CONSEQUENCES OF REAL EARNINGS MANAGEMENT AND WEAK CORPORATE GOVERNANCE: EVIDENCE FROM CASH HOLDINGS

by

Adam J. Greiner

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This dissertation was prepared under the direction of the candidate's dissertation advisor, Dr. Mark Kohlbeck, School of Accounting, and has been approved by the members of his supervisory committee. It was submitted to the faculty of the College of Business and was accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

SUPERVISORY COMMITTEE:

Mark Kohlbeck, Ph.D.
Dissertation Chair

Roy Clemons, Ph.D.

Maya Thevenot, Ph.D.

Ky-Hyang Yuhn, Ph.D.

Kimberly Dunn, Ph.D.
Director, School of Accounting

Somnath Bhattacharya, Ph.D.
Interim Dean, College of Business

Barry T. Rosson, Ph.D.
Dean, Graduate College

April 4, 2013
Date

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ABSTRACT

Author: Adam J. Greiner

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I examine the impact of real earnings management (REM) and corporate governance on cash holdings. Extant research documents an increase in both cash holdings and REM activity in recent years and shows that agency conflicts influence both the levels and valuations of cash holdings. Motivated by agency problems of REM and Jensen's (1986) arguments concerning the free cash flow problem, I investigate whether opportunistic asset sales and reductions in discretionary expenditures are associated with levels and valuations of cash holdings. Prior research also shows that strong corporate governance mitigates opportunistic earnings management behavior and enhances the valuation of cash holdings. Using empirical models from prior research, I document that REM is positively associated with cash holdings, investors discount cash holdings of high REM firms, and, among high REM firms, valuations of cash holdings of weak corporate governance firms are discounted significantly lower relative to those of strong corporate

governance firms. My study unites two lines of research by incorporating agency problems concerning REM with levels and valuations of cash holdings.

DEDICATION

To Mom and Dad

CONSEQUENCES OF REAL EARNINGS MANAGEMENT AND WEAK CORPORATE GOVERNANCE: EVIDENCE FROM CASH HOLDINGS

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CHAPTER 1: INTRODUCTION

The rise in cash holdings is a popular issue among the media and academics. For example, a recent article in *The Wall Street Journal* points out that "Companies are basically earning more [cash] than ever before….they're holding their cash really tight."[1] Empirical evidence in Bates et al. (2009) is consistent with this claim, indicating that firms are hoarding cash at unprecedented levels. Hence, cash holdings attract attention due to circumstances leading firms to hold too much cash and managers' discretion in timing cash outlays. Motivated by Jensen's (1986) arguments concerning the free cash flow problem, recent research explores whether agency conflicts contribute to higher levels of cash holdings and their effect on the valuation of cash.

Meanwhile, an increase in real earnings management (REM) behavior has gained attention as an agency problem. REM becomes costly as managers alter underlying operations that directly affect cash flows to mask true firm performance to meet financial reporting and contracting objectives (see e.g., Cohen et al. 2008; Cohen and Zarowin 2010; Zang 2012).[2] Therefore, an analysis of opportunistic REM behavior can add to our understanding of relations between agency conflicts and cash holdings. In order to mitigate agency conflicts, firms employ governance structures to reduce managers'

[1] Jason Zweig, "What Will It Take for Companies to Unlock Their Cash Hoards?" *The Wall Street Journal*, May 28, 2011, p.B1.
[2] REM is not disallowed by accounting standards.

inefficient use of cash. To investigate how REM and corporate governance influence cash holdings, I ask two main questions: (i) How do REM activities influence the levels and valuations of cash holdings?, (ii) Does the valuation of cash holdings in conjunction with REM vary based on firms' corporate governance quality?

Evidence on relations between agency conflicts and levels of cash holdings is mixed. Addressing concerns related to accruals-based earnings management and information asymmetry, Sun et al. (2012) report that poor earnings quality drives managers to hold more cash in order to avoid costly external funding. Harford et al. (2008) find that poorly governed firms hold less cash and managers spend more on acquisitions and capital expenditures and less on research and development.[3] Alternatively, Bates et al. (2009) provide evidence inconsistent with the notion that agency concerns are associated with higher cash holdings and recommend researchers consider other proxies of agency conflicts to explore potential explanations. These studies do not consider REM, which, according to survey responses in Graham et al. (2005), CFOs pursue to meet earnings objectives. They document that managers believe outsiders focus more on short-term earnings than on cash flows and therefore are willing to face unintended consequences of REM. These studies indicate that REM behavior presents an opportunity to examine a relevant and timely agency problem that involves cash holdings.

In light of concerns about levels of cash holdings, it seems that REM also influences the valuation of cash. Jensen and Meckling (1976) point out that an

[3] This finding is interesting in the context of my study given that only expenditures for research and development immediately reduce current earnings.

underlying role of accounting is to align managers' and shareholders' interests to reduce information asymmetry and restrict managers' non-value maximizing behavior. However, when self-interested managers engage in suboptimal behavior and take advantage of accounting treatments for certain transactions, investors often suffer the consequences (Cohen and Zarowin 2010). Richardson (2000) identifies corporate environments susceptible to earnings manipulation and shows that earnings management activity is most prevalent among firms with high information asymmetry. Drobetz et al. (2010) show that high information asymmetry firms incur substantial valuation discounts on their cash holdings, a sign that managers tend to waste free cash flow. Meanwhile, other studies show that income increasing behavior is managers' response to market incentives driven by meeting earnings benchmarks (see e.g., Holthausen et al. 1995; Burgstahler and Dichev 1997; Barth et al. 1999; Roychowdhury 2006). Given that REM influences information asymmetry, the valuation of cash holdings may be impacted as investors assess the future use of cash based on potential implications of opportunistic management behavior. On average, to the extent that REM indicates opportunistic behavior, investors will perceive inefficient use of resources and discount cash holdings accordingly. Therefore, I expect discounts on cash valuations to be most prominent with income increasing REM activities.

While information asymmetry explains valuations of cash, Dittmar and Mahrt-Smith (2007) document that valuations of cash are higher among firms with strong governance. Their evidence suggests that strong monitoring mechanisms have a positive influence on investors' expectations such that cash holdings will be used efficiently (i.e.

allocated towards value-maximizing investments and/or managed carefully). Bushman and Smith (2001) argue a firm's governance structure also affects managerial decision-making and serves as an additional layer of management oversight through monitoring the financial reporting process and ensuring optimal allocation of resources. Empirical evidence of Xie et al. (2003) shows that high quality corporate governance is able to constrain earnings management behavior. Further, Barth and Taylor (2010) assert that earnings management activities vary with corporate governance quality and indicate an agency problem because managers are able to extract rents from shareholders. Therefore, limiting managers' expropriation of a firm's assets can improve its economic performance. Because altering actual transactions directly affects cash flows, investors likely differentiate their valuation of cash in conjunction with both REM and the firm's corporate governance quality.

Beginning with a sample of firms in Compustat from 1988 to 2011, I first investigate my prediction that REM activities contribute to firms' cash holdings. Augmenting the model of Opler et al. (1999) that predicts a firm's optimal level of cash holdings with proxies for REM (see e.g., Roychowdhury 2006; Gunny 2010) and controlling for accrual-based earnings management, I predict and find that opportunistic asset sales and reductions in discretionary expenditures contribute to higher cash holdings. Additional analysis indicates a differential impact of REM on cash holdings among firms with higher incentives to manage earnings. These findings suggest that agency problems concerning REM have unintended consequences such that firms' cash holdings to deviate from optimal levels.

The valuation of cash holdings is then analyzed. First, I employ the Fama and French (1998) firm valuation model to assess the effect of REM on the valuation of cash holdings. Given that REM activities indicate a propensity for managers to pursue their own interests, I show that income increasing REM firms have lower valuations on cash than income decreasing ones. Economically, the valuation of cash holdings is discounted by almost half when firms aggressively pursue REM.

Second, evidence of a potential monitoring effect motivates my analysis of whether corporate governance affects the relationship between cash valuations and REM behavior. I predict that strong corporate governance mitigates investors' concerns that cash holdings are prone to value destruction even when REM is high. To investigate this hypothesis, I use the corporate governance index developed by Gompers et al. (2003) (hereafter Gompers' index) to separate my sample into strong and weak corporate governance firms. The empirical results suggest that strong corporate governance alleviates investors' concerns that opportunistic REM indicates future cash outlays towards value destroying investments. Moreover, opportunistic REM among firms with weak corporate governance leads to a substantially discounted valuations on cash, consistent with investors' expectations that REM behavior can indicate a severe misallocation of resources.

To assess the validity of my findings, I subject my main analyses to a number of sensitivity tests that involve an alternative methodology for measuring cash holdings and other potential control variables. Specifically, I focus on suboptimal levels of cash and apply the excess cash methodology from extant literature to my empirical tests regarding

levels and valuations of cash, finding nearly identical results. The main results are also robust to the inclusion of other control variables observed in the literature.

An examination of potential unintended consequences of REM with respect to cash holdings captures a tension that managers face in deciding whether to manage earnings to meet their objectives. To my knowledge, this study is the first to empirically test how REM activities impact cash holdings. I therefore seek to fill a gap in the literature by exploring how agency concerns involving REM influence the levels and valuations of cash holdings. My study contributes to prior research in at least four ways.

First, my study provides evidence of associations between cash holdings and agency problems stemming from REM activities. While prior research notes that monitoring managers reduces opportunistic behavior, evidence in my study arms corporate governance committees with additional motivations to minimize REM behavior. Specifically, higher excess cash holdings and discounts on the valuation of cash holdings are two unintended consequences of managers' efforts to manipulate earnings asset sales and cut discretionary expenditures.

Second, decomposing the effect of agency problems on cash holdings into different dimensions of earnings management behavior enables researchers to further differentiate costs of accruals-based earnings management and REM. In particular, Zang (2012) documents a negative relation between accruals-based earnings management and REM, providing evidence of a trade-off between the two earnings management methods.[4] Her results indicate that managers assess the relative costs of both discretionary accruals

[4] Exploiting the fact that REM activities must occur before year-end while accruals can be manipulated subsequent to year-end, Zang (2012) also shows that managers substitute between the two approaches: higher (lower) REM is offset by lower (higher) accrual manipulations.

and REM, choosing the combination with the lowest cost to the firm. My study adds to the costs of opportunistic REM behavior to consider in future research and broadens the scope of factors that managers need to evaluate in their trade off decisions.

Third, my study will also interest standard setters. In examining REM and cash holdings, my study offers additional implications of convergence efforts and the movement toward fair value accounting. The International Accounting Standard (IAS) No. 38 permits separate treatment for research activities and development activities. Under this standard, research activities are expensed as incurred and certain development costs are capitalized. Therefore, managers may not reduce development expenditures in REM efforts. As for fair value accounting, Black et al. (1998) show that firms in countries allowing revaluation of fixed assets have less incentive to sell assets at a gain to manage earnings. REM activities examined in my study contribute to higher levels of cash and discounts on valuations of cash, thus, adoption of IAS in the U.S. may help reduce related agency problems.

Finally, evidence of the impact of REM on the firm is limited relative to the number of studies that examine accrual-based earnings management. My study therefore addresses Roychowdhury's (2006) call for future research to investigate how the market interprets current and future implications of REM activities.

The remainder of my study is organized as follows. Chapter 2 provides a review of related literature. Chapter 3 discusses related theory and develops my hypotheses. In Chapter 4, I outline estimation and empirical models for hypotheses testing. Chapter 5 discusses sample selection procedures and estimation of REM measures. Chapter 6 and

Chapter 7 present descriptive statistics and empirical results concerning my three hypotheses. Chapter 8 offers concluding remarks.

CHAPTER 2: LITERATURE REVIEW

My study unites several research streams. First, I discuss earnings management behaviors pertaining to the manipulation of real transactions. I then review literature relevant to my investigation of levels and values of cash holdings. Finally, I discuss prior research on corporate governance as it relates to earnings management activities and cash holdings.

2.1 Real earnings management

Schipper (1989) argues that managers make subjective judgments to manage earnings and other objectives using accounting estimates and real business activities. Real activities manipulation of earnings include opportunistic sales of assets, reductions in research and development (R&D), selling, general, and administrative (SG&A), and advertising expenditures, and overproduction of inventory to lower reported cost of goods sold (see e.g., Bartov 1993; Roychowdhury 2006; Gunny 2010). In contrast to accrual-based earnings management, REM activities must occur prior to the end of the reporting period in order to influence reported earnings.

A driving force for opportunistic behavior using REM approaches is the use of accounting information in contracting (i.e. bonus and debt contracts) and in outsiders' expectations about firm performance (i.e. earnings expectations of investors, creditors,

analysts and other interested parties). Ewert and Wagenhofer (2005) note that tighter accounting standards induce REM and provide analytical arguments suggesting that it is costly to the firm. Similarly, empirical results of Cohen et al. (2008) also suggest that REM is likely to be more costly than accrual-based earnings management. In a survey of over 400 chief financial officers of public companies, Graham et al. (2005) report that the choice of REM for manipulating earnings has become a preference among managers. They document that managers are willing to sacrifice economic value (i.e. forego positive net present value projects, sell revenue generating assets, and/or other value-enhancing activities) to meet earnings objectives. Graham et al. (2005) conjecture that scrutiny of accounting estimates following the accounting scandals such as Enron and WorldCom and the advent of the Sarbanes-Oxley Act (SOX) in 2002 has influenced managers' use of REM. These findings indicate why researchers have been motivated to explore the extent of agency problems involving REM and its potential for value-destroying behavior.

Accounting studies provide convincing evidence of opportunistic REM. Bartov (1993) explores motivations for gains on asset sales to test positive accounting theories (Watts and Zimmerman 1986) and finds that managers use these gains to meet earnings benchmarks for bonus purposes and leverage requirements of debt covenants. The results of Bartov (1993) are consistent with self-interested managers using gains from asset sales to achieve their objectives. Similarly, Herrmann et al. (2003) investigate asset sales by Japanese companies that are required to provide management earnings forecasts. Herrmann et al. (2003) find a negative association between income from asset sales and

the magnitude of forecast errors, providing evidence that managers sell assets to meet their forecasts.

Prior research has also shown that REM has become an attractive alternative to accrual-based earnings management since the passage of SOX. Cohen et al. (2008) show that REM has increased since the passage of SOX and accrual-based earnings management has decreased. Cohen et al. (2008) note that at least one explanation for this finding is that REM activities are in accordance with accounting standards and therefore are difficult for auditors to deter and to detect because they can be justified as legal business activities in response to economic conditions. Cohen and Zarowin (2010) find that managers engage in REM to increase income in anticipation of seasoned equity offerings, which were previously shown to be preceded primarily by periods of accrual manipulations (see e.g., Teoh et al. 1998; Rangan 1998). Moreover, Cohen and Zarowin (2010) also show that REM contributes to operating under-performance subsequent to seasoned equity offerings. In fact, their comparisons of economic significance show that REM activities have a greater negative effect on subsequent operating performance than accrual-based earnings management in the seasoned equity offerings environment. Coupled with Jensen's (2005) point that departures from optimal operational decisions are unlikely to result in higher long-term value, these findings draw concern about the extent to which REM impacts current and future cash flows and how investors interpret REM in terms of its reflection on management behavior.

Engaging in REM activities may be more convenient than manipulating accruals but motivations for undertaking both approaches are similar. Prior research documents

that managers have incentives to report steady and consistent trends of increasing earnings and shows earnings patterns reflective of managers' fixation on certain earnings thresholds. For instance, Barth et al. (1999) show that investors place a stock premium on firms with consecutive earnings increases and penalize firms that break an increasing earnings trend. Further, these findings are consistent with the work of Burgstahler and Dichev (1997) showing that cross-sectional distributions of earnings changes exhibit a discontinuity around zero - a majority of firms avoid losses and report earnings increases. More recently, Roychowdhury (2006) finds that the distributions of REM activities are consistent with firms avoiding losses and meeting/beating analysts' annual forecasts. Further, Bhojraj et al. (2009) show that both the long-run operating and stock performance of firms that beat analyst expectations using REM are worse than those of firms that miss analyst expectations without REM.[5] These results show that managers use REM to meet important earnings benchmarks and suggest that REM efforts to meet short-term objectives can lead to poor future performance.

Alternatively, prior research indicates that REM activities can be good for the firm. Gunny (2010) shows that REM activities allow for better future performance and signal current earnings that are more indicative of expected future earnings.[6] Exploiting differences in information asymmetry between two types of firms, Beatty and Harris (1999) show that public banks realize more securities gains (i.e. gains trading, a REM

[5] Bhojraj et al. (2009) use reductions in R&D and advertising expenditures as proxies for REM. They show similar results in tests using discretionary accruals as a proxy for earnings management.
[6] Taylor and Xu (2010) also demonstrate that high REM firms do not suffer from declines in future operating performance.

method used by financial institutions) than private banks.[7] They also find that REM can improve managers' signal of future performance, as indicated by current earnings with gains trading that are more positively associated with next period's earnings. Hence, REM likely improves firm value if it is pursued to reduce both information asymmetry and agency problems.[8]

These studies present a range of incentives and motivations that help explain why managers engage in REM and its influence on current and future performance. To date, most of the accounting research relates evidence of REM to contracting, audit quality, and earnings quality. Studies also address benefits and agency problems pertaining to REM, but do not link them to their impact on other aspects of managing a firm. To the extent that REM activities lead to other implications associated with cash holdings, extant research has ignored potential agency problems of REM.

