIN is net long-term debt issuance (#*DLTIS* - #*DLTR*) plus change in current debt (#*DLCCH*) and scaled by total assets (#*AT*). EQUITY_XFIN is sale of common and preferred stock (#*SSTK*) scaled by total assets. MATURITY is the ratio of long-term debt due within three years (sum of #*DD1*, #*DD2* and #*DD3*) to total long-term debt (#*DLTT* + #*DD1*). N_FINCOV and N_GENCOV are the weighted average of the number of financial covenants and general covenants of all bank loans borrowed in the fiscal year, in which the weight is the deal amount of each facility. If no bank loan is borrowed, then N_FINCOV and N_GENCOV are set to zero. NO_LOAN is an indicator variable that equals one if no bank loan is borrowed in the fiscal year, and zero otherwise. We also include an indicator of a Big N auditor (*BigN*), as this variable shows significant difference between the restatement and control firms in the pre-restatement period (see Table A1 and A2).

We find that the results are qualitatively similar. In particular, the increase in cash holdings after the restatements is significantly higher for the restatement firms than for the control firms. In

addition, the effect is concentrated in the sample of restatements related to irregularities, and the economic significance of the effect is also similar to that inferred from Panel A.

To summarize, the evidence presented in Table 3 is consistent with Hypothesis 1 that firms increase their cash holdings after accounting restatements. In addition, the evidence suggests that the effects are concentrated in restatements related to irregularities. Thus, we focus on irregularity restatements in the following analysis.

[Insert Table 3 here]

4.3. Connection with McNichols & Stubben (2008)

McNichols & Stubben (2008) suggest that irregularity firms tend to overinvest in misreporting periods because distorted accounting numbers provide misleading information about investment opportunities for managers. They also find that the overinvestment is corrected after the misreporting periods. Thus, one concern is that the increase in cash holdings documented in Table 3 is a sideshow of McNichols & Stubben (2008). More specifically, even if firms do not actively manage their cash reserves, they will have higher cash holdings when the funds saved from cutting overinvestment are piled into cash reserves.

Ex ante, cutting investment does not necessarily increase cash holdings, because cash holdings are also affected by external financing and payout decisions. The funds saved from investment cut may be used to pay down debt or distributed to investors rather than accumulated into cash reserves. In addition, firms may be forced to cut both investment and existing reserves to pay down debt or cover operating loss (see section 5.2 for more discussions). Nevertheless, we conduct a robustness test to address this concern. If the increase in cash holdings after the restatements is purely driven by the decrease in overinvestment, then we should observe a more pronounced increase in cash holdings for the irregularity firms that experience a more pronounced decrease in overinvestment.

To test this prediction, we follow McNichols & Stubben (2008) to measure overinvestment (*XINV*). See the note to Table 4 for detailed definition. We compute the decrease in overinvestment for each irregularity firm as the mean *XINV* over the pre-restatement period (i.e., years −3 to −1) minus the mean *XINV* over the post-restatement period (i.e., years +1 to +3). The results are presented in Panel A of Table 4. For the irregularity firms with *low decrease* in overinvestment, the difference in the coefficient of *POST* between the irregularity firms and control firms is 0.065 (*p*-value < 0.001). For the irregularity firms with *high decrease* in overinvestment, the difference is insignificant (0.018; *p*-value = 0.215). We also partition the sample based on mean *XINV* over the pre-restatement period. For irregularity firms with *low* overinvestment, the difference in the coefficient of *POST* is 0.055 (*p*-value = 0.003). For irregularity firms with *high overinvestment*, the difference is smaller (0.026; *p*-value = 0.071).

Overall, the results in Table 4 suggest that the change in cash holdings after the restatements is unlikely a sideshow of the overinvestment effect of restatements as documented in McNichols & Stubben (2008).

[Insert Table 4 here]

4.4. Precautionary saving demand and the effect of accounting restatements on cash holdings

We first construct a proxy of the precautionary saving demand by considering three variables that characterize the joint distribution of internal funds and investment opportunities (Duchin, 2010). The first variable is the industry volatility of operating cash flows, which is defined as the standard deviation of the industry (based on Fama and French 48 industry classification) median CFO over the previous ten years (i.e., years −10 to −1).[5] The second variable is the industry

[5] Precautionary saving demand measures based on 3-digit SIC or 2-digit SIC generate qualitatively similar results.

volatility of investment opportunities, defined as the standard deviation of the industry median Tobin's Q over the previous ten years. The third variable is the negative correlation between the industry median CFO and industry median Tobin's Q over the previous ten years. For each variable, a higher value suggests higher precautionary saving demand, other things being equal. For each year, we convert the above three variables into percentile ranks. The composite measure of precautionary saving demand, denoted by *PS_DEMAND*, is constructed as the mean of the above three percentile ranks. We use an industry-level measure to avoid the potential endogeneity bias from the firm-level CFO and Tobin's Q being affected by decisions that may be influenced by accounting restatements (Acharya et al., 2007).

We then partition the irregularity firms into two subsamples (high and low) based on *PS_DEMAND* measured at year 0 (the year in which the restatements are announced).[6] The matched control firms are placed in the same subsample as their corresponding restatement firms.[7] The regression results are presented in Panel A of Table 5 and the results of hypothesis tests are reported in Panel B. For firms with high *PS_DEMAND*, the coefficient of *POST* is significantly higher for the irregularity firms than that for the matched control firms (0.064; *p*-value = 0.001). In contrast, for firms with low *PS_DEMAND*, the difference in the coefficient of *POST* is not statistically significant (0.016; *p*-value = 0.226). Thus, the evidence suggests that irregularity firms only increase their cash holdings after restatements when they have high precautionary saving demand. Formal test also shows that the treatment effect of irregularity-related restatements on

[6] Note that the volatility and correlation for year 0 are computed based on the data over years −10 to year −1.

[7] Since we match control firms to restatement firms within the same industry based on Fama and French 48 industry classification (see the appendix for details), by construction *PS_DEMAND* is identical for the treatment and control firms.

cash holdings is significantly higher in the high *PS_DEMAND* sample than in the low *PS_DEMAND* sample (0.048; *p*-value = 0.031). This evidence is consistent with Hypothesis 2.

We also partition the sample based on each individual measure of precautionary saving demand. The results are reported in Panel C of Table 5. The results are qualitatively similar but less significant. One possible reason is that the precautionary saving demand is determined by the joint distribution of internal funds and investment opportunities, but each individual measure only captures one dimension of the joint distribution, resulting in lower testing power.

To summarize, the evidence supports Hypothesis 2 that the effect of accounting restatements on cash holdings is more pronounced for firms with a higher precautionary saving demand.

[Insert Table 5 here]

4.5. Robustness tests

4.5.1. Controlling for lines of credit

Prior studies suggest that poor accounting information quality limits firms' access to lines of credit (Graham et al., 2008; Li & Radhakrishnan, 2013). Firms use both cash and lines of credit as liquidity buffers (Holmstrom & Tirole, 1998; Lins et al., 2010). The finance literature provides mixed evidence on the substitutability of cash and lines of credit as sources of liquidity.[8] Thus, one natural question is whether the irregularity firms increase cash holdings simply to substitute for lines of credit. If the answer is yes, then accounting restatements only change the way firms maintain liquidity, otherwise, accounting restatements appear to force firms to increase total liquidity reserves.

[8] For example, in a survey-based study, Campello, Graham, Giambona & Harvey (2009) suggest that firms view cash and lines of credit as liquidity substitutes, whereas in another survey-based paper, Lins et al. (2010) find that fewer than half of the CFOs who participated in their survey hold this view. Flannery & Lockhart (2009) suggest that cash and lines of credit are substitutes for financially unconstrained firms but not for financially constrained firms.

