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ScienceDirect
Journal of Financial Economics 83 (2007) 599–634
JOURNAL OF Financial ECONOMICS
www.elsevier.com/locate/jfec

Corporate governance and the value of cash holdings ☆

Amy Dittmar[a,*], Jan Mahrt-Smith[b]

[a] *University of Michigan, 701 Tappan Street, Ann Arbor, MI, 48109, USA*
[b] *University of Toronto, 105 St. George Street, Toronto, Ont., Canada, M5S 3E6*

Received 12 May 2005; received in revised form 18 November 2005; accepted 23 December 2005
Available online 28 November 2006

Abstract

We investigate how corporate governance impacts firm value by comparing the value and use of cash holdings in poorly and well-governed firms. We show that governance has a substantial impact on value through its impact on cash: $1.00 of cash in a poorly governed firm is valued at only $0.42 to $0.88. Good governance approximately doubles this value. Furthermore, we show that firms with poor corporate governance dissipate cash quickly in ways that significantly reduce operating performance. This negative impact of large cash holdings on future operating performance is cancelled out if the firm is well governed.

JEL classification: G30; G32; G34

Keywords: Cash holdings; Corporate governance; Ownership structure; Take-over provisions; Firm value

☆ We are grateful for comments from the referee, as well as Seoungpil Ahn, Sergei Davidenko, Francois Derrien, Craig Doidge, Art Durnev, Alexander Dyck, Michael Faulkender, David Goldreich, Jarrad Harford, Li Jin, E. Han Kim, Bill Maxwell, Adair Morse, Joshua Rauh, Marcel Rindisbacher, Amit Seru, Henri Servaes, Jeremy Stein, René Stulz, and seminar participants at the Financial Economics and Accounting 2005 Conference, NBER 2005 Summer Institute Corporate Governance meetings, Swedish Institute of Financial Research 2005 Conference on Corporate Governance, Northern Finance Association 2005 Annual Meetings, University of Mannheim, University of Michigan, University of North Carolina, University of Texas, University of Toronto, and Wayne State University.

* Corresponding author.
E-mail address: adittmar@umich.edu (A. Dittmar).

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doi:10.1016/j.jfineco.2005.12.006

1. Introduction

Left to their own devices, managers will waste corporate resources. This is the implication of the extensive literature on agency costs formalized by Jensen and Meckling (1976), but first articulated by Adam Smith (1937), who explains that due to the separation of ownership and control, ''negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such compan[ies].'' In this paper, we examine the potential value destruction that results from such negligence and profusion and how good corporate governance helps to prevent it. We do this by focusing on one particular asset: cash. We examine cash for three reasons. First, cash reserves are easily accessible by management with little scrutiny and much of their use is discretionary.[1] Second, firms hold substantial and increasing amounts of cash reserves and the value of these cash holdings represents a significant fraction of all corporate wealth. Lastly, while firm-level governance itself is only slowly changing, there is substantial variation in firm-level cash holdings over time. This variation in cash allows for statistically powerful tests to examine the effect that governance has on the value and the eventual use of cash reserves in individual firms.

In 2003, the sum of all cash and marketable securities represented more than 13% of the sum of all assets for large publicly traded US firms, reflecting a substantial increase from 5% in 1990. To put the value of these amounts in perspective, the aggregate cash held by publicly traded US firms in 2003 represents approximately 10% of annual US GDP. Although it is optimal for firms to hold some cash to finance day-to-day operations and to provide a buffer against the cost of externally financing their investments, holding excessive cash resources may have negative value implications if managers use these liquid resources inefficiently. In other words, a dollar may not be worth a dollar if there is a chance that it is going to be wasted. Since good corporate governance is the shareholders' defense against the inefficient use of corporate assets by managers, an important question to ask is: how does corporate governance impact the value and eventual use of cash reserves?

To determine the value effects of governance on cash resources, we employ two methods. First, we follow Faulkender and Wang (2005) and examine how a change in cash holdings leads to a change in the market valuation of a firm. We show that the effect is striking: depending on the measure of governance used, and controlling for other factors, the value of an additional \$1.00 of cash for a poorly governed firm is between \$0.42 and \$0.88. Good governance approximately doubles this value. Second, we estimate and value cash reserves held in excess of those needed for operations and investments, as these resources are most at management's discretion and thus most at risk of being wasted. We value excess cash by using methods employed in Fama and French (1998), using market-to-book ratios to estimate the marginal value of firm attributes. We find again that the market value of excess cash for firms that have poor governance is approximately one-half of the value of excess cash for firms that are well governed. Pinkowitz, Stulz, and Williamson (2006) also use the Fama and French methodology in their cross-country study of cash, dividends and governance. They find that the impact of governance on the value of cash is of a similar order of magnitude as in our study.[2]

[1] Myers and Rajan (1998) hypothesize that more liquid assets can lead to increased agency problems.

[2] See also Pinkowitz and Williamson (2004) for a study of the value of cash without controlling for governance.

Next, we investigate more directly whether poorly governed firms waste cash reserves. We show that a well-governed firm has its cash resources better "fenced in," and that firms with poor corporate governance dissipate excess cash more quickly. In fact, governance has a relatively minor impact on how firms accumulate cash, but a significant impact on how firms spend their money. More importantly, we find that firms with both high excess cash and poor governance subsequently experience particularly low operating performance: the accounting returns of a sample of firms that draw down their large excess cash reserves is significantly diminished if the firms have poor corporate governance. This negative impact of excess cash on operating performance is cancelled out if the firm is well governed. These results indicate that either managers subject to agency problems invest their excess cash inefficiently in low return projects or excess cash reduces the pressures on management to operate efficiently by minimizing costs, improving margins, closely monitoring employees and operations, and engaging in other profit enhancing measures. In either case, excess cash leads to suboptimal performance and good governance can reverse this effect.

Throughout our analysis, we examine corporate governance mechanisms that measure investor oversight by large institutional shareholders and managerial entrenchment resulting from antitakeover provisions. We focus on these aspects of corporate governance because each can substantially affect the ability of investors to pressure management to efficiently use excess cash resources. Prior research shows that large shareholders have enough capital at stake to have an incentive to monitor and influence management's actions (see Black, Jang, and Kim, 2003; Denis, Denis, and Sarin, 1997; Dlugosz, Fahlenbrach, Gompers, and Metrick, 2004; Del Guercio and Hawkins, 1999; Gillian and Starks, 2000; Gompers and Metrick, 2001; Palia, 2001; Smith, 1996; Qiu, 2004; Wahal, 1996). Other authors find that antitakeover provisions shelter management from the scrutiny and discipline of the market for corporate control (see DeAngelo and Rice, 1983; Linn and McConnell, 1983; Bertrand and Mullainathan, 2003; Gompers, Ishii, and Metrick, 2003; Bebchuk, Cohen, and Ferrell, 2005; Cremers and Nair, 2005). The influence of these aspects of governance is apparent in events such as the pressure Kirk Kerkorian put on Chrysler to disgorge a portion of its almost $8B in cash reserves and his eventual attempt to acquire control in 1995 (DeWitt and Ruback, 1996), as well as his more recent attempts in 2005 to apply similar pressure to General Motors. Additionally, recent studies confirm the value relevance of the specific governance measures used in this paper (Gompers, Ishii, and Metrick, 2003; Cremers and Nair, 2005; Bebchuk, Cohen, and Ferrell, 2005). Our results partly explain the importance of investor oversight and managerial entrenchment on firm value by showing that both of these aspects of governance significantly improve the value and use of excess cash reserves.

Harford (1999) shows that regardless of a firm's level of corporate governance, firms with large cash reserves spend more on acquisitions. Harford, Mansi, and Maxwell (2005) build on this finding and show that poorly governed firms dissipate cash through acquisitions. Both papers focus on the level of cash holdings, rather than the value of cash holdings. Nevertheless, these studies raise the question of whether the value destruction and performance decline we document in this paper is primarily due to bad acquisitions or whether the poor operating and investment decisions of badly governed firms extend to other areas of the firm. To address this issue, we repeat our analysis controlling for the level of acquisitions and find that the effect of governance on the value and use of cash reserves remains. This suggests that acquisitions are one but not the only means through which agency problems impact the firm value of poorly governed, cash-rich firms.

By investigating the impact of corporate governance on the value and use of cash resources, this paper contributes to the growing governance literature that argues that good corporate governance is essential for preventing managers from destroying firm value. While much of this research examines the effect of corporate governance on overall firm value, we are able to clearly demonstrate a direct mechanism by which governance works. Through its impact on the use of liquid firm assets, good governance dramatically affects both firm value and behavior in magnitudes that are economically important.[3]

This paper also contributes to the literature on the determinants of the level of corporate cash reserves. Based on the findings of Opler, Pinkowitz, Stulz, and Williamson (1999) and Kim, Mauer, and Sherman (1998), firms have an optimal level of cash holdings and trade off the costs and benefits of holding cash to determine the appropriate level. However, actual cash holdings often exceed the level predicted by these factors. One reason that has been suggested for excessive cash holdings is that managers build up cash reserves to shield themselves from the scrutiny of the financial markets. However, the evidence of a relation between cash levels, agency problems, and corporate governance is still inconclusive.[4] This paper addresses the question of how governance impacts cash policy from a different perspective, namely by investigating the implications of governance on the value and use of cash reserves. Specifically, in this paper, we ask: does it matter if firms hold large cash reserves? Our answer is yes, but only if the firms are poorly governed; for well-governed firms, there may be little cost to holding large cash reserves.

Finally, this paper is related to recent papers by Faulkender and Wang (2005) and Pinkowitz, Stulz, and Williamson (2006). Faulkender and Wang examine the marginal value of cash as well as the impact of capital constraints.[5] They focus on the potential benefits of holding cash and how these fluctuate in the cross-section, and show that the value of a dollar of cash is often less than one ($0.94 for the average firm). Thus, their paper raises the question of why holding cash can destroy firm value. In this paper, we examine the costs of holding cash and provide an explanation for this low value of cash reserves by relating it to the corporate governance literature. In doing so, we show that the value of cash, and thus firm value, is determined in part by how investors expect cash to be used in the presence of unchecked managerial agency problems. Pinkowitz, Stulz, and Williamson (2006) examine the impact of various corporate governance regimes across different countries on the value of corporate liquidity and dividends. Consistent with the presence of agency problems, they find that investors in countries with below median governance scores place a lower value ($0.33) on a dollar of corporate cash holdings than

[3]In addition, the variation in firm-level cash reserves over time allows us to use econometric techniques not available when governance alone is studied. Since governance itself is only slowly changing, the power of firm-level time-series tests is limited. However, the variation in cash levels allows us to study firm-level changes as well as cross-sectional effects to substantiate the findings of governance and firm value from the previous literature.

[4]While Opler Pinkowitz, Stulz, and Williamson (1999) and Mikkelson and Partch (2003) do not find evidence to suggest that entrenched managers hold more cash, other papers do provide such evidence. Dittmar, Mahrt-Smith, and Servaes (2003) find that cash levels are generally higher in countries with poor investor protection, which reflects likely agency problems. Harford, Mansi, and Maxwell (2005) document a negative relation between corporate governance and the level of cash holdings in US data. Harford (1999) and Blanchard, Lopez-de-Silanes, and Shleifer (1994) examine how firms use cash windfalls or large cash reserves without focusing on corporate governance or the value of cash, and Faleye (2004) investigates the role of proxy fights in containing cash policy. See also Kalcheva and Lins (2005) for more international evidence.

[5]Pinkowitz and Williamson (2004) is similar in motive but different in methodology to Faulkender and Wang (2005).

investors in countries with above median governance scores ($0.91). Their findings are consistent with ours and provide further justification for our efforts to unearth *how* bad governance reduces the value of cash holdings.

The remainder of the paper is organized as follows. Section 2 discusses the data and describes our primary specification. Section 3 uses two methods to estimate how governance impacts the value of an additional dollar of cash and the marginal value of excess cash reserves. Section 4 extends the analysis to examine how corporate governance affects firm behavior following periods of high cash holdings. Section 5 concludes the paper.

2. Data and methods

2.1. Governance data

We use multiple measures of internal and external corporate governance including the degree of managerial entrenchment due to takeover defenses and the presence of large shareholder monitoring. These governance measures are collectively examined in Gompers, Ishii, and Metrick (2003), Cremers and Nair (2005), and Bebchuk, Cohen, and Ferrell (2005), who show that governance has a positive impact on firm value. Takeover protection provisions have a significant impact on a firm's decision making, since the market for corporate control is viewed as a strong external force for disciplining management. Alternatively, large shareholders with incentives to monitor management improve the governance of the firm from within, by taking steps to protect their own investments in the face of potential managerial agency conflicts. Our study focuses on these measures to provide insight into the effects of both internal and external governance.