2.2 Determinants of cash holdings

Prior literature concerning corporate capital structure generally focuses on theories about costs and benefits of levels of cash holdings (see e.g., Jensen 1986; Opler et al. 1999). Jensen (1986) argues that managers prefer cash holdings at levels above what is necessary to fund investments and operations. Alternatively , according to

[7] Beatty and Harris (1999) use evidence of Warfield et al. (1995) to motivate predictions that lower executive ownership increases information asymmetry between shareholders and management.
[8] Studies suggest that similar arguments can be made for accrual-based earnings management. Subramanyam (1996) provides evidence of a positive relation between stock returns and discretionary accruals, suggesting that earnings management proxies may not reflect opportunistic behavior, but managers' efforts to reduce information asymmetry. In a related study, Tucker and Zarowin (2006) show that firms that report smooth earnings using discretionary accruals enjoy a higher market response to their earnings (ERC), which also suggests that earnings management may be good for investors and the firm.

empirical evidence of Opler et al. (1999), because there are opportunity costs associated with holding too much cash, such as a low rate of return on liquid investments and double taxation, shareholders prefer additional dividend payments or share repurchases once cash accumulates beyond an optimal level. Prior research argues two different perspectives on this issue.

On the one hand, Myers and Majluf (1984) argue the pecking order model, which implies an adverse selection problem. Specifically, pecking order suggests managers accumulate cash in order to avoid raising external capital due to information asymmetry and forego positive investment opportunities if internal funds are lacking. On the other hand, Jensen (1986) contends that excessive cash holdings exhibit managers' preference for holding cash to pursue their own interests, presenting a moral hazard problem. These agency problems have motivated researchers to explore determinants of cash holdings in order to develop predictions of optimal levels of cash necessary to maximize shareholder wealth.

Opler et al. (1999) explore determinants of cash holdings to predict normal levels to explain characteristics of organizations susceptible to abnormal cash levels. They show that firms aim for certain amounts of cash, implying that firms do not systematically let cash balances fluctuate widely about their preferred levels.[9] However, Opler et al. (1999) lack clear evidence of associations between proxies for agency costs and cash holdings. Nonetheless, their research has derived a cash prediction model that

[9] First order autoregressive models estimating current year cash balances yield negative coefficients (i.e. the median of firm coefficients on prior year cash balances is negative). Hence, cash balances are mean reverting, suggesting firms have target levels of cash.

allows researchers to pursue other explanations for abnormal cash holdings and whether companies can mitigate related agency problems.

Bates et al. (2009) build on prior work exploring determinants of cash and investigate why corporate cash holdings have increased over time, expecting that agency problems have contributed to managers hoarding cash. Using management entrenchment, market valuation of cash, and the relation between cash and future growth in cash holdings, they are unable to directly link these agency problems to firms holding higher levels of cash. A substantial portion of the cross-sectional variation in cash holdings is not explained in their analyses, thus, it is plausible that other agency problems could explain the accumulation of cash holdings.

Extant research has further examined more detailed proxies of agency conflicts in search of additional evidence. Nikolov and Whited (2011) show that lower managerial ownership is a contributing factor to increasing cash levels over the last 20 years. Gao et al. (2012) provide evidence that entrenched managers hold less cash due to their preference to overinvest. A recent study by Sun et al. (2012) considers agency problems with respect to earnings quality as a possible determinant of cash holdings. In particular, they predict and show that information asymmetry arising from poor earnings quality, using accrual-based measures, leads firms to hold more cash, which is consistent with firms holding higher levels of cash in order to avoid external financing costs.[10]

To summarize, efforts in search of compelling evidence of higher cash holdings resulting from agency problems are mixed. This gap in the research provides an

[10] These results are consistent with Garcia-Teruel et al. (2009) who also investigate earnings quality and cash holdings in a small sample of Spanish firms.

opportunity to explore implications of managers' decisions pertaining to REM and to advance our understanding of management behavior as it relates to cash holdings.

2.3 Valuation of cash holdings

Cash holdings allow managers to finance operations and investments without obtaining external funding, enabling them to avoid transaction costs resulting from information asymmetries associated with accessing the capital markets. Internally generated liquidity therefore limits monitoring of cash outlays, providing managers flexibility to pursue their own interests. This environment has motivated researchers to analyze a number of frictions based on firm characteristics that influence the market's valuation of cash holdings.

Faulkender and Wang (2006) explore the influence of financial constraints on the marginal value of cash.[11] Among firms with favorable investment opportunities, they show financially constrained firms enjoy higher market values for marginal increases in cash than financially unconstrained firms. This finding supports predictions that the market rewards constrained firms for their ability to avoid costs of raising external funds and for having the funding capacity to invest in value-enhancing projects that may have otherwise been foregone absent of internal funds. The results of Faulkender and Wang (2006) also support previously documented agency problems of free cash flow whereby a

[11] Proxies for financial constraints include: payout ratio (measured as total common dividends plus repurchases/earnings), firm size (measures as total sales and total assets), long-term bond rating, and commercial paper rating.

marginal increase in cash among unconstrained firms is discounted by the market, implying that investors expect managers to squander cash.

Drobetz et al. (2010) investigate the relation between information asymmetry, as measured by the dispersion of analysts' earnings forecasts, and a valuation of cash. Their results confirm prior research showing negative consequences of free cash flow and suggest that cash holdings of high information asymmetry firms are deeply discounted.[12] This evidence reinforces the importance of finding more specific management characteristics that contribute to high information asymmetry environments and discounted valuations of cash holdings.

Mikkelson and Partch (2003) examine a matched sample of public companies and show that performance measures of firms with higher cash levels are either equal to or greater than those with lower levels of cash. Moreover, they find no evidence that managers' self-interests (i.e. maximization of personal wealth, specifically, incentive compensation packages) hinder performance among high cash firms, implying that such firms serve the profit maximizing interests of shareholders and do not exhibit agency conflicts.

In an accounting setting, Louis et al. (2012) investigate accounting conservatism and the valuation of cash holdings. By definition, accounting conservatism suggests early recognition of losses increases users' awareness of firm performance before potential violation of debt contracts but jeopardizes a manager's employment. A

[12] The free cash flow hypothesis (Jensen, 1986) implies that cash holdings of high information asymmetry firms create a moral hazard whereby outsiders are uncertain about how funds will be used. In contrast, pecking order theory (Myers and Majluf 1984) argues an adverse selection problem resulting in costly external financing, which motivates managers to hoard cash to avoid having to access capital markets as investment opportunities arise.

manager is therefore less likely to shirk and the incentive to undertake non-value maximizing projects for personal interests is reduced. Louis et al. (2012) predict and find that accounting conservatism enhances valuations of cash holdings by way of alleviating agency problems, suggesting management behavior can signal efficient use of cash holdings by providing timely information about losses. Their study provides a clear indication that managers' application of accounting principles influences valuations of cash holdings and implies that alternative measures of management behavior may also explain cash valuations.

Other accounting characteristics can impact the valuation of cash. Noting that poor earnings quality increases information asymmetry and cost of capital, Sun et al. (2012) provide evidence that poor accrual quality and earnings manipulation through discretionary accruals also reduces cash valuations.[13] Chen et al. (2012) utilize the statement of cash flows to analyze how firm valuations vary by the sources of cash. Specifically, they show that cash generated from operating activities is valued higher than cash from investing and financing activities, which is consistent with investors rewarding firms for profitability through normal operations. However, an increase in cash from operating activities from prior year is valued lower than increases in investing and financing activities, indicating that profitable firms experience higher agency costs when

[13] Sun et al. (2012) attribute the lower cash valuations among firms with poor earnings quality to investors' perceptions that existing cash holdings will be used inefficiently. While prior research supports claims that firms with undisciplined managers face agency costs, the work of Sun et al. (2012) lacks a direct link between manipulating earnings through discretionary accruals and inefficient deployment of cash holdings towards projects that reduce firm value.

cash is generated internally.[14] Collectively, these recent studies using accounting constructs in a cash holdings setting indicate there are opportunities to gain deeper insights into how managers' efforts to manipulate reported earnings impact the valuation of cash holdings.

To summarize, this stream of literature documents that firm characteristics signal to investors about how effectively managers will utilize cash holdings. These studies also indicate that improvements to a firm's overall operating environment can reduce negative implications of cash holdings. While a substantial amount of the literature focuses on proxies involving capital market variables, extant research examining proxies for management decision-making presents a promising avenue to expand our understanding of how the market values cash holdings.

2.4 Corporate governance

Costly monitoring ensures that managers can act in their own best interests given shareholders are unable to directly observe *all* management activities. A strong corporate governance structure however is at least one mechanism used to improve monitoring of managers to address agency problems within a firm. The corporate governance literature consists of research on the correlations between management, board of directors, audit committees, and external auditors and measures indicative of accounting quality in financial reporting.

[14] The result for cash from investing activities is consistent with the notion that asset sales may reflect strategic decisions of managers to improve efficiencies within the firm. The result for cash from financing activities suggests that managers may be comfortable with the additional monitoring that comes with generating cash externally and are optimistic about future prospects of the firm.

Dechow et al. (1996) document that firms investigated by the SEC for alleged violations of GAAP have weaker corporate governance structures than matched sample of control firms. Using a sample period that precedes the passage of SOX, Klein (2002) examines characteristics of the quality of audit committees and boards of directors and shows that those reflecting high quality are negatively associated with accrual-based earnings management. Vafaes (2005) finds that firms exhibiting higher earnings quality (i.e. lower likelihood of avoiding an earnings decline and/or negative earnings surprise) generally have characteristics of strong corporate governance. Evidence in these studies is consistent with assertions of Bushman and Smith (2001) and Lo (2008) who suggest that monitoring efforts are able to constrain earnings management and thus, influence the quality of information provided to investors through the financial reporting process.

Cohen et al. (2010) provide more recent evidence on the importance of corporate governance. Specifically, they report that auditors find corporate governance mechanisms to be more effective since the passage of SOX, noting that boards are more actively involved with management in company operations and financial reporting. However, Cohen et al. (2010) also report that corporate boards may still play a passive role when management has high influence over corporate boards, despite scrutiny following SOX.

Dittmar and Mahrt-Smith (2007) evaluate how the market values cash holdings relative to a firm's degree of corporate governance. They report that investor oversight and managerial entrenchment represent monitoring mechanisms that improve value and use of cash holdings. They find that the market values of cash holdings of poorly

governed firms at approximately half the value of those of well governed firms, suggesting that strong corporate governance can mitigate agency problems involving cash holdings. Dittmar and Mahrt-Smith (2007) contribute to the literature by providing insight on the role of corporate governance in cash policy and valuation, indicating that monitoring mechanisms are able to improve the perceived value of a firm's cash holdings.

Harford et al. (2008) use corporate governance measures as proxies for agency problems within firms to explore whether they influence managers' propensity to stockpile and utilize cash. They find evidence in support of the spending hypothesis, which states that firms with weak corporate governance tend to spend cash more quickly than firms with strong corporate governance. Thus, it appears that a strong corporate governance structure can improve managers' handling of higher levels of cash.

Overall, prior research demonstrates the importance of high quality corporate governance in terms of valuation of cash holdings as well as restricting earnings management behavior. To the extent that REM is associated with cash holdings, there are opportunities to reduce agency costs of free cash flow through improvements in corporate governance structures. In particular, identifying management behaviors indicative of suboptimal decisions can provide evidence to corporate boards and suggest that more focus should be placed on efficient deployment of cash holdings.

CHAPTER 3: HYPOTHESES DEVELOPMENT

I begin this section with a discussion of agency conflicts and management behavior in the external reporting environment, which leads to my first hypothesis concerning the effects of REM on cash holdings. I then develop my hypotheses on the impact of REM on the valuation of cash holdings. I conclude this section with my hypothesis regarding the influence of corporate governance on the relation between REM and the valuation of cash.

3.1 Hypothesis on levels of cash holdings

The accounting function is a monitoring mechanism that purports to enforce the proper application of accounting standards and distribution of accurate financial reports to external users. Because financial statements are a major source of information, the possibility of opportunistic behavior increases, particularly when managers seek to maximize their own interests (Watts and Zimmerman 1986). Jensen and Meckling (1976) model the agency relationship and contend that agency problems persist between managers (agents) and shareholders (principals) in financial reporting despite efforts to minimize managers' self-serving behavior. They show analytically that as the interests of agents and principals diverge, management decision-making will inevitably stray from projects that maximize shareholder wealth and lead to agency costs. Therefore, the

external financial reporting environment represents a setting in which managers' pervasive efforts to take advantage of accounting standards using REM have implications for cash holdings.

Prior research points out that managers often choose to exercise discretion in an opportunistic manner to achieve certain objectives such as bonus contract thresholds (see e.g., Healy 1985; Watts and Zimmerman 1990; Holthausen et al. 1995), thus, serving their own interests at the expense of others. Flexibility within accounting standards also motivates managers to pursue activities to avoid debt covenant violations (Dichev and Skinner 2002), smooth earnings to achieve a lower cost of debt (Trueman and Titman 1988), and report earnings consistent with expectations about future earnings (Tucker and Zarowin 2006). Regardless of the reason for exercising discretion through manipulating earnings, REM activities may result in unintended consequences in the form of higher cash holdings.

Given that agency conflicts involve deviations from optimal business operations, REM potentially offers an explanation for firms holding *higher* levels of cash. I focus on two REM activities because they offer predictable relations with cash holdings: Selling assets to report gains (i.e. cash inflows) and cutting discretionary expenditures (i.e. avoid cash outflows through cuts in SG&A, R&D, and advertising). [15]

[15] Prior research also explores other REM proxies, including overproduction of inventory and accelerating sales. Overproduction of inventory theoretically results in *lower* cash holdings than would otherwise exist under normal business operations, as cash is paid upon acquisition of inventory for production. In addition, the effect on cash of accelerating sales through discounts, channel stuffing, or lenient credit terms may result in a net increase or decrease in overall abnormal cash flows from operations relative to sales (see e.g., Roychowdhury 2006; Gunny 2010).

The accounting treatment for asset sales provides a unique setting in which to investigate levels of cash holdings. Fixed assets and certain investments are recorded and maintained on the balance sheet at historical cost, thus, unaffected by changes in market prices.[16] Therefore, a gain or loss is recorded upon sale, leaving managers with opportunities to strategically time asset sales to manipulate earnings (see e.g., Bartov 1993; Herrmann et al. 2003). In addition, Dechow and Shakespeare (2009) examine the timing of securitizations, which receive similar accounting treatment as asset sales, and show that a substantial majority of these transactions occur in the last month of each quarter and approximately 50 percent occur in the last few days of the quarter.[17] Their results also provide evidence in contrast to sales motivated by financing needs, leading them to conclude that the accounting treatment and favorable affect on accounting earnings as opposed to the firm's demand for liquidity motivate securitizations.

Lang et al. (1995) advance alternative explanations for asset sales, showing that proceeds are often returned to shareholders, used to pay down debt, and/or allocated to unfunded projects. Given evidence of asset sales as a source of liquidity, one may observe opportunistic behavior with respect to asset sales but subsequent deployment of proceeds may result in little or no change in cash holdings. Alternatively, Black et al. (1998) relate motives for earnings management to income from asset sales and show that

[16] In instances of impairments of fixed assets and investments, the accounting rules dictate that their initial costs must be adjusted to reflect market prices. Otherwise, these assets remain on the balance sheet at historical cost.

[17] In short, the accounting for securitizations permits issuers (sellers) to record gain/loss for the difference between fair value and cost upon the sale of the underlying collateral. As with asset sales, securitizations also involve an exchange of cash. From an accounting perspective and managers' opportunistic behavior, asset sales in my study are comparable in nature to the motivations and treatment of securitizations such that cash is received and income is affected. I also note that gains/losses resulting from a securitization are presented separately in the financial statements, so my measure of sales of assets excludes securitization transactions.

pre-managed earnings are incremental to liquidity needs. Cash inflows from asset sales are therefore likely in excess of a level of cash necessary to fund normal business activities.

The accounting treatment for discretionary expenditures also allows managers to immediately influence earnings because SG&A, R&D, and advertising activities are expensed as incurred. Cuts and/or delays in these discretionary activities not only impact reported earnings, but also avoid outlays of existing cash holdings. The preference for this REM approach is indicated by Graham et al. (2005), who report that 80 percent of CFOs reduce discretionary expenditures to manage earnings. This finding offers evidence of the availability and ease with which managers reduce activities and operations and thereby reduce cash outflows.[18] Overall, the direct positive impact on cash flows following income increasing REM efforts involving cuts to discretionary expenditures likely contributes to higher cash holdings.

Consistent with the view that managers have incentives to spend or avoid higher cash levels due to investors' agency concerns (see e.g. Jensen 1986; Stulz 1990), there are reasons why REM may lead to lower cash holdings. First, Harford et al. (2008) find evidence of the spending hypothesis, suggesting that managers of poorly governed firms pursue empire building through quick deployment of accumulated cash holdings.

[18] While asset sales and cuts in discretionary expenses influence cash levels, the timing of the cash flow effects for the REM measures may be different. Specifically, managers can reasonably predict cash inflows from asset sales upon sale and therefore, if they are inclined, make necessary adjustments to reallocate cash holdings to appropriate levels. The effects of reductions in discretionary expenditures on cash holdings are likely less predictable. The decision to reduce discretionary expenses affects cash holdings over a period of time and impacts various operations of the business, creating difficulty in managing cash holdings. These circumstances suggest lower predictability of cash flow effects of reductions in discretionary expenditures. On average, I do not expect these considerations to influence cash holdings differently.

Likewise, poorly governed firms engaging in opportunistic REM are susceptible to inefficient cash outlays, as they invest suboptimal investments. These outlays may offset REM-induced cash inflows. Second, managers planning future REM efforts may hold less cash in anticipation of REM. Third, McNichols and Stubben (2008) find that firms overinvest during periods of high earnings management in attempts to maintain distorted growth expectations resulting from earnings management.[19] Fourth, cash flows from REM efforts might serve as a financing source for unfunded projects at the discretion of management, resulting in a reallocation of assets. Finally, Cohen et al. (2010) report that decreasing advertising expenses results in lower revenues and net cash flows as revenue losses exceed savings through reductions in advertising. Thus, some evidence indicates there are circumstances in which agency concerns of REM activities could lead to lower cash holdings despite cash generated from REM.