To answer this question, we examine whether the results in Tables 3 and 4 still hold after controlling for unused lines of credit. If the irregularity firms simply increase cash to substitute for lines of credit, the effect on cash holdings should become significantly weaker or disappear once the unused lines of credit are controlled. We manually collect information about lines of credit from the 10-K reports for the irregularity firms and control firms. The results are reported in Table 6. The sample size is reduced from 2,825 (1,391 + 1,434) to 2,708 (1,345 + 1,363). We lose these observations mainly because we cannot find their 10-K reports on EDGAR. After controlling for the unused lines of credit, we continue to observe a more pronounced increase in cash holdings after the restatements for the irregularity firms than for the control firms. Columns 1 and 2 show that the difference in the coefficients of *POST* between the irregularity firms and controls is significant (0.029; *p*-value = 0.005). In addition, the effects of irregularity restatements are more pronounced for the firms with higher precautionary saving demand. Columns 3 and 4 show a significant difference in the coefficient of *POST* between the irregularity firms and control firms for the high precautionary saving demand sample (0.057; *p*-value = 0.002). Columns 5 and 6 show that the corresponding difference for the low precautionary saving demand sample is insignificant (0.013; *p*-value = 0.269). The difference in the coefficient of *POST* (β) between the irregularity firms and control firms in the high precautionary saving demand subsample is significantly higher than that for the low precautionary saving subsample (*p*-value = 0.035, untabulated).[9] Consistent with prior literature (e.g., Opler et al., 1999), the unused credit is negatively associated with cash holdings. Finally, as an alternative test, we repeat the tests in Table 6 by replacing *CASH* with the

[9] Controlling for total lines of credit (including both the unused portion and the drawdowns) generates qualitatively similar results.

ratio of the sum of cash and unused lines of credit to total assets and removing the unused lines of credit from the independent variable set. The results (untabulated) are qualitatively similar.[10]

[Insert Table 6 here]

4.5.2. Placebo tests

One concern about the DID approach is that the changes in cash holdings before the restatement year may already differ between the restatement firms and the matching firms (Robert & Whited, 2011). To mitigate this concern, we include both the level of and the change in cash holdings before the restatements in the probit model to estimate the propensity score. To further address this issue, we repeat the tests in Tables 3 and 5 using a series of pseudo restatement events. Specifically, we assign year *T* before the actual restatement year as the pseudo restatement year. We then use the observations of the restatement and control firms in [*T*−3, *T*−1] and [*T*+1, *T*+3] to repeat the tests in Tables 3 and 5. [*T*−3, *T*−1] are defined as the pre-pseudo restatement years and [*T*+1, *T*+3] are defined as the post-pseudo restatement years.[11] We then redefine *POST* as an indicator variable that equals one for the post-pseudo restatement years and zero otherwise. If the restatement firms and the matching firms follow parallel trends in cash holdings before the restatement year, we should not find any significant difference between the irregularity firms and control firms in the change in cash holdings after the pseudo restatements.

We conduct the pseudo restatement event tests for *T* = 2 to 7, and the results are reported in Table 7. We only show the results of the key variables to save space. Panel A shows the coefficient

[10] Specifically, the difference in the coefficient of *POST* between columns 1 and 2 is 0.023 (*p*-value = 0.092), that between columns 3 and 4 is 0.048 (*p*-value = 0.043), and that between columns 5 and 6 is 0.010 (*p*-value = 0.455).

[11] When *T* = 2, we only include year *T*+1 (i.e., year −1 of the actual restatement year) as the post-pseudo restatement period. When *T* = 3, we only include year *T*+1 and year *T*+2 (i.e., year −2 and year −1 of the actual restatement year) as the post-pseudo restatement period. The purpose is to ensure that the post-pseudo restatement period does not overlap with the actual post-restatement period.

of *POST* for the irregularity firms and that for the control firms, and their difference. In general we do not observe significant differences in the coefficient of *POST* except for $T = 5$ (p-value = 0.060). Nevertheless, the magnitude (0.019) is much smaller than that reported in Table 3 (0.034). Panels B and C show the results of the pseudo restatement event analysis for firms with a high and low precautionary saving demand, respectively. We do not find results similar to those in Table 5.

The results in Table 7 suggest that the findings in Tables 3 and 5 are not likely to be due to differing trends in cash holdings between the irregularity firms and the matched control firms. This evidence further increases our confidence that the results documented in Tables 3 and 4 are attributable to accounting restatements.

[Insert Table 7 here]

5. Additional analysis

The evidence so far is consistent with the precautionary saving theory. That is, firms increase cash holdings to insure against a future shortage of internal funds because future financing costs are higher after restatements. However, one may argue that the cash holdings increase is due to strengthened shareholder control over managers (Farber, 2005; Desai, Hogan & Wilkins, 2006; Cheng & Farber, 2008; Hennes, Leone & Miller, 2012). Harford et al. (2008) argue that self-interested managers prefer current expansion of the firm over investing cash reserves in the future. More effective control over managers prevents them from spending cash in the current investment and therefore increases cash holdings to the extent that the funds saved from the reduction in spending are not used to pay down debts or distributed to investors. In addition, with more restrictive control over managers, shareholders may allow managers to hold more cash reserves. We refer to this alternative hypothesis as the "strengthened shareholder control hypothesis".

While the precautionary saving hypothesis and strengthened shareholder control hypothesis are not mutually exclusive, we conduct two additional analyses in attempt to distinguish between them. First, we partition the sample based on CEO/CFO turnover (Farber, 2005) and examine how the cash holdings change in the subsample with CEO/CFO turnover versus that without. Second, we examine the changes in financial decisions concerning investment and payouts in relation to excess cash after the restatements. We discuss the different predictions of the two hypotheses and present the empirical results below.

5.1. Conditioning effects of CEO/CFO turnover

First, we examine how the cash holdings effect of irregularity restatements differs when a CEO/CFO is replaced when the restatement announcements are made. Firms that replace their management team are more likely to reduce overinvestment planned by the previous management. Thus, the strengthened shareholder control hypothesis predicts a more pronounced increase in cash holdings when a CEO/CFO is replaced. In contrast, the prediction of the precautionary saving hypothesis, if anything, would be the opposite. On the one hand, replacing a CEO/CFO helps restore equity investors' confidence and alleviate adverse effects on the cost of equity (e.g., Chen et al., 2014), implying a larger increase in cash holdings in firms without CEO/CFO turnover. On the other hand, to the extent that replacing a CEO/CFO does not help reduce the cost of debt (Chava et al., 2012), CEO/CFO replacement may not matter for the effect of restatements on cash holdings.

We partition the sample based on whether the irregularity firms replace their CEO or CFO up to year +1. The results are reported in Table 8. For the irregularity firms *without* CEO/CFO replacement, the difference in the coefficient of *POST* between the irregularity firms and control

firms is significantly positive (0.038; *p*-value = 0.005). However, the difference is insignificant for the irregularity firms *with* CEO/CFO replacement (0.024; *p*-value = 0.259).[12]

Overall, the evidence does not support the strengthened shareholder control hypothesis as the main reason for the cash increase after the restatements.

[Insert Table 8 here]

5.2. Irregularity restatements and the way to deploy excess cash

The precautionary saving hypothesis and strengthened shareholder control hypothesis also have different predictions on how firms deploy excess cash, and more specifically, changes in the sensitivity of investments and payouts to excess cash. According to the precautionary saving hypothesis, cash holdings are more valuable for mitigating future underinvestment when firms are more financially constrained, and therefore in such cases investment should be more sensitive to cash holdings.[13] If accounting restatements increase firms' financial constraint, the precautionary saving hypothesis posits an increase in the sensitivity of investment to excess cash after the restatements. In contrast, the strengthened shareholder control hypothesis predicts a decrease in investment-to-excess-cash sensitivity after restatements. This is because the managers are less likely to waste excess cash in overinvestment when shareholders have more restrictive control after restatements.[14]

The precautionary saving hypothesis argues that firms hold more cash in response to exacerbated information asymmetry. Larger information asymmetry implies higher need to use

[12] In Table 4 we also show that cash holdings increase more for firms that experience smaller decrease in overinvestment or have less overinvestment in the pre-restatement period. This finding is also inconsistent with the strengthened shareholder control hypothesis.
[13] Denis & Sibilkov (2010) find higher sensitivity of investment to cash holdings for more financially constrained firms.
[14] Harford et al. (2008) find that capital expenditure and acquisition are less sensitive to excess cash for firms with stronger shareholder rights.

dividends to mitigate investors' concern over agency conflict and/or adverse selection (Hail, Tahoun & Wang, 2014). Therefore, the precautionary saving hypothesis predicts an increase in the sensitivity of payouts to excess cash after restatement. However, if shareholders allow managers to hold more cash reserves when they have more restrictive control, the sensitivity of payouts to excess cash is expected to be lower (Harford et al., 2008).