We employ two measures of the degree of managerial entrenchment due to takeover protection. Our first measure is the Gompers, Ishii, and Metrick (2003) corporate governance index, which measures the number of antitakeover provisions in a firm's charter and in the legal code of the state in which the firm is incorporated. Gompers, Ishii, and Metrick establish that more antitakeover provisions are an indication of poor corporate governance. The data for the index is assembled and reported about every two years (1990, 1993, 1995, 1998, 2000, and 2002) by the Investor Responsibility Research Center (IRRC) and the index varies between zero and 24. As a second measure, we replace the Gompers, Ishii, and Metrick index with the index developed in Bebchuk, Cohen, and Ferrell (2005). The two indexes are based on the same raw data, but the latter index uses only six provisions that Bebchuk, Cohen, and Ferrell show have the greatest impact on firm value. When we use data for years in which IRRC does not report scores, we assume, similar to Gompers, Ishii, and Metrick (2003) and Bebchuk, Cohen, and Ferrell (2005), that the index remains unchanged in the year following the most recent report. However, our results are robust to alternative ways of dealing with the missing years, including omitting them from the analysis.

We also employ two measures of large shareholder monitoring. One measure is the sum of all ownership positions greater than 5% held by institutional investors. These blockholdings, as collected from the 13-F filings by Thomson Financial, can be considered a measure of how much oversight management is subject to by (potentially) active large shareholders. A larger number would indicate more oversight and hence better corporate

governance. For additional evidence, we replace block institutional ownership with the sum of all ownership positions by public pension funds, also from the Thomson Financial data. We use public pension fund ownership as an alternative measure because public pension funds often monitor firms in their portfolios more actively than do other investors (see Del Guercio and Hawkins, 1999; Gillian and Starks, 2000; Gompers and Metrick, 2001; Smith, 1996; Wahal, 1996). Table 1 provides the names of the funds as they appear in Thomson with their manager numbers. While we recognize that there are other aspects of corporate governance that may also influence firm value, we focus on these measures because (1) they offer clear predictions for what constitutes "good" governance; (2) other papers show that these mechanisms have value effects; and (3) they collectively provide internal and external ways for governance to impact decision making. Thus, these measures capture some of the most important elements of governance that are likely to affect the value of cash holdings.

We include governance in our analysis as a binary dummy by splitting the sample into terciles: the lowest tercile of the entrenchment indices and the highest tercile of institutional ownership are coded as one (best governance), the highest tercile of the entrenchment indices and the lowest tercile of block ownership are coded as zero (poor governance), and the middle tercile is discarded. Using the top and bottom quartiles instead of terciles leads to similar results. We use a dummy variable to allow for more intuitive interpretation of the coefficients and to avoid having to discuss whether a score of 10 on the Gompers, Ishii, and Metrick index is "far away" from a score of 11, or whether 6% institutional ownership likely leads to very different investor monitoring than 7% ownership. In addition, the dummy variables should mitigate any measurement problems, which are sometimes an issue with institutional ownership data.

Table 1
Public pension funds from Thomson financial data

Fund name on Thomson	Manager No
CALIF PUBLIC EMP. RET.	12000
CALIF STATE TEACHERS RET	12120
COLORADO PUBLIC EMPL RET	18740
FLORIDA STATE BOARD OF ADMIN.	38330
KENTUCKY TEACH RETIREMENT SYS	49050
MARYLAND STATE RETIRMENT	54360
MICHIGAN STATE TREASURER	57500
MISSOURI ST EMP RET SYS	58150
MONTANA BOARD OF INVESTMENTS	58650
NEW MEXICO EDU RETIREMENT BD	63600
NEW YORK STATE COMMON RET FD	63850
NEW YORK STATE TEACHERS RET	63895
OHIO PUBLIC EMP RETIREMENT SYS	66550
OHIO SCHOOL EMP RETIRMNT	66610
OHIO STATE TEACH RET SYS	66635
PENNSYLVANIA PUBLIC SCH EMP RE	68830
TEXAS TEACHER RETIRM SYS	83360
VIRGINIA RETIREMENT SYS	90803
WISCONSIN INVESTMT BOARD	93405

2.2. Main regression specification

To measure the impact of governance on the value of cash holdings, we use two specifications. In our primary specification, which we discuss in this section, we build on Faulkender and Wang (2005) by applying their methods to value cash and investigate how governance impacts this value. Specifically, we examine whether a change in cash holdings leads to a change in firm value. The change in firm value is measured by the excess return for firm i during fiscal year t less the return of stock i's benchmark portfolio during fiscal year t. The benchmark portfolios are Fama and French (1993) size and book-to-market portfolios. We examine returns in excess of the benchmark portfolios to control for risk-related factors that may impact a firm's return and discount rate. Using raw returns rather than excess returns does not affect any of our conclusions. We further recognize that the cross-sectional variation of firm returns, unlike portfolio returns, may be impacted by idiosyncratic firm characteristics. We therefore also control for other variables that may be correlated with both firm cash holdings and returns. As in Faulkender and Wang, we control for changes in firms' profitability, financial policy, and investment policy. Thus, our methods can be interpreted similar to a long-run event study, where the event is an unexpected change in cash and we control for other factors that may impact returns over the estimation window of one year.

The dependent variable is the stock return and the independent variable of interest is change in cash (normalized by beginning-of-period equity value)—both by itself and interacted with governance. Since both dependent and independent variables are scaled by the previous year's market value of equity, the coefficient on the change in cash measures the dollar change in shareholder value resulting from a one-dollar change in the amount of cash held by the firm. We determine the effect of governance by interacting the change in cash with each governance measure. Unconditionally, one might expect that an extra dollar of cash added to the firm would cause its market value to go up by one dollar, controlling for changes in profitability, investment, and financing. We predict that an extra dollar of cash will result in a smaller (larger) increase in market value if the firm is poorly (well) governed. In other words, we expect a positive coefficient on the interaction between cash and governance.

The following equation describes the regression, which we estimate separately for each measure of corporate governance:

$$\begin{aligned} r_{i,t} - R^B_{i,t} = {} & \gamma_0 + \gamma_1 \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_2 \frac{\Delta E_{i,t}}{M_{i,t-1}} + \gamma_3 \frac{\Delta NA_{i,t}}{M_{i,t-1}} + \gamma_4 \frac{\Delta RD_{i,t}}{M_{i,t-1}} + \gamma_5 \frac{\Delta I_{i,t}}{M_{i,t-1}} + \gamma_6 \frac{\Delta D_{i,t}}{M_{i,t-1}} \\ & + \gamma_7 \frac{C_{i,t-1}}{M_{i,t-1}} + \gamma_8 L_{i,t} + \gamma_9 \frac{NF_{i,t}}{M_{i,t-1}} + \gamma_{10} \frac{C_{i,t}}{M_{i,t-1}} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_{11} L_{i,t} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} \\ & + \gamma_{12} GOV_{i,t} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \varepsilon_{i,t}, \end{aligned} \tag{1}$$

where ΔX indicates a change in X from year $t-1$ to t, and (Compustat codes in parentheses): $r_{i,t}$ = Stock return over year $t-1$ to t (from CRSP), $R^B_{i,t}$ = Fama and French (1993) size and book-to-market matched portfolio return from year $t-1$ to t, $M_{i,t}$ = Market Value of Equity at time t computed as Price (199) times Shares (25), $C_{i,t}$ = Cash (1) at time t, $E_{i,t}$ = Earnings before Extraordinary Items (18 + 15 + 50 + 51) from year $t-1$ to t, $NA_{i,t}$ = Net Assets (6 – 1) at time t, $RD_{i,t}$ = R&D Expenses (46, set to

zero if missing) from year $t-1$ to t, $I_{i,t}$ = Interest Expenses (15) from year $t-1$ to t, $D_{i,t}$ = Common Dividends (21) from year $t-1$ to t, $L_{i,t} = Debt_{i,t}/(Debt_{i,t}+M_{i,t})$ = leverage at time t, $Debt_{i,t}$ = Long Term Debt plus Short Term Debt $(9+34)$ at time t, $NF_{i,t}$ = New Finance from year $t-1$ to t = Net New Equity Issues $(108-115)$ + Net New Debt Issues $(111-114)$, and $GOV_{i,t}$ = Governance measure.

The control variables are exactly as in Faulkender and Wang (2005) and control for firm-specific characteristics that may be correlated with both returns and cash holdings due to changes in profitability ($E_{i,t}$), investment ($NA_{i,t}$ and $RD_{i,t}$), and financing ($I_{i,t}$, $D_{i,t}$, $L_{i,t}$, and $NF_{i,t}$). Also, as in their paper, the regression is estimated as ordinary least squares (OLS) with robust standard errors. We predict that the coefficient γ_{12} on the interaction term between changes in cash holdings and corporate governance is positive and statistically significant. Using this specification, we can compute the marginal value of a dollar of cash, both unconditional as well as conditional on corporate governance. In the subsequent analysis, we will also control for potential capital constraints faced by the firm, since Faulkender and Wang document that constraints affect the value of corporate cash holdings.

To ensure that our results are robust to different specifications, we will also use a second methodology that follows Fama and French (1998). In that case, we will estimate the value of total and excess cash holdings using the market-to-book ratio. The setup will be similar to the one in Eq. (1) above: the left-hand side variable will be a measure of value, the firm's market-to-book ratio, and the right hand side will include an interaction between (excess) cash and governance, as well as suitable controls. We will discuss all issues associated with that method and its implementation in Section 3.2.

2.3. Sample

Our sample consists of all US publicly traded firms from 1990 to 2003 for which the required data items are available. We begin our sample in 1990 because one of our main corporate governance measures, the Gompers, Ishii, and Metrick (2003) corporate governance index, is only available since 1990. Consistent with the previous literature, we exclude firms in the financial services industries, where liquidity is hard to assess, and in the utility sector, where liquidity and governance might be driven by regulatory factors. The final sample of firms consists of 1,952 firms with 13,095 firm-year observations. In all of the analyses, firm-level ratios are winsorized at the 1% and 99% levels in order to minimize the effect of outliers.

Panel A of Table 2 presents summary statistics for cash holdings and governance. Consistent with the previous literature, we refer to "cash and equivalents" as "cash," and we define "assets" as assets net of cash for the remainder of the paper. On average, firms hold 22% of assets in cash. However, this ratio is highly skewed, with the median firm holding 6% of assets in cash. In addition, the median cash holdings in our sample have increased from 5% in 1990 to 13% in 2003. The median firm has about $850 million in assets, measured in 2000 dollars. The median firm has a Gompers, Ishii, and Metrick index of nine and 11% of its stock is held by institutional blockholders, with substantial variation across the distribution; a firm at the 25th percentile has a Gompers, Ishii, and Metrick index of seven and 0% of its stock held by institutional blockholders, compared to a firm at the 75th percentile, which has a Gompers, Ishii, and Metrick index of 11 and 21% of its stock held by institutional blockholders. We present correlation statistics in Panel B

of Table 2. Because the relationships between the level of cash holdings, firm size, and governance have been shown to be complex in the previous literature, we refrain from attempting to interpret simple correlations between any two variables and postpone inferences until the regression analysis.

Panel C of Table 2 reports cash holdings by industry. Industries are defined as the Fama and French 48 industries.[6] The industries with the highest levels of cash holdings in 1990 are Precious Metals, Coal, Recreation, Business Services, and Computers. By 2003, the leaders are Pharmaceutical Products, Electronic Equipment, Computers, Precious Metals, and Business Services. Since all our main regressions are estimated in changes or as regressions with firm fixed effects, time-invariant industry effects are not a concern. We also deal with the secular trend by including year dummies in all levels regressions.

3. Results on corporate governance and the value of cash

3.1. Using stock returns to estimate changes in value

In this section, we examine the results of the valuation methods described in Eq. (1), using stock returns to estimate the impact of changes in cash on changes in firm value. Panel A of Table 3 provides results for our primary specifications. Column 1 presents results measuring managerial entrenchment with the Gompers, Ishii, and Metrick index. The results show that having less entrenched managers (good governance) substantially and significantly increases the value of a dollar of cash, as evidenced by the positive and significant coefficient on the interaction between governance and cash. Column 2 presents similar results using institutional blockholdings to measure governance and thus examines the impact of shareholder monitoring on the value of cash. Again, we show that the value that the stock market assigns to a dollar of cash is greater for a well-governed firm relative to a poorly-governed firm.

Panel B of Table 3 uses the coefficients from Panel A to calculate the marginal value of a dollar of cash for the mean firm in the sample. To do this, we use the coefficients on the change in cash and each coefficient that is interacted with the change in cash. Specifically, when we add the coefficient on the change in cash plus the respective coefficients on the cash interactions times the sample means of the interaction variables, we obtain the marginal value of a change in cash for the mean firm. We find that a dollar of cash is worth approximately \$1.09 on average.[7] However, that value can deteriorate to \$0.42 if the firm is poorly governed, measuring governance with the Gompers, Ishii, and Metrick index. Alternatively, a dollar in a well-governed firm is worth as much as \$1.62. The fact that for the best governed firms \$1 in cash is worth more than one dollar once inside the firm is consistent with Myers and Majluf (1984) and others, who argue that financial slack is valuable for firms with positive investment opportunities that face costs of external finance. For comparison, Faulkender and Wang show that the differences in the value of cash for financially unconstrained and constrained firms are up to \$0.60. Replacing antitakeover

[6]The industry definitions, as well as the size and book-to-market portfolio return data used below, are from Kenneth French's web page at Dartmouth.

[7]Using the same procedure—but not considering governance effects—Faulkender and Wang (2005) find that a dollar of cash is worth \$0.94 on average. The difference between our estimate and theirs derives from the differences in our sample periods and coverage, as well as the fact that we only consider firms with very strong or very weak governance (dropping the middle tercile based on governance).