Given the motivations for income increasing activities coupled with the unpredictability of the magnitude of respective cash flows, REM is likely to disrupt a firm's normal level of cash holdings. I posit that, on average, a firm engaging in income increasing REM will accumulate higher cash holdings than it would otherwise under normal business operations. I state the following hypothesis in alternative form:

H1: Levels of cash holdings are positively associated with income increasing REM.

[19] See Richardson (2006) for evidence of over-investments among firms with high levels of free cash flow.

3.2 Hypotheses on the valuation of cash holdings

It is well documented in the literature that firm value is based on investors' assessments about the discounted present value of future cash flows of the firm (see e.g., Hirshleifer 1958).[20] In a world of perfect information, security prices reflect all information about a firm and the market price of a firm equals its fundamental value as there is no information asymmetry between insiders and outsiders. A more realistic view of firm valuation relaxes the assumption of perfect information and considers the role of information asymmetry. Investors' valuations of cash holdings can shed light on whether their perceptions of REM activities are consistent with either value-destroying or value-maximizing behavior, and whether corporate governance has a moderating effect.

Earnings management behavior exists within environments of information asymmetry whereby managers mask true performance and exploit inside information.[21] Managers of poorly performing firms engage in costly income increasing activities to report earnings that meet their objectives despite the potential for a negative effect on firm value (see e.g. Jensen 2005; Ewert and Wagenhofer 2005). Therefore, from a shareholder's perspective, a manager's control over resource allocation lends concern about whether cash holdings will be invested in projects with the intention of maximizing firm value or their compensation.

Louis et al. (2012) show that firms that adopt conservative accounting policies enjoy higher valuations of cash holdings, suggesting managers of these firms mitigate

[20] See also Watts and Zimmerman (1986) and Ohlson (1995) for formal discussions concerning the relation between stock prices, accounting earnings, and cash flows.
[21] See Dye (1988), Trueman and Titman (1988), and Ewert and Wagenhofer (2005) for analytical arguments and Warfield et al. (1995), Dechow et al. (1996), Richardson (2000), and Cohen et al. (2008) for empirical evidence.

value destruction through efficient uses of cash holdings. In contrast, investors discount cash holdings because agency problems increase and investors' become uncertain about the future valuation of cash holdings given managers' incentives to mask true firm performance to meet their objectives. Therefore, it seems reasonable that investors perceive income increasing REM as opportunistic as managers' propensity toward self-serving behavior and therefore discount cash holdings.

The work of Jensen and Meckling (1976) suggests the agency relationship allows managers to enjoy non-pecuniary benefits and pursue their own interests that destroy firm value. McNichols and Stubben (2008) show that managers who manipulate earnings upwards make suboptimal investment decisions, providing further evidence that they waste cash. Hence, managers altering business operations through REM may not only interrupt optimal operations, but also negatively impact future cash flows, and result in a destruction of long-term firm value. These observations support the notion that valuations of cash holdings are likely impacted by investors' perception that income increasing REM firms deploy cash toward their own interests.

In particular, the valuation of cash depends partially on whether investors expect cash to be deployed toward optimal investments. Survey evidence in Graham et al. (2005) suggests a tolerance for value-destroying behavior among CFOs using REM, noting they are willing to sacrifice firm value in order to meet their objectives. Such uncertainty about managers' behavior driven by their incentives to manage earnings reflects a possibility that existing cash holdings will be used inefficiently. Specifically, if management behavior reflects a tendency to engage in REM activities through

opportunistic asset sales and/or reductions in discretionary expenditures, then investors will not expect to capture the highest potential value of existing cash holdings among these firms. This demonstration of managerial discretion indicative of suboptimal use of cash will lead investors to devalue a firm's cash holdings.

Managers' attempts to reduce information asymmetry also drive earnings management. Under the assumption that managers have more information about future prospects of the firm, they may want to reveal through current earnings their expectations about future earnings and cash flows. Beatty and Harris (1999) show that efforts to manage earnings and regulatory capital through REM activities are motivated by efforts to reduce information asymmetry. Similarly, Gunny (2010) provides evidence consistent with REM as a means to signal better future operating performance to investors. This result also suggests that mangers alter business operations in the best interest of shareholders instead of in an opportunistic manner. Therefore, the market may interpret REM as an optimal response to economic conditions. If market participants perceive REM to be activities motivated by efforts to signal higher future firm value, then these firms may experience a positive differential impact on the valuation of cash holdings.

Despite evidence suggesting that managers may engage in REM behavior to signal future earnings to improve investors' assessments of future cash flows, investors discount cash holdings due to agency problems concerning managers' inefficient use of cash in pursuit of their own interests (Jensen 1986; Faulkender and Wang 2006). Hence, the following hypothesis (stated in the alternative form) tests whether REM, on average, exacerbates discounting of cash holdings:

H2: Market valuation of cash holdings is lower among firms that engage in income increasing real earnings management.

To further explore the effect of income increasing REM on the valuation of cash holdings, I examine whether corporate governance impacts this relationship. Consideration of corporate governance allows an assessment of the effect of monitoring on investors' perceptions about the use of cash holdings given a firm's level of REM. This analysis is critical to the investigation of cash holdings considering Jensen's (1986) arguments that poorly monitored managers are more likely to waste cash. Prior research also argues that corporate governance mechanisms improve investment decisions, firm productivity, and the quality of financial information.[22] Moreover, extant research reports evidence that corporate governance impacts the use of cash holdings and influences investors' valuation of cash (see e.g., Dittmar and Mahrt-Smith 2007; Harford et al. 2008). Reliable accounting information can also enhance managers' and investors' ability to assess good and bad investments and thus, lower estimation risk (see e.g. Barry and Brown 1985).

Corporate governance functions may improve investors' ability to assess how cash holdings will be used. Adams and Ferreria (2007) note that outside members of governance boards are more likely to intervene in managers' decisions, limiting their private benefits. Klein (2002) documents that boards with a majority of outside directors

[22] See Bushman and Smith (2001) and Armstrong et al. (2010) for recent reviews of prior research on corporate governance. Bushman and Smith (2001) encourage researchers to explore interactions between financial reporting characteristics and corporate governance mechanisms to evaluate their economic effects in the presence of agency problems. My study addresses these relationships and their effects on aspects of cash holdings.

effectively influence earnings by curtailing earnings management, asserting that board independence can impose meaningful reductions in opportunistic behavior. A strong corporate governance firm that exhibits opportunistic income increasing REM may be the result of managers responding to orders by an effective board.[23] Therefore, strong corporate governance may signal to investors an efficient reallocation of resources.

In sum, to the extent that investors are unable to unravel managers' intentions for REM, their consideration of corporate governance may facilitate efforts in evaluating managers' ability to pursue self-interested activities. On the one hand, strong corporate governance may reduce risk of loss from opportunistic managers attempting to expropriate wealth from investors. On the other hand, weak corporate governance may exacerbate information asymmetry and agency problems in which investors perceive REM activities as value destroying behavior of self-interested managers. These arguments lead to the following hypothesis (stated in the alternative form):

H3: Market valuation of cash holdings in conjunction with income increasing real earnings management is higher for firms with strong corporate governance than for firms with weak corporate governance.

[23] I assume that, on average, strong corporate governance boards act in the interests of shareholders and guide managers to allocate resources to maximize shareholder wealth.

CHAPTER 4: RESEARCH DESIGN

This section presents the research design for testing my hypotheses. I begin with models from prior research to estimate REM. I conclude with descriptions of the empirical models employed to test my hypotheses.

4.1 Estimating REM

I employ models from Roychowdhury (2006) and Gunny (2010) to estimate normal levels of gains on asset sales and discretionary expenses.[24] Consistent with prior research, residuals from these estimation models represent measures of management manipulation (Roychowdhury 2006; Cohen et al. 2008; Gunny 2010; Cohen and Zarowin 2010; Zang 2012). The use of these models in extant research lends credit to the construct validity of these proxies for REM behavior with respect to altering normal business operations.

I first estimate normal levels of gains on asset sales using a model augmented by Gunny (2010) based on factors applied in Bartov (1993) and Herrmann et al. (2003). The asset gain model of Gunny (2010) therefore provides a comprehensive model to estimate normal income from asset sales and is as follows:

$$GAINA_{i,t} = \beta_0 + \beta_1(1 / A_{i,t-1}) + \beta_2 LMV_{i,t} + \beta_3 Q_{i,t} + \beta_4 INT_{i,t} + \beta_5 ASALES_{i,t} +$$

[24] In this study and in prior research, discussions on the impact of asset sales on net income mention gain on sale; I acknowledge the fact that asset sales may also result in losses, which are also included in the estimation of REM.

$$\beta_6 ISALES_{i,t} + \varepsilon_{i,t} \quad (1)$$

where:

GAINA = income from fixed asset and investment sales scaled by total assets at the beginning of the year;

A = total assets at the end of the year;

LMV = natural log of market value;

Q = Tobin's Q;

INT = internal funds measured as the sum of income before extraordinary items, research and development expense, and depreciation and amortization expense scaled by total assets at the beginning of the year;

ASALES = long-lived fixed asset sales scaled by total assets at the beginning of the year; and

ISALES = long-lived investment sales scaled by total assets at the beginning of the year.

Subscripts represent observations for firm *i* at period *t*. Equation (1) is estimated cross-sectionally for each two-digit SIC industry-year pair with at least 15 observations.[25] *LMV* controls for firm size. The coefficient on *LMV* is expected to be positive as larger firms

[25] Inclusion of a scaled intercept ($1 / A_{i,t-1}$) follows the approach of prior research (see e.g., Roychowdhury 2006; Gunny 2010; Zang 2012) that investigates discretionary accounting measures. This approach helps to avoid spurious correlation between a scaled dependent variable and explanatory variables due to variation in total assets and allows for a non-zero predicted value when predictors are zero. Additionally, prior research estimating discretionary accounting measures indicates that lagged assets are positively associated with the variance of the disturbance term (see e.g., Jones 1991). This weighted least squares approach that scales the intercept by lagged assets weighs observations proportional to the inverse of the variable, thus, giving less weight to observations with higher lagged asset values. Kothari, Leone, and Wasley (2005) suggest that including a constant term in addition to the scaled intercept controls for heteroscedasticity not captured by assets as the deflator. In essence, the scaled intercept is part of the normalization process.

hold proportionally more assets and apply more conservative depreciation policies than smaller firms.[26] Variable *Q* proxies for the marginal benefit to marginal cost of an additional unit of investment. When *Q* is relatively high, firms are less likely to sell assets at a gain given they are currently expanding operations, therefore, the coefficient on *Q* is expected to be negative. *INT* proxies for reduced internal funds available for investment and is expected to be positively associated with income from asset sales. *ASALES (ISALES)* are sales of long-lived assets (investments). *ASALES* and *ISALES* control for the magnitude of the sales and are included in the model to avoid biased parameter estimates due to correlated omitted-variables. By construction, they require a monotonic relationship with the dependent variable *GAINA*. Following prior research, I transform *ASALES* and *ISALES* into negative values when asset sales result in a loss. Hence, they are expected to have positive coefficients, as they enter the regression with the same sign as *GAINA*. All variables in equation (1) except *LMV* and *Q* are scaled by total assets at the beginning of the year. Residuals computed as actual minus the normal levels in equation (1) represent abnormal gains on asset sales (*aGAINA*).

I follow Roychowdhury (2006) and estimate normal levels of discretionary expenses using the following equation:

$$DISEXP_{i,t} = \beta_0 + \beta_1(1 / A_{i,t-1}) + \beta_2 S_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

where:

[26] I take the log of a firm's market value because scaling it by total assets at the beginning of the year would resemble a market-to-book ratio, which is a common proxy for growth and investment opportunities. Thus, market-to-book would likely be highly correlated with *Q*. Also, market value tends to exhibit a skewed distribution and heteroscedasticity, thus, using log transformation can mitigate these problems.

DISEXP = sum of R&D, SG&A, and advertising expenses scaled by total assets at the beginning of the year;[27]

A = total assets; and

S = total sales scaled by total assets at the beginning of the year.

Subscripts represent observations for firm *i* at period *t*. Equation (2) is estimated cross-sectionally for each two-digit SIC industry-year pair with at least 15 observations. Given that firms with higher sales generally have higher expenses, the coefficient on lagged sales should be positive.[28] Residuals computed as actual minus the normal levels in equation (2) represent abnormal discretionary expenses (*aDISEXP*). For consistency with other REM proxies, I multiply *aDISEXP* by -1 so that positive values represent income increasing REM.

Firms are likely to engage in a number of earnings management methods to meet their objectives. Following Cohen et al. (2008) and Gunny (2010), I compute a comprehensive measure that aggregates my two measures of REM. Specifically, I create *aAGGREM*, which represents the sum of the residuals from equations (1) and (2), and captures the net effects of firms using both REM approaches. For hypotheses testing, I create quintile measures (*QaREM*) for each of the three REM variables. Specifically, I rank each REM measure into quintiles by industry and year and divide the quintiles by five.[29] This transformation allows for more intuitive interpretations of their coefficients,

[27] Missing advertising and R&D expenses are set to zero when SG&A is available.
[28] As noted in prior research, a mechanical problem arises when contemporaneous sales are used as an estimator of *DISEXP*. I therefore follow Roychowdhury (2006), among others, and use lagged sales.
[29] Results are robust to ranking the REM measures into deciles.

focusing on the difference in REM between levels zero (income decreasing REM) and one (income increasing REM).

4.2 Empirical tests on levels of cash holdings hypothesis

Recent studies have examined levels of cash holdings based on the model of Opler et al. (1999) as a basis for their estimations (Dittmar and Mahrt-Smith 2007; Foley et al. 2007; Harford et al. 2008; Bates et al. 2009; Drobetz et al. 2010; Fresard and Salva 2010). The general approach for modeling optimal cash holdings in these studies follows that firm characteristics, namely transaction and precautionary motives, drive the level of cash necessary to finance current and future operations and investments.

Consistent with extant research on cash holdings, I begin with the cash prediction model of Opler et al. (1999) and estimate cash holdings as follows:

$$LNCASH_{i,t} = \beta_0 + \beta_1 LNA_{i,t} + \beta_2 CF_{i,t} + \beta_3 NWC_{i,t} + \beta_4 INDSIG_{i,t} + \beta_5 MTB_{i,t} + \beta_6 CAPX_{i,t} + \beta_7 R\&D_{i,t} + \beta_8 LEV_{i,t} + \beta_9 DIV_{i,t} + \boldsymbol{\delta} + \boldsymbol{\eta} + \varepsilon_{i,t} \quad (3)$$

where:

LNCASH = log of cash and short-term investments scaled by net assets (total assets minus cash and short-term investments);

LNA = log of net assets;

CF = cash flows measured as operating income before depreciation minus interest expense and income tax expense scaled by net assets;

NWC = net working capital measured as current assets minus current liabilities minus cash and short-term investments scaled by net assets;

INDSIG = industry sigma measured as the average standard deviation of industry cash flows scaled by net assets over the previous 10 years;

MTB = market-to-book ratio measured as the market value of the firm plus long-term debt scaled by net assets;

CAPX = capital expenditures scaled by net assets;

R&D = research and development expenses scaled by net assets;

LEV = leverage measured as the sum of long-term debt and short-term debt scaled by net assets; and

DIV = indicator variable equal to one if firm pays a cash dividend, and zero otherwise.

LNA controls for firms size and is expected to be negative, as larger firms generally have economies to scale and more access to capital markets for funding investments. *CF* captures cash flows from operations and should be positive. *NWC* measures the liquid assets within a firm and is expected to be negatively associated with cash holdings given that firms with more cash substitutes require less cash. *INDSIG* indicates the volatility of cash flows within a firm's industry and therefore represents uncertainty about cash inflows and outflows. A firm within an industry with high cash flow volatility is expected to hold more cash, thus, *INDSIG* is expected to be positive. *MTB* controls for a firm's investment and growth opportunities. The coefficient on *MTB* is expected to be positive because firms with more growth opportunities tend to hold more cash as positive net present value projects may be given up if a firm faces a cash shortage. Similarly, the coefficient on *CAPX* is expected to be positive as firms with more capital expenditures

tend to hold more cash to fund expanding operations. *R&D* represents the level of research and development expenses and implies information asymmetry between managers and shareholders, which makes it more difficult to raise outside funds at a reasonable cost of capital. As such, firms with higher R&D are expected to hold more cash. *LEV* measures the level of debt within a firm and is expected to be negatively related to cash. The reason is that firms with higher debt levels exhibit an ability to access the debt market and can use borrowing capacities as a substitute for cash holdings. *DIV* identifies firms that pay cash dividends. The coefficient on *DIV* is expected to be negative because dividend paying firms tend to hold lower levels of cash given they are able to raise cash through dividends cuts. Vectors of year indicators (**δ**) control for macroeconomic and time period effects, and firm fixed effects (**η**) control for firm-specific heterogeneity. All continuous variables except *INDSIG* and *LNA* are scaled by net assets (total assets less cash and short-term investments) at the end of the year.

The objective of this portion of my study is to examine the association between REM and levels of cash holdings. To test my hypothesis that REM is positively associated with levels of cash holdings, I add variables specific to my study to equation (3) as follows:

$$\begin{aligned} LNCASH_{i,t} = {} & \beta_0 + \beta_1 LNA_{i,t} + \beta_2 CF_{i,t} + \beta_3 NWC_{i,t} + \beta_4 INDSIG_{i,t} + \beta_5 MTB_{i,t} + \\ & \beta_6 CAPX_{i,t} + \beta_7 R\&D_{i,t} + \beta_8 LEV_{i,t} + \beta_9 DIV_{i,t} + \beta_{10} DA_{i,t} + \\ & \beta_{11} QaREM_{i,t} + \boldsymbol{\delta} + \boldsymbol{\eta} + \varepsilon_{i,t} \end{aligned} \quad (4)$$

where:

QaREM = abnormal REM proxies measured as scaled quintile measures of ranked residuals from equation (1) (*aGAINA*) and equation (2) (*aDISEXP*) and their sum, *aAGGREM*;

DA = discretionary accruals measured as the residuals from a modified Jones (1991) model;[30] and

other variables are defined as in equation (3).