To test the above predictions, we examine how firms' sensitivities of investment and payouts to excess cash change after the restatements.[15] Towards this end, we estimate the following regression separately for the irregularity firms and control firms.

$$DECISION_{i,t} = \alpha_i + \beta_1 EXCASH_{i,t-1} + \beta_2 POST_{i,t} + \beta_3 POST_{i,t} \times EXCASH_{i,t-1} + CONTROLS + \varepsilon_{i,t} \quad (2)$$

where *DECISION* is *CAPXACQ* or *PAYOUT*. *CAPXACQ* is defined as net capital expenditure plus acquisition *(#CAPX - #SPPE + #ACQ*). *PAYOUT* is defined as the sum of the repurchase of preferred and common stocks (*#PRSTKC*) and cash dividends (*#DV*). Both variables are scaled by lagged total assets. *EXCASH* is the residual term from annual regression of cash holdings on *Q*, *SIZE*, *CFO*, *NWC*, *LEV*, *SIGMA*, *NSEG*, *AGE*, and industry fixed effects using all non-financial firms in Compustat. The optimal value of cash holdings is defined as the cash holdings predicted by the annual regressions. The control variables (*CONTROLS*) in model (2) include Tobin's Q (*Q*), firm size (*SIZE*), operating cash flows (*CFO*), and leverage (*LEV*). These variables are defined in section 3.2.

The coefficient of interest is β_3, which captures the change in the financial decisions concerning investment and/or payouts to excess cash after the restatements. We focus on the

[15] In untabulated results, we find more pronounced decrease in the sensitivity of cash savings to excess cash for the irregularity firms than the control firms. We also find that irregularity firms significantly reduce external financing compared with the control firms, consistent with prior literature (e.g., Chen et al., 2013), although the change in the external financing-to-excess cash sensitivity does not significantly differ between the irregularity and control firms.

difference in β_3 between the irregularity firms and control firms to test the effect of restatement on financial decisions.

The results are reported in Table 9. The dependent variables in panels A and B are *CAPXACQ* and *PAYOUT*, respectively. Column 1 shows the coefficients and *t*-statistics of *POST*×*EXCASH* for the irregularity firms and column 2 for the matched control firms. Tests of the difference between the irregularity firms and control firms are reported in the last column.

Panel A shows that the increase in the sensitivity of *CAPXACQ* to excess cash for the irregularity firms after the restatements is significantly higher than that for the matched controlled firms (*p*-value = 0.057). This evidence is consistent with the notion that cash reserves are more valuable in reducing underinvestment after restatements, supporting the precautionary saving hypothesis. The results are inconsistent with the strengthened shareholder control hypothesis that irregularity firms spend less excess cash in overinvestment after restatements.

Panel B shows that the increase in the sensitivity of *PAYOUT* to excess cash after the restatements is significantly higher for the irregularity firms than the control firms (*p*-value = 0.040). Thus, the evidence supports the view that irregularity firms increase payouts to mitigate investors' concern over exacerbated information asymmetry, and is inconsistent with the notion that shareholders allow managers to hold more cash after the restatements.

[Insert Table 9 here]

6. Irregularity restatements and the market value of cash holdings

According to the precautionary saving hypothesis, one of the key links connecting accounting restatements and cash holdings is that cash holdings are more valuable in mitigating future underinvestment problems, because external finance is more costly after restatements. Faulkender

& Wang (2006) find that the value of cash holdings is greater for firms with greater external financing constraints. Denis & Sibilkov (2010) find similar results. As accounting restatements magnify external financing constraints, we should observe an increase in the market value of cash holdings after restatements. However, the markets may not place a higher value on cash holdings after restatements because the restatements may reveal a more severe agency problem than expected. The literature shows that cash holdings have lower market value when the agency problem is more severe (e.g., Dittmar & Mahrt-Smith, 2007). Although internal governance and external discipline improve after restatements, it is not clear whether the improved governance can offset the effect of the perception of severe agency problems. Keeping this caveat in mind, we test whether the market places a higher value on cash reserves after a restatement. Specifically, we estimate the following regressions separately for the irregularity firms and control firms.

$$R_{i,t} - R^{B}_{i,t} = \eta_0 + \eta_1 POST_{i,t} + \eta_2 \Delta CASH_{i,t} + \eta_3 \Delta CASH_{i,t} \times POST_{i,t} + CONTROL + \varepsilon_{i,t} \quad (3)$$

where $R_{i,t}$ is compounded returns of firm i over the fiscal year t, and $R^{B}_{i,t}$ is compounded returns of the benchmark portfolio over the same period. Following Faulkender & Wang (2006) and Louis, Sun & Urcan (2012), we use the 25 Fama and French portfolios formed on size and book-to-market as the benchmark. $\Delta CASH_{i,t}$ is the change in cash and short-term investment from year $t-1$ to year t, scaled by the market value of common shares outstanding at the end of year $t-1$. We also follow Faulkender & Wang (2006) and include the following control variables (*CONTROL*): change in earnings before extraordinary items plus interest, deferred tax credits, and investment tax credits ($\Delta E_{i,t}$), change in non-cash assets ($\Delta NA_{i,t}$), change in R&D expenditure ($\Delta RD_{i,t}$), change in interest expense ($\Delta I_{i,t}$), change in total dividends ($\Delta D_{i,t}$), net external finance ($NF_{i,t}$), lagged total cash ($CASH_{i,t-1}$) and total debts ($L_{i,t}$). We scale all the control variables by the lagged market value of equity ($MV_{i,t-1}$). We also include the interactions of $\Delta CASH_{i,t}$ with lagged cash ($CASH_{i,t-1}$) and

total debts ($L_{i,t}$) to control for the effect of lagged cash holdings and leverage on the market value of cash holdings (Faulkender & Wang, 2006).

Table 10 reports the regression results for the irregularity restatements sample. The results are consistent with the precautionary saving theory. The coefficient of $\Delta CASH \times POST$ for the irregularity firms is significantly greater than that for the matched control firms (0.855; *p*-value = 0.002). Huang, Guo, Ma & Zhang (2015) find firms identified as having material weaknesses in their internal control system have higher value of cash holdings. As a robustness test, we delete the observations that are identified as having material weaknesses in internal control over financial reporting in the SOX Section 404 report and re-estimate regression (3). The results are reported in columns 3 and 4 and are essentially the same. Thus, the change in cash value after the announcement of irregularity restatements is unlikely to be driven by firms that are identified as having material internal control weaknesses.

To summarize, the evidence presented in Table 10 suggests that the markets place a higher value on cash holdings after the restatements. Combined with the results reported in Table 9, the evidence further supports the precautionary saving theory.

[Insert Table 10 here]

7. Conclusions

This study investigates how financial reporting credibility affects a firm's cash policy by examining the change in cash holdings after the announcement of accounting restatements. Using a DID approach, we find that firms increase their cash holdings after such announcements. The effect is concentrated in the restatements related to accounting irregularities. The effect of irregularity restatements on the cash holdings of firms is more pronounced when firms have a

higher precautionary saving demand. The evidence also suggests that the increase in cash holdings after irregularity restatements is not more pronounced for firms with a higher decrease in overinvestment after the restatements or with higher pre-restatement overinvestment, or firms that replace their CEOs/CFOs after the restatements. In addition, irregularity firms tend to deploy excess cash more to investment and payouts to shareholders. This evidence suggests that the increase in cash holdings after restatements is not purely driven by improved shareholder control. Finally, we find a higher market value of cash holdings after restatements. Our study contributes to the literature on the effect of financial reporting credibility on real corporate decisions.

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Appendix: Propensity score matching

We first estimate the following probit model:

$$\Pr(RESTATE) = \mathrm{B}_1 X_1 + \mathrm{B}_2 X_2 + \mathrm{B}_3 X_3 + \text{industry fixed effects} + \text{year fixed effects} + \varepsilon$$

where *RESTATE* is an indicator variable that equals one for the restatement firms and zero for the non-restatement firms. X_1 includes the variables associated with corporate cash holdings: firm size (*SIZE*), Tobin's Q (*Q*), operating cash flows (*CFO*), leverage (*LEV*), net working capital (*NWC*), industry volatility of operating cash flows (*SIGMA*), number of business segments (*NSEG*), firm age (*AGE*), capital expenditure (*CAPX*), R&D expenditure (*RDSALE*), acquisition (*ACQUISITION*), and dividend (*DIV*). X_2 includes additional variables that may affect the restatements: sales growth rate (*SGRW*), net amount of external finance (*FINANCE*), change in net working capital (Δ*NWC*), an indicator of loss (*LOSS*), Altman's (1968) *Z*-score (*Z-SCORE*), and an indicator of Big-N auditor (*BigN*). We also include the level of and the change in cash holdings (*CASH* and *ΔCASH*) in the regression (X_3) to ensure the pre-restatement trend similarities in the cash holdings (Roberts and Whited, 2011). The industry fixed effects are based on the 48 industry classification by Fama and French (1997). For the restatement firms, we only include the observations in the year of the announcement of the restatement (i.e., year 0). The non-restatement firms are those that did not announce accounting restatements during our sample period. We include all annual observations of the non-restatement firms during our sample period. All the independent variables are measured as the mean value over the previous years. That is, for observation of firm *i* in year *t*, all independent variables are measured over year *t*−3 to *t*−1.