Table 2
Summary statistics

This table provides summary statistics for the data employed in the analysis. The data is from 1990 to 2003. Panel A provides mean, median, standard deviations, and 25th and 75th percentiles. For all variables, assets are computed net of cash. The variables are: ratio of cash to assets (Cash/Assets), assets adjusted for inflation to 2000 (Assets), cash flow to assets (Cash Flow/Assets), ratio of net working capital to assets (NWC/Assets), market-to-book ratio (MktVal/Assets), three-year compound sales growth (Sales Growth), property, plant, and equipment to assets (PP&E/Assets), the Gompers, Ishii, and Metrick governance index (Gompers, Ishii, and Metrick index), the sum of the 5% blockholdings of common equity by institutions (Blocks). All ratios are winsorized at the 1% and 99% levels. Panel B shows the unconditional, pair-wise correlations. The variables are as in Panel A, except that we report the natural logarithm of Assets, because that is how they will appear in the regression models. Panel C shows the median cash holdings and asset levels by industry for both 1990 and 2003.

	Mean	Median	Standard deviation	25th Percentile	75th Percentile
Panel A: full sample					
Cash/Assets	0.22	0.06	0.53	0.02	0.18
Cash/Assets (1990)	0.13	0.05	0.27	0.02	0.14
Cash/Assets (2003)	0.41	0.13	0.76	0.04	0.41
Assets	3487.74	850.05	9268.80	333.54	2569.27
Gompers, Ishii, and Metrick index	9.19	9.00	2.78	7.00	11.00
Blocks	0.13	0.11	0.13	0.00	0.21
Number of observations	13095				
Firms	1952				

	Cash/Assets	Assets	Gompers, Ishii, and Metrick index	Blocks
Panel B: correlations				
Cash/Assets	1			
Assets	−0.36	1		
Gompers, Ishii, and Metrick index	−0.16	0.23	1	
Blocks	0.04	−0.18	0.03	1

	Cash/Assets (1990)	Assets (1990)	Cash/Assets (2003)	Assets (2003)
Panel C: by industry				
Agriculture	0.12	1391.66	0.12	2637.73
Food Products	0.04	648.56	0.08	1230.29
Candy & Soda	0.01	4143.70	0.01	14565.85
Beer & Liquor	0.10	8662.53	0.08	19179.20
Tobacco Products	0.04	482.83	0.27	4667.73
Recreation	0.15	699.63	0.20	701.23
Entertainment	0.10	812.74	0.06	2255.93
Printing and Publishing	0.05	1434.02	0.02	1627.44
Consumer Goods	0.08	419.99	0.07	1028.80
Apparel	0.03	435.03	0.10	671.89
Healthcare	0.03	501.17	0.04	1056.26
Medical Equipment	0.12	210.13	0.13	652.39
Pharmaceutical Products	0.13	1291.35	0.67	309.61
Chemicals	0.04	1038.50	0.06	1789.75

Table 2 (*continued*)

	Cash/Assets (1990)	Assets (1990)	Cash/Assets (2003)	Assets (2003)
Rubber and Plastic Products	0.03	820.64	0.03	1005.77
Textiles	0.02	412.81	0.05	587.94
Construction Materials	0.02	390.43	0.07	814.53
Construction	0.04	735.98	0.15	1743.56
Steel Works Etc	0.03	983.62	0.04	758.21
Fabricated Products	0.02	203.28	0.06	410.97
Machinery	0.05	611.60	0.12	814.93
Electrical Equipment	0.03	233.46	0.04	829.17
Automobiles and Trucks	0.02	1057.54	0.06	1176.29
Aircraft	0.02	2378.72	0.07	26394.00
Shipbuilding, Railroad Equipment	0.04	472.45	0.04	1273.94
Defense	0.04	5005.53	0.05	2776.44
Precious Metals	0.24	282.73	0.46	176.59
Non-Metallic & Ind. Metal Mining	0.02	822.09	0.08	827.40
Coal	0.15	294.89	0.04	2287.99
Petroleum and Natural Gas	0.05	1424.60	0.04	2516.49
Communication	0.01	3418.50	0.10	6145.07
Personal Services	0.12	462.22	0.10	733.89
Business Services	0.15	375.45	0.42	337.94
Computers	0.13	278.31	0.49	473.28
Electronic Equipment	0.08	239.52	0.51	427.41
Measuring and Control Equipment	0.08	263.16	0.25	529.31
Business Supplies	0.02	1794.99	0.02	1480.90
Shipping Containers	0.03	973.33	0.02	2435.78
Transportation	0.05	1383.63	0.10	1864.29
Wholesale	0.02	406.84	0.05	1099.60
Retail	0.03	783.12	0.12	1455.64
Restaurants, Hotels, Motels	0.06	352.24	0.03	1067.58

provisions with institutional blockholder monitoring as a measure of corporate governance, we find that institutional blockholdings also have a statistically and economically significant impact on the value of cash holdings. In column 2 of panel A, we find that the value of a dollar of cash to a firm with high institutional block ownership is \$0.39 greater than to a similar firm with low or no institutional block ownership. As column 2 of Panel B shows, a dollar of cash is worth \$1.27 to a monitored firm relative to \$0.88 to an unmonitored firm.

Columns 3 and 4 of Panel A in Table 3 use alternative measures of the governance metrics. Column 3 replaces the Gompers, Ishii, and Metrick (2003) index with the Bebchuk, Cohen, and Ferrell (2005) index and provides similar results: a dollar of cash is \$1.43 more valuable if the firm is well governed. Column 4 examines the impact of pension fund holdings and shows that higher pension fund ownership increases the value of a dollar of cash held in the firm by \$0.25. This last result, while not statistically significant, is consistent with the results in Del Guercio and Hawkins (1999) and others, who report that activist pension funds exert a positive influence on firms.

Next, we investigate several robustness issues. In the specifications presented in Table 3, we include governance itself—in addition to the interaction variable of interest—since

Table 3
The impact of governance on the value of cash using return regressions

This table uses OLS return regressions motivated by Faulkender and Wang (2005). Panel A reports the regression results. The dependent variable is the annual excess return of the firm relative to the Fama and French (1993) 25 size and book-to-market portfolios. Δ indicates the change from the previous year. Cash is cash plus marketable securities. The independent variables include a governance dummy based on whether the firm was in the top or bottom governance tercile of the Gompers, Ishii, and Metrick index, the sum of the 5% institutional blockholdings, the sum of public pension fund holdings, and the Bebchuk, Cohen, and Ferrell index distribution (Gompers, Ishii, and Metrick index, Blocks, Pension Holdings, and Bebchuk, Cohen, and Ferrell index). All other independent variables are normalized by the market value of equity (ME) of the firm at the beginning of the year. They include the interaction between the change in cash and the governance dummy (ΔCash × Gov. Dummy), lagged cash, as well as changes in earnings (earnings before extraordinary items plus interest, deferred taxes, and investment tax credit), assets net of cash, R&D expenses, Interest expenses, Common Dividends, Leverage (long term plus current debt divided by market value of equity plus long term plus current debt); also included is New Financing (net equity issues plus net debt issues). Models [5,6] use for all years the first sample observation of the governance variable for each firm. *P*-values based on robust standard errors are in brackets. In Panel B, we use the mean (in-sample for each regression) levels of lagged cash, leverage, and governance variables to compute the marginal value of $1 in cash for the average firm in the sample. The marginal value for the average firm is coefficient on the change in cash plus the sample average for all variables that are interacted with the change in cash times the respective regression coefficient from the model. Model [1] uses the Gompers, Ishii, and Metrick index as the governance variable, model [2] uses blockholdings.

	[1]	[2]	[3]	[4]	[5]	[6]
Panel A						
ΔCash/ME	0.69	1.09	0.34	1.22	1.21	1.39
	[0.016]	[0.000]	[0.281]	[0.000]	[0.000]	[0.000]
Gompers, Ishii, and Metrick index × ΔCash	1.21				0.67	
	[0.004]				[0.013]	
Gompers, Ishii, and Metrick index	−0.02				−0.02	
	[0.084]				[0.123]	
Blocks × ΔCash		0.39				0.37
		[0.030]				[0.075]
Blocks		−0.01				−0.01
		[0.585]				[0.415]
Bebchuk, Cohen, and Ferrell index × ΔCash			1.43			
			[0.005]			
Bebchuk, Cohen, and Ferrell. index			−0.02			
			[0.258]			
Pension Holdings × ΔCash				0.25		
				[0.240]		
Pension Holdings				−0.05		
				[0.000]		

ΔEarnings/ME	0.58	0.44	0.80	0.48	0.57	0.46
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
ΔAssets/ME	0.32	0.14	0.26	0.23	0.25	0.15
	[0.010]	[0.000]	[0.005]	[0.001]	[0.002]	[0.000]
ΔR&D/ME	−0.88	1.03	−0.64	−0.77	−0.61	0.96
	[0.634]	[0.076]	[0.784]	[0.576]	[0.660]	[0.132]
ΔInterest/ME	−0.92	−1.28	−1.44	−1.44	−1.37	−1.82
	[0.347]	[0.016]	[0.132]	[0.012]	[0.023]	[0.000]
ΔDividends/ME	2.21	1.19	3.08	2.19	1.73	0.69
	[0.082]	[0.185]	[0.016]	[0.011]	[0.072]	[0.454]
Lagged Cash/ME	0.66	0.38	0.65	0.51	0.58	0.4
	[0.007]	[0.000]	[0.013]	[0.003]	[0.001]	[0.000]
Debt/Market Value	−0.47	−0.46	−0.4	−0.48	−0.47	−0.49
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
New Finance/ME	−0.46	−0.21	−0.39	−0.23	−0.31	−0.18
	[0.009]	[0.001]	[0.000]	[0.004]	[0.002]	[0.001]
Lagged Cash/ME × ΔCash/ME	0.9	−0.13	1.22	0.68	0.49	−0.1
	[0.455]	[0.542]	[0.438]	[0.425]	[0.574]	[0.653]
Leverage × ΔCash/ME	−1.73	−0.86	−1.83	−1.64	−1.7	−1.21
	[0.246]	[0.019]	[0.307]	[0.111]	[0.123]	[0.001]
Constant	0.03	0.05	0.02	0.07	0.03	0.06
	[0.287]	[0.000]	[0.448]	[0.007]	[0.080]	[0.000]
Observations	6459	8386	5941	8326	9603	9197
R-squared	0.18	0.14	0.18	0.15	0.16	0.15
					[1]	[2]
Panel B: The marginal value of cash for the average firm						
Sample means for cash value computation			Lagged Cash		0.12	0.12
			Leverage		0.22	0.23
			Gompers, Ishii, and Metrick index Dummy		0.56	
			Blockholdings Dummy			0.51
Marginal Value of $1 (Good Governance)					1.62	1.27
Marginal Value of $1 (Poor Governance)					0.42	0.88
Marginal Value of $1 (Average Governance Firm)					1.09	1.07

previous research has shown that governance improves firm value and cash is only one way in which governance may do this. Thus, the interpretation of our results on the interaction variable is that governance has an impact on cash holdings that is above and beyond the impact it has on the other assets of the firm. In each of these models, the coefficient on governance alone is negative, though not always significant. The negative coefficient on governance alone may arise because governance and firm value are endogenously determined (Himmelberg, Hubbard, and Palia, 1999; Palia, 2001). Unfortunately, finding a good instrument for governance is difficult. We mitigate this concern in two ways. First, we focus our analysis on the interaction between governance and change in cash, while including governance itself as well. If an endogenous relation exists, it is more likely to manifest itself in the governance coefficient than in the interaction with the change in cash. This is especially true because cash varies significantly more over time than governance.

As a second way to address the potential endogeneity, in columns 5 and 6 of Table 3, we repeat the analysis forcing governance to remain constant by using only the initial year of governance data in forming the dummy variable. In other words, we replace the slowly but potentially endogenously changing governance variable by its initial value. We use the initial governance value because governance changes only slowly over time and the initial value is clearly exogenous to future firm value. Further, it is reasonable to expect that a firm with bad governance to begin with is likely to make few changes that lead to meaningfully improved governance (especially compared to other firms).[8] This technique and logic are also used in Bebchuk, Cohen, and Ferrell (2005). The results confirm our previous findings: the coefficient on the interaction term between governance and cash remains positive and significant. The magnitude of the coefficient on the interaction variable, using the Gompers, Ishii, and Metrick index to measure governance, drops by about one-half. However, the impact remains statistically and economically significant, with a dollar of cash in a well-governed firm worth \$0.66 more than that held in a poorly governed firm.

Table 3 also includes many control variables examined in Faulkender and Wang (2005), some of which are significant in their study but not in the results presented here. In particular, Faulkender and Wang show that the interactions between the change in cash with two variables, lagged cash and leverage impact the value of cash holdings. In untabulated tests, we examine whether the insignificance of these variables in our study results from the inclusion of the governance variables or the restrictions that these variables place on our sample availability. Specifically, we replicate Faulkender and Wang's tests using our shorter time period and restricting the sample to firms with governance data available and that have governance in the top and bottom tercile. Thus, we re-estimate our specification excluding the governance variable but only including a firm if it is in our sample. We find that the interactions between the change in cash with lagged cash and leverage are insignificant in this restricted sample. We then relax the sample restriction and repeat this test for our sample period and find result similar to those of Faulkender and Wang. We therefore conclude that the sample restriction, not the inclusion of the governance variables, causes the differences in results.