I include discretionary accruals as prior research shows that accruals-based earnings management influences levels of cash holdings and serves as a substitute for REM (see e.g., Sun et al. 2012; Zang 2012). I estimate normal accruals using the modified Jones model (Jones 1991) estimated cross-sectionally for each two-digit SIC industry-year pair with at least 15 observations. *DA* presents the residuals from this estimation, computed as the difference between firms' actual and normal accruals. *DA* is expected to be negatively related to cash holdings levels.

The test variable for H1 is *QaREM*. I estimate equation (4) separately for each test variable, *QaGAINA* and *QaDISEXP*, and also include them together to assess whether each has an incremental effect. I also estimate equation (4) separately using *QaAGGREM*. A positive coefficient on *QaAGGREM* is consistent with my hypothesis that REM contributes to higher levels of cash holdings, after controlling for other factors. In sensitivity analyses, I employ alternative specifications of equation (4) and consider potential omitted variables correlated with both REM and cash holdings.

[30] I measure total accruals as earnings before extraordinary items and discontinued operations minus operating cash flows in the statement of cash flows.

4.3 Empirical tests on the valuation of cash holdings hypotheses

This section of my study presents empirical tests of whether investors' valuations of cash holdings vary among firms with higher levels of REM. Consistent with prior research that investigates valuation of cash, I begin with the Fama and French (1998) model. Their basic regression equation is as follows:[31]

$$MV_{i,t} = \alpha_0 + \alpha_1 E_{i,t} + \alpha_2 \Delta LE_{i,t} + \alpha_3 \Delta E_{i,t+1} + \alpha_4 R\&D_{i,t} + \alpha_5 \Delta LR\&D_{i,t} + \alpha_6 \Delta R\&D_{i,t+1} + \alpha_7 DIV_{i,t} + \alpha_8 \Delta LDIV_{i,t} + \alpha_9 \Delta DIV_{i,t+1} + \alpha_{10} I_{i,t} + \alpha_{11} \Delta LI_{i,t} + \alpha_{12} \Delta I_{i,t+1} + \alpha_{13} \Delta LTA_{i,t} + \alpha_{14} \Delta TA_{i,t+1} + \alpha_{15} MV_{i,t+1} + \varepsilon_{i,t} \quad (5)$$

where:

MV = market value measured as share price times shares outstanding plus total liabilities;

E = earnings before extraordinary items;

$R\&D$ = research and development expenses (set to zero if missing);

D = common dividends;

I = interest expenses; and

TA = total assets.

Subscripts represent observations for firm i at period t, and $\Delta LX_{i,t}$ ($\Delta X_{i,t+1}$) is the change in variable X from time t - 1 to t (t to $t + 1$). Fama and French (1998) use a number of determinants of investors' expectations of future cash flows to explain MV: Past changes, future changes, and current levels of a firm's financing characteristics and profitability measures, as well as past and future changes in assets and future changes in market value

[31] I specify the scaling measure in equation (6), which is an augmented version of equation (5).

of the firm. Future changes are introduced in order to capture changes in investors' expectations about firm value. Time period specifications of each variable have the same expected sign, thus, I discuss only one expectation for each variable. Earnings (*E*) are expected to be positively associated with firm value. Due to mandatory expensing of R&D expenses, *R&D* is expected to capture information about expected profits not captured by *E*. Hence, the coefficient on *R&D* is expected to be positive. *DIV* measures dividend payments and higher dividends generally indicate a positive outlook on a firm and therefore, *DIV* is expected to have a positive effect on market value. Variable *I* represents interest expense and measures a firm's leverage policy. The coefficient on *I* is expected to be negative considering higher payments to debtholders inherently reduces payments to shareholders. *TA* captures additional information about investors' expectations about firms' overall investment outcomes and is expected to be positively associated with market value. Investors' revisions to their expectations about firm value lead to a predicted negative coefficient on *MV*.

I follow prior research that investigates cash holdings and augment equation (5) by separating *TA* into cash and non-cash components and adding my proxies for REM as well as their interaction with cash holdings, which tests H2. I therefore employ the following regression equation:[32]

$$MV_{i,t} = \alpha_0 + \alpha_1 E_{i,t} + \alpha_2 \Delta LE_{i,t} + \alpha_3 \Delta E_{i,t+1} + \alpha_4 R\&D_{i,t} + \alpha_5 \Delta LR\&D_{i,t} + \alpha_6 \Delta R\&D_{i,t+1} +$$

[32] The market value model approach is subject to econometric problems regarding correlated omitted variable bias or serial correlation of residuals. See Appendix B for a discussion on the methodology used to address these concerns. In sensitivity analyses, I also estimate standard errors clustered at the firm level to address potential correlation of residuals across years within the firm. An alternative to the levels approach in equation (6) is a first difference approach, which, as pointed out by Dittmar and Mahrt-Smith (2007), makes interpretations difficult considering changes in cash holdings may be due to changes in total cash or changes in determinants of optimal cash holdings.

$$\alpha_7 DIV_{i,t} + \alpha_8 \Delta LDIV_{i,t} + \alpha_9 \Delta DIV_{i,t+1} + \alpha_{10} I_{i,t} + \alpha_{11} \Delta LI_{i,t} + \alpha_{12} \Delta I_{i,t+1} +$$

$$\alpha_{13} \Delta NA_{i,t} + \alpha_{14} \Delta LNA_{i,t+1} + \alpha_{15} \Delta MV_{i,t+1} + \alpha_{16} DA_{i,t} + \alpha_{17} CASH_{i,t} +$$

$$\alpha_{18} QaREM_{i,t} + \alpha_{19} CASH_{i,t} * QaREM_{i,t} + \boldsymbol{\theta} + \boldsymbol{\delta} + \boldsymbol{\eta} + \varepsilon_{i,t} \quad (6)$$

where:

NA = net assets measured as total assets minus cash and short-term investments;

DA = discretionary accruals as in equation (3);

CASH = sum of cash and short-term investments;

QaREM = quintile measures of REM as in equation (3); and

other variables are defined as in equation (5).

Subscripts represent observations for firm *i* in period *t*. $\Delta LNA_{i,t}$ ($\Delta NA_{i,t+1}$) is the change in net assets from time *t* - 1 to *t* (*t* to *t* + *1*). $\boldsymbol{\theta}$ represents a vector of indicator variables controlling for industry effects. Following Dittmar and Mahrt-Smith (2007), I include firm indicators (**$\boldsymbol{\delta}$**) to focus on the within dimension of the data and year indicators (**$\boldsymbol{\eta}$**) to absorb macroeconomic factors affecting all firms in a given year. All continuous variables are scaled by net assets at the end of the year.

NA captures investors' expectations about firms' investments in non-cash assets and is expected to be positively associated with market value. Investors may interpret discretionary accruals (*DA*) as either a result of opportunistic behavior or informative about future earnings (see e.g., Subramanyam 1996; Sun et al. 2012). Therefore, I make no prediction about *DA*. The coefficient on *CASH* indicates the valuation of a dollar of cash and is expected to be positively associated with firm market value. The main

coefficient of interest in equation (6) is α_{19}, which captures the differential effect of REM on the valuation of cash holdings. A negative α_{19} supports H2, consistent with investors concerns about potential value destruction due to inefficient uses of cash holdings resulting from opportunistic REM. I estimate separate regressions of equation (6) for each *QaREM* measure as well as one that includes both *QaGAINA* and *QaDISEXP*.

Prior research shows that strong corporate governance enhances valuations of cash. In H3, I predict that strong corporate governance firms have higher cash valuations than weak ones given income increasing REM. Gompers et al. (2003) note that fewer antitakeover provisions in a firm's corporate charter is indicative of strong corporate governance, suggesting takeover provisions expose managers to external monitoring and thus constrain opportunistic behavior. I therefore use their corporate governance measure, the Gompers' index, to investigate H3.

I separate the sample into two groups based on the firm's corporate governance quality. Following the approaches of Dittmar and Mahrt-Smith (2007), among others, I sort firms by their Gompers' index measure, setting those in the lowest and highest terciles equal to one and eliminating those in the middle (to increase the power of my test). I then estimate stacked regressions for firms in the lowest and highest terciles and conduct F-tests for significant differences in coefficients between high and low governance firms. Given the marginal valuation of cash holdings depends on a firm's quality of corporate governance, H3 predicts that stronger corporate governance (a lower Gompers' index measure) will enhance the investors' understanding of the purpose and potential consequences of REM and mitigate investors' concerns about opportunistic

behavior. A significantly higher coefficient on *CASH*QaREM* for strong corporate governance firms compared to weak corporate governance firms would support H3.

CHAPTER 5: SAMPLE SELECTION AND ESTIMATING REAL EARNINGS MANAGEMENT

This section presents the procedures employed to derive my sample and discusses descriptive statistics. I conclude this section with estimations of REM used in my empirical analyses.

5.1 Sample selection

The main empirical tests in my study use data from Compustat and RiskMetrics. Panel A of Table 1 begins my sample selection procedures to estimate REM. I start with 226,829 firm-year observations of U.S. publicly traded firms available through Compustat for the period from 1988 to 2011.[33] Consistent with prior research regarding REM and cash holdings, I eliminate American Depository Receipts and firms in regulated industries: utilities (SIC between 4400-5000) and financial institutions (SIC between 6000-6999). I lose additional firm-year observations due to data restrictions on models estimating REM, resulting in 46,896 for equation (1) and 109,962 for equation (2).[34]

[33] I begin my sample in 1987 to obtain lagged variables and because data on a number of variables are not available until then, namely those presented in the statement cash flows.
[34] The difference in sample sizes for the REM measures is mainly due to availability of data on variables necessary to estimate equation (1). For comparison, I note that my sample size is within 1.1% of Gunny (2010) using the time period in her study.

In order to maintain a consistent sample size across various empirical results, a firm-year observation must have both REM measures to initially enter the cash levels sample. As shown in Panel B, this requirement yields 42,275 observations. I further remove firms with insufficient data and those with zero cash holdings, resulting in a cash levels sample (H1) of 39,758 observations (7,772 firms). [35,36]

The cash valuation sample (H2) reduces to 31,323 observations (6,118 firms) after excluding observations with missing data necessary to estimate excess cash holdings in sensitivity analyses and missing lead and lag variables.[37] Merging these observations with Gompers' index data available through RiskMetrics reduces the sample by 23,061 observations.[38] Finally, I use only firm-year observations in the highest and lowest terciles (H3) of the corporate governance index, resulting in a sample of 5,019 observations (870 firms).[39]

[35] Wooldridge (2009) notes that the log of (1+y) may be used in certain instances but changes starting at y equal to zero have no interpretation. An alternative approach is to set firm-year observations with zero cash equal to the minimum cash level in the sample. I avoid these approaches in order to maintain comparable samples and due to concerns about assuming an outcome for a firm, particularly because equation (4) uses the log of cash as the dependent variable.

[36] An untabulated distribution by industry indicates that my sample has reasonable industry dispersion. Because my empirical models control for firm, industry, and year effects, any related invariant effects are not a major concern.

[37] I restrict the cash levels sample to observations with data available to estimate excess cash holdings to improve comparability between the main analyses and related sensitivity analyses.

[38] RiskMetrics contains governance data about every two years: 1990, 1993, 1995, 1998, 2000, 2002, 2004, and 2006. Consistent with prior research, I use firms' prior year governance measures when current year measures are unavailable through 2010.

[39] In a similar sample construction, Dittmar and Marht-Smith (2007) use 2,666 firm-year observations for the period 1990 through 2003 in their analyses using firms with excess cash and the Gompers' index, resulting in an average of approximately 190 observations per year. I conduct analyses using excess cash in sensitivity analyses and obtain a sample of 3,834, approximately 182 observations per year. Given this consistency along with my additional data requirements for REM measures, I conclude that my samples for regressions using either actual cash or excess cash are consistent with prior research.

5.2 Estimating REM

Table 2 provides descriptive statistics about regression variables used to estimate REM. Consistent with prior research, I winsorize all continuous explanatory variables at the 1 percent and 99 percent levels in order to minimize extreme observations.[40] *GAINA* has a mean of 0.0072 and *DISEXP* has a mean (median) of 0.7561 (0.3866), which indicates a skewed right distribution.

Table 3 reports the estimation results of normal levels of asset sales and discretionary expenses in equations (1) and (2), respectively. All estimated coefficients are consistent with prior research in magnitude and significance (see e.g., Roychowdhury 2006; Gunny 2010; Zang 2012). The average sample size of each cross-sectional industry-year pair estimation of equation (1) is 54.51 compared to 100.55 for equation (2). The reason for this disparity is due to the limited number of firms reporting income from asset sales relative to those reporting measures of discretionary expenses. The mean adjusted R^2 of the cross-sectional regressions ranges between 49.47% and 74.42%, suggesting these models explain a reasonable amount of variation in their respective dependent variable.

In summary, the estimation results suggest that the fitted values are suitable for estimating income from asset sales and discretionary expenses. Therefore, the residuals from these models are appropriate to use as proxies of opportunistic behavior in empirical tests regarding the levels and valuations of cash holdings.

[40] Results are qualitatively similar when continuous explanatory variables are not winsorized.

CHAPTER 6: RESULTS –LEVELS OF CASH HOLDINGS

In this chapter, I first discuss descriptive statistics about the regression variables in the cash holdings model, continue with empirical results concerning the relation between REM and levels of cash holdings, and conclude with sensitivity analyses to assess the robustness of my main findings.

6.1 Descriptive statistics

Table 4 presents descriptive statistics about the cash model variables and continuous measures of REM for the 39,758 firm-year observations. The natural logarithm transformation of the ratio of cash holdings to net assets (measured as total assets minus cash) results in *LNCASH* having negative values. I therefore present levels of cash holdings scaled by net assets at the beginning of the year, *CASH*, and note the mean (75^{th} Percentile) values of 0.3824 (0.3231). Scalar choice of net assets likely drives the skewed distribution, as firms holding a majority of their assets in cash will mechanically show a disproportionate share of scaled cash holdings. [41]

[41] This measurement approach follows prior research and the reported values on *LNCASH* are similar to those of Opler et al. (1999) and Foley et al. (2007). Additionally, in untabulated results I note that the mean (median) cash scaled by total assets is 0.2233 (0.0903), which is consistent with the same cash measure of Bates et al. (2009).

A mean (median) of 4.6336 (4.5517) and a standard deviation of 2.1012 on *LNA* indicates a wide variation in firm size. *MTB* also has a skewed distribution with a mean (median) of 2.9431 (1.6242). Over 30 percent of the sample paid a dividend (*DIV*). The means of *DA*, *GAINA*, and *DISEXP* should be zero by construction; however, this sample does not include all observations from the estimations reported in Table 3 due to sample selection requirements. Positive mean (median) values on *DA* of 0.0481 (0.0321) suggests income increasing discretionary accruals. The mean (median) of *aGAINA* is -0.0006 (-0.0025) suggesting that the average firm has abnormal losses on assets sales. The mean (median) of 0.0873 (0.0927) on *aDISEXP* indicates that managers generally cut discretionary expenditures in order to increase earnings. Overall, the descriptive statistics above are consistent with prior research.

A review of the cut-off points (untabulated) for top and bottom quintile REM measures, *QaGAINA* and *QaDISEXP*, used in the empirical analyses offers meaningful interpretations. The top quintile of *QaGAINA* reflects limited abnormal income increasing asset sales (80^{th} percentile = 0.0047). The middle quintile of *QaDISEXP* implies some level of income increasing REM and its top quintile provides initial evidence of opportunistic income increasing REM (80^{th} percentile = 0.3426). Comparatively, the cut-off points for the bottom quintiles of *QaGAINA* and *QaDISEXP* are -0.0113 and -0.1071, respectively, indicating some efforts to engage in income decreasing REM behavior. Thus, it appears most of the income increasing REM behavior in my study consists of cutting discretionary expenses.

Table 5 reports Pearson (upper triangle) and Spearman (lower triangle) correlations between regression variables in equation (4). The main variables of interest are *LNCASH*, *aGAINA*, and *aDISEXP*. There is a positive and significant Pearson correlation between *LNCASH* and *aGAINA*, and a negative and significant Pearson correlation between *LNCASH* and *aDISEXP*. *aDISEXP* and *aGAINA* are negatively correlated, suggesting firms trade-off between the two methods. Confounding effects of other variables typically influence simple correlations, thus, these results should be viewed with caution. All significant correlations between the other variables are less than 0.8, indicating that multicollinearity should not compromise inferences. Variance inflation factors (VIF) on estimated coefficients are computed and discussed in the multiple regression analyses.

6.2 The relation between levels of cash holdings and REM

Table 6 reports the results of regression analyses of my first hypothesis that opportunistic REM is associated with higher cash holdings. All specifications report t-statistics based on White's (1980) heteroscedastic-consistent standard errors.[42] The dependent variable is the log of cash and short-term investments scaled by net assets at the end of the year. The adjusted R^2 statistics in the cash holdings estimations range from 12.58% to 12.77%, which are in line with prior research.

[42] A significant χ^2 statistic (p-value < 0.01) on the Hausman test (untabulated) confirms the need to account for firm fixed effects. I also review the VIF of each explanatory variable and there is no indication that multicollinearity draws concerns about inferences.

The primary objective in this section is to estimate the effect of REM on the levels of cash holdings. I therefore report results of equation (4) in columns (a) through (d) of Table 6. The coefficients on control variables are generally consistent with prior research. I note that coefficient on *NWC* is negative but insignificant.[43] Additionally, dividend paying firms tend to hold less cash because they can cease dividend payments in order to preserve cash. However, as in Opler et al. (1999), I report a positive relation between *DIV* and *LNCASH* using fixed effects regressions. Consistent with expectations, I find a negative and significant coefficient on *DA* (p-value < 0.01), which supports the notion of a negative correlation between accruals and cash flows (Dechow 1994; Dechow et al. 1998).