For each restatement firm, we select as the matching control firm the non-restatement firm that operates in the same industry based on the Fama and French (1997) 48 industry classification and has the closest propensity score in the year of restatement announcement (i.e., year 0). Note that the propensity score is estimated based on average firm characteristics over year -3 to -1. If more than one restatement firm matches the same control firm, we select the pair with the smallest difference in the propensity score. We then repeat the above matching procedure after eliminating the selected control firm from the control firm pool (i.e., matching without replacement).

Table A1 shows the univariate comparison of firm characteristics between the restatement firms and the non-restatement firms before and after matching. We find that before matching, the restatement firms and the control firms differ systematically in a number of characteristics. After matching, the restatement firms and the matched control firms do not show significant differences in most of these firm characteristics. There are only a few exceptions in which the difference is significant at the 10% level based on a *t*-test. Table A2 shows the results of the probit regression before and after matching. Before matching, 11 out of 20 independent variables have coefficients that are significant at the 5% or 1% level. After matching, none of the independent variables has a coefficient that is significant at the 5% or 1% level. Only the coefficient of the indicator of Big-N auditor is significant at the 10% level. In addition, the *p*-value of the probit model before matching is less than 0.1%, showing joint significance of the independent variables. The *p*-value of the probit model after matching is almost 1, suggesting that the independent variables do not have joint explanatory power for the selection. In general, the diagnostics suggest that the propensity score matching is reasonably well implemented.

Table A1 Comparison of firm characteristics between the restatement firms and the non-restatement firms before and after matching

	Before matching			After matching		
	Restatement firms (N = 984)	Control firms (N = 20,217)		Restatement firms (N = 949)	Control firms (N = 949)	
Variable	Mean [1]	Mean [2]	t-stat of [1]-[2]	Mean [3]	Mean [4]	t-stat of [3]-[4]
PSCORE	0.093	0.044	33.75***	0.092	0.090	0.79
SIZE	5.849	4.811	20.79***	5.855	5.839	0.20
Q	2.080	2.398	-5.52***	2.065	2.101	-0.55
CFO	0.052	0.008	7.84***	0.054	0.064	-1.86*
NWC	0.116	0.126	-1.69*	0.118	0.124	-0.69
LEV	0.232	0.205	3.96***	0.232	0.215	1.79*
SIGMA	0.062	0.064	-1.97**	0.063	0.062	0.60
NSEG	5.000	3.741	11.38***	5.048	5.105	-0.28
AGE	2.690	2.510	8.34***	2.691	2.704	-0.44
CAPX	0.062	0.060	1.08	0.062	0.060	0.84
ACQUISITION	0.028	0.026	1.40	0.028	0.027	0.61
R&D	0.188	0.471	-4.85***	0.150	0.158	-0.19
DIV	0.005	0.005	-0.11	0.005	0.005	-1.32
SGRW	0.151	0.197	-3.78***	0.154	0.145	0.69
FINANCE	0.052	0.096	-7.96***	0.050	0.040	1.74*
ΔNWC	-0.009	-0.004	-3.19***	-0.009	-0.009	-0.21
LOSS	0.354	0.413	-4.44***	0.350	0.325	1.44
Z-SCORE	7.232	9.723	-7.14***	7.238	7.913	-1.89*
BigN	0.840	0.823	1.42	0.840	0.868	-1.76*
CASH	0.167	0.239	-9.13***	0.163	0.168	-0.69
ΔCASH	-0.006	-0.001	-2.31**	-0.006	-0.004	-0.70

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table A2. The probit regression before and after matching

Independent variable	Before matching	After matching
SIZE	0.172***	0.025
	(11.41)	(1.10)
Q	0.029**	0.000
	(1.97)	(0.00)
CFO	0.713***	-0.376
	(3.16)	(-0.75)
NWC	0.385**	-0.115
	(2.34)	(-0.39)
LEV	-0.265**	0.208
	(-2.49)	(1.11)
SIGMA	0.410	3.681
	(0.24)	(1.28)
NSEG	0.016***	-0.002
	(3.03)	(-0.21)
AGE	-0.026	0.008
	(-0.79)	(0.14)
CAPX	-0.122	0.689
	(-0.30)	(0.88)
ACQUISTION	-0.643	0.228
	(-1.47)	(0.27)
R&D	-0.015	-0.027
	(-0.90)	(-0.62)
DIV	-4.620***	-2.829
	(-2.77)	(-1.01)
SGRW	-0.051	0.020
	(-0.78)	(0.15)
FINANCE	0.593***	0.266
	(2.82)	(0.55)
ΔNWC	-1.569***	-0.316
	(-3.96)	(-0.37)
LOSS	0.108*	0.000
	(1.76)	(0.00)
Z-SCORE	-0.009***	-0.002
	(-3.02)	(-0.32)
BigN	-0.082	-0.177*
	(-1.57)	(-1.87)
CASH	-0.225	-0.144
	(-1.51)	(-0.50)
ΔCASH	-1.787***	-0.206
	(-6.27)	(-0.32)
Industry and year fixed effects	YES	YES
p-value of the model	0.000	1.000
Pseudo *R*-squared	0.101	0.007
N	21,201	1,898

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 1. Sample selection process

All accounting restatements 1997–2006 from GAO (2003, 2006)			2705
Less:	Duplicated announcements	(203)	
	Firms that cannot be found in COMPUSTAT	(296)	
	Subsequent restatements	(396)	
	Firms in financial industries (SICs between 6000 and 6999)	(270)	
	Firms in regulated industries (SICs between 4900 and 4999)	(60)	
	Firms for which the values of variables used to estimate the propensity scores are missing	(496)	
	Firms that cannot be matched to a control firm	(7)	
	Firms for which observations are unavailable in the post-restatement periods	(28)	
Restatement firms used in this paper			949
Irregularity and error restatement as identified by Hennes et al. (2008)			
	Irregularity firms		270
	Error firms		679

Table 2. Univariate tests

	Mean value of *CASH*			Test of difference	
	Pre-restatement [1]	Post-restatement [2]	Post – Pre [3]	*t*-statistics [4]	Z-statistics [5]
Panel A: All restatements					
Restatement firms (R)	0.163	0.179	0.016	4.58***	4.86***
Matching firms (C)	0.168	0.169	0.001	0.27	0.86
(R) – (C)	-0.005	0.011	0.016	3.22***	3.30***
Panel B: Restatements due to errors					
Restatement firms (R)	0.162	0.175	0.014	3.24***	3.16***
Matching firms (C)	0.168	0.168	0.000	0.01	0.43
(R) – (C)	-0.006	0.007	0.014	2.36**	2.14**
Panel C: Restatements due to irregularities					
Restatement firms (R)	0.166	0.189	0.023	3.47***	4.07***
Matching firms (C)	0.167	0.170	0.003	0.50	0.92
(R) – (C)	-0.001	0.019	0.020	2.33**	2.81***

Note:
This table shows the results of the univariate tests of the change in *CASH* after the restatements. *CASH* is defined as cash and short-term investment scaled by total assets. For each restatement firm and its matched control firm, we compute the average value of *CASH* in the pre- and post-restatement periods. The first row in each panel shows the mean average *CASH* for the restatement firms in the pre- (column 1) and post-restatement periods (column 2), the difference between the post- and pre-restatement periods (column 3), and the *t*-statistics of the *t*-test (column 4) and the Z-statistics of the Wilcoxon rank sum test (column 5) for the null hypothesis that the difference between the post-restatement period and the pre-restatement period (column 3) equals zero. The second row in each panel shows the corresponding statistics for the matching firms, and the third row shows the corresponding statistics for the difference between the matched pair. The sample in Panel A includes all restatement and matched control firms, and the sample in Panel B (C) includes all restatements related to errors (irregularities) and the corresponding matched control firms. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively

Table 3. Average effect of accounting restatements on cash holdings

Panel A: baseline model

	All restatements		Restatements related to errors		Restatements related to irregularities	
	Restatement firms	Control firms	Restatement firms	Control firms	Restatement firms	Control firms
Variable	[1]	[2]	[3]	[4]	[5]	[6]
POST	**0.029***** **(7.21)**	**0.011**** **(2.20)**	**0.020***** **(4.89)**	**0.011*** **(1.80)**	**0.046***** **(4.84)**	**0.012*** **(1.90)**
Test of difference in the coefficient of *POST*						
	[1]−[2]		[3]−[4]		[5]−[6]	
Coefficient difference [*p*-value]	**0.018***** **[0.003]**		0.009 [0.199]		**0.034***** **[0.002]**	
Control variables						
Q	0.009*** (3.65)	0.011*** (4.32)	0.005** (2.10)	0.009*** (3.51)	0.017*** (2.66)	0.013*** (3.25)
SIZE	-0.024*** -(3.38)	-0.004 -(0.72)	-0.018** -(2.00)	-0.006 -(0.85)	-0.035*** -(3.12)	0.001 (0.09)
CFO	0.097*** (3.93)	0.007 (0.30)	0.105*** (3.83)	0.014 (0.51)	0.064 (1.32)	-0.010 -(0.19)
NWC	-0.325*** -(11.14)	-0.430*** -(13.59)	-0.347*** -(9.43)	-0.432*** -(10.18)	-0.287*** -(5.32)	-0.430*** -(7.77)
LEV	-0.103*** -(5.46)	-0.116*** -(6.08)	-0.136*** -(5.44)	-0.108*** -(4.31)	-0.048* -(1.70)	-0.139*** -(4.31)
SIGMA	0.656 (1.49)	1.013*** (2.88)	0.352 (0.66)	1.143*** (2.80)	1.421** (2.13)	0.732 (1.39)
NSEG	-0.001** -(1.99)	-0.001 -(1.35)	-0.001 -(1.59)	-0.002 -(1.63)	-0.002* -(1.80)	-0.001 -(0.36)
AGE	-0.044*** -(3.50)	-0.031*** -(2.88)	-0.032** -(2.40)	-0.028** -(2.32)	-0.069** -(2.35)	-0.039** -(2.17)
Firm fixed effects	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.156	0.141	0.157	0.134	0.180	0.162
N	4941	5004	3550	3570	1391	1434

Panel B: Expanded model

	All restatements		Restatements related to errors		Restatements related to irregularities	
	Restatement firms	Control firms	Restatement firms	Control Firms	Restatement firms	Control firms
Variable	[1]	[2]	[3]	[4]	[5]	[6]
POST	**0.025*** (6.83)**	**0.011** (2.18)**	**0.017*** (3.96)**	**0.009* (1.67)**	**0.041*** (4.64)**	**0.014** (2.26)**
Test of difference in the coefficient of *POST*						
	[1] – [2]		[3] – [4]		[5] – [6]	
Coefficient difference	**0.014****		0.008		**0.027*****	
p-value	**[0.012]**		[0.300]		**[0.008]**	
Control variables						
Q	0.007*** (2.89)	0.008*** (3.80)	0.004 (1.41)	0.007*** (2.97)	0.012** (2.13)	0.011*** (2.90)
SIZE	-0.020*** -(2.75)	-0.005 -(0.72)	-0.014 -(1.61)	-0.005 -(0.72)	-0.029*** -(2.64)	0.000 (0.01)
CFO	0.185*** (8.50)	0.101*** (3.46)	0.192*** (6.73)	0.110*** (3.53)	0.152*** (3.48)	0.087 (1.32)
NWC	-0.316*** -(9.87)	-0.415*** -(13.54)	-0.336*** -(8.51)	-0.425*** -(10.28)	-0.281*** -(5.06)	-0.409*** -(7.20)
LEV	-0.117*** -(5.98)	-0.145*** -(7.01)	-0.154*** -(6.25)	-0.141*** -(5.45)	-0.064** -(2.28)	-0.160*** -(4.83)
SIGMA	0.510 (1.21)	0.794** (2.45)	0.263 (0.51)	0.954** (2.38)	1.025* (1.83)	0.370 (0.79)
NSEG	-0.002** -(2.11)	-0.001 -(1.61)	-0.001* -(1.66)	-0.002** -(2.06)	-0.002* -(1.69)	0.000 -(0.29)
AGE	-0.048*** -(3.97)	-0.041*** -(3.55)	-0.036*** -(2.64)	-0.037*** -(2.77)	-0.071*** -(2.61)	-0.056*** -(3.05)
CAPX	-0.468*** -(8.90)	-0.436*** -(9.12)	-0.472*** -(7.60)	-0.448*** -(6.63)	-0.456*** -(4.83)	-0.435*** -(4.04)
ACQUISITION	-0.275*** -(9.56)	-0.354*** -(8.81)	-0.328*** -(9.89)	-0.362*** -(7.90)	-0.184*** -(3.91)	-0.349*** -(6.81)
R&D	0.068*** (2.67)	0.068*** (2.71)	0.049** (2.29)	0.071** (2.15)	0.084* (1.75)	0.068 (1.61)
DIV	0.260* (1.94)	-0.226 -(1.34)	0.251 (1.36)	-0.003 -(0.01)	0.292 (1.16)	-0.952*** -(3.66)
DEBT_XFIN	0.176*** (7.23)	0.242*** (9.77)	0.206*** (9.23)	0.241*** (9.05)	0.130** (2.37)	0.248*** (5.95)
EQUITY_XFIN	0.194*** (7.68)	0.187*** (6.34)	0.192*** (5.45)	0.189*** (7.18)	0.183*** (3.56)	0.189*** (2.49)
MATURITY	-0.012** -(2.21)	-0.009** -(2.12)	-0.009 -(1.48)	-0.010** -(2.16)	-0.016 -(1.64)	-0.004 -(0.34)
NO_LOAN	0.013*** (4.18)	0.007** (2.15)	0.011** (2.45)	0.006* (1.69)	0.017*** (2.61)	0.009 (1.17)

N_FINCOV	-0.003*	0.000	-0.003	-0.001	-0.004	0.005
	-(1.86)	(0.01)	-(1.25)	-(0.58)	-(1.11)	(0.96)
N_GENCOV	0.002*	-0.001	0.001	0.000	0.002	-0.003
	(1.86)	-(0.95)	(1.51)	-(0.13)	(1.06)	-(1.64)
BigN	0.007	-0.017*	0.005	-0.023**	0.011	0.013
	(0.72)	-(1.75)	(0.41)	-(2.03)	(0.83)	(0.83)
Firm fixed effects	YES	YES	YES	YES	YES	YES
Adjusted. R^2	0.230	0.230	0.235	0.221	0.237	0.261
N	4855	4900	3490	3494	1365	1406

Note:
The dependent variable is *CASH*, defined as the ratio of cash and cash equivalent to total assets. *Q* is Tobin's Q, *SIZE* is natural logarithm of total assets, *CFO* is operating cash flow scaled by total assets. *NWC* is net working capital scaled by total assets. *LEV* is the sum of long-term and short-term debts scaled by total assets. *SIGMA* is industry volatility of cash flow, *NSEG* is the number of business segments, *AGE* is firm age, *CAPX* is capital expenditures scaled by total assets, *ACQUISITION* is acquisitions scaled by total assets, *R&D* is research and development expenditures scaled by sales, *DIV* is dividends divided by total assets, *DEBT_XFIN* is external debt financing, *EQUITY_XFIN* is external equity financing, *MATURITY* is the proportion of long-term debt due within three years to total long-term debt. *NO_LOAN* is an indicator variable that equals one if there is no bank loan borrowed in the fiscal year, and zero otherwise. *N_FINCOV* and *N_GENCOV* are weighted averages of the number of financial covenants and general covenants of all bank loans issued in the fiscal year, in which the weight is the deal amount of each facility. If no bank loan is borrowed, then *N_FINCOV* and *N_GENCOV* are set to zero. Δ*NWC* is the change in net working capital scaled by total assets. *BigN* is an indicator variable that equals one if the annual report is audited by one of the Big 5 (or 4) auditors and zero otherwise. *t*-statistics (in parentheses) and *p*-values (in brackets) are based on standard errors adjusted for clustering at both the matched pair and year levels, with the regressions of the restatement and control samples estimated simultaneously. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 4. Partition the irregularity firms based on decrease in overinvestment after the restatements or overinvestment before the restatements