As we mention earlier, a key result in Faulkender and Wang (2005) is that cash reserves are more valuable to a financially constrained firm. In columns 1 to 4 of Table 4, we

[8]Note that these arguments are more plausible for the entrenchment index than for blockholdings, which are more variable over time for exogenous reasons. This suggests that we have less statistical power in applying this method when using blockholdings as a measure of governance.

Table 4
The impact of governance on the value of cash using return regressions (robustness)

This table uses OLS return regressions motivated by Faulkender and Wang (2005). The dependent variable is the annual excess return of the firm relative to the Fama and French (1993) 25 size and book-to-market portfolios. Δ is the change from the previous year. Cash is cash plus marketable securities. The independent variables include a governance dummy based on whether the firm was in the top or bottom governance tercile of the Gompers, Ishii, and Metrick index, or the sum of the 5% institutional blockholdings (Gompers, Ishii, and Metrick index, Blocks). All other independent variables are normalized by the market value of equity (ME) of the firm at the beginning of the year. These variables are as in Table 2 and include the interaction between Cash and the governance dummy (ΔCash × Gov. Dummy), as well as (not reported) lagged cash, changes in earnings (earnings before extraordinary items plus interest, deferred taxes, and investment tax credit), assets net of cash, R&D expenses, Interest expenses, Common Dividends, Leverage (long-term plus current debt divided by market value of equity plus long term plus current debt); also included is New Financing (net equity issues plus net debt issues). Models [1] to [4] include a control variable that represents the interaction between the change in cash and a measure of financial constraints (high payout dummy). Model [5] includes both governance measures at the same time. Models [6] and [8] use only firms that report acquisitions, while models [7] and [9] use only firms which do not report any acquisitions. *P*-values based on robust standard errors are in brackets.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
ΔCash/ME	0.75	1.04	0.71	1.13	0.03	0.93	0.77	1.41	0.93
	[0.008]	[0.000]	[0.027]	[0.000]	[0.931]	[0.000]	[0.101]	[0.000]	[0.001]
Gompers, Ishii, and Metrick index × ΔCash	0.47		1.20		0.98	1.11	1.10		
	[0.039]		[0.006]		[0.000]	[0.049]	[0.030]		
Gompers, Ishii, and Metrick index	−0.01		−0.02		−0.03	−0.02	−0.03		
	[0.583]		[0.085]		[0.071]	[0.267]	[0.180]		
Blocks × ΔCash		0.37		0.4	0.59			0.24	0.48
		[0.076]		[0.025]	[0.016]			[0.340]	[0.040]
Blocks		0.00		−0.01	0.00			−0.01	0.00
		[0.788]		[0.560]	[0.853]			[0.694]	[0.759]
Bond Ratings Dum. × ΔCash			−0.05	−0.38					
			[0.915]	[0.059]					
High Payout Dum. × ΔCash	−0.45	−0.36							
	[0.045]	[0.097]							
Constant	0.05	0.03	0.03	0.05	0.05	0.06	0.01	0.05	0.04
	[0.001]	[0.015]	[0.286]	[0.000]	[0.001]	[0.003]	[0.861]	[0.001]	[0.007]
Observations	5448	6974	6459	8386	4169	3128	3331	4023	4363
R-squared	0.12	0.14	0.18	0.14	0.14	0.17	0.19	0.15	0.14

examine whether our results are robust to controlling for the impact of financial constraints. First, we consider a firm as unconstrained if the firm has an investment grade bond rating and measure this as a dummy variable equal to one if a rating exits and zero otherwise. Second, we consider a firm as unconstrained if the firm has a payout ratio above the median and measure this using a dummy variable equal to one if the firm is unconstrained and zero otherwise. These measures are similar to those used in Faulkender and Wang (2005) and Almeida, Campello, and Weisbach (2004).[9] We also include these

[9]Faulkender and Wang (2005) compare firms in the highest and lowest 30% of payout, dropping the middle 40% of their sample. We split the data at the median to prevent losing a large portion of our sample, since our sample size is significantly smaller due to the governance data requirements. However, when we duplicate their dummy, our results are similar in magnitude and remain significant. Also, Faulkender and Wang consider a firm that has *any* bond rating (including D) unconstrained. Given the paucity of non-investment grade ratings in our large firm sample, the results remain virtually the same if we follow that procedure.

financial constraint indicators interacted with the change in cash in our analysis.[10] The coefficient on the interaction term confirms that constrained firms have a higher value of cash reserves. More importantly for this paper, we show that the value of a dollar of cash continues to be significantly greater for well governed relative to poorly governed firms. The economic impact of blockholdings is consistent with that documented previously in Table 3. Performing a similar calculation to that presented in Panel B of Table 3, we find that, using dividend payout (bond rating) as a control for constraint, the value of a dollar of cash is \$1.12 (\$1.21) for well governed firms and \$0.75 (\$0.81) for poorly governed firms. The economic significance of the Gompers, Ishii, and Metrick index is also similar to that presented in Table 3 when we measure constraint with the bond rating (column 3): the value of a dollar of cash is \$1.61 to a well and \$0.41 to a poorly governed firm. However, the economic significance of the Gompers, Ishii, and Metrick index is lower but still economically meaningful when we measure constraint using the dividend payout dummy. A dollar of cash is worth \$1.13 to a well and \$0.66 to a poorly governed firm, reflecting a \$0.47 difference in value. Given the magnitudes of the value of a dollar of cash in the other specifications, it is possible that this last calculation provides a more modest but reasonable estimate.

In column 5 of Table 4, we include both governance measures to investigate the incremental importance of each governance mechanism. The coefficient on the interaction between cash and each governance measure remains positive and significant. These findings suggest that the measures play somewhat independent roles in disciplining management and are consistent with the findings of Cremers and Nair (2005), who show that both measures of governance remain significant in their firm value regressions.

Table 4 also examines how the value of cash may differ based on the use of cash. Harford (1999) shows that firms with large cash reserves spend extensively and possibly negligently on acquisitions. Recently, Harford, Mansi, and Maxwell (2005) confirm this finding and show that this is most prevalent in firms with poor governance. In Table 4, we investigate whether our findings are due to poorly governed firms destroying value through acquisitions, or whether the value destruction is more widely spread throughout firm decision making. Specifically, we divide the sample into those firms that report (columns 6 and 8) and those that do not report (columns 7 and 9) using cash for acquisitions on the statement of cash flows over year t. The results show little difference in the impact of governance on the marginal value of cash between the two groups. It is clear from the results that even for firms that do not undertake acquisitions, governance remains an important determinant for the value of cash. The interaction coefficient between cash and governance remains economically and statistically significant in all cases except column 8, which uses blockholdings and examines firms making acquisitions. In untabulated tests, we repeat this analysis breaking the sample into firms with high and low acquisition activity over the two and three year periods following year t, and we find similar results. Overall, this analysis shows that the value destruction of a dollar of cash due to poor governance occurs for reasons beyond spending on bad acquisitions. In Section 4, we will investigate the use of cash reserves to further understand *how* poorly governed firms destroy value. Before doing so, we turn to an alternative technique for estimating the value impact of governance.

[10]In untabulated results, we also include the financial constraint variable itself (not interacted) and find similar results.

3.2. Governance and the value of excess cash

In the previous analysis, we focus on the value effects of changes in total cash, and we show that investors assign lower value to cash in poorly governed firms. In this section, we apply a different technique that is based not on changes in cash but on the level of cash. Furthermore, we extend our measure of cash to consider the value effects of governance through their effect on *excess* cash. We define excess cash as cash held by firms that is not needed for firm operations or investments. Total cash does not account for the fact that managers may be less likely to waste cash resources needed for daily operations. Jensen (1986) argues that poorly monitored and/or entrenched managers of public corporations waste *free* cash flows. We extend this argument to *excess* cash reserves and provide empirical evidence for its relevance for firm value and the impact of corporate governance on that value.[11]

As in the previous literature, we define excess cash as the cash held above a predicted "optimal" (or necessary) level of cash. We estimate this optimal level using a regression of cash on variables that proxy for "legitimate" reasons firms hold cash (investment opportunities, hedging needs, availability of alternative sources of liquidity, etc.). The regression specifications for an optimal cash regression are well discussed in the literature (Opler, Pinkowitz, Stulz, and Williamson, 1999; Dittmar, Mahrt-Smith, and Servaes, 2003; Harford, Mansi, and Maxwell, 2005). Nevertheless, there are many important issues to consider and we relegate the details of these regressions to the appendix. We note here merely that our valuation results and the impact of governance on the value of excess cash below are robust to several different specifications of the excess cash computation. Moreover, they are very similar if we simply use total cash rather than excess cash.

3.2.1. Value regression specification

To calculate the value of excess cash, we employ a level regression rather than the changes regression described in Eq. (1). We use this alternative method for two reasons: first, it is not straight-forward to interpret a change in excess cash, since this may be caused either by a change in total cash or a change in some of the determinants of optimal cash; second, this method provides a robustness check on the results above. We use value regressions akin to Fama and French (1998) to determine the impact of governance on the value of excess cash reserves. Similar methods are used by other "value of governance" papers (Gompers, Ishii and Metrick, 2003; Bebchuk, Cohen, and Ferell, 2005; Cremers and Nair, 2005; and others) and by other "value of cash" papers (Pinkowitz and Williamson, 2004; Pinkowitz, Stulz, and Williamson, 2006).[12] Other than the excess cash and governance measures, we use the same variables that Fama and French employed to determine the impact of debt tax shields on firm value. The dependent variable is the firm's

[11] In the analysis of changes in cash in Section 3.1, we control for the level of cash and several factors that may cause a firm to hold more cash. However, we do not directly measure "changes in *excess* cash." Excess cash is total cash minus "normal" or necessary cash. Since the determinants of "normal" cash change over time, it is difficult to interpret the regression coefficient on 'changes in *excess* cash': it could be due to changes in cash itself or due to changes in such determinants of normal cash as industry uncertainty, profitability, or firm size. Thus, we use changes in total cash in the previous section.

[12] Pinkowitz and Williamson (2004) are unable to show that financially constrained firms place a higher value on cash reserves. It is partly for this reason that we focus on the methods presented in Section 2.2 with the results discussed in Section 3.1, even though we find that our results are unaffected by the choice of methodology.

market-to-book ratio as a measure of firm value. The control variables include those quantities that are likely to affect investors' expectations of future net cash flows, which determine the value of the firm. The determinants of future cash flows that Fama and French use as controls are past changes, future changes, and current levels of Earnings, R&D Expenses, Dividends, Interest Expenses, as well as past and future changes in Assets and future changes in Market Value, all normalized by the Book Value of Assets of the firm. We also include year dummies to capture macroeconomic and time trend effects, as well as firm dummies (fixed effects) to capture unobserved heterogeneity and industry effects. Specifically, we estimate the following regression separately for each measure of corporate governance:

$$\begin{aligned}\frac{MV_{i,t}}{NA_{i,t}} = {} & \beta_o + \beta_1 \frac{E_{i,t}}{NA_{i,t}} + \beta_2 \frac{\mathrm{d}E_{i,t}}{NA_{i,t}} + \beta_3 \frac{\mathrm{d}E_{i,t+2}}{NA_{i,t}} + \beta_4 \frac{RD_{i,t}}{NA_{i,t}} + \beta_5 \frac{\mathrm{d}RD_{i,t}}{NA_{i,t}} + \beta_6 \frac{\mathrm{d}RD_{i,t+2}}{NA_{i,t}} \\ & + \beta_7 \frac{D_{i,t}}{NA_{i,t}} + \beta_8 \frac{\mathrm{d}D_{i,t}}{NA_{i,t}} + \beta_9 \frac{\mathrm{d}D_{i,t+2}}{NA_{i,t}} + \beta_{10} \frac{I_{i,t}}{NA_{i,t}} + \beta_{11} \frac{\mathrm{d}I_{i,t}}{NA_{i,t}} + \beta_{12} \frac{\mathrm{d}I_{i,t+2}}{NA_{i,t}} \\ & + \beta_{13} \frac{\mathrm{d}NA_{i,t}}{NA_{i,t}} + \beta_{14} \frac{\mathrm{d}NA_{i,t+2}}{NA_{i,t}} + \beta_{15} \frac{\mathrm{d}MV_{i,t+2}}{NA_{i,t}} + \beta_{16} Gov_{i,t} + \beta_{17} \frac{XCash_{i,t}}{NA_{i,t}} \\ & + \beta_{18} Gov_{i,t} \times \frac{XCash_{i,t}}{NA_{i,t}} + Yr\,Dum. + Firm\,Fixed\,Effects + \varepsilon_{i,t}, \end{aligned} \tag{2}$$

where $\mathrm{d}X_t$ indicates a change in X from time $t-2$ to t and, Compustat codes in parentheses, $MV_{i,t}$ = Market Value at time t = Price (199) times Shares (25) plus total liabilities (181), $NA_{i,t}$ = Net Assets (6 – 1) at time t, $E_{i,t}$ = Earnings before Extraordinary Items (18 + 15 + 50 + 51) from year $t-1$ to t, $RD_{i,t}$ = R&D Expenses (46, set to zero if missing) from year $t-1$ to t, $D_{i,t}$ = Common Dividends (21) from year $t-1$ to t, $I_{i,t}$ = Interest Expenses (15) from year $t-1$ to t, $XCash_{i,t}$ = Cash (1) at time t minus Optimal Cash from the appendix, and $GOV_{i,t}$ = Governance measure.