Turning to the main results, *QaDISEXP* and *QaGAINA* are examined in isolation in columns (a) and (b), respectively. Positive and significant (p-value < 0.01) coefficients for both methods are consistent with H1 and suggest that extreme income increasing REM (i.e. top quintiles) is associated with higher cash holdings at the firm level. Column (c) includes both test variables in one estimation and reports positive and significant coefficients on *QaDISEXP* (p-value < 0.01) and *QaGAINA* (p-value < 0.01), providing further evidence of a positive association between REM and cash holdings. This result also implies that each REM method contributes incrementally to cash holdings. To

[43] The coefficients (untabulated) on *NWC* are negative and significant when these regressions are estimated without winsorizing the variables. This indicates that the reported insignificant coefficients on *NWC* may be due to winsorization. Additionally, following Opler et al. (1999), I employ a reduced-form specification, omitting *CAPEX*, *LEV* and *DIV* from the model as these variables are likely simultaneously determined within a firm. Consistent with Opler et al. (1999), results (untabulated) from this specification show that *NWC* is positively related to *LNCASH*. To address the possibility that these results are influenced by firms with extreme levels of cash, I exclude those in the top quintile of cash holdings and find similar results.

address a potential for a lower net effect of both methods, indicating a firm's ability to minimize their overall effect on cash holdings, I estimate REM in aggregate. Column (d) reports a positive and significant (p-value < .01) coefficient on *QaAGGREM* , supporting the notion that overall REM behavior contributes to firms' cash holdings.[44]

In summary, the analyses regarding the associations between levels of cash holdings and REM supports H1. The results show deviations from normal business activities to influence reported earnings present an agency problem whereby managers have access to higher cash holdings. This observation is particularly important considering Jensen's (1986) agency concerns about the free cash flow problem, which argues that unmonitored managers tend to waste cash. In addition, these findings offer insights into how REM behaviors have unintended consequences for cash holdings.

6.3 Sensitivity on the relation between levels of cash holdings and REM

I next assess whether the results on H1 persist when subject to a number of robustness checks. Given the similarity of the results between *QaDISEXP* and *QaGAINA*, the following robustness tests focus on the *QaAGGREM* measure. I start with tests to address the possibility of a mechanical relation between cash holdings levels and REM and then consider additional control variables to address potential omitted variable bias. I conclude with estimating equation (4) using a continuous measures of *QaAGGREM* and observations in only the top and bottom quintiles of *QaAGGREM*.

[44] Subsequent analyses involving firm valuation models for testing of H2 have additional data requirements. I subject my analyses of H1 to these data requirements, resulting in 31,323 firm-year observations, and re-estimate equation (4) for the specifications in Table 6. The results are virtually identical to those in Table 6, thus, I conclude that inferences regarding H1 are not sensitive to sample restrictions.

Evidence supporting H1 may be consistent with a mechanical relation driving the results. Higher cash holdings are attributed to the nature of REM activities involving cash inflows and/or avoiding cash outflows. I explore this possibility in three ways. First, I consider whether REM activities among firms with a greater motivation to engage in income increasing REM have a differential impact on cash holdings. It is reasonably possible that engaging in suboptimal business operations necessary to meet certain earnings benchmarks will disrupt management of cash holdings. I create a dummy variable (*SUSPECT*) equal to one for firms whose REM activities allowed them to report higher current earnings than prior year earnings, and zero otherwise.[45] I estimate equation (4) with the addition of an interaction term between each explanatory variable and *SUSPECT* and conduct an F-test to assess whether firms in the top quintile of *QaAGGREM* are different between suspect and non-suspect firms. In untabulated results, the coefficient on *QaAGGREM* is significantly higher among suspect firms (p-value = .019). This finding suggests that opportunistic REM has a stronger influence on cash holdings among firms with motivations to report an increase in earnings from prior year than other firms.

Second, I continue with the approach above but interact *SUSPECT* with only *QaAGGREM* . I therefore estimate equation (4) using both the full sample and a subsample of firms with only income increasing *aAGGREM*. Results from these tests

[45] Specifically, I calculate adjusted income as reported income less both *aDISEXP* and *aGAINA* and classify firms as *SUSPECT* when both adjusted income is less than prior year reported earnings and reported current earnings are greater than prior year earnings. I classify all other observations as non-suspect firms. A t-test (untabulated) of the difference in cash holdings between these two groups suggests non-suspect firms' cash holdings are significantly higher (p-value < 0.01) than those of suspect firms, which is initial evidence against a mechanical relation.

lead to qualitatively similar results, that the impact of REM on cash holdings is stronger among suspect firms.

Third, if a mechanical relation drives the reported results, then income decreasing REM would have a negative impact on cash holdings, particularly for discretionary expenses considering they involve additional cash outlays.[46] I therefore re-estimate equation (4) separately for all REM measures using only observations with income decreasing REM. The coefficients on the REM variables in these regressions are insignificant from zero (p-value > 0.10), indicating that income decreasing REM does not appear to disrupt optimal levels of cash. Collectively, these findings offer support that results consistent with H1 are unlikely mechanical.

Other alternative explanations for my main findings concern omitted variables. Foley et al. (2007) present evidence that income from foreign operations contribute to firms' cash holdings as a result of repatriation taxes.[47] To control for their main findings, I include current foreign income and current foreign income taxes (both scaled by lagged net assets) as control variables in equation (4). Another possibility for a positive relation between levels of cash holdings and REM in the current year is managers' efforts to raise cash through current REM when their prior year cash levels were low or they expect lower cash holdings in the future. To capture these possibilities, I include prior year's

[46] Asset sales resulting in a loss (i.e. income decreasing REM) yield cash inflows but at a lower level of cash relative to the asset's book value.

[47] This phenomenon has also recently gained attention in the press. See Kate Linebaugh, "Firms Keep Stockpiles Of 'Foreign' Cash in U.S." *The Wall Street Journal*, January 13, 2013, p.A1; and Kate Linebaugh, "Top U.S. Firms Are Cash-Rich Abroad but Poor at Home." *The Wall Street Journal*, December 4, 2012, p. B1.

and next year's cash holdings as explanatory variables in equation (4).[48] In light of Bates et al. (2009) showing net equity issuances (i.e. equity sales minus stock repurchases) are associated with cash holdings, I also control for this possibility considering market conditions for equity activities. Prior research also shows that poorly governed firms prefer empire building and tend to quickly deploy accumulated cash (Harford et al. 2008) and also exhibit higher levels of opportunistic behavior (Bushman and Smith 2001; Klein 2002; Vafaes 2005). Hence, a firm with a strong corporate governance structure may have a greater influence on cash holdings than high REM. I therefore include the Gompers' index as a control for corporate governance.[49] I also consider estimations of equation (4) using continuous measures of REM and observations in only the top and bottom quintiles of REM. Estimations of equation (4) that adopt these alternative considerations yield a coefficients on *AGGREM* and *QaAGGREM* slightly lower in magnitude but are significantly different from zero at or better than p-value < 0.01. I conclude that inferences in the main analyses are robust to consideration of these alternative specifications.

In the main analysis, I focus on the levels of cash holdings model using fixed effects. I also re-estimate equation (4) using changes in the variables rather than levels,

[48] Gao et al. (2012) also use next year's cash as a control variable to capture transitory components of levels of cash holdings. I also include the lagged dependent variable as a control, which is similar to using fixed effects (Wooldridge 2009). I estimate equation (4) using both prior and next year's cash holdings as well as firm fixed effects and find similar results to those in Table 6. Alternatively, Kennedy (2003) points out that lagged dependent variables as regressors may lead to biased coefficients in a fixed effects model. I therefore drop firm fixed effects from this sensitivity test, re-estimate equation (4), and again obtain similar results. Interestingly, in both of these alternative specifications, the coefficient on *NWC* becomes negative and significant (p-value < 0.01), suggesting firm fixed effects do not pick up components of prior year cash holdings that are positively related to *NWC*.

[49] My sample is reduced to 9,181 observations due to the limited number of firms covered in the Gompers' index offered by RiskMetrics. This sample size is consistent with that of Harford et al. (2008), who offer a reasonable comparison as they use actual cash holdings as opposed to excess cash holdings.

as an alternative to removing unobserved effects correlated with explanatory variables, particularly my proxies for REM. The results from this analysis are consistent with those reported in Table 6. Because cross-sectional and time series data are used in estimating OLS regressions, there is potential for correlation of residuals within a firm across years (see e.g., Petersen 2009; Gow et al. 2010). I also estimate equation (4) using robust standard errors clustered at the firm level and find qualitatively similar results, noting no inconsistencies in inferences about the hypothesis

Finally, I examine whether the results hold among firms with only excess cash holdings. This analysis stems from the possibility that a positive relation between cash holdings and REM holds only for firms with negative excess cash, which would also be consistent with firms using REM to generate liquidity.[50] I set observations with negative excess cash to zero and thus employ a tobit regression because OLS estimates would be biased due to the pile up at zero.[51] Results from this estimation lead to the same inferences as the ones in the main analyses supporting H1.

[50] I acknowledge the possibility that REM might bring a firm's cash holdings from negative excess cash to positive excess cash. I conclude that this outcome still provides information about REM contributing to excess cash holdings. Please see Appendix B for detailed explanations regarding estimations of excess cash holdings. .

[51] Fresard et al. (2010) note that theoretically a firm could not operate with negative excess cash and therefore set these observations to zero.

CHAPTER 7: RESULTS – VALUATION OF CASH HOLDINGS

In this chapter, I examine whether REM affects investors' valuation of cash holdings. I begin with a discussion of descriptive statistics about my market valuation model variables, then present empirical results concerning the relation between REM and the valuation of cash. I conclude with sensitivity analyses to assess the robustness of my main findings.

7.1 Descriptive statistics

Table 7 presents descriptive statistics about the valuation model variables as well as the continuous measures of REM of 31,323 firm-year observations. Consistent with prior research, I winsorize all continuous explanatory variables at the 1 percent and 99 percent levels in order to minimize extreme observations.[52] The mean (median) of *MV* is 2.6267 (1.5844). At the median, firms earn 0.0584 cents for every dollar of net assets, while the average firm reports negative earnings (-0.0400) and positive changes in earnings from prior year (0.0239).[53] The mean (median) of the level of cash holdings is 0.3212 (0.0925). The mean of continuous measure of and *aDISEXP* and *aGAINA* is -0.0007 and 0.1065, respectively. Untabulated descriptive statistics pertaining to the cut-

[52] Results are qualitatively similar when continuous explanatory variables are not winsorized.
[53] A skewed left distribution is consistent with managers' efforts to report positive earnings.

off points for the top and bottom quintile measures of *QaGAINA* and *QaDISEXP* are virtually the same as the ones discussed for cash levels analyses.

Panels A and B of Table 8 present the correlation matrix for continuous measures of market value regression variables in equation (6). The table reveals that most correlations among variables are relatively low in magnitude, particularly the REM measures. The only potentially problematic significant correlation involves *CASH* and *R&D* (Pearson of 0.4508), given interactions between *CASH* and REM measures are used to make inferences about H2.[54]

7.2 The relation between the valuation of cash holdings and REM

I first report estimates of equation (6) in column (a) of Table 9 to provide a basis of comparison to prior studies without REM variables. All specifications report t-statistics based on White's (1980) heteroscedastic-consistent standard errors.[55] The estimated coefficient of 1.7747 (p-value < 0.01) on *CASH*, which captures how investors value a firm holding an additional dollar of cash, is consistent with existing findings in the literature (see e.g., Dittmar and Marht-Smith 2007; Bates et al. 2009; Fresard and Salva 2010). As discussed in Dittmar and Mahrt-Smith (2007) and others, a coefficient greater than one supports arguments that an additional dollar varies with a number of firm characteristics. Therefore, they caution against interpreting the unconditional value of a

[54] The strong correlation between *aDISEXP* and *aAGGREM* is not a concern as they are not included in the same regression model.

[55] Hausman test (untabulated) reports a significant χ^2 statistic (p-value < 0.01), confirming the need to account for firm fixed effects. I also review the VIF of each explanatory variable and there is no indication that multicollinearity draws concerns about inferences. I later examine VIFs in multiple regression analyses to assess potential multicollinearity issues.

dollar and suggest focusing on the relative magnitude of interaction terms using this methodology.[56]

Column (a) also reports a negative and moderately significant (p-value < 0.10) coefficient on *E*, which is not consistent with expectations but stems from valuations of firms that report losses in the current year.[57] Overall, coefficients across each specification are consistent with those in the baseline model and are consistent with predictions, except for *I*. A positive coefficient on *I* is consistent with the explanation of Fama and French (1998), who infer that *I* picks up the value of interest deductions and components of profitability when earnings (*E*) is measured on a pre-tax basis. Adjusted R^2 values ranging from 37.49% to 38.18% are consistent with prior research.

The second hypothesis is concerned with whether the market's valuation of cash holdings varies by the level of REM within a firm. In columns (b) through (e) of Table 9, I show results of my estimation of equation (6) that includes various REM measures and their interactions with cash. Consistent with H2, Column (b) reports a negative and significant (p-value < 0.05) coefficient on *CASH*QaDISEXP*, suggesting that investors discount the market valuation of cash as the average firm engages in more REM through cuts in discretionary expenditures.

[56] Dittmar and Mahrt-Smith (2007) argue that there is minimal concern that the relative magnitudes of interaction terms (main variables of interest) in the model are biased. However, the possibility of a biased coefficient on *CASH* due to growth opportunities is a concern. Sensitivity analyses below using measures of excess cash address this issue.

[57] This relation is shown in an augmented version of equation (6) that includes a dummy variable equal to one for firms that report positive earnings, and zero otherwise, along with its interaction with current earnings. Estimations (untabulated) using this approach yield significant and positive coefficients on the interaction term. My reported findings are unaffected using this alternative specification.

Alternatively, Column (c) reports a negative but insignificant coefficient on *CASH*QaGAINA* (p-value > 0.10), which is inconsistent with the expectation that investors discount cash holdings of firms engaging in REM. This result reveals that investors do not expect asset sales to result in agency concerns leading to inefficient uses of cash holdings.

Inferences similar to those in columns (b) and (c) can be made for the results reported in column (d); that is, discounts on cash valuations relating to cuts in discretionary expenses remain significant (p-value < 0.05) while asset sales continue to be insignificant (p-value > 0.10). As for valuation of cash holdings with respect to firms at the top quintile of *QaAGGREM*, a negative and significant (p-value < 0.01) provides additional support for H2. In economic terms, this result implies that cash holdings of firms in the top quintile of *QaAGGREM* are discounted by 95 cents (or 57 percent) less than firms in the bottom quintile.[58] Accordingly, the valuation of cash holdings is almost half among high REM firms.

Overall, my results are consistent with H2. Evidence supports the notion that the market's valuation of cash holdings decreases as managers engage in income increasing REM. However, prior research addresses alternative estimation methodologies concerning the valuation of cash holdings. To mitigate the related validity concerns in my study, I conduct sensitivity tests in the next section.

[58] Recall that the coefficient on *QaREM* interacted with *CASH* represents the difference in the market value of cash holdings between extreme quintiles of REM. Economically, the percentage impact of *QaAGGREM* on cash valuations among firms at the top quintile relative to those at the bottom quintile is calculated as follows: [(2.2627-.9505)/ 2.2627]=.57. This relatively large discount on cash holdings is consistent with prior studies associating cash holdings using other proxies for agency issues (see e.g., Dittmar and Marht-Smith 2007: Drobetz et al. 2010)

7.3 Sensitivity on the valuation of cash holdings and REM

In this section, I address potential alternative explanations of the above findings in robustness tests. I consider using excess cash holdings rather than levels of cash holdings and controlling for possible correlated omitted variables.

While reported evidence in support of H2 indicates investors discount cash holdings of high REM firms relative to others, these tests assume that all cash within a firm is available to managers to spend on suboptimal projects. Consistent with Jensen's (1986) views about agency concerns related to free cash flows, a more likely scenario is that managers squander excess cash holdings. Following prior research (see e.g., Dittmar and Mahrt Smith 2007; Fresard and Salva 2010), I replace *CASH* in equation (6) with an excess cash holdings measure, *eCASH*, and use a subsample of firms with only residuals greater than zero from equation (4) (see Appendix B for the estimation of excess cash holdings). The excess cash approach allows the analyses to focus on a sample of firms that are most likely to deploy cash inefficiently, as their cash holdings are above levels necessary to fund operating and investing activities.

Table 10 contains the estimated coefficients of the same specifications reported in Table 9 with the exception the excess cash replaces cash holdings. Column (a) presents the baseline model and indicates a value of excess cash is positive and significant (p-value < 0.01) but slightly lower than the original cash measure (1.67 versus1.77), suggesting that *CASH* may be biased upwards; this observation is consistent across different specifications in Table 10. I also note that both current and the change in

earnings from prior year, *E* and *ΔE*, respectively, as well as *ΔLR&D* and *I* become insignificant (p-value > 0.10). A possible explanation for the loss of significance in *ΔLR&D* is firms with excess cash are more likely to waste cash on inefficient projects, reducing the perceived value of changes in R&D efforts. The difference in the coefficient on *I* between the two specifications may be due to investors viewing excess cash as a substitute for leverage, which is likely more important for firms without excess cash that are seeking funds for current and future investments. Interestingly, the coefficient on the change in dividends from prior year, *ΔLDIV*, increases in magnitude and significance, which is consistent with the notion that investors reward firms reducing agency concerns through cash distributions to shareholders when limited or no positive net present value project exist within the firm (see e.g., Pinkowitz et al. 2006). Adjusted R^2 remains around 38 percent in each specification.

