# Corporate Governance and the Value of Cash Holdings*

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**Abstract**

In this paper, we investigate the impact of corporate governance on firm value. We do this by examining how managerial entrenchment and lack of shareholder oversight influence both the value and use of cash resources. We focus on cash because cash, in particular cash holdings not needed for investment or operations, represent a large fraction of corporate assets and can easily be spent by management. We find that governance has a substantial impact on firm value through its impact on cash policy: the market value of *excess* cash reserves is reduced by up to one-half when firms are poorly governed. We further find that firms with poor corporate governance dissipate excess cash more quickly than those with good governance. More importantly, we show that firms with poor governance invest excess cash reserves in assets with low accounting returns. This negative impact of excess cash investment on operating performance is cancelled out if the firm is well governed. These findings provide direct evidence of how governance can improve firm value and insight into the importance of governance in determining corporate cash policy.

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## 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 mentioned by Adam Smith (1776), 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 with little scrutiny and much of their use is discretionary. 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 allows for statistically powerful tests to examine the effect that governance has on value and the eventual use of cash reserves in individual firms.

To illustrate the amount of cash resources that are at managers' discretion, we can examine a few statistics. In 2003, cash and marketable securities comprised over 12% of total assets for the median publicly traded US firm, reflecting a substantial increase from 5.4% in 1990. Even large firms with sales greater than $500 million held 7% of their total assets in cash in 2003. To put the value of these amounts in perspective, the aggregate cash held by 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 as 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. Consequently, an important question to ask is: *how does corporate governance impact the value and eventual use of cash reserves*?

In this paper, we investigate the role of corporate governance by examining how managerial entrenchment and lack of shareholder oversight influence both the value and use of cash resources. To determine the value effects of governance on cash resources, we first estimate cash reserves held in excess of those needed for operations and investments, because these resources are most at management's discretion and thus most at risk of being wasted. We then use both market-to-book ratios and annual stock returns to measure firm value (or change in value) to estimate the marginal value of a dollar of excess cash for poorly versus well governed firms. Our first hypothesis is that bad corporate governance will lead to low firm valuation when firms have high excess cash holdings.[1] We find a significant difference in the value of excess cash reserves between well and poorly governed firms: the market value of excess cash is reduced by approximately one-half when firms have poor governance.

We then ask *how* good governance improves the value of cash reserves. We hypothesize that governance affects the *use* of cash resources. We predict that poorly governed firms will waste excess cash holdings. We find that a well governed firm has its excess resources better "fenced in", and that firms with poor corporate governance dissipate excess cash more quickly than those with good governance. More importantly, we find that firms with both high excess cash and poor governance invest in assets with particularly low accounting returns. When we examine the operating performance of a sample of firms who draw down their large excess cash reserves, we find that firms with poor investor oversight or with entrenched managers show declining returns on assets. The negative impact of investing excess cash on operating

[1] Myers and Rajan (1998) argue that, in theory, more liquid assets can lead to more agency problems.

performance, however, is cancelled out if the firm is well governed.

Throughout our analysis, we examine corporate governance mechanisms that measure investor oversight by large institutional shareholders and managerial entrenchment resulting from anti-takeover provisions. We focus on these aspects of corporate governance because each can substantially affect investors' ability 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[2] and that anti-takeover provisions shelter management from the scrutiny of the market for corporate control.[3] Thus, both aspects of governance have potential value implications. The influence of these aspects of governance are apparent in dealings 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)]. Our results confirm the importance of investor oversight and managerial entrenchment on the value of the firm by showing that both of these aspects of governance improve the value and use of excess cash reserves.

By investigating the impact of corporate governance on the use and value 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

[2] For general research on investor oversight, see Denis, Denis and Sarin (1997), Dlugosz, Fahlenbrach, Gompers and Metrick (2004) and many others on block holdings, as well as Del Guercio and Hawkins (1999), Gillian and Starks (2000), Gompers and Metrick (2001), Smith (1996) and Wahal (1996) on the impact of public pension fund monitoring. See also Black, Jang and Kim (2003), Palia (2001) and Qui (2004).

[3] See DeAngelo and Rice (1983), Linn and McConnel (1983), Bertrand and Mullainathan (2003), Gomper, Ishii and Metrick (2003), Bebchuk, Cohen and Ferrell (2004), Cremers and Nair (2005) and others.

behavior in magnitudes that are economically important.

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 contributes to our understanding of the role of corporate governance on cash policy by investigating the implications of governance on the value of cash reserves and asking: *does it matter if firms hold large cash reserves*? Our answer is yes, but only if the firms are poorly governed.

Finally, this paper is related to a recent paper by Faulkender and Wang (2005),[5] which examines the marginal value of corporate cash. Faulkender and Wang 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

[4] While Opler et al. (1999) and Mikkleson and Partch (2003) do not find evidence to suggest that entrenched managers hold more cash, other papers 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. Pinkowitz, Stulz and Williamson (2003) find support for both the trade-off theory of cash policy and the impact of agency problems on cash levels across countries. Harford, Mansi and Maxwell (2004) 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).

corporate governance literature. In doing so, we show that the value of cash, and thus firm value, are determined in part by how investors expect cash to be used when there are managerial agency problems.

The remainder of the paper is organized as follows: section 2 discusses the data and our empirical methods. Section 3 reports the evidence of how governance impacts the 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. Methods

### 2.1. Data and Main Value Specification

In this paper, we examine the impact of governance on the value of cash reserves. Jensen (1986) argues that poorly monitored and/or entrenched managers of public corporations will waste free cash flows. We extend this argument to excess cash reserves and provide empirical evidence for its relevance and relation to corporate governance, by asking if poorly monitored and/or entrenched managers waste excess cash reserves. We therefore focus our analysis on cash held by firms that is not needed for firm operations or investments and refer to this as *excess cash*. We define excess cash as the residual from an optimal cash regression applied to the entire data sample. The methods for estimating an optimal cash regression are well discussed in the literature [Opler et al. (1999), Dittmar et al. (2003), and Harford et al. (2004)]; we therefore relegate the details of this estimation and the computation of excess cash to Appendix 1.

In addition to cash, the second key variable of interest is governance. We use four alternative measures of corporate governance that are meant to proxy for two key aspects of governance: the degree of managerial entrenchment and shareholder monitoring. We recognize

that there are other aspects of corporate governance that may also influence firm value, but we believe that our measures capture some of the most important elements of governance that are likely to affect the value of cash holdings. Our first measure is the Gompers et al. (2003) corporate governance index, which measures the number of anti-takeover provisions in a firm's charter and in the legal code of the state in which the firm is incorporated. Gompers et al. establish that more anti-takeover 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 0 and 24. In order for the numerical results in this paper to be easier to interpret, we report from here on the 'modified' Gompers et al. index by taking 24 minus the index. This leads to a higher index being associated with better corporate governance – consistent with our other measures of corporate governance. As a second measure, we replace the Gompers et al. index with a modified version of the index developed in Bebchuck et al. (2004) – which is based on the same raw data but uses only six of the provisions that they show have the greatest impact on firm value. The Gompers et al. and Bebchuk et al. indices have a positive 74% correlation. When we use data for years in which IRRC does not report scores, we assume similar to Gompers et al. and Bebchuck et al. 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.

Our third measure of corporate governance is the sum of all greater than 5% block ownership positions held by institutional investors. These block holdings, as collected from the 13-F filings by Thomson Financial, can be considered as a measure of how much oversight

management is subject to by (potentially) active block holders.[6] Again, a larger number would indicate more oversight