We estimate our value regression (2) on all firms with *positive* excess cash. We focus on this subgroup because our hypotheses concern the influence of governance on the value and use of cash reserves not needed for operations and investments. The role of governance likely differs for negative excess cash firms, and theories of governance and capital constraints are not as well developed as theories of governance and excess cash.[13]

Table 5 presents the results of estimating regression (2). In the first two columns, we show the impact of our two primary measures of governance on the value of excess cash. We find that good corporate governance significantly increases the value of cash holdings: the coefficient on the interaction variable between excess cash and both measures of corporate governance is consistently positive and significant. To interpret this coefficient, consider a firm with one dollar of excess cash: the coefficient on the interaction would be zero if governance had no impact on the value of the dollar. Our results show that the value of the dollar is statistically and economically significantly greater if the firm is well governed. Using the Gompers, Ishii, and Metrick index, the relative size of the coefficients on excess cash alone and on the interaction indicate that, going from the lowest tercile of

[13]One potential criticism of this method of valuing cash is that the level of cash may be endogenously determined with the market-to-book ratio, which is correlated with investment opportunities, which in turn may determine the need for cash holdings. As we explain in the appendix, this is one benefit of using *excess* rather than total cash. When we estimate excess cash, we can use instrumental variables to deal with this endogeneity issue, producing a measure of excess cash that is orthogonal to investment opportunities.

Table 5
The impact of governance on value of excess cash using market-to-book regressions

This table shows the results for the value regressions. All models are estimated as fixed effects regressions. In all variables, assets are computed net of cash. The dependent variable in all models is the ratio of the firm's market value to assets. The independent variables include: the ratio of excess cash computed as the residual from regression [1] in Table A.1 divided by assets (Excess Cash/Assets), a governance dummy based on whether the firm was in the top or bottom tercile of the Gompers, Ishii, and Metrick index, the sum of the 5% institutional blockholdings, the sum of public pension fund holdings, and the Bebchuk, Cohen, and Ferrell index distribution (Gompers, Ishii, and Metrick index, Blocks, Pension Holdings, Bebchuk, Cohen, and Ferrell index), the interaction between Excess Cash/Assets and the governance dummy (Excess Cash x Gov. Dummy), as well as the two-year lagged change (ΔL2), the 2-year future change (Δ2), and the current realizations of the ratios of the following variables over assets: Earnings, Assets (current realization not used), R&D, Interest Expenses, Dividends, Market Value (only future change). All ratios are winsorized at the 1% and 99% levels. All models use only firms with positive excess cash. Models [5] and [6] use for all years the first sample observation of the governance variable of each firm. All regressions include year dummies. *P*-values are given in brackets.

	[1]	[2]	[3]	[4]	[5]	[6]
Excess Cash	2.03	2.70	2.26	3.03	2.00	3.07
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Excess Cash × Gompers, Ishii, and Metrick index	3.39				2.89	
	[0.000]				[0.000]	
Gompers, Ishii, and Metrick index	−0.87					
	[0.276]					
Excess Cash × Blocks		0.52				1.91
		[0.079]				[0.000]
Blocks		−0.17				
		[0.243]				
Excess Cash × Bebchuk, Cohen, and Ferrell index			2.53			
			[0.000]			
Bebchuk, Cohen, and Ferrell index			0.9			
			[0.380]			
Excess Cash × Pension Holdings				0.93		
				[0.001]		
Pension Holdings				−0.49		
				[0.003]		
Earnings /Assets	1.43	1.36	1.59	0.82	1.51	1.43
	[0.001]	[0.000]	[0.009]	[0.026]	[0.000]	[0.000]
Δ2 Earnings /Assets	0.48	0.7	0.71	0.84	0.87	0.65
	[0.041]	[0.001]	[0.011]	[0.000]	[0.000]	[0.002]
ΔL2 Earnings /Assets	1.15	1.86	2.1	0.39	0.87	1.68
	[0.001]	[0.000]	[0.000]	[0.118]	[0.001]	[0.000]
Δ2 Assets /Assets	0.32	0.71	0.27	0.24	0.3	0.49
	[0.003]	[0.000]	[0.026]	[0.005]	[0.000]	[0.000]
ΔL2 Asset /Assets	0.32	0.05	0.18	0.38	0.3	-0.06
	[0.094]	[0.729]	[0.390]	[0.003]	[0.024]	[0.676]
R&D /Assets	10.76	15.12	15.2	12.34	12.66	13.57
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Δ2 R&D /Assets	7.26	8.72	7.94	7.6	7.68	7.97
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
ΔL2 R&D /Assets	0.04	1.51	−0.68	−0.87	0.17	0.49
	[0.973]	[0.132]	[0.598]	[0.289]	[0.829]	[0.606]
Interest /Assets	16.86	7.75	4.31	12.46	4.86	−1.87
	[0.001]	[0.077]	[0.467]	[0.001]	[0.200]	[0.692]
Δ2 Interest /Assets	3.15	−2.07	7.64	5.91	−0.53	−0.01
	[0.344]	[0.465]	[0.029]	[0.009]	[0.830]	[0.996]

Table 5 (*continued*)

	[1]	[2]	[3]	[4]	[5]	[6]
ΔL2 Interest /Assets	−6.34	−0.47	−4.27	−4.95	−4.55	2.74
	[0.136]	[0.891]	[0.375]	[0.078]	[0.127]	[0.431]
Dividends /Assets	33.34	0.28	30.86	18.16	26.32	25.35
	[0.000]	[0.958]	[0.000]	[0.000]	[0.000]	[0.000]
Δ2 Dividends /Assets	23.41	10.02	24.85	16.53	20.31	19.87
	[0.000]	[0.024]	[0.000]	[0.000]	[0.000]	[0.000]
ΔL2 Dividends /Assets	4.62	1.85	−1.64	1.75	−4.97	−5.38
	[0.511]	[0.758]	[0.834]	[0.770]	[0.343]	[0.383]
Δ2 Market Value /Assets	−0.29	−0.35	−0.31	−0.25	−0.3	−0.31
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.35	0.91	−0.49	1.38	0.39	0.31
	[0.503]	[0.000]	[0.506]	[0.000]	[0.032]	[0.144]
Observations	2666	3600	2517	3358	4044	3853
Number of firms	680	994	640	1003	853	826
Pseudo *R*-squared	0.52	0.50	0.53	0.43	0.49	0.50

corporate governance to the highest tercile, the marginal impact of excess cash on firm value more than doubles. Using blockholdings, the relative size of the coefficients on excess cash alone and on the interaction indicate that, going from the lowest tercile of corporate governance to the highest tercile, the marginal impact of excess cash on firm value increases by 30%. We explain in the appendix why we focus our interpretation on the *relative* magnitude of the interaction term and refrain from interpreting the coefficient on cash alone as representing the true marginal value of excess cash.

In columns 3 and 4 of Table 5, we examine our previously described two additional proxies for governance. In column 3, we replace the Gompers, Ishii, and Metrick (2003) measure for antitakeover provisions with the Bebchuk, Cohen, and Ferrell (2005) measure. Again, we find that the marginal value of a dollar of cash doubles. In column 4, we replace the block institutional ownership with ownership by public pension funds. The results are consistent with our previous findings and are now statistically significant. These findings confirm the importance of pension holdings as documented in DelGuercio and Hawkins (1999). Specifically, the value of excess cash of a well monitored firm is 40% greater than that of a lesser monitored firm. Overall, our results are consistent with the findings in Pinkowitz, Stulz, and Williamson (2006), who find effects of similar order of magnitude for various governance measures across different countries.

As we discuss previously, governance may be endogenously determined with value. To alleviate this concern, we replicate the procedure of Section 3.1, where we replace the slowly but potentially endogenously changing measures of governance with their initial, unchanging, and clearly exogenous realizations. We present these results in columns 5 and 6. When we re-estimate the regression using the initial governance measures, we continue to find that the interaction term remains positive and significant in each of the specifications. While using non-changing governance measures precludes us from estimating the effect of governance by itself on firm value in a fixed effects regression (the governance effect is now subsumed by the firm fixed effect), the large variation in cash levels over time still allows us to estimate the interaction coefficient precisely.

Table 6
The impact of governance on the value of cash and excess cash using market-to-book regressions (robustness)

This table shows the results for the value regressions. All models are estimated as fixed effects regressions. In all variables, assets are computed net of cash. The dependent variable in all models is the ratio of the firm's market value to assets. The independent variables include: a measure of cash—either the ratio of excess cash computed as the residual from the regressions in Table A.1 divided by assets, or actual cash/assets, (Cash Measure), a governance dummy based on whether the firm was in the top or bottom tercile of the Gompers, Ishii, and Metrick index or the sum of the 5% institutional blockholdings, the interaction between the cash measure and the governance dummy (Cash Measure x Gov. Dummy), as well as the (unreported) two-year lagged change (ΔL2), the 2-year future change (Δ2), and the current realizations of the ratios of the following variables over assets: Earnings, Assets (current realization not used), R&D, Interest Expenses, Dividends, and Market Value (only future change). All ratios are winsorized at the 1% and 99% levels. Models [1–4] and [7–9] use only firms with positive excess cash and models [5] and [6] use only firms with cash/assets above the median. Models [1] and [2] use excess cash computed from regression [2] in Table A.1 (which includes the governance variable). Models [3] and [4] use excess cash computed from regression [3] in Table A.1 (which includes Leverage, Dividends, and Capital Expenditures). Models [5] and [6] are estimated using raw cash rather than excess cash. Model [7] is the base model from column 1 in Table 5, but now with both measures of governance included at the same time. Models [8] and [9] use only those sample firms that report zero acquisitions. All regressions include year dummies. *P*-values are given in brackets.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Cash Measure	2.07	2.68	0.80	1.11	0.82	2.18	1.29	1.26	2.08
	[0.000]	[0.000]	[0.202]	[0.000]	[0.087]	[0.000]	[0.052]	[0.241]	[0.000]
Cash Measure × Gompers, Ishii, and Metrick index	3.34		2.55		2.81		1.49	4.84	
	[0.000]		[0.000]		[0.000]		[0.034]	[0.000]	
Gompers, Ishii, and Metrick index	−0.87		−1.03		−1.45		−1.85	0.26	
	[0.271]		[0.154]		[0.109]		[0.077]	[0.892]	
Cash Measure × Blocks		0.52		0.57		1.15	1.73		0.35
		[0.075]		[0.093]		[0.000]	[0.000]		[0.476]
Blocks		−0.17		−0.29		−0.47	−0.34		−0.07
		[0.231]		[0.030]		[0.004]	[0.114]		[0.787]
Constant	0.20	0.91	0.69	0.76	0.20	0.43	1.91	−0.93	1.78
	[0.693]	[0.000]	[0.141]	[0.000]	[0.760]	[0.072]	[0.005]	[0.466]	[0.000]
Observations	2729	3702	2711	3648	2582	3391	1731	1367	1891
Number of firms	695	1019	726	1070	700	1029	561	498	722
Pseudo *R*-squared	0.52	0.50	0.45	0.47	0.58	0.54	0.52	0.54	0.50

In Table 6, we report several robustness checks on the results presented in Table 5. Columns 1–4 present results for alternative specifications of the cash regression used to calculate excess cash, which we describe in the Appendix. These results show that our findings and conclusions are not sensitive to how excess cash is computed. Specifically, in columns 1 and 2, we report results from the value regressions when the level of excess cash is measured including a control variable for corporate governance. The results and economic significance of the value regression are similar to those discussed above. Columns 3 and 4 report results from the value regression when excess cash is measured using an OLS regression that includes additional variables to predict cash reserves (similar to Opler, Pinkowitz, Stulz, and Williamson, 1999). The results and economic significance

of the value regression are similar to those discussed above.[14] To further illustrate the robustness of our findings, we re-estimate Eq. (2) using total (not excess) cash; now including only firms with total cash to assets above the median as opposed to only firms with positive excess cash. These results, presented in columns 5 and 6 of Table 6, also show that the marginal value of cash is significantly greater for well versus poorly governed firms. In untabulated results, we measure cash as cash divided by sales (rather than cash divided by net assets) in the optimal cash regression and in the value regression. The results again confirm the earlier findings that good corporate governance has a significant and positive impact on the value of excess corporate cash holdings. In column 7, we include both governance measures. Similar to the results presented with both measures in Table 4, the evidence indicates that each governance mechanism has an independent effect. Lastly, in column 8, we show that our results continue to hold for the subsample of firms that did not use cash for acquisitions in the year following the positive excess cash observation, illustrating that the value effects shown here extend beyond the impact of wasting cash on acquisitions.[15] Column 9 presents similar results using blockholdings but shows the results do not hold for this subsample.