The estimations reported in columns (b) through (e) are generally consistent with those shown in Table 9. The coefficient on *eCASH*QaGAINA* remains insignificant (p-value > 0.10) in both columns (c) and (d). Therefore, regardless of a firm's level of cash, investors value cash holdings among extreme levels of asset sales equally. Examining the interactions of excess cash with *QaDISEXP* and *QaGAINA* together, column (d) shows that both measures are insignificant, though, *eCASH*QaDISEXP* is only slightly above a moderate level of significance (p-value = 0.106).[59] In column (e), the combined measure of REM interacted with excess cash, *eCASH*QaAGGREM*, has a negative and

[59] Additional robustness tests discussed later include a 3 year sales growth measure as a proxy for growth options not captured by other control variables. Here the coefficient on *eCASH*QaDISEXP* remains negative but becomes significant (p-value < 0.10).

significant coefficient of -0.7982 (p-value < 0.05). This evidence implies that the marginal valuation of excess cash of high REM firms is approximately 62 percent less that of a low REM, an economically significant result.[60] These results are unaffected when using the reduced-form version of excess cash holdings (see column Appendix B).

Another approach to specifying target cash levels controls for one-year past and future changes in cash (see e.g., Pinkowitz and Williamson 2002; Pinkowitz et al. 2006). Including past and future changes instead of excess cash holdings measure also controls for times when firms hold suboptimal levels of cash.[61] I augment equation (6) with these measures and find qualitatively similar results.

I also address concerns related to the possibility that firm growth may still influence investors' valuation of cash. Although the instrumental variable approach controls for firm growth, it is possible that uncaptured growth opportunities remain in the excess cash measure. As in Fresard and Salva (2010), I include three-year sales growth in the valuation regressions to gain comfort that growth options do not mislead my results. Another potential omitted variable relates to the work of Faulkender and Wang (2006), who show that constrained firms enjoy a higher marginal value of cash than unconstrained firms.[62] I therefore include the payout ratio as a control variable in the valuation models. Results using this specification for both *CASH* and *eCASH* model are at or better than those discussed above. Finally, I also estimate equation (6) using robust

[60] [(2.1026-.7982)/2.1026] = 0.6204.
[61] An advantage of this approach over the specification with excess cash is that the regression includes the same observations as those in Table 9, making this robustness test a more direct comparison with cash levels results.
[62] I follow their measurement of constrained (unconstrained) firms, using those in the 30th (70th) percentile of a payout ratio measured as total common dividends plus repurchases over earnings.

standard errors clustered at the firm level (see e.g., Petersen 2009; Gow et al. 2010) and find qualitatively similar results, noting no inconsistencies in inferences about the hypotheses.

Overall, sensitivity analyses confirm previous findings that support my prediction that the market valuation of cash holdings is lower among firms that engage in income increasing REM. Considering the potential misleading effect of other factors that may influence both cash and firm value in the main results, it is reassuring to observe that the REM effect remains strong after consideration of these alternative explanations.

7.4 The effect of corporate governance and REM on the valuation of cash holdings

Table 11 reports regressions concerning the influence of REM and corporate governance on the valuation of cash holdings. All specifications report t-statistics based on White's (1980) heteroscedastic-consistent standard errors.[63] Requiring corporate governance data reduces the sample to 5,019 observations. Stacked regressions are estimated to allow all coefficients to vary across strong and weak corporate governance firms. [64,65] To test H3, which predicts that the valuation of cash holdings in conjunction with REM is higher for firms with strong corporate governance than for firms with weak corporate governance, I conduct F-tests that compare the coefficients on the interaction term of *CASH* and REM using White's (1980) heteroscedastic-consistent standard errors.

[63] Hausman test (untabulated) reports a significant χ^2 statistic (p-value < 0.01), confirming the need to account for firm fixed effects. I also review the VIF of each explanatory variable and there is no indication that multicollinearity draws concerns about inferences.
[64] Recall that I rank the corporate governance measure into terciles and eliminate observations in the middle tercile, allowing for stronger tests of comparisons between strong and weak corporate governance firms.
[65] All VIFs are less than 5, thus, multicollinearity does not appear to be an issue.

Panel A of Table 11 provides the baseline model of the general effect of corporate governance on the valuation of cash holdings. Columns (a) and (b) report the coefficients of stacked regressions strong and weak corporate governance firms based on the Gompers' index. Consistent with extant research, the results in Panel A show that the valuations of cash holdings for firms with a strong corporate governance structure is approximately double that of weak corporate governance firms. The adjusted R^2 also increases to 57.39%, indicating that stacked regressions improve the overall fit of the model.

Panel B of Table 11 reveals the main results for tests of H3. Given the consistency of the control variables in these regressions with those in Panel A, I only report the coefficients that directly relate to H3. Starting with columns (a) and (b) in Panel B, the coefficients on *CASH*QaDISEXP* indicate that the valuation of cash among high REM firms with strong corporate governance increases, while investors discount cash holdings among high REM firms with weak corporate governance. Consistent with H3, the F-test reveals that the coefficient on *CASH*QaDISEXP* is significantly (p-value < 0.05) higher for strong corporate governance firms relative to weak corporate governance firms. This evidence indicates that a strong corporate governance structure of a firm that cuts discretionary expenses to manage earnings gives investors comfort that existing cash holdings will be used efficiently in the future, whereas discounts among weak corporate governance firms indicate investors' are concerned about inefficient uses of cash.

The F-tests in Columns (c) and (d) indicate that cash valuations of firms engaging in opportunistic asset sales are not significantly (p-value > 0.10) different between strong

and weak governance firms. Regressions including both REM measures reported in columns (e) and (f) yield similar inferences as those in columns (a) through (d). Results on the interaction *CASH*QaAGGREM* presented in columns (g) and (h) suggest that investors assessing the combined effect of REM among weak corporate governance firms continue to discount cash holdings. The F-test reveals that the coefficient on *CASH*QaAGGREM* is significantly (p-value < 0.05) higher for strong corporate governance firms, providing additional support of H3.

Evidence in Panel B suggests that the negative influence of REM on the market valuation of cash tends to be stronger for firms with weak corporate governance. Overall, the results support the notion that investors expect efficient cash outlays under effective oversight of managers engaging in the highest level of REM. The relative magnitude of the market value of a dollar of a strong corporate governance firm is more than double that of a weak corporate governance firm. Accordingly, the effect of corporate governance on investors' perceptions about the use of cash is economically significant despite the presence of REM.

7.5 Sensitivity on the effect of corporate governance and REM on the valuation of cash holdings

In this section, I address potential alternative explanations for the above findings in robustness tests. These analyses consist primarily of examining only firms with excess cash holdings. I also consider executives' equity ownership as another measure of corporate governance.

The use of excess cash holdings in the following sensitivity analyses is consistent with the work of Dittmar and Mahrt-Smith (2007) and yields a similar sample size as their corporate governance analyses using the Gompers' index; restricting the sample to only firms with both excess cash holdings and available Gompers' index measures reduces the sample to 3,834 (789 firms) observations. The results using excess cash holdings in Panels A and B of Table 12 are very similar to those using levels of cash. Again, I report only coefficients of direct interest to H3 and discuss only the results pertaining to *QaAGGREM* but present all specifications.

Columns (g) and (h) of Table 12 report results consistent with H3. Specifically, the F-test reveals a significantly higher (p-value < 0.05) coefficient on the interaction of *eCASH*QaAGGREM* for strong corporate governance firms compared to weak corporate governance firms. Further, the marginal value of a dollar drops significantly for weak corporate governance firms, while strong corporate governance appears to mitigate potential inefficient uses of excess cash, as shown by the insignificant (p > 0.10) interaction of *eCASH*QaAGGREM* for these firms. Overall, these results are consistent with the main analyses and provide additional support for H3.

A potential endogeneity issues arises if a firm shifts between terciles over time due to market factors. To address this concern, I create new terciles based on each firm's initial Gompers' index measure, which forces its rank to remain constant over time. I

then re-estimate the stacked regressions reported in Table 11 and Table 12 and obtain nearly identical results.[66]

As an additional sensitivity test, I consider an alternative measure of corporate governance in this setting. Jensen and Meckling (1976) predict that firms with compensation contracts with less equity ownership tend to be more susceptible to managerial opportunism, leading to non-value-maximizing behavior. Warfield et al. (1995) show that a higher level of manager ownership motivates more informative financial reporting (i.e. earnings), reducing related agency problems. I expect the valuation of cash holdings to be discounted to a larger degree when equity ownership in compensation contracts is low because investors perceive inefficient uses of cash when executives' wealth does not suffer from unintended consequences. I follow Harford et al. (2008) and measure corporate governance using equity incentives measured as the lagged percentage of total outstanding common shares owned by the top five executives of the firm.[67] This measure of equity incentives replaces the Gompers' index in all specifications. Results from these analyses are substantially the same as those reported in Panel B of both Table 11 and Table 12. I conclude that the main results using the Gompers' index are not sensitive to the choice of corporate governance measure.

[66] Using a firm's initial Gompers' index measure creates a constant variable for each firm. I note that there is adequate variation in cash holdings over time despite inclusion of firm fixed effects, enabling estimation of the interaction terms. Nonetheless, I re-estimate regressions that exclude firm fixed effects and obtain very similar results.

[67] Data used to construct the equity incentive measure are obtained from RiskMetrics for years 1996 through 2005 and from Compustat's Execucomp database for years 2006 through 2010. Similar to the Gompers' index, I rank the lagged equity incentive measure into terciles, treating those in the lower (upper) tercile as weak (strong) governance and excluding observations in the middle tercile.

As in robustness tests of H2, I control for the following in the corporate governance analyses: 1) corporate target levels of cash using one-year past and future changes in cash, 2) reduced-form estimation of excess cash (column (c) of Table B1), 3) additional control for growth options, 4) payout ratio, 5) limiting sample to firms at the bottom and top quintiles of *QaAGGREM*, and 6) firm-level clustered standard errors. Results from these alternative specifications yield qualitatively similar results as those in the main analyses.

CHAPTER 8: CONCLUSIONS

As researchers continue to explore how managers' efforts to serve their own interests affect firm operations and cash flows, it is important to consider potential unintended consequences of REM behavior. I test three hypotheses. The first two hypotheses investigate the effect of REM on levels and valuations of cash holdings. The third hypothesis considers the role of corporate governance in the valuation of cash holdings in connection with REM to assess whether monitoring provides investors with additional information about potential consequences of management behavior. These hypotheses draw from agency theory that involves managers' efforts to meet their own objectives despite potential for exacerbating the free cash flow problem and destruction of firm value.

I test my hypotheses using methodologies applied in extant research regarding REM and cash holdings. Consistent with my predictions, I find evidence that income increasing REM results in both higher cash holdings and valuation discounts on cash holdings. At the same time, strong corporate governance mitigates investors' concerns about future uses of cash and reduces the magnitude of valuation discounts that weak corporate governance firms incur. The economic impact of REM indicates drastic discounts, leaving firms with severe agency problems as little as one third the valuation of cash compared to ones that are able to avoid or alleviate opportunistic behavior.

Results of this study inform researchers, investors, corporate boards, and standard setters about two major concerns. It shows that real transactions that directly affect cash flows contribute to cash holdings and how the market values expected future uses of cash holdings when management has demonstrated efforts to manipulate earnings. Insights of this study inform these parties that the nature of accounting standards introduce conflicts and, in turn, create additional agency concerns surrounding the free cash flow problem as well as valuation discounts pertaining to firm cash holdings. Potentially, a continuation of efforts among accounting standard setters to further the application of fair value measurement could reduce some of the opportunistic behaviors explored in this study. In light of the analytical work of Ewert and Wagenhofer (2005), my study indicates that tighter accounting standards enabling REM behavior is costly to the firm, particularly when a firm has weak corporate governance.

My results are robust to controlling for a number of issues, including but not limited to firm fixed-effects, within firm correlation of residuals, relevant omitted variables identified in extant research, and separate analyses using subsamples to increase the power of my tests. These alternative considerations reinforce inferences made in the main analyses, providing additional support about REM leading to agency issues associated with levels and valuations of cash holdings. Despite efforts to examine relevant variables, I acknowledge that other factors affecting the outcomes observed may exist. The level of scrutiny managers face after conducting opportunistic behaviors and other egregious acts leaves open questions concerning how accounting information can shed light of levels and valuations of cash holdings.

APPENDIX A: VARIABLE DEFINITIONS

GAINA = income from fixed asset and investment sales scaled by lagged total assets scaled by total assets at the beginning of the year;

A = total assets at the end of the year;

LMV = natural log of market value;

Q = Tobin's Q;

INT = internal funds measured as the sum of income before extraordinary items research and development expense, and depreciation and amortization expense scaled by total assets at the beginning of the year;

ASALES = long-lived fixed asset sales scaled by total assets at the beginning of the year;

ISALES = long-lived investment sales scaled by total assets at the beginning of the year;

aGAINA = abnormal income from asset sales measured as the residual from equation (1);

DISEXP = sum of R&D, SG&A, and advertising expenses scaled by total assets at the beginning of the year;

S = total sales scaled by total assets at the beginning of the year;

aDISEXP = abnormal discretionary expenses measured as the negative of the residual from equation (2);

aAGGREM = abnormal aggregate REM measured as the sum of residuals of equations (1) and (2);

LNCASH = log of cash and short-term investments scaled by net assets (total assets minus cash and short-term investments);

LNA = log of net assets;

CF = cash flow measured as operating income before depreciation minus interest expense and income tax expense scaled by net assets;

NWC = net working capital measured as current assets minus current liabilities minus cash and short-term investments scaled by net assets;

INSIG = industry sigma measured as the average standard deviation of industry cash flows scaled by net assets over the last 10 years;

MTB = market value measured as share price times shares outstanding plus total liabilities scaled by net assets;

CAPX = capital expenditures scaled by net assets;

R&D = research and development expenses scaled by net assets;

LEV = measured as the sum of long-term debt and short-term debt scaled by net assets;

DIV = indicator variable equal to one if firm pays a cash dividend, and zero otherwise;

MV = market value measured as share price times shares outstanding plus total liabilities scaled by net assets;

E = earnings before extraordinary items scaled by net assets;

D = common dividends scaled by net assets;

I = interest expenses scaled by net assets;

NA = net assets measured as total assets minus cash and short-term;

DA = discretionary accruals estimated using a modified Jones model;

QaGAINA = *aGAINA* ranked into quintiles by industry and year;

QaDISEXP = *aDISEXP* ranked into quintiles by industry and year;

QaAGGREM = *aAGGREM* ranked into quintiles by industry and year;

eCASH = positive residuals described as excess cash holdings from equation (3);

3YRSG = instrumental variable equal to three year lagged sales growth;

$\widehat{MTB}$ = instrumented (predicted) *MV* for excess cash estimations

SUSPECT = indicator variable equal to one if reported income less both *DISEXP* and *GAINA* is less than prior year reported earnings and current earnings are positive and zero otherwise.

APPENDIX B: ESTIMATING EXCESS CASH HOLDINGS

This appendix describes estimating excess cash holdings based on prior research.[68] The work of Opler et al. (1999) provides evidence that firms stray from optimal levels but generally seek to maintain a certain level of cash holdings necessary to support operating and investing activities. Thus, the level of cash held by a firm may be due to idiosyncratic reasons that are constant or correlated over time.

I employ the instrumental variable (IV) approach of Dittmar and Mahrt-Smith (2007), among others, in estimating excess cash. Using *MTB* as a proxy for investment opportunities in equation (4) would create an econometric problem in my research design concerning the valuation of cash holdings (i.e. equation (6)). Specifically, *MTB* as a proxy for investment opportunities likely results in an endogenous relationship between cash holdings and firm value. The first stage of the IV model with *MTB* as the dependent variable uses three year lagged sales growth as a proxy for investment opportunities and includes *LNA*, *CF*, *NWC*, *INDSIG*, and *R&D* as independent variables. Fitted values ($\widehat{MTB}$) from the first stage are used in the second stage. I estimate equation (4) using $\widehat{MTB}$ in place of *MTB* and include fixed effects to reduce the potential for

[68] I refer the reader to both Dittmar and Mahrt-Smith (2007) and Fresard and Salva (2010) who offer extensive discussions of more specific methodology issues employed in estimating excess cash holdings.

correlated omitted variables in estimating model coefficients.[69] Next, I calculate predicted log of cash levels using all coefficients except firm fixed effects and subtract these values from firms' actual cash holdings. Leaving a firm's fixed effect measure of excess cash is important given that subsequent analyses test whether managers' opportunistic behaviors contribute to excess cash. I the calculate the residuals used in my analyses as actual cash minus the exponential of the predicted log of cash. In addition, I also apply the IV approach to a reduced-form equation that excludes *LEV*, *DIV* and *CAPEX* , as they may be simultaneously determined with cash (Opler et al. 1999). Positive residuals from estimations in columns (b) and (c) represent excess cash holdings. See Table B1 for results of these regression estimations.

[69] I formally test whether a random effects model or a fixed effects model is the appropriate specification for equation (4). The Hausman test (untabulated) rejects the null hypothesis that constant factors across firms are uncorrelated with the explanatory variables (p-value < 0.01). I therefore allow for firm fixed effects in equation (4) to reduce coefficient bias.

Table B1 Estimating excess cash holdings

	First Stage	Second stage	
		Full Model	Reduced form
Variable	(a)	(b)	(c)
LNA	-0.8438***	-0.3655***	-0.3362***
	(-20.01)	(-13.44)	(-12.25)
CF	0.2070	0.1610***	0.1906***
	(1.30)	(4.45)	(5.06)
NWC	-0.7036***	-0.0152	0.1939***
	(-4.67)	(-0.30)	(4.17)
INDSIG	0.9121**	0.6638***	0.6147***
	(2.25)	(3.10)	(2.83)
$\widehat{MTB}$		0.1387***	0.1744***
		(4.54)	(5.67)
CAPX		1.2454***	
		(9.63)	
R&D	3.6180***	0.2562*	0.2072
	(11.26)	(1.90)	(1.48)
LEV		-0.4475***	
		(-10.19)	
DIV		0.1537***	
		(5.77)	
3YRSG	0.8856***		
	(9.43)		
N	36,063	36,063	36,063
Adj. R^2 (%)	12.83	8.79	10.02

*, **, *** Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.
t-statistics (in parentheses) are estimated using White's (1980) heteroscedastic-consistent errors.