	Partitioned by decrease in overinvestment (*DECREAS_XINV*)				Partitioned by mean *XINV* in the pre-restatement period			
	Low		High		Low		High	
Independent variable	Irregularity firms [1]	Control firms [2]	Irregularity firms [3]	Control firms [4]	Irregularity firms [5]	Control firms [6]	Irregularity firms [7]	Control firms [8]
POST	**0.069*****	0.004	**0.034*****	0.016	**0.062*****	0.007	**0.041*****	0.015
	(4.75)	(0.49)	**(3.44)**	(1.48)	**(4.21)**	(0.79)	**(4.02)**	(1.46)
Test of difference in the coefficient of *POST*								
	[1]−[2]		[3]−[4]		[5]−[6]		[7]−[8]	
Coefficient difference	**0.065*****		0.018		**0.055*****		**0.026***	
p-value	**[0.000]**		[0.216]		**[0.003]**		**[0.071]**	
Control variables								
Q	0.031***	0.016***	0.005	0.010	0.020**	0.017***	0.015**	0.011*
	(3.41)	(3.07)	(0.73)	(1.44)	(2.12)	(2.98)	(2.41)	(1.79)
SIZE	-0.029	-0.008	-0.026**	0.014	-0.034**	0.019	-0.021	-0.008
	-(1.49)	-(0.46)	-(2.04)	(0.69)	(-2.04)	(1.26)	(-1.48)	(-0.48)
CFO	-0.009	-0.021	0.135***	-0.023	-0.052	-0.045	0.207***	0.025
	-(0.13)	-(0.41)	(2.72)	-(0.27)	(-0.79)	(-0.91)	(3.96)	(0.34)
NWC	-0.297***	-0.368***	-0.317***	-0.548***	-0.348***	-0.422***	-0.259***	-0.436***
	-(5.41)	-(5.47)	-(4.20)	-(5.18)	(-5.45)	(-5.23)	(-3.22)	(-5.91)
LEV	-0.04	-0.176***	-0.025	-0.114**	-0.088**	-0.199***	0.024	-0.103**
	-(0.97)	-(4.85)	-(0.61)	-(2.12)	(-2.48)	(-4.87)	(0.47)	(-2.02)
SIGMA	1.617	1.574**	1.048	-0.475	1.151	1.297*	1.359***	-0.034
	(1.59)	(2.55)	(1.43)	-(0.61)	(1.24)	(1.90)	(2.28)	(-0.04)
NSEG	-0.001	0.000	-0.003	-0.001	-0.001	-0.001	-0.002	0.001
	-(0.47)	-(0.04)	-(1.38)	-(0.43)	(-0.62)	(-0.71)	(-1.46)	(0.26)
AGE	-0.109**	0.003	-0.062**	-0.065**	-0.094**	-0.019	-0.087***	-0.065**
	-(2.25)	(0.14)	-(2.39)	-(2.03)	(-2.03)	(-0.70)	(-2.88)	(-2.15)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.243	0.181	0.175	0.173	0.266	0.204	0.159	0.138
N	658	674	656	658	680	688	651	667

Note:

The dependent variable is *CASH*, defined as the ratio of cash and cash equivalent to total assets. *Q* is Tobin's Q, *SIZE* is natural logarithm of total assets, *CFO* is operating cash flow scaled by total assets. *NWC* is net working capital scaled by total assets. *LEV* is the sum of long-term and short-term debts scaled by total assets. *SIGMA* is industry volatility of cash flow, *NSEG* is the number of business segments, and *AGE* is firm age. *XINV* is defined as the residual term from the following annual regression estimated with each industry based on the 48 classification in Fama and French (1997). $INV_t = a + b_1Q_{t-1} + b_2Q_{t-1}*QTR2 + b_3Q_{t-1}*QTR3 + b_4Q_{t-1}*QTR4 + b_5CFO_t + b_6GRW_{t-1} + b_7INV_{t-1} + e_t$. We follow McNichols and Stubben (2008) and define *INV* as capital expenditure scaled by lagged net property, plant and equipment. *GRW* is the natural logarithm of assets growth rate. *QTR2*, *QTR3*, and *QTR4* are indicator variables equal to one if Q_{t-1} is in the 2nd, 3rd, and 4th quartile within the industry, and zero otherwise. *DECREAE_XINV* is defined as the mean *XINV* over years -3 to -1 minus the mean *XINV* over years +1 to +3. *t*-statistics (in parentheses) and *p*-values (in brackets) are based on standard errors adjusted for clustering at both the matched pair and year levels, with the regressions of the restatement and control samples estimated simultaneously. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 5. Precautionary saving demand and the effect of irregularity restatements on cash holdings

Panel A: Results of partitioned regression based on composite measure PS_DEMAND

	High *PS_DEMAND*		Low *PS_DEMAND*	
	Irregularity firms	Control firms	Irregularity firms	Control firms
Variable	[1]	[2]	[3]	[4]
POST	**0.070*****	0.006	**0.029*****	0.013
	(4.27)	(0.65)	**(2.98)**	(1.32)
Q	0.023***	0.009*	0.003	0.018**
	(2.96)	(1.93)	(0.40)	(2.47)
SIZE	-0.040***	-0.012	-0.024*	0.025
	(-2.65)	(-0.72)	(-1.90)	(1.45)
CFO	0.052	0.009	0.083*	-0.035
	(0.79)	(0.17)	(1.85)	(-0.36)
NWC	-0.295***	-0.450***	-0.270***	-0.422***
	(-3.46)	(-6.81)	(-3.32)	(-5.01)
LEV	-0.033	-0.153***	-0.058	-0.125**
	(-0.83)	(-3.29)	(-1.54)	(-2.00)
SIGMA	1.946*	0.261	0.906	1.270**
	(1.68)	(0.32)	(1.47)	(2.39)
NSEG	-0.001	-0.003	-0.003**	0.001
	(-0.56)	(-1.25)	(-2.07)	(0.81)
AGE	-0.113***	-0.028	-0.030	-0.053**
	(-2.67)	(-1.22)	(-1.20)	(-2.28)
Firm fixed effects	YES	YES	YES	YES
Adjusted. R^2	0.193	0.135	0.19	0.234
N	689	713	702	721

Panel B: Hypothesis test based on composite measure PS_DEMAND

Coefficient and (*t*-stat) of *POST* in each subsample	Partitioned by *PS_DEMAND*		Difference (High – Low) [*p*-value]
	High	Low	
Irregularity firms (R)	**0.070*****	**0.029*****	**0.041****
	(4.26)	**(2.97)**	**[0.024]**
	N=689	N=702	
Control firms (C)	0.006	0.013	-0.007
	(0.64)	(1.32)	[0.607]
	N=713	N=721	
Difference (R – C)	**0.064*****	0.016	**0.048****
[*p*-value]	**[0.001]**	[0.226]	**[0.031]**

Panel C: Hypothesis tests using individual measure of precautionary saving demand

Coefficient and (*t*-stat) of *POST* in each subsample	Partitioned by *IND_STDCFO*		Difference (High – Low) [*p*-value]
	High	Low	
Irregularity firms (R)	**0.048***** **(3.70)** N=698	**0.041***** **(3.44)** N=693	0.007 [0.661]
Control firms (C)	0.007 (0.74) N=718	0.014 (1.56) N=716	-0.007 [0.609]
Difference (R – C) [*p*-value]	**0.041***** **[0.009]**	**0.027*** **[0.077]**	0.013 [0.525]

Coefficient and (*t*-stat) of *POST* in each subsample	Partitioned by *IND_STDQ*		Difference (High – Low) [*p*-value]
	High	Low	
Irregularity firms (R)	**0.071***** **(4.50)** N=692	**0.028***** **(2.94)** N=699	**0.043**** **[0.016]**
Control firms (C)	0.013 (1.22) N=713	0.011 (1.20) N=721	0.002 [0.854]
Difference (R – C) [*p*-value]	**0.058***** **[0.003]**	0.017 [0.134]	**0.041*** **[0.057]**

Coefficient and (*t*-stat) of *POST* in each subsample	Partitioned by *NEG_IND_CORR*		Difference (High – Low) [*p*-value]
	High	Low	
Irregularity firms (R)	**0.060***** **(4.04)** N=714	**0.034***** **(3.43)** N=677	0.026 [0.145]
Control firms (C)	0.008 (0.94) N=731	**0.015*** **(1.80)** N=703	-0.007 [0.548]
Difference (R – C) [*p*-value]	**0.052***** **[0.003]**	0.019 [0.132]	0.033 [0.132]