4. The impact of governance on levels and uses of excess cash

In the previous section, we show that good corporate governance improves the value of cash holdings. In this section, we further explore the effect of governance on the value of cash by investigating how governance affects the level and use of excess cash. According to Jensen (1986), firms with poor corporate governance might be found to invest their excess cash inefficiently; alternatively, it may be the case that excess cash simply reduces the pressures on management to control costs, improve margins, closely monitor employees and operations, and generally enhance profits. We therefore hypothesize that poorly governed firms dissipate cash more quickly than well-governed firms, operating in ways that drive down the firm's accounting returns.

To begin the investigation of *how* governance impacts the use of cash holdings, we first examine *if* governance impacts how much excess cash firms dissipate. We compare the impact on dissipation to the effect governance has on how much excess cash firms accumulate over time. The results are presented in Table 7, where we examine all firms that have excess cash at date t. In the first two columns, we examine the dissipation of excess cash. We report the results from regressing the change in excess cash from date t to date $t+1$ on governance over the same period, controlling for the industry average change in excess cash. This control for the industry average change captures the impact of industry wide changes in investment opportunities, profitability, and hedging needs as drivers of cash changes. We find that indeed the industry average change is very highly correlated with the firm-level change. More importantly, we find that governance significantly

[14]In fact, and reassuringly, most alternative procedures for estimating excess cash lead to levels that are highly correlated (generally above 80%). In particular, including or excluding governance in the optimal cash regression does not appear to influence the resulting excess cash levels. This indicates that governance, while clearly important for value considerations, appears to have a second-order impact on the *level* of cash holdings. We further investigate this below, where we find that indeed governance affects *use* of cash to a much higher extent than *accumulation* of cash.

[15]These results are again robust to using firms that conduct below median acquisitions over two or three year horizons, rather than zero acquisitions over just one year.

Table 7
The of impact of governance on level changes of excess cash

This table shows the results for the excess cash level changes regressions. The sample includes all firms that have positive excess cash at date t. In models [1] and [2], the dependent variable is the future change in excess cash relative to assets (ratio at $t+1$ minus ratio at t). In models [3] and [4], the dependent variable is the past change in excess cash relative to assets (ratio at t minus ratio at $t-1$). In all variables, assets are computed net of cash. The independent variables include: a (lagged or current) governance dummy based on whether the firm was in the top or bottom tercile of the Gompers, Ishii, and Metrick index or Blocks (Gompers, Ishii, and Metrick index and Blocks), and (lagged or future) industry average change in excess cash divided by assets. All ratios are winsorized at the 1% and 99% levels. Excess Cash/Assets is based on the residual from regression [1] in Table A.1. *P*-values based on robust standard errors are given in brackets.

	[1]	[2]	[3]	[4]
Industry Average Change in Excess Cash	1.00	0.67		
	[0.000]	[0.000]		
Gompers, Ishii, and Metrick index	0.01			
	[0.051]			
Blocks		0.02		
		[0.004]		
Lagged Ind. Avg. Change in Excess Cash			0.94	0.62
Lagged Gompers, Ishii, and Metrick Index			[0.000]	[0.000]
			0.01	
			[0.377]	
Lagged Blocks				−0.01
				[0.234]
Constant	0.01	0.01	0.01	0.02
	[0.000]	[0.042]	[0.006]	[0.000]
Observations	2930	3950	2932	3916
R-squared	0.04	0.02	0.03	0.02

influences how much excess cash firms dissipate. Specifically, poorly governed firms dissipate more cash than well-governed firms. These results hold when governance is measured by either the Gompers, Ishii, and Metrick index or blockholdings.

For comparison, we also investigate if governance influences the accumulation of cash. Using the same firms that have excess cash in year t, in columns 3 and 4, we step back in time and investigate how governance impacts the change in excess cash from the year $t-1$ to t, that is, the accumulation of excess cash. Again controlling for industry wide changes, we find that governance has little to do with the rate of accumulation of excess cash. This insight has important implications for understanding how governance influences cash policy. The findings in Table 7 indicate that governance influences cash policy not via the decision to *accumulate*, but rather via the decision to *use* excess cash. This implies that governance has more of an impact on investment and operating decisions than it does on financing policy related to cash. It is also consistent with the notion that the accumulation of excess cash is driven by external factors (shocks to profitability, competitive pressures, etc.), while the dissipation of excess cash is a discretionary firm choice driven in part by agency issues and the firm's governance structure.

Panels A–C of Fig. 1 further illustrate this dissipation of excess cash over a longer time window. To construct the panels of Fig. 1, we start with any year a firm has positive excess cash and label this year 0. We then calculate the ratio of excess cash in each of the

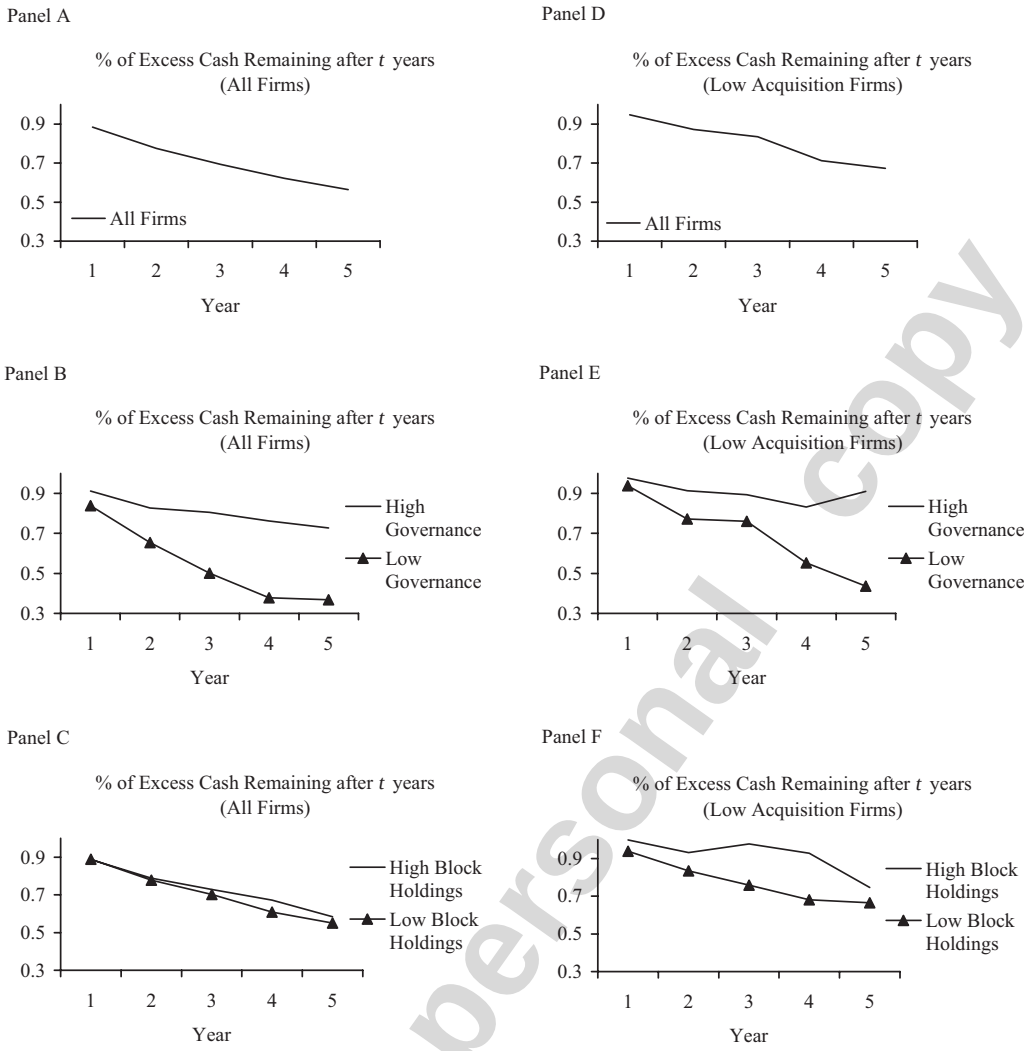

Fig. 1. Dissipation of excess cash. This figure shows the change in excess cash for the median firm over time. All firms with positive excess cash based on regression [1] in Table A.1 in a particular year are included. The year with positive excess cash is considered year 0. The ratio plotted is the amount of excess cash in year t divided by the amount of excess cash in year 0. Governance is measured using the Gompers, Ishii, and Metrick (2003) Governance index (high and low terciles), blockholdings are the sum of all > 5% blockholdings (high and low terciles). Low acquisition firms (right hand side panels) are firms with below median acquisitions during the three years following the initial excess cash observation.

following five years divided by the level in year 0. Panel A shows that the median firm in the sample dissipates almost 30% of its excess cash within five years. Panel B shows that governance, as measured by the Gompers, Ishii, and Metrick index, strongly impacts the rate of dissipation. This panel divides the sample into good and bad governance based on the managerial entrenchment index. The difference is dramatic. While good governance firms hold onto their cash, poorly governed firms use up over half of these excess cash resources. Panel C presents similar, though less dramatic, results for firms with high and low block ownership. Since previous research shows that firms with poor governance dissipate some of their cash on acquisitions (Harford, Mansi, and Maxwell, 2005), we repeat panels A–C for firms that have low expenditures on acquisitions over the three years following the initial cash observations and present this in panels D–F. We focus on firms with low (below median), rather than no, acquisitions here because once we extend to a

multi-year window, the sample of no acquirers is quite small. Panels D–F show poorly governed firms that spend little on acquisitions also quickly dissipate excess cash, suggesting that acquisitions account for part but not all of the use of cash in poorly governed firms. Overall, the figure indicates that poorly governed firms dissipate cash more quickly and that this dissipation is not fully due to acquisitions. In untabulated results, we find that the difference in dissipation we document is not driven by differing payout ratios.

Of course, this paper is about value considerations and dissipating cash is not necessarily a bad decision. The interpretation of any reduction in cash depends on how firms use these resources. To investigate whether dissipating cash improves or hinders performance, we examine the operating performance for a subset of firms that use excess cash reserves. We hypothesize that firms that draw down their excess cash from year $t-1$ to year t will have lower operating performance if they have poor governance. Specifically, we investigate the industry-adjusted return on assets (ROA) for the subsample of firms that had positive excess cash at time $t-1$ and used some of it up in year t. We measure ROA as operating income before depreciation (Compustat code 13) divided by total assets net of cash. Industries are defined as in previous sections. We estimate a regression of industry-adjusted ROA on the level of excess cash at time $t-1$, governance at time $t-1$, and an interaction between the two. We control for size (real assets), asset structure (PP&E divided by net assets), as well as lagged industry-adjusted ROA in these regressions, which we estimate as firm fixed effects regressions with year dummies. The regression equation is given as follows.

$$ROA_{i,t} = \delta_0 + \delta_1 \frac{XCash_{i,t-1}}{NA_{i,t-1}} + \delta_2 GOV_{i,t-1} + \delta_3 \frac{XCash_{i,t-1}}{NA_{i,t-1}} \times GOV_{i,t-1} + \delta_4 Ln\left(NA_{i,t}\right) + \delta_5 \frac{PPE_{i,t}}{NA_{i,t}} + \delta_6 ROA_{i,t-1} + Year\ Dummies + Firm\ Fixed\ Effects + \varepsilon_{i,t}, \quad (3)$$

where (Compustat codes in parentheses) $ROA_{i,t}$ = operating Income (13) in year t divided by $NA_{i,t}$ minus industry average ROA, $NA_{i,t}$ = net Assets (6 – 1) at time t, $PPE_{i,t}$ = property, Plant, and Equipment (8) at time t, $XCash_{i,t-1}$ = cash (1) at time t—1 minus Predicted Cash from the Appendix, and $GOV_{i,t}$ = Governance measure at time $t-1$.

We estimate the ROA regression (3) on all firms that both have *positive* excess cash at date $t-1$ and reduce their cash between $t-1$ and t. In other words, we are interested in firms that had excess cash and did something with it. A positive coefficient on the interaction term between lagged excess cash and lagged governance indicates that for every dollar of excess cash held at date $t-1$, firms with bad corporate governance who used up excess cash experienced a lower ROA in the following year compared to firms with good corporate governance.

The results are presented in Table 8. In columns 1 and 2, we present our primary specifications and find that the coefficient on lagged excess cash by itself shows that for firms that use excess cash holdings over the year, a larger beginning balance of excess cash results in lower future operating performance. However, the interaction coefficient in column 1 shows that this negative effect is almost completely reversed if the firm has good external governance. An F-test (not presented) shows that the sum of the coefficients on Cash and the Cash–Gompers, Ishii, and Metrick index interaction is significantly greater

Table 8
The impact of the use of cash on operating performance

This table shows the regression results for the return on assets (ROA) regressions. In all variables, assets are computed net of cash. The dependent variable is ROA (Operating Income over Assets) normalized by industry average ROA. The independent variables include: a one-year lagged cash measure, either excess cash/assets from regression [1] in Table A.1 or actual cash/assets (Lag. Cash Measure), a one-year lagged governance dummy based on whether the firm was in the top or bottom tercile of the Blocks or Gompers, Ishii, and Metrick index distribution (Lag. Blocks and Lag. Gompers, Ishii, and Metrick index), the interaction between Lag Excess Cash/Assets and the lagged governance dummy (Lag. Cash Measure x Lag. Gov Dummy), firm real assets (Assets), property, plant, and equipment to assets (PP&E/Assets), cash flow to assets (Cash Flow/Assets), and lagged ROA in excess of industry average. The sample is the intersection of firms with either positive lagged excess cash (models [1]–[2] and [5]–[6]) or lagged cash to assets greater than the median and firms for which actual cash has declined over the year. Models [3] and [4] use raw cash instead of excess cash as the independent variable and interaction term. Models [5] and [6] control for the level of acquisitions (Acquisitions/Assets) that firms undertake and the interaction with the governance variable. All ratios are winsorized at the 1% and 99% levels. All models are estimated as fixed effects. All regressions include year dummies. *P*-Values are given in brackets.