This table reports the estimation results for the level of cash used to compute excess cash holdings discussed in Appendix B. *MV* is the dependent variable in column (a) which represents the first stage of the instrumental variable approach. The log of cash is the dependent variable in Columns (b) and (c), which report two approaches to estimating excess cash: a full model and a reduced form model, respectively. Both approaches use the predicted values of *MV* (i.e. $\widehat{MTB}$) from first stage to proxy for *MTB* in the second stage. All estimations are based on the pooled ordinary least squares method with firm fixed effects and year indicators. The constant for firm intercepts from firm fixed effects estimation is not reported. Each adjusted R^2 refers to the within dimension. See Appendix A for variable definitions.

Table 1 Sample selection

Panel A Estimating REM

	Eq. 1	Eq. 2
Compustat firm-year observations from 1987 to 2011	226,829	226,829
Less: American Depository Receipts	(59)	(59)
Firms in the financial and utility industries (SIC 6000-6999 and SIC 4400-5000)	(43,361)	
Firms in the financial and utility industries (SIC 6000-6500 and SIC 4400-5000)		(33,735)
Missing data	(63,287)	(37,631)
Observations with gain or loss of sale of assets equal to zero	(68,498)	
Observations with sales less than zero		(34,818)
Industries with less than 15 firm-year observations	(4,728)	(10,624)
	46,896	109,962

Panel B Samples used in hypotheses testing

Intersection of samples for Equations (1) and (2)		42,275
Less: Observations with cash holdings equal to zero	(420)	
Observations missing data	(2,097)	(2,517)
Cash Level Sample (Equation 4)		39,758
Less: Observations missing data for estimating excess cash holdings	(3,695)	
Less: Observations missing lead and lag variables	(4,740)	(8,435)
Cash Valuation Sample (Equation 6)		31,323
Less: Observations missing Corporate Governance data	(23,061)	
Observations in middle tercile of Gompers' index	(3,243)	(26,304)
Cash Valuation and Corporate Governance Sample (Equation 6)		5,019

Table 2 Descriptive statistics of variables for estimating REM

Variable[a]	N	Mean	Median	Standard Deviation	25th Percentile	75th Percentile
GAINA	46,896	0.0072	0.0000	0.0447	-0.0012	0.0033
$1 / A_{t-1}$	46,896	0.0758	0.0104	0.2723	0.0023	0.0435
LMV	46,896	4.6094	4.5228	2.1837	2.9518	6.1812
Q	46,896	2.5745	1.2253	6.2888	0.7577	2.2531
INT	46,896	0.0181	0.0920	0.4675	-0.0020	0.1715
ASALES	46,896	0.0037	0.0000	0.0212	0.0000	0.0005
ISALES	46,896	0.0029	0.0000	0.1046	0.0000	0.0000
DISEXP	109,523	0.7561	0.3866	2.0382	0.1885	0.7047
$1 / A_{t-1}$	109,523	0.4192	0.0136	3.6462	0.0026	0.0725
S_{t-1}	109,523	1.2667	1.1020	0.9470	0.6344	1.6599

[a] See Appendix A for variable definitions.

Table 3 Estimating normal levels of gain on asset sales and discretionary expenditures

Variable	Pred. sign	Estimated Coefficient	Variable	Pred. sign	Estimated Coefficient
Intercept		0.0024***	*Intercept*		0.2024***
		(3.11)			(17.23)
$1 / A_{t-1}$	?	0.0743***	$1 / A_{t-1}$	+	1.8520***
		(2.17)			(11.82)
LMV_t	+	-0.0002	S_{t-1}	+	0.1239***
		(-1.55)			(12.27)
Q_t	-	-0.0013***			
		(-3.90)			
INT_t	+	0.0303***			
		(10.62)			
$ASALES_t$	+	0.4258***			
		(13.96)			
$ISALES_t$	+	0.0367			
		(0.18)			
Mean Adj. R^2 (%)		49.47			74.42
Mean no. of obs.		54.51			100.55
No. of industry years		775			1,068

*, **, *** Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.

The regressions are estimated cross-sectionally for industry-year pairs with at least 15 observations for the period 1988 – 2011. t-statistics are based on standard errors of the mean coefficients across the industry-year pairs. The adjusted R^2 and the number of observations is the mean across the industry-year pairs. See Appendix A for variable definitions.

Table 4 Descriptive statistics of cash levels variables

Variable[a]	Mean	Median	Standard Deviation	25th Percentile	75th Percentile
LNCASH	-2.4545	-2.3563	1.8736	-3.6929	-1.1298
CASH	0.3824	0.0947	1.3304	0.0249	0.3231
LNA	4.6336	4.5517	2.1012	3.1185	6.0889
CF	-0.0485	0.0772	0.6211	-0.0054	0.1364
NWC	0.0709	0.1118	0.3709	-0.0354	0.2660
INDSIG	0.1657	0.1465	0.0973	0.0843	0.2173
MTB	2.9431	1.6242	5.1994	1.1524	2.7386
CAPX	0.0755	0.0491	0.0831	0.0251	0.0930
R&D	0.0922	0.0005	0.3148	0.0000	0.0713
LEV	0.2769	0.2104	0.3371	0.0403	0.3883
DIV	0.3114	0.0000	0.4631	0.0000	1.0000
DA	0.0481	0.0321	0.2451	-0.4291	0.1308
aGAINA	-0.0006	-0.0025	0.0276	-0.0090	0.0027
aDISEXP	0.0873	0.0927	0.4057	-0.0568	0.2895

[a] The sample covers the period 1988-2011 and includes 39,758 firm-year observations. See Appendix A for variable definitions.

Table 5 Correlations of cash levels variables

	Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.	*LNCASH*		-0.223*	-0.197*	-0.137*	0.317*	0.383*	0.096*	0.342*	-0.191*	-0.139*	0.019*	0.048*	-0.076*
2.	*LNA*	-0.231*		0.325*	0.147*	-0.096*	-0.197*	-0.054*	-0.225*	-0.014*	0.375*	0.049*	0.009	0.196*
3.	*CF*	0.045*	0.326*		0.476*	-0.199*	-0.416*	-0.100*	-0.716*	-0.266*	0.148*	0.170*	-0.110*	0.226*
4.	*NWC*	-0.088*	0.017*	0.217*		-0.171*	-0.296*	-0.143*	-0.361*	-0.446*	0.108*	0.153*	-0.076*	0.104*
5.	*INDSIG*	0.344*	-0.131*	-0.096*	-0.125*		0.225*	-0.052*	0.285*	-0.035*	-0.165*	0.199*	-0.016*	0.199*
6.	*MTB*	0.557*	-0.131*	0.173*	-0.177*	0.321*		0.164*	0.477*	0.061*	-0.096*	-0.045*	0.019*	-0.243*
7.	*CAPX*	0.094*	0.047*	0.245	-0.119*	-0.099*	0.176*		0.089*	-0.009	-0.002	-0.024*	-0.004	-0.131*
8.	*R&D*	0.437*	-0.147*	-0.111*	0.009*	0.503*	0.386*	-0.033*		0.107*	-0.134*	-0.040*	0.036*	-0.220*
9.	*LEV*	-0.452*	0.141*	-0.216*	-0.243*	-0.191*	-0.271*	-0.068*	-0.246*		-0.062*	-0.102*	0.031*	-0.025*
10.	*DIV*	-0.149*	0.365*	0.242*	0.079*	-0.191*	-0.064*	0.069*	-0.151*	0.008*		0.013*	0.005	0.037*
11.	*DA*	0.053*	0.037*	0.134*	0.130*	0.259*	0.064*	-0.014*	0.069*	-0.103*	0.006		0.060*	0.179*
12.	*aGAINA*	-0.027*	0.114*	-0.128*	-0.053*	-0.154*	-0.032*	-0.048*	-0.068*	0.073*	0.057*	-0.033*		-0.033*
13.	*aDISEXP*	-0.017*	0.157*	0.048*	0.014*	0.299*	-0.103*	-0.158*	-0.056*	0.019*	0.010*	0.184*	-0.037*	

This table reports Pearson (Upper Triangle) and Spearman (Lower Triangle) correlations of variables in the cash levels equation (4) for the sample of 39,758 observations over the period 1988-2011. * Indicates significance at the 5 percent level. See Appendix A for variable definitions.

Table 6 Multiple regression of cash holdings on REM

Variable	Pred. sign	(a)	(b)	(c)	(d)
LNA	-	-0.4392***	-0.4376***	-0.4416***	-0.4401***
		(-31.93)	(-31.79)	(-32.08)	(-31.99)
CF	+	0.2002***	0.2063***	0.2090***	0.2032***
		(7.21)	(7.43)	(7.48)	(7.30)
NWC	-	-0.0165	-0.0211	-0.0142	-0.0153
		(-0.41)	(-0.53)	(-0.35)	(-0.38)
INDSIG	+	0.6677***	0.8161***	0.6746***	0.6622***
		(3.28)	(4.03)	(3.32)	(3.26)
MTB	+	0.0482***	0.0476***	0.0482***	0.0482***
		(15.02)	(14.92)	(15.05)	(15.02)
CAPX	+	1.3068***	1.2690***	1.3088***	1.3044***
		(11.25)	(10.95)	(11.28)	(11.23)
R&D	+	0.4367***	0.4187***	0.4443***	0.4420***
		(6.48)	(6.34)	(6.59)	(6.55)
LEV	-	-0.4348***	-0.4341***	-0.4351***	-0.4338***
		(-10.95)	(-10.92)	(-10.94)	(-10.92)
DIV	-	0.1468***	0.1458***	0.1471***	0.1472***
		(5.90)	(5.85)	(5.92)	(5.92)
DA	-	-0.0874***	-0.0921***	-0.0878***	-0.0915***
		(-2.80)	(-2.95)	(-2.81)	(-2.93)
QaDISEXP	H1: +	0.2143***		0.2129***	
		(7.45)		(7.40)	
QaGAINA	H1: +		0.0897***	0.0882***	
			(4.81)	(4.73)	
QaAGGREM	H1: +				0.2330***
					(8.15)
N		39,758	39,758	39,758	39,758
Adj. R^2 (%)		12.70	12.58	12.77	12.74

*, **, *** Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test. t-statistics (in parentheses) are estimated using White's (1980) heteroscedastic-consistent errors.

This table reports the estimation results of equation (4) based on the pooled ordinary least squares method with firm fixed-effects and year indicators. The dependent variable in all specifications is the log of the ratio of cash holdings to net assets, where net assets is measured as total assets minus cash holdings. Columns (a) through (d) report specifications using REM measures. The constant for firm intercepts from firm fixed effects estimation is not reported. Each adjusted R^2 refers to the within dimension. See Appendix A for variable definitions.

Table 7 Descriptive statistics of firm valuation variables

Variable	Mean	Median	Standard Deviation	25th Percentile	75th Percentile
MV	2.6267	1.5844	4.0647	1.1393	2.5763
E	-0.0400	0.0584	0.4241	-0.0278	0.1081
ΔLE	0.0239	0.0104	0.4019	-0.0407	0.0576
ΔE	0.0260	0.0106	0.3304	-0.0443	0.0637
R&D	0.0712	0.0017	0.1632	0.0000	0.0673
ΔLR&D	-0.0004	0.0000	0.0565	0.0000	0.0017
ΔR&D	0.0026	0.0000	0.0571	0.0000	0.0016
DIV	0.0086	0.0000	0.0240	0.0000	0.0061
ΔLDIV	0.0006	0.0000	0.0132	0.0000	0.0000
ΔDIV	0.0006	0.0000	0.0137	0.0000	0.0000
I	0.0248	0.0156	0.0344	0.0039	0.0318
ΔLI	-0.0001	0.0000	0.0188	-0.0030	0.0038
ΔI	0.0008	0.0000	0.0203	-0.0031	0.0036
ΔLNA	0.0070	0.0380	0.3643	-0.0750	0.1609
ΔNA	0.1061	0.0343	0.4295	-0.0719	0.1766
ΔMV	0.3331	0.0462	2.7825	-0.2552	0.4765
CASH	0.3212	0.0925	0.9165	0.0248	0.3040
aGAINA	-0.0007	-0.0024	0.0266	-0.0088	0.0026
aDISEXP	0.1065	0.0975	0.3486	-0.0413	0.2907
aAGGREM	0.1058	0.0978	0.3490	-0.0432	0.2895

[1 a] The sample covers the period 1988-2011 and includes 31,323 firm-year observations. See Appendix A for variable definitions.

Table 8 Correlations of firm valuation variables

PANEL A Correlation matrix columns 1-11

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. MV		-0.220*	0.047*	-0.045*	0.444*	0.080*	0.235*	0.052*	0.040*	0.015*	0.047*
2. *E*	0.226*		0.184*	-0.550*	-0.513*	0.155*	0.228*	0.141*	0.039*	0.031*	-0.220*
3. *ΔLE*	0.176*	0.406*		-0.174*	0.060*	-0.355*	0.019*	-0.011*	0.009	0.012*	0.047*
4. *ΔE*	0.066*	-0.286*	-0.169*		0.134*	-0.141*	-0.343*	-0.024*	-0.009	0.017*	0.078*
5. *R&D*	0.384*	-0.144*	0.023*	0.047*		-0.030*	-0.100*	-0.077*	-0.001	-0.015*	0.029*
6. *ΔLR&D*	0.151*	0.129*	-0.103*	-0.061*	0.220*		0.153*	0.003	0.001	0.013*	-0.087*
7. *ΔR&D*	0.186*	0.221*	0.118*	-0.100*	0.124*	0.170*		-0.009	-0.009	0.010*	-0.050*
8. *DIV*	0.020*	0.287*	-0.036*	-0.045*	-0.125*	0.018*	0.013*		0.463*	-0.218	-0.107*
9. *ΔLDIV*	0.101*	0.225*	0.024*	-0.031*	-0.039*	0.059*	0.039*	0.527*		-0.330*	-0.036*
10. *ΔDIV*	0.097*	0.221*	0.072*	0.028*	-0.035*	0.043*	0.065*	0.354*	0.420*		-0.035*
11. *I*	-0.314*	-0.116*	-0.017*	0.004	-0.255*	-0.118*	-0.102*	-0.102*	-0.080*	-0.071*	
12. *ΔLI*	-0.033*	-0.059*	-0.027*	0.009	-0.044*	0.036*	-0.029*	0.015*	0.006	-0.018*	0.154*
13. *ΔI*	0.048*	-0.004	-0.032*	-0.019*	-0.029*	0.057*	0.041*	0.048*	0.064*	0.008*	-0.205*
14. *ΔLNA*	0.166*	0.329*	0.121*	-0.149*	-0.063*	0.237*	0.183*	0.043*	0.116*	0.094*	-0.193
15. *ΔNA*	0.279*	0.332*	0.166*	0.134*	-0.035*	0.102*	0.247*	0.056*	0.099*	0.130*	-0.142*
16. *ΔMV*	-0.038*	0.083*	0.056*	0.257*	-0.013*	-0.001	0.089*	0.032*	0.035*	0.099*	-0.032*
17. *CASH*	0.553*	0.033*	0.081*	0.038*	0.431*	0.086*	0.104*	-0.112*	-0.047*	-0.034*	-0.448*
18. *aGAINA*	-0.033*	-0.018*	-0.004	-0.014*	-0.071*	-0.042*	-0.040*	0.061*	0.027*	0.022*	0.084*
19. *aDISEXP*	-0.063*	0.031*	-0.012*	-0.016*	-0.019*	-0.052*	0.029*	-0.001	-0.008	-0.004	-0.023*
20. *aAGGREM*	-0.062*	0.034*	-0.005	-0.023	-0.019	-0.054	0.026	-0.000	-0.008	-0.005	-0.018

Table 8 continued

PANEL B Correlation matrix columns 12-20

Variable	12.	13.	14.	15.	16.	17.	18.	19.	20.
1. MV	-0.027*	0.016*	0.006	0.246*	-0.019*	0.559*	0.041*	-0.139*	-0.135*
2. *E*	-0.011*	-0.010	0.502*	0.083*	-0.019*	-0.220*	-0.000	0.125*	0.125*
3. *ΔLE*	-0.047*	-0.051*	0.014*	0.063*	0.092*	0.039*	0.087*	-0.008	-0.001
4. *ΔE*	0.036*	-0.052*	-0.399*	-0.038*	0.084*	-0.009	-0.113*	-0.008	-0.017*
5. *R&D*	-0.018*	-0.011	-0.207*	0.042*	0.089*	0.451*	0.040*	-0.214*	-0.211*
6. *ΔLR&D*	0.009*	0.049*	0.265*	0.044*	-0.048*	-0.013*	-0.031*	-0.066*	-0.068*
7. *ΔR&D*	-0.035*	0.023*	0.197*	0.260*	0.068*	0.070*	0.004	0.025*	0.026*
8. *DIV*	0.009	0.014*	0.015*	-0.002	-0.014*	0.056*	0.005*	0.003*	0.004*
9. *ΔLDIV*	0.004	0.013*	0.014*	0.007	-0.006	0.029*	0.004	0.004	0.005
10. *ΔDIV*	-0.009	-0.004	0.025*	0.013*	0.024*	-0.008	-0.011*	-0.004	-0.005
11. *I*	0.164*	-0.261*	-0.241*	-0.064*	-0.000	-0.010	0.072*	-0.062*	-0.057*
12. *ΔLI*		0.066*	0.191*	-0.011	-0.026*	-0.036*	-0.029*	-0.039*	-0.041*
13. *ΔI*	0.195*		0.201*	0.276*	0.064*	-0.019*	-0.034*	-0.036*	-0.038*
14. *ΔLNA*	0.246*	0.321*		0.140*	-0.008	-0.146*	-0.070*	-0.102*	-0.107*
15. *ΔNA*	-0.005*	0.251*	0.281*		0.304*	0.138*	-0.005	-0.049*	-0.049*
16. *ΔMV*	-0.035*	0.083*	0.026*	0.414*		0.020*	-0.013*	-0.060*	-0.061*
17. *CASH*	-0.120*	-0.040*	-0.056*	0.104*	-0.005		0.072*	-0.013*	-0.008
18. *aGAINA*	-0.020*	-0.027*	-0.069	-0.037	-0.012*	-0.027*		-0.024*	0.052*
19. *aDISEXP*	-0.060*	-0.047*	-0.100	-0.031	-0.023*	0.014*	-0.033*		0.997*
20. *aAGGREM*	-0.063*	-0.050*	-0.104	-0.034	-0.026*	0.017*	0.026*	0.995*	

This table reports Pearson (Upper Triangle) and Spearman (Lower Triangle) correlations of variables in the firm valuation equation (6) for the sample of 31,323 observations over the period 1988-2011. * Indicate significance at the 5 percent level. See Appendix A for variable definitions.