Note:
The dependent variable is *CASH*, defined as the ratio of cash and cash equivalent to total assets. *Q* is Tobin's Q, *SIZE* is natural logarithm of total assets, *CFO* is operating cash flow scaled by total assets. *NWC* is net working capital scaled by total assets. *LEV* is sum of long-term and short-term debts scaled by total assets. *SIGMA* is industry volatility of cash flow, *NSEG* is number of business segments, and *AGE* is firm age. *IND_STDCFO* is standard deviation of industry (based on Fama and French 48 industry classification) median operating cash flows. *IND_STDQ* is standard deviation of industry median Tobin's Q. *NEG_IND_CORR* is the negative correlation between industry median operating cash flows and industry median Tobin's Q. *PS_DEMAND* is mean value of the percentile ranks of *IND_STDCFO*, *IND_STDQ*, and *NEG_IND_CORR*. *t*-statistics (in parentheses) and *p*-values (in brackets) are based on standard errors adjusted for clustering at both the matched pair and year levels, with the regressions of the restatement and control samples estimated simultaneously. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 6. Controlling for the effects of lines of credit

			Partitioned by *PS_DEMAND*			
	All irregularity restatements		High		Low	
	Irregularity firms [1]	Control firms [2]	Irregularity firms [3]	Control firms [4]	Irregularity firms [5]	Control firms [6]
POST	**0.038*****	0.009	**0.064*****	0.007	**0.018****	0.005
	(4.53)	(1.33)	**(4.12)**	(0.75)	**(2.04)**	(0.60)
Test of difference in the coefficient of *POST*						
	[1]−[2]		[3]−[4]		[5]−[6]	
Coefficient difference	**0.029*****		**0.057*****		0.013	
[*p*-value]	**[0.005]**		**[0.002]**		[0.269]	
Control variables						
Q	0.017**	0.014***	0.022***	0.013**	0.002	0.013*
	(2.40)	(3.55)	(2.59)	(2.47)	(0.25)	(1.86)
SIZE	-0.041***	0.000	-0.048***	-0.014	-0.023*	0.035**
	(-3.69)	(0.02)	(-3.48)	(-0.80)	(-1.78)	(1.98)
CFO	0.072	0.028	0.067	0.058	0.076	-0.036
	(1.43)	(0.56)	(0.96)	(1.06)	(1.45)	(-0.40)
NWC	-0.303***	-0.440***	-0.318***	-0.448***	-0.290***	-0.456***
	(-5.50)	(-7.64)	(-3.64)	(-6.51)	(-3.86)	(-5.43)
LEV	-0.054*	-0.153***	-0.039	-0.132***	-0.062	-0.196***
	(-1.84)	(-5.91)	(-0.98)	(-3.24)	(-1.59)	(-5.23)
SIGMA	1.265*	0.676	1.546	0.103	1.052	1.385***
	(1.77)	(1.39)	(1.28)	(0.13)	(1.65)	(3.10)
NSEG	-0.001	-0.001	0.000	-0.003	-0.003*	0.001
	(-0.86)	(-0.56)	(0.02)	(-1.24)	(-1.92)	(0.43)
AGE	-0.048*	-0.029	-0.093**	-0.022	-0.001	-0.053**
	(-1.88)	(-1.61)	(-2.46)	(-0.88)	(-0.04)	(-2.17)
UNLC	-0.179***	-0.167***	-0.224***	-0.181**	-0.136***	-0.132***
	(-3.96)	(-4.31)	(-2.59)	(-2.37)	(-2.90)	(-3.59)
Firm fixed effects	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.198	0.195	0.211	0.151	0.220	0.315
N	1345	1363	672	680	673	683

Note:

The dependent variable is *CASH*, defined as the ratio of cash and cash equivalent to total assets. *Q* is Tobin's Q, *SIZE* is natural logarithm of total assets, *CFO* is operating cash flow scaled by total assets. *NWC* is net working capital scaled by total assets. *LEV* is the sum of long-term and short-term debts scaled by total assets. *SIGMA* is industry volatility of cash flow, *NSEG* is number of business segments, and *AGE* is firm age. *UNLC* is unused lines of credit scaled by total assets. *IND_STDCFO* is standard deviation of industry (based on Fama and French 48 industry classification) median operating cash flows. *IND_STDQ* is standard deviation of industry median Tobin's Q. *NEG_IND_CORR* is the negative correlation between industry median operating cash flows and industry median Tobin's Q. *PS_DEMAND* is mean value of the percentile ranks of *IND_STDCFO*, *IND_STDQ*, and *NEG_IND_CORR*. *t*-statistics (in parentheses) and *p*-values (in brackets) are based on standard errors adjusted for clustering at both the matched pair and year levels, with the regressions of the restatement and control samples estimated simultaneously. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 7. Placebo tests

	Pseudo event year (T years before the actual restatement year)					
	T=2	T=3	T=4	T=5	T=6	T=7
Panel A: Average effect of the pseudo restatement event (*repeat columns 5 and 6 of Panel A of Table 3*)						
The coefficient of *POST* for the irregularity firms (*R*)	0.006	0.005	0.011	0.015*	0.006	**-0.013***
	(0.75)	(0.63)	(1.32)	(1.66)	(0.67)	**(-1.84)**
The coefficient of *POST* for the control firms (*C*)	0.007	0.001	-0.001	-0.004	-0.008	-0.002
	(0.98)	(0.15)	(-0.11)	(-0.62)	(-0.77)	(-0.21)
Test of the difference (*R* – *C*)						
Coefficient difference	-0.001	0.004	0.012	**0.019***	0.014	-0.015
[*p*-value]	[0.892]	[0.765]	[0.159]	**[0.060]**	[0.172]	[0.391]
Panel B: The effect of the pseudo restatement event for the firms with high PS_DEMAND (*repeat columns 1 and 2 of Panel A of Table 5*)						
The coefficient of *POST* for the irregularity firms (*R*)	-0.015	-0.007	0.008	0.023	**0.024***	-0.003
	(-1.03)	(-0.32)	(0.42)	(1.48)	**(1.82)**	(-0.12)
The coefficient of *POST* for the control firms (*C*)	0.014	-0.002	0.004	0.009	0.000	0.008
	(1.35)	(-0.06)	(0.22)	(0.53)	(0.03)	(0.38)
Test of the difference (*R* – *C*)						
Coefficient difference	**-0.029***	-0.005	0.004	0.014	0.024	-0.011
[*p*-value]	**[0.067]**	[0.817]	[0.846]	[0.541]	[0.172]	[0.702]
Panel C: The effect of the pseudo restatement event for the firms with low PS_DEMAND (*repeat columns 3 and 4 of Panel A of Table 5*)						
The coefficient of *POST* for the irregularity firms (*R*)	0.013*	0.011	0.009	0.001	0.000	**-0.013****
	(1.26)	(1.28)	(0.96)	(0.11)	(-0.05)	**(-2.24)**
The coefficient of *POST* for the control firms (*C*)	0.003	0.005	-0.001	-0.011	-0.011	-0.010
	(0.41)	(0.40)	(-0.09)	(-1.40)	(-1.09)	(-1.83)
Test of the difference (*R* – *C*)						
Coefficient difference	0.010	0.006	0.010	-0.012	0.011	0.003
[*p*-value]	[0.555]	[0.644]	[0.416]	[0.313]	[0.283]	[0.848]

Note:
This table shows the key results of testing the change in cash holdings after a pseudo restatement event. In particular, for each matched pair of irregularity firm and control firm, we set the fiscal year *T* years prior to the actual restatement year as the pseudo restatement year (*T* = 2 to 7). The pseudo restatement sample includes the observations between three years before and three years after the pseudo restatement year, but not the observations in the pseudo restatement year. We repeat the tests in Tables 3 to 4 using the pseudo restatement sample. *t*-statistics (in parentheses) and *p*-values (in brackets) are based on standard errors adjusted for clustering at both the matched pair and year levels, with the regressions of the restatement and control samples estimated simultaneously. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 8. Partition the sample based on CEO/CFO turnover after the restatements