	[1]	[2]	[3]	[4]	[5]	[6]
Lag. Cash Measure	−0.09	−0.04	−0.22	−0.04	−0.07	−0.01
	[0.017]	[0.073]	[0.000]	[0.008]	[0.077]	[0.893]
Lag. Cash Measure × Gompers, Ishii, and Metrick index	0.20		0.27		0.23	
	[0.000]		[0.000]		[0.000]	
Lag. Gompers, Ishii, and Metrick index	0.04		−0.02		0.05	
	[0.547]		[0.842]		[0.412]	
Lag. Cash Measure × Blocks		0.07		0.03		0.05
		[0.003]		[0.062]		[0.026]
Lag. Blocks		−0.02		0.01		0.01
		[0.134]		[0.945]		[0.937]
Acquisitions /Assets					−0.22	−0.15
					[0.013]	[0.014]
Acqu./Assts. × Gompers, Ishii, and Metrick Index					−0.04	
					[0.735]	
Acqu./Assts. × Blocks						−0.07
						[0.389]
Lag. ROA	0.33	0.41	0.33	0.42	0.31	0.47
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Assets	0.01	−0.01	−0.01	−0.01	0.01	0.00
	[0.525]	[0.389]	[0.672]	[0.211]	[0.231]	[0.666]
PP&E /Assets	−0.24	−0.08	−0.34	−0.13	−0.28	−0.11
	[0.000]	[0.067]	[0.000]	[0.014]	[0.000]	[0.013]
Constant	0.11	0.17	0.24	0.2	0.07	0.14
	[0.259]	[0.011]	[0.028]	[0.002]	[0.510]	[0.047]
Observations	1598	2130	1548	2006	1474	1968
Number of firms	646	914	670	940	619	876
Pseudo *R*-squared	0.20	0.33	0.23	0.35	0.22	0.35

than zero. The interaction coefficient in column 2 indicates that the negative effect is reversed if the firm has good internal governance. An F-test shows that the sum of the coefficient on Cash and the Cash–Blocks interaction is not significantly different from zero. Thus, excess cash leads to lower operating performance only if a firm is poorly

governed.[16] There are multiple interpretations of this result. Poorly governed firms may invest their excess cash in low return investments or, alternatively, the presence of excess cash may make managers "lazy" in that it reduces their incentives to control costs, improve margins, and engage in other profit-increasing measures. Either way, the excess cash is associated with suboptimal performance; however, good governance can provide the pressures on management to reverse this effect. Combining this result with the evidence on the dissipation of cash, we show that poorly governed firms dissipate cash more quickly in ways that destroy operating performance. In contrast, well-governed firms dissipate less cash but when they do use excess cash they do so in ways that are nondestructive.

In columns 3 and 4, we repeat this analysis examining total (not excess) cash, using firms that dissipate cash and have total cash to assets above the median. We show that our results are robust to this specification, illustrating that it is the use of cash, not changes in optimal cash, that drives our results. In columns 5 and 6, we investigate whether acquisitions alone can explain the diminishing operating performance. To do so, we ask two questions: what is the impact of acquisitions on the operating performance of firms that dissipate cash, and, do the results documented above persist after controlling for cash spent on acquisitions? To answer these questions, we include two additional variables in our analysis; namely, cash spent on acquisitions in year t divided by assets, and this variable interacted with the corporate governance dummies. We find that firms that spend more on acquisitions experience a drag on their operating performance: the coefficient on cash spent on acquisitions is negative and significant. However, we cannot conclude that corporate governance influences the impact of acquisitions on operating performance, as the coefficient on the governance and acquisitions interaction is statistically insignificant. In other words, while good governance may reduce the total money spent on acquisitions for high cash firms, acquisitions undertaken by *both* well and poorly governed, high-excess cash firms may hurt a firm's return on assets. More importantly for our paper, we show that the results presented previously on operating performance hold after controlling for the effect of acquisitions: firms' initial excess cash reserves have a negative impact on the future operating performance of poorly governed firms that dissipate cash. However, well governed firms do not demonstrate this effect. These results indicate that governance improves the use of cash by improving the returns from normal operations. In untabulated results, we also control for payout policy (dividend and repurchases divided by net income) and find no difference in our results. This is consistent with the lack of findings in Mikkelson and Partch (2003), who conclude that "high cash firms, despite their ample resources, do not make unusually high payouts to security holders."

In Table 9, we perform a number of robustness tests on the results presented in Table 8. First, we use raw rather than industry-adjusted ROA (columns 1 and 2) and show that the results are qualitatively unchanged. Second, we replace the dependent variable with the (industry adjusted) ROA over two years following the initial calculation of excess cash.

[16]These results also confirm the findings of Mikkelson and Partch (2003), who show that unconditionally, prior excess cash does not appear to reduce future operating performance. We find a similar (non-)result when we regress operating performance on excess cash without controlling for governance. However, we extend this approach by including measures of internal and external governance and find that operating performance *is* affected by large excess cash balances, but only for firms with poor governance. Indeed, Mikkelson and Partch (2003) speculate that agency problems may partially determine the effect of cash on future operating performance, but they have only insider ownership available as a control variable for this issue, and this does not lead to statistically significant results.

Table 9
The impact of the use of cash on operating performance (robustness)

This table shows the regression results for the return on assets (ROA) regressions. In all variables, assets are computed net of cash. The dependent variable is ROA (Operating Income over Assets) normalized by industry average ROA. The independent variables include: the one-year lagged excess cash/assets from regression [1] in Table A.1 (Lag. Excess Cash/Assets), a one-year lagged governance dummy based on whether the firm was in the top or bottom tercile of the Blocks or Gompers, Ishii, and Metrick index distribution (Lag. Blocks and Lag. Gompers, Ishii, and Metrick index), the interaction between Lag Excess Cash/Assets and the lagged governance dummy (Lag. XCash x Lag. Gov Dummy), firm real assets (Assets), ratio of property, plant and equipment to assets (PP&E/Assets), cash flow to assets (Cash Flow/Assets), and lagged ROA in excess of industry average. The sample is the intersection of firms with positive lagged excess cash and firms for which cash has declined over the year. Models [1] and [2] use raw ROA instead of ROA minus the industry average as the dependent variable and lagged control. Models [3] and [4] use the industry adjusted ROA two years following the excess cash realization as the dependent variable. Models [5] and [6] use the beginning of sample period realizations of the governance variables. All ratios are winsorized at the 1% and 99% levels. All models are estimated as fixed effects. All regressions include year dummies. *P*-values are given in brackets.

	[1]	[2]	[3]	[4]	[5]	[6]
Lag. Excess Cash	−0.08	−0.03	−0.07	−0.03	−0.02	0.02
	[0.027]	[0.099]	[0.020]	[0.048]	[0.462]	[0.329]
Lag. XCash × Gompers Ind.	0.15		0.14		0.06	
Lag. Gompers, Ishii, and Metrick Index	[0.000]		[0.000]		[0.031]	
	0.10		0.04			
	[0.086]		[0.386]			
Lag. XCash × Blocks		0.04		0.05		0.02
		[0.034]		[0.007]		[0.464]
Lag. Blocks		0.00		−0.01		
		[0.787]		[0.365]		
Lag. ROA	0.32	0.35	0.36	0.33	0.50	0.38
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Assets	−0.02	−0.03	−0.01	−0.02	0.00	0.00
	[0.032]	[0.000]	[0.303]	[0.001]	[0.790]	[0.725]
PP&E /Assets	−0.19	−0.08	−0.12	−0.07	−0.18	−0.10
	[0.002]	[0.033]	[0.025]	[0.086]	[0.000]	[0.017]
Constant	0.24	0.31	0.07	0.26	0.11	0.10
	[0.012]	[0.000]	[0.380]	[0.000]	[0.060]	[0.097]
Observations	1598	2130	1495	1986	2424	2305
Number of firms	646	914	593	849	831	802
Pseudo *R*-squared	0.15	0.27	0.26	0.32	0.32	0.29

These results, presented in columns 3 and 4, show that the drag on ROA from the sub-optimal investment of dissipated cash in poorly governed firms persists for at least two years. Lastly, in columns 5 and 6, we present results using initial rather than contemporaneous governance to control for potential endogeneity issues in the governance variable. This is similar to the robustness tests that we conduct with the value regressions in Section 3. In those tests, the endogeneity concern was that high valued firms may choose particular bylaws or institutional shareholders may choose to invest in firms that have a higher/lower market value. In the analysis presented in Tables 8 and 9, the endogeneity would result, for instance, from managers taking entrenching actions when they realize that their performance is not sustainable and will likely revert to lower levels in the next period. The results in columns 5 and 6 indicate that governance continues to have a

positive effect through the impact of excess cash on operating performance. In particular, this effect is significant when governance is measured with the Gompers, Ishii, and Metrick index, indicating that the entrenchment actions of management are not done in direct anticipation of low performance, but rather are the likely underlying cause of the poor performance. The results are not significant when we use blockholdings from the beginning of the sample period, likely because blockholdings are significantly less stable over time and possibly have less of a direct effect on ROA via the excess cash channel.[17]

5. Conclusion

Jensen (1986) argues that if left unmonitored, entrenched managers may waste free cash flows. We extend this argument to cash reserves and provide empirical evidence by examining the effect of governance on the value of excess cash. We find that the value of a dollar of cash is substantially less if a firm has poor corporate governance. We then ask how good governance improves the value of cash reserves. We find that a well governed firm has its excess resources better "fenced in," and that firms with poor corporate governance dissipate excess cash reserves more quickly on less profitable investments than those with good governance. In short, poorly governed firms waste excess cash resources and thus destroy firm value. We also find that these results persist when we control for the acquisition activity of cash-rich firms.

The findings in this paper contribute to our understanding of both the role of governance and cash policy. A large and growing literature documents that governance improves firm value. However, much less is understood about *how* governance enhances firm value; in other words, how does governance work? We provide fresh insight into this question by providing a direct link between governance and the value of an important asset of the firm: cash holdings. Specifically, we find that governance increases firm value by improving the use of cash holdings. The results also shed light on the role of governance in cash policy. We show that governance has a greater influence on the use, rather that the accumulation, of cash holdings. This implies that governance impacts operating and investment decisions (how to use cash) more than financing decisions related to cash policy (how much cash to amass). However, this paper does not attempt to comprehensively examine all reasons for firms to hold cash; rather, we focus on the cost of holding excess cash for poorly governed firms. One conclusion with respect to cash policy is that it may matter very little whether a firm holds excess cash—*if* it is well governed.

Appendix. Measuring excess cash

This appendix describes the methodology for estimating excess cash holdings. We first estimate a regression to establish the normal cash holdings for a US firm. This step is based on the work of Opler, Pinkowitz, Stulz, and Williamson (1999). Excess cash is then defined as the difference between actual cash and predicted, normal cash. In other words, it is the residual of a cash levels regression.

The premise of the literature on normal (or optimal) cash is that corporate cash holdings do not matter if financial markets are perfect in the sense of Modigliani and Miller (1958). If there

[17]Blockholdings are also more variable over time due to both exogenous reasons and blockholder portfolio considerations; thus, we have less statistical power when we use initial blockholdings as a measure of governance.

are imperfections, however, then there are various reasons for firms to hold cash. First, a certain level of cash holdings is required to support the day-to-day operations of the firm, because cash cannot be raised instantaneously on a daily need basis. This transactions motive (Keynes, 1936; Frazer, 1964) suggests that the size of the firm is a key determinant. Thus, most papers control for the log of inflation adjusted total assets. Most papers also include a measure of other, non-cash liquid assets in order to control for potential cash substitutes, with working capital used as a proxy. Other motives for holding cash include accumulating precautionary financial slack in anticipation of new investment opportunities when external finance is costly (Myers and Majluf, 1984). Thus, most papers include controls for cash flow, investment opportunities measured by market-to-book, and access to financial markets measured by total firm size (real assets). Over time, macroeconomic factors may also affect general demand and supply of liquidity, which implies a need for year dummies. Lastly, there is strong anecdotal evidence that some firms hold very high cash levels for idiosyncratic reasons (e.g., Microsoft, Chrysler, and others).[18]

We employ several specifications to estimate normal cash, and none of our eventual conclusions about the effect of corporate governance on the value and the use of excess cash are affected materially by the choice. The following regression equation represents our main specification; its residuals (including firm fixed effects) are used to compute excess cash:[19]

$$Ln\left(\frac{Cash_{i,t}}{NA_{i,t}}\right) = \beta_0 + \beta_1 Ln(NA_{i,t}) + \beta_2 \frac{FCF_{i,t}}{NA_{i,t}} + \beta_3 \frac{NWC_{i,t}}{NA_{i,t}} + \beta_4 (IndustrySigma)_{i,t} + \beta_5 \left(\frac{\widehat{MV}_{i,t}}{NA_{i,t}}\right) + \beta_6 \frac{RD_{i,t}}{NA_{i,t}} + Year\ Dummies + Firm\ Fixed\ Effects + \varepsilon_{i,t}, \tag{4}$$

where (Compustat codes in parentheses): $Cash_{i,t}$ = Cash and Equivalents (1) at time t, $NA_{i,t}$ = Net Assets (6 – 1) at time t, $FCF_{i,t}$ = Operating Income (13) minus Interest (15) minus Taxes (16) over year t, $NWC_{i,t}$ = Current Assets (4) minus Current Liabilities (5) minus Cash (1) at time t, $IndustrySigma_{i,t}$ = industry average of prior 10 year standard deviation of FCF/NA, $MV_{i,t}$ = Market Value at time t = Price (199) times Shares (25) plus total liabilities (181) [Note: the market-to-book ratio is instrumented using past three-year sales growth as described below], and $RD_{i,t}$ = R&D expenditures (46), set to zero if missing, over year t.