Table 9 The effect of REM on the valuation of cash holdings

Variable	Pred. sign	(a)	(b)	(c)	(d)	(e)
E	+	-0.6861*	-0.5893*	-0.6813*	-0.5913*	-0.5729*
		(-1.92)	(-1.72)	(-1.90)	(-1.72)	(-1.68)
ΔLE	+	0.2559**	0.2196*	0.2542**	0.2163*	0.2182*
		(2.12)	(1.81)	(2.11)	(1.79)	(1.80)
ΔE	+	0.0687	0.1103	0.0566	0.1019	0.0960
		(0.23)	(0.36)	(0.19)	(0.34)	(0.32)
R&D	+	7.1321***	6.6481***	7.0846***	6.6014***	6.5667***
		(7.28)	(6.64)	(7.21)	(6.56)	(6.59)
ΔLR&D	+	2.4764**	2.2890**	2.4862**	2.3080**	2.2441**
		(2.55)	(2.35)	(2.57)	(2.38)	(2.31)
ΔR&D	+	11.7144***	11.6033***	11.6691***	11.5660***	11.5731***
		(7.75)	(7.67)	(7.69)	(7.61)	(7.65)
DIV	+	7.3976***	7.8883***	7.3839***	7.8733***	7.9405***
		(6.40)	(6.92)	(6.45)	(6.90)	(7.02)
ΔLDIV	+	3.3842***	2.9690**	3.3215***	2.9100**	2.8552**
		(2.76)	(2.50)	(2.73)	(2.45)	(2.41)
ΔDIV	+	6.5332***	6.3043***	6.4158***	6.1852***	6.2794***
		(6.25)	(6.31)	(6.26)	(6.29)	(6.33)
I	-	7.4403***	7.0848***	7.5360***	7.1964***	7.0241***
		(3.64)	(3.53)	(3.71)	(3.59)	(3.50)
ΔLI	-	-11.1160***	-10.4800***	-11.2662***	-10.6066***	-10.3309***
		(-4.36)	(-4.31)	(-4.40)	(-4.36)	(-4.26)
ΔI	-	-4.1991*	-3.6122	-4.1371*	-3.5599	-3.4793
		(-1.84)	(-1.62)	(-1.80)	(-1.60)	(-1.57)
ΔLNA	+	1.1278***	1.0072***	1.1324***	1.0094***	0.9776***
		(8.04)	(7.44)	(8.01)	(7.45)	(7.30)
ΔNA	+	1.3572***	1.3305***	1.3530***	1.3260***	1.3263***
		(8.03)	(7.80)	(8.01)	(7.78)	(7.78)

Table 9 continued

Variable	Pred. sign	(a)	(b)	(c)	(d)	(e)
ΔMV	-	-0.2364***	-0.2376***	-0.2368***	-0.2379***	-0.2377***
		(-5.40)	(-5.41)	(-5.42)	(-5.43)	(-5.42)
DA	?	-0.0285	-0.0359	-0.0466	-0.0329	-0.0285
		(-0.23)	(-0.30)	(-0.39)	(-0.27)	(-0.23)
CASH	+	1.7747***	2.1862***	1.9850***	2.3865***	2.2627***
		(11.71)	(8.12)	(9.56)	(8.21)	(8.52)
QaDISEXP	?		-0.0908		-0.0914	
			(-0.79)		(-0.79)	
*CASH*QaDISEXP*	H2: -		-0.8393**		-0.8346**	
			(-2.15)		(-2.13)	
QaGAINA	?			0.1186	0.1212*	
				(1.57)	(1.68)	
*CASH*QaGAINA*	H2: -			-0.2958	-0.2851	
				(0.23)	(-1.18)	
QaAGGREM	?					-0.0691
						(-0.65)
*CASH*QaAGGREM*	H2: -					-0.9505***
						(-2.70)
Adj. R^2 (%)		37.49	38.00	37.57	38.07	38.18

*, **, *** Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.
t-statistics (in parentheses) are estimated using White's (1980) heteroscedastic-consistent errors.

This table reports the estimation results of equation (6) based on the pooled ordinary least squares method with firm and industry fixed effects and year indicators.. MV is the dependent variable in all specifications. Columns (a) reports a baseline model and columns (b) through (e) report specifications using REM measures. The constant for firm intercepts from firm fixed effects estimation is not reported. Each adjusted R^2 refers to the within dimension. See Appendix A for variable definitions.

Table 10 The effect of REM on the valuation of excess cash holdings

Variable	Pred. sign	(a)	(b)	(c)	(d)	(e)
E	+	-0.1950	-0.1119	-0.1992	-0.1168	-0.0869
		(-0.41)	(-0.24)	(-0.42)	(-0.25)	(-0.18)
ΔLE	+	0.1557	0.1115	0.1539	0.1101	0.1077
		(1.10)	(0.80)	(1.10)	(0.79)	(0.78)
ΔE	+	0.4458	0.4715	0.4339	0.4598	0.4561
		(1.02)	(1.07)	(0.99)	(1.04)	(1.03)
R&D	+	7.9516***	7.5505***	7.9084***	7.5122***	7.4653***
		(7.62)	(7.26)	(7.54)	(7.18)	(7.17)
ΔLR&D	+	1.6916	1.4740	1.7242	1.5071	1.4202
		(1.38)	(1.21)	(1.41)	(1.24)	(1.17)
ΔR&D	+	12.2380***	12.2018***	12.1848***	12.1520***	12.1673***
		(6.53)	(6.49)	(6.47)	(6.43)	(6.47)
DIV	+	7.5575***	7.7918***	7.5750***	7.8039***	7.8498***
		(4.19)	(5.22)	(4.96)	(5.24)	(5.30)
ΔLDIV	+	5.3198***	4.9515***	5.2549***	4.8932***	4.8121***
		(3.23)	(3.08)	(3.20)	(3.04)	(3.00)
ΔDIV	+	7.0510***	6.6922***	6.9378***	6.5882***	6.6350***
		(5.34)	(5.25)	(5.39)	(5.28)	(5.27)
I	-	2.8392	2.4858	2.9582	2.6068	2.4133
		(0.97)	(0.85)	(1.02)	(0.89)	(0.82)
ΔLI	-	-8.9403***	-8.0758***	-9.1566***	-8.2920**	-7.8330**
		(-2.69)	(-2.47)	(-2.73)	(-2.53)	(-2.42)
ΔI	-	-8.5183**	-7.8611**	-8.4541**	-7.8113**	-7.6155***
		(-2.27)	(-2.15)	(-2.24)	(-2.13)	(-2.09)
ΔLNA	+	1.2365***	1.0967***	1.2357***	1.0969***	1.0567***
		(6.53)	(5.84)	(6.53)	(5.83)	(5.66)
ΔNA	+	1.6163***	1.5849***	1.6114***	1.5807***	1.5767***
		(6.59)	(6.41)	(6.58)	(6.40)	(6.37)

Table 10 continued

Variable	Pred. sign	(a)	(b)	(c)	(d)	(e)
ΔMV	-	-0.2645***	-0.2652***	-0.2655***	-0.2661***	-0.2652***
		(-5.00)	(-5.00)	(-5.03)	(-5.03)	(-5.00)
DA	?		0.0107	0.0037	0.0152	0.0213
			(0.05)	(0.02)	(0.07)	(0.10)
eCASH	+	1.6699***	2.0027***	1.8770***	2.1954***	2.1026***
		(11.81)	(8.00)	(7.62)	(7.06)	(8.42)
QaDISEXP	?		-0.2855		-0.2886*	
			(-1.62)		(-1.65)	
*eCASH*QaDISEXP*	H2: -		-0.6438		-0.6347	
			(-1.62)		(-1.60)	
QaGAINA	?			0.0852	0.0865	
				(0.77)	(0.78)	
*eCASH*QaGAINA*	H2: -			-0.2894	-0.2756	
				(-1.06)	(-1.02)	
QaAGGREM	?					-0.2309
						(-1.39
*eCASH*QaAGGREM*	H2: -					-0.7982**
						(-2.25
N		18,263	18,263	18,263	18,263	18,263
Adj. R^2 (%)		38.86	39.20	38.93	39.27	39.37

*, **, *** Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.
t-statistics (in parentheses) are estimated using White's (1980) heteroscedastic-consistent errors.

This table reports the estimation results of equation (6) based on the pooled ordinary least squares method with firm and industry fixed effects and year indicators. MV is the dependent variable in all specifications. Only firm-year observations with positive residuals from equation (4) and available data are included in this sample. Columns (a) report a baseline model and columns (b) through (e) report specifications using REM measures. The constant for firm intercepts from firm fixed effects estimation is not reported. Each adjusted R^2 refers to the within dimension. See Appendix A for variable definitions and Appendix B for estimation of excess cash holdings.

Table 11 The effect of corporate governance and REM on the valuation of cash

Panel A Baseline model

Variable	Pred. sign	Strong (a)	Weak (b)
E	+	2.3049***	2.3924***
		(3.16)	(3.28)
ΔLE	+	-0.1227	-0.2635
		(-0.35)	(-0.88)
ΔE	+	2.3190***	1.5418***
		(3.39)	(4.16)
R&D	+	-0.1473	4.0962
		(-0.04)	(1.27)
ΔLR&D	+	-0.3668	1.3782
		(-0.13)	(0.72)
ΔR&D	+	-2.0406	4.5150***
		(-0.68)	(2.97)
DIV	+	5.4015	3.6135
		(1.54)	(1.30)
ΔLDIV	+	4.6167	1.4661
		(1.62)	(0.83)
ΔDIV	+	6.1369*	2.7153
		(1.92)	(1.33)
I	-	18.1792***	-0.6937
		(3.05)	(-0.18)
ΔLI	-	-11.3614***	-6.0952
		(-2.67)	(-0.97)
ΔI	-	8.2895	-6.6839
		(0.83)	(-1.66)
ΔLNA	+	0.7538**	0.2106
		(2.37)	(1.28)
ΔNA	+	0.6350	0.7268***
		(1.38)	(3.98)
ΔMV	-	-0.2099**	-0.2943***
		(-2.38)	(-4.36)
DA	?	0.6208**	0.2517**
		(1.94)	(2.50)
CASH	+	3.4280***	1.5155***
		(6.90)	(6.60)
N		5,019	
Adj. R^2 (%)		57.39	

Table 11 continued

Panel B Levels of cash

Variable	Pred. sign	Strong (a)	Weak (b)	Strong (c)	Weak (d)	Strong (e)	Weak (f)	Strong (g)	Weak (h)
CASH	+	2.0357***	2.2915***	3.9334***	1.6965***	2.5178***	2.3262***	2.7227***	2.3014***
		(4.22)	(5.28)	(9.03)	(5.51)	(4.82)	(5.21)	(4.40)	(5.74)
*CASH*QaDISEXP*	H3[a]	3.0220***	-1.1737**			2.8550***	-1.1551**		
		(3.32)	(-2.19)			(2.87)	(-2.11)		
*CASH*QaGAINA*	H3[a]			-1.0773*	-0.3075	-0.8629*	-0.0766		
				(-1.65)	(-0.78)	(-1.66)	(-0.18)		
*CASH*QaAGGREM*	H3[a]							1.6953	-1.2152**
								(1.45)	(-2.43)
N		5,019		5,019		5,019		5,019	
Adj. R^2 (%)		60.64		58.61		61.48		58.46	
F-Test[b]		p < 0.01		p > 0.10		p < value 0.01 [p > 0.10]		p < 0.05	

*, **, *** Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.
t-statistics (in parentheses) are estimated using White's (1980) heteroscedastic-consistent errors.

This table reports the estimation results of stacked regressions of equation (6) based on the pooled ordinary least squares method with firm and industry fixed effects and year indicators. Stacked regressions allow all coefficients to vary across strong and weak corporate governance firms. MV is the dependent variable in all specifications. Columns labeled High (Low) represent strong(weak) corporate governance. The constant for firm intercepts from firm fixed effects estimation is not reported. Each adjusted R^2 refers to the within dimension. See Appendix A for variable definitions.

[a] H3 predicts that the coefficient on *CASH*QaREM* is greater among firms with high corporate governance relative to weak corporate governance.
[b] F-Test tests the hypothesis that the coefficient on *CASH*QaREM* is equal between high and low corporate governance and are based on White's (1980) heteroscedastic-consistent errors. The p-value in brackets reports the F-test on the hypothesis concerning *CASH*QaGAINA*.

Table 12 The effect of corporate governance and REM on the valuation of excess cash

Panel A Baseline model

Variable	Pred. sign	Strong (a)	Weak (b)
E	+	2.4037***	2.2616***
		(2.98)	(2.90)
ΔLE	+	-0.1939	-0.2176
		(-0.49)	(-0.67)
ΔE	+	2.1522***	1.4691***
		(3.10)	(3.45)
R&D	+	1.3239	5.2626
		(0.42)	(1.56)
ΔLR&D	+	0.5903	0.7938
		(0.20)	(0.33)
ΔR&D	+	-4.1144	4.7714***
		(-1.22)	(2.58)
DIV	+	3.5747	2.2815
		(0.98)	(0.71)
ΔLDIV	+	7.9007**	2.6173
		(2.07)	(1.18)
ΔDIV	+	5.0235	3.1783
		(1.44)	(1.21)
I	-	24.3909***	0.9982
		(3.30)	(0.20)
ΔLI	-	-11.8271*	-8.2436
		(-1.82)	(-0.99)
ΔI	-	14.9872	-7.7652
		(1.02)	(-1.49)
ΔLNA	+	0.8572**	0.2369
		(2.40)	(1.09)
ΔNA	+	0.6625	0.8346***
		(1.23)	(3.82)
ΔMV	-	-0.1731*	-0.3089***
		(-1.91)	(-4.11)
DA	?	0.7637*	0.2455*
		(1.79)	(1.73)
eCASH	+	3.5459***	1.3362***
		(7.27)	(5.41)
N		3,834	
Adj. R^2 (%)		59.58	

Table 12 continued

Panel B Excess cash

Variable	Pred. sign	Strong (a)	Weak (b)	Strong (c)	Weak (d)	Strong (e)	Weak (f)	Strong (g)	Weak (h)
eCASH	+	2.0799***	2.1703***	3.9277***	1.5181***	2.4545***	2.2061***	2.8644***	2.1971***
		(3.95)	(4.57)	(8.75)	(4.43)	(4.31)	(4.41)	(4.27)	(5.06)
*eCASH*QaDISEXP*	H3[a]	3.0829***	-1.2104**			3.0652***	-1.1792**		
		(3.06)	(-1.96)			(2.90)	(-1.89)		
*eCASH*QaGAINA*	H3[a]			-0.8719	-0.3275	-0.8361	-0.1092		
				(-1.03)	(-0.75)	-(1.32)	(-0.23)		
*eCASH*QaAGGREM*	H3[a]							1.5997	-1.3029**
								(1.20)	(-2.23)
N		3,834		3,834		3,834		3,834	
Adj. R^2 (%)		62.38		60.30		63.06		60.40	
F-Test[b]		p < 0.05		p > 0.10		p < value 0.01 [p > 0.10]		p < 0.05	

*, **, *** Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.
t-statistics (in parentheses) are estimated using White's (1980) heteroscedastic-consistent errors.

This table reports the estimation results of stacked regressions of equation (6) based on the pooled ordinary least squares method with firm and industry fixed effects and year indicators. Stacked regressions allow all coefficients to vary across strong and weak corporate governance firms. MV is the dependent variable in all specifications. Only firm-year observations with positive residuals from equation (4) and available data are included in this sample. The constant for firm intercepts from firm fixed effects estimation is not reported. Each adjusted R^2 refers to the within dimension. See Appendix A for variable definitions and Appendix B for estimation of excess cash holdings.

[a] H3 predicts that the coefficient on *eCASH*QaREM* is greater among firms with high corporate governance relative to weak corporate governance.
[b] F-Test tests the hypothesis that the coefficient on *eCASH*QaREM* is equal between high and low corporate governance and are based on White's (1980) heteroscedastic-consistent errors. The p-value in brackets reports the F-test on the hypothesis concerning *eCASH*QaGAINA*.

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VITA

Adam James Greiner was born on January 4, 1980 in Independence, Iowa to incredible parents, Jim and Rosie Greiner. He moved with his family to Rocky Mount, NC in 1985 and graduated from Northern Nash Senior High in 1998. In May 2002, Adam earned his Bachelor of Science in Business Administration with a concentration in accounting from the University of North Carolina at Wilmington, where he also played on the men's varsity tennis team. He obtained his Master of Accountancy from the University of North Carolina at Charlotte in August 2004 and became a Certified Public Accountant in North Carolina in March 2006. Adam worked as an auditor in public accounting at Dixon Hughes for three years and in the Corporate Accounting and Reporting Division at Wachovia Corporation for two years. In August 2009, he returned to graduate school to obtain the Doctor of Philosophy in Business Administration at Florida Atlantic University. Adam has accepted a tenure-track position with the University of Denver.