	Irregularity restatements *with* CEO/CFO replacement till year +1		Irregularity restatements *without* CEO/CFO replacement till year +1	
	Irregularity firms [1]	Control firms [2]	Irregularity firms [3]	Control firms [4]
POST	**0.041****	0.017	**0.049*****	0.010
	(2.51)	(1.60)	**(4.15)**	(1.43)
Test of difference in the coefficient of *POST*				
	[1]−[2]		[3]−[4]	
Coefficient difference	0.024		**0.038*****	
[*p*-value]	[0.259]		**[0.005]**	
Control variables				
Q	0.018**	0.012*	0.016*	0.016***
	(2.38)	(1.85)	(1.85)	(3.48)
SIZE	-0.048***	0.011	-0.026*	-0.002
	(-2.78)	(0.51)	(-1.81)	(-0.14)
CFO	0.023	-0.141**	0.122	0.105*
	(0.52)	(-2.34)	(1.18)	(1.84)
NWC	-0.334***	-0.514***	-0.230***	-0.386***
	(-4.64)	(-5.62)	(-3.11)	(-7.11)
LEV	-0.056	-0.237***	-0.039	-0.054
	(-1.29)	(-3.97)	(-1.07)	(-1.02)
SIGMA	1.268	1.59	1.467	0.556
	(1.39)	(1.59)	(1.61)	(0.90)
NSEG	0.000	0.001	-0.003**	-0.001
	(-0.17)	(0.52)	(-2.22)	(-0.61)
AGE	-0.06	-0.045	-0.071*	-0.042*
	(-1.23)	(-1.29)	(-1.84)	(-1.88)
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.215	0.233	0.160	0.149
N	527	537	847	884

Note:
The dependent variable is *CASH*, defined as the ratio of cash and cash equivalent to total assets. *Q* is Tobin's Q, *SIZE* is natural logarithm of total assets, *CFO* is operating cash flow scaled by total assets. *NWC* is net working capital scaled by total assets. *LEV* is the sum of long-term and short-term debts scaled by total assets. *SIGMA* is industry volatility of cash flow, *NSEG* is the number of business segments, and *AGE* is firm age. *t*-statistics (in parentheses) and *p*-values (in brackets) are based on standard errors adjusted for clustering at both the matched pair and year levels, with the regressions of the restatement and control samples estimated simultaneously. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 9. Irregularity restatements and the financial decisions

	Irregularity firms [1]	Control firms [2]	Difference ([1]−[2]) [*p*-value]
Panel A: Investment			
$CAPXACQ_{i,t} = \alpha_i + \beta_1 EXCASH_{i,t-1} + \beta_2 POST_{i,t} + \beta_3 POST_{i,t}*EXCASH_{i,t-1} + CONTROL + e_{i,t}$			
$POST_{i,t} \times EXCASH_{i,t-1}$	**0.092** **(1.48)**	-0.062 (-1.23)	**0.154*** **[0.057]**
Control variables and firm fixed effects	YES	YES	
Panel B: Payouts			
$PAYOUT_{i,t} = \alpha_i + \beta_1 EXCASH_{i,t-1} + \beta_2 POST_{i,t} + \beta_3 POST_{i,t}*EXCASH_{i,t-1} + CONTROL + e_{i,t}$			
$POST_{i,t} \times EXCASH_{i,t-1}$	**0.063***** **(2.82)**	-0.003 (-0.12)	**0.066**** **[0.040]**
Control variables and firm fixed effects	YES	YES	

Note:

CAPXACQ is net capital expenditure plus acquisition (*#CAPX – #SPPE + #AQC*) and *PAYOUT* is the sum of cash dividends (*#DV*) and repurchase (*#PRSTKC*). Both variables are scaled by lagged total assets (*#AT*). Control variables (*CONTROL*) include Tobin's Q (*Q*), the natural logarithm of total asset (*SIZE*), operating cash flow scaled by lagged total assets (*CFO*), and the sum of long-term and short-term debts scaled by total assets (*LEV*). *POST* is a dummy variable that equals one for the post-restatement period, and zero otherwise. *EXCASH* is residual value of annual regressions of *CASH* on *Q*, *SIZE*, *CFO*, *NWC*, *LEV*, *SIGMA*, *NSEG*, *AGE* (see the note to Table 3 for definition) and industry fixed effects using all non-financial firms in Compustat. *t*-statistics (in parentheses) and *p*-values (in brackets) are based on standard errors adjusted for clustering at both the matched pair and year levels, with the regressions of the restatement and control samples estimated simultaneously. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 10. Change in the market value of cash holdings after irregularity restatements

	Include all observations		Exclude observations identified as having material weaknesses in internal control system	
Variable	Irregularity firms [1]	Control firms [2]	Irregularity firms [3]	Control firms [4]
$POST_{i,t}$	0.015	-0.040	0.017	-0.040
	(0.44)	-(1.59)	(0.46)	-(1.56)
$\Delta CASH_{i,t}$	2.301***	1.826***	2.514***	1.793***
	(3.98)	(5.84)	(5.25)	(5.62)
$\Delta CASH_{i,t} \times POST_{i,t}$	**0.397**	**-0.458***	**0.476***	**-0.415**
	(1.57)	**-(1.67)**	**(1.65)**	**-(1.36)**
Test of difference in the coefficient of $\Delta CASH_{i,t} \times POST_{i,t}$				
	[1]−[2]		[3]−[4]	
Coefficient difference	**0.855*** **		**0.891*** **	
[*p*-value]	**[0.002]**		**[0.003]**	
Control variables				
$\Delta E_{i,t}$	0.539***	0.826***	0.514***	0.824***
	(4.16)	(5.06)	(3.87)	(5.06)
$\Delta NA_{i,t}$	0.172***	0.231***	0.152**	0.225***
	(2.64)	(3.59)	(2.38)	(3.47)
$\Delta RD_{i,t}$	0.187	-0.585	0.259	-0.515
	(0.15)	-(1.63)	(0.22)	-(1.44)
$\Delta I_{i,t}$	-3.426***	-2.317***	-3.437***	-2.216***
	-(3.76)	-(3.54)	-(3.23)	-(3.36)
$\Delta D_{i,t}$	-3.526	1.973	-2.258	1.827
	-(1.09)	(0.65)	-(0.62)	(0.57)
$NF_{i,t}$	-0.211*	-0.132	-0.251**	-0.131
	-(1.92)	-(1.29)	-(2.29)	-(1.26)
$CASH_{i,t-1}$	0.766***	0.448***	0.779***	0.489***
	(6.42)	(3.31)	(6.77)	(3.70)
$L_{i,t}$	-0.403***	-0.383***	-0.397***	-0.387***
	-(3.00)	-(3.87)	-(2.76)	-(3.86)
$\Delta CASH_{i,t} \times CASH_{i,t-1}$	-0.846*	-0.371	-1.063***	-0.196
	-(1.95)	-(0.97)	-(2.63)	-(0.57)
$\Delta CASH_{i,t} \times L_{i,t}$	-2.344***	-2.153***	-2.474***	-2.200***
	-(3.77)	-(3.61)	-(4.44)	-(3.78)
Adjusted R^2	0.244	0.194	0.249	0.195
N	1095	1309	991	1281

Note: The dependent variable is $R–R^B$, where R is stock return over the fiscal year, and R^B is the benchmark portfolio returns over the same period. We use the 25 Fama and French portfolios formed on size and book-to-market as the benchmark portfolio. *ΔCASH* is change in cash and short-term investment. *ΔE* is change in earnings, where earnings is defined as earnings before extraordinary items (*#IB*) plus interest expense (*#XINT*), deferred taxes (*#TXDI*) and investment tax credit (*#ITCI*). *ΔNA* is change in non-cash assets (*#AT – #CHE*). *ΔRD* is change in *R&D* expenditures (*#XRD*), *ΔI* is change in interest expenses (*#XINT*), *ΔD* is change in dividends (*#DVC*). *L* is total debt, defined as the sum of long-term debt (*#DLTT*) and short-term debt (*#DLC*). *NF* is net external financing, defined as total equity issuance (*SSTK*), minus repurchases (*PRSTKC*), plus debt issuance (*DLTIS*), and minus debt redemption (*DLTR*). All the above independent variables are scaled by the lagged market value of equity. *POST* is a dummy variable that equals one for the post-restatement period, and zero otherwise. *t*-statistics (in parentheses) and *p*-values (in brackets) are based on standard errors adjusted for clustering at both the matched pair and year levels, with the regressions of the

restatement and control samples estimated simultaneously. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.