The measure of investment opportunities, the market-to-book ratio, presents a problem: as we discuss in the main body of the paper, we hypothesize and find evidence that excess cash impacts firm value as measured by the market-to-book ratio. Thus, it is problematic to specify that market-to-book as a measure of investment opportunities also predicts total cash levels in a simple regression sense. We therefore extend the specification of previous papers and use an instrumented variable to control for investment opportunities. We use three year lagged sales growth as an instrument for the market-to-book ratio. This measure of past growth is clearly exogenous to current cash (i.e., current cash clearly does not

[18] Foley, Hartzell, Titman, and Twite (2006), for instance, show that multinational firms may hold cash reserves for tax reasons.

[19] Since the regressions in this literature are estimated with the natural logarithm of cash in order to deal with the skewed distribution, we set observations with zero cash/assets equal to the sample minimum in order to avoid the logarithm going to infinity. Our results in this paper remain virtually identical if we instead use the natural logarithm of (1 + cash/assets) as a way to deal with the zero cash realizations.

determine past sales growth). As we show below, the instrument also performs well statistically.[20]

Column 1 of Table 10 presents the results of the regression estimation. The parameter estimates are generally consistent with the previous literature. For reference only, the results from the first stage of the instrumental variables regression, which are presented in the last column of Table A.1, show that the three-year sales growth instrument is strongly positively correlated with market-to-book and hence is a good choice. The results also show that small firms with few other liquid assets hold more cash, which is consistent with previous research. We also find that firms with better investment opportunities hold less cash, implying that firms with good investment opportunities spend cash before accumulating reserves. Although this result makes intuitive sense, it conflicts with the results of some other papers. We suspect that this difference is due to the endogenous relation between cash and market-to-book and the fact that we control for this endogeneity using instrumental variables.

Due to the imprecise nature of using instruments to control for investment opportunities (rather than actual market-to-book), it is plausible that the excess cash measure is still slightly related to firm value (measured by market-to-book) due to investment opportunity hedging needs, rather than due to direct value implications. When we use this excess cash measure as an explanatory variable in a value regression, this may bias the coefficient. However, there is little reason to believe that the *relative* magnitude of the interaction of cash with governance—our main coefficient of interest—will be significantly affected or even biased. This is especially evident from the fact that estimating optimal cash with and without governance controls makes no difference in our eventual value regressions. To be safe, we focus our analysis only on the *relative* influence of governance on the value of excess cash, and we refrain from attempting to determine the unconditional value of a dollar of excess cash using the market-to-book regressions.

We allow for firm fixed effects in our optimal cash regression since some firms may consistently hold more cash than required for economic reasons. Thus, if we did not allow for firm fixed effects, the OLS coefficients on the economic determinants of cash would likely be biased.[21] We find that statistical tests clearly show the need for firm fixed effects (the p-value for the firm fixed effects as a group is 0.000). Even though we allow for these fixed effects as controls in the estimation, we do include the estimated firm effects as part of excess cash, since the firm fixed effects do not reflect accepted economic determinants of cash holdings such as investment, hedging, or operational needs. Thus, excess cash is the residual including firm fixed effects from Eq. (4). An example may help with the intuition: suppose that Microsoft consistently holds cash reserves that are larger than other comparable firms and larger than any economic regression model predicts—let us call it the "Bill Gates" effect (Panel B of Table A.2 shows that this is indeed the case for Microsoft). Because of the presence of effects like the Bill Gates effect, estimating an OLS optimal cash regression on the data without firm fixed effects

[20]We also obtain qualitatively similar value results if we do not instrument for market-to-book.

[21]While there are other techniques, such as changes regressions and Fama and MacBeth (1973) type regressions, we consider fixed effects to be best for our application because the level of cash held for idiosyncratic reasons is likely constant or correlated over time. See Petersen (2005) for a lucid discussion about the various estimation techniques available for panel data. In addition, our results are robust to the alternative specifications shown in Table A.1 and discussed below.

Table A.1
Predicting the normal level of cash

This table shows the regression results for the level of cash discussed in the Appendix. In all variables, assets are net of cash. The dependent variable is the natural logarithm of the ratio of cash divided by assets (zero cash/assets is set equal to the sample minimum to avoid the logarithm going to infinity). The independent variables include: log of firm real assets (Log Assets), cash flow to assets (Cash Flow/Assets), net working capital to assets (NWC/Assets), the Gompers, Ishii, and Metrick governance index (Gompers, Ishii, and Metrick index), sum of the 5% blockholdings of common equity by institutions (Blocks), market-to-book ratio (MktVal/Assets), capital expenditures to assets (CAPX/Assets), total debt to assets (Leverage), R&D to assets (R&D/Assets), dividend dummy (Dividend Dummy), three-year compound sales growth (Sales Growth), and the median industry standard deviation of the past 10 year cash flow over assets (STDV CF/Assets). All ratios are winsorized at the 1% and 99% levels. Model [1] is estimated as a fixed effects panel with Sales Growth as an instrument for MktVal/Assets. The results of the first stage of the IV model (MktVal/Assets as dependent variable) are in the last column of the table. Model [2] is identical to model [1], but includes governance measures. Model [3] is estimated as OLS regression with industry dummies and robust standard errors. All models include year dummies. *P*-values are in brackets.

	[1]	[2]	[3]	First stage of [1]	
Log Assets	−0.65	−0.66	−0.24	Log Assets	−0.92
	[0.000]	[0.000]	[0.000]		[0.000]
Cash Flow /Assets	1.06	1.04	1.22	Cash Flow /Assets	2.1
	[0.000]	[0.000]	[0.000]		[0.000]
NWC /Assets	−0.84	−0.81	−1.12	NWC /Assets	−1.88
	[0.000]	[0.000]	[0.000]		[0.000]
STDEV CF /Assets	1.34	1.29	1.19	STDEV CF /Assets	0.72
	[0.000]	[0.000]	[0.016]		[0.247]
R&D /Assets	1.68	1.59	3.05	R&D /Assets	8.17
	[0.000]	[0.000]	[0.000]		[0.000]
MktVal /Assets	−0.09	−0.08	0.04	3-yr. Sales Growth	1.19
	[0.068]	[0.086]	[0.311]		[0.000]
Blocks		−0.49			
		[0.000]			
Gompers, Ishii, and Metrick index		0.02			
		[0.019]			
Leverage			−1.17		
			[0.000]		
CAPX /Assets			−0.33		
			[0.410]		
Dividend Dummy			−0.18		
			[0.002]		
Constant	1.44	1.34	−0.38		7.54
	[0.000]	[0.001]	[0.377]		[0.000]
Observations	13095	13095	12922		13095
Number of firms ID	1952	1952			1952
Pseudo *R*-Squared	0.17	0.17	0.44		0.24

might severely bias other coefficients (such as the firm size coefficient in the Microsoft case). However, given that we control for all other known economic determinants of optimal cash, we still want to classify the high level of Microsoft's cash as *excess*. It is this excess level of cash that we hypothesize is affected by the quality of corporate governance. Hence, we retain the estimated Bill Gates effect in our measure of excess cash. Because we are only interested in 'normal' cash levels in order to subtract them from actual cash

Table A.2
Excess cash summary statistics

This table provides summary statistics of excess cash discussed in the Appendix. Panel A provides summary statistics for the sample broken into firms with high excess cash (> 0) and firms with low excess cash (< 0). In all variables, assets are computed net of cash. The variables are: excess cash to assets (Excess Cash/Assets), ratio of cash to assets (Cash/Assets), real assets (Assets), cash flow to assets (Cash Flow/Assets), net working capital to assets (NWC/Assets), the Gompers, Ishii, and Metrick governance index (Gompers, Ishii, and Metrick index), sum of the 5% blockholdings of common equity by institutions (Blocks), market-to-book ratio (MktVal/Assets), 3-year compound sales growth (Sales Growth). All variables are winsorized at the 1% and 99% levels. Panel B lists the median ratio of Excess Cash to Assets in the sample over the years, as well as the 95th percentile and the ratio of Microsoft.

	Mean		Median	
	Low Excess Cash	High Excess Cash	Low Excess Cash	High Excess Cash
Panel A				
Excess Cash/Assets	−0.06	0.24	−0.04	0.09
Cash/Assets	0.06	0.36	0.02	0.15
Assets	2072.17	4854.28	685.05	1144.31
Cash Flow/Assets	0.09	0.09	0.10	0.12
NWC/Assets	0.12	0.08	0.11	0.09
Gompers, Ishii, and Metrick index	9.28	9.11	9.00	9.00
Blocks	0.14	0.12	0.12	0.09
MktVal/Assets	1.73	3.29	1.40	2.04
Sales Growth	0.09	0.11	0.07	0.08
Observations	6194	7018	6194	7018

Year	Sample median Excess Cash/Assets	95th percentile Excess Cash/Assets	Microsoft Excess Cash/Assets
Panel B			
1990	0.00	0.43	0.64
1991	0.00	0.38	0.68
1992	0.01	0.41	1.01
1993	0.01	0.46	1.49
1994	0.00	0.46	2.04
1995	0.00	0.46	1.92
1996	0.00	0.48	2.10
1997	0.00	0.44	1.65
1998	0.00	0.63	1.65
1999	0.00	0.75	0.86
2000	0.00	0.84	0.84
2001	0.00	0.85	1.14
2002	0.02	1.36	1.32
2003	0.02	1.19	1.59

and arrive at excess cash, we do not worry about the fact that some interesting, but unchanging factors might get 'swept up' in the firm fixed effects. All effects that are related to the operational needs of the firm for cash (size, sales, profitability, investment opportunities, etc.) have sufficient time series variation to make estimation by fixed effects feasible and plausible.

A consequence of including the fixed effects in our definition of excess cash is that the summary statistics in Table A.2, panel A, show that high and low excess cash firms differ along some of the dimensions included in the optimal cash regressions. Hence, while size is a variable that negatively determines the average firm's cash holdings (see the coefficient in column 1 of Table A.1), possibly because large firms have more ready access to alternative sources of liquidity in capital markets, it also appears to be the case that the incidents of *excess* cash are more often present in large firms (see the comparison in Panel A of Table A.2). This may be due to the fact that some large firms hold significant amounts of excess cash in order to hedge against market power induced legal liabilities (such as Microsoft), or in order to prepare for dominance-increasing acquisition sprees (such as Cisco).

For robustness, we also estimate our value regressions in the main part of the paper using excess cash estimated as the residual from two different specifications of the optimal cash regressions. These alternative optimal cash regressions are presented in columns 2 and 3 of Table A.1. First, we also include the governance variables themselves as controls since the previous literature is divided on how governance affects the level of cash holdings (see, e.g., Dittmar, Mahrt-Smith, and Servaes, 2003; Harford, Mansi, and Maxwell, 2005); thus, governance may have an effect on the level of cash holdings. However, since governance is not an operational determinant of needed cash, our main specification does not include it as a control when computing the excess cash residual. Secondly, for consistency with the previous literature (Opler, Pinkowitz, Stulz, and Williamson, 1999), we estimate an OLS regression with robust standard errors that includes the ratio of capital expenditures (Compustat Code 128) divided by total assets, the ratio of long-term debt (9) plus short-term debt (34) divided by total assets net of cash, and a dummy variable if the firm pays dividends (127). In the primary specification presented in column 1, we exclude these variables due to their potentially endogenous relation with cash. Here, no instruments for market-to-book are used, but we include industry dummies in addition to the year dummies.[22] Both of the alternative specifications, as well as other methods like using cash to sales rather than cash to assets, lead to the same conclusions on the interaction between governance and cash and their impact on firm value in Section 3.2. This is partially due to the high correlation of the excess cash measures across different specifications of the optimal cash regression (generally above 80%). In fact, the correlation between excess cash from regressions with and without governance as controls is above 98%. This again confirms that governance does not appear to have much of a consistent impact on the rate of cash accumulation in firms, even though as the main part of the paper shows, governance has a dramatic impact on how firms use their cash and how valuable the cash is from the perspective of investors. Of course, as we mention in the main part of the paper, using raw cash instead of the excess cash computed in this appendix also confirms our value results.

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[22]In this specification, we recover the effect from the previous literature, where market-to-book has a positive impact on the level of cash holdings. Since we find a negative impact when we use instruments, this may require further research. None of our valuation results are affected by this issue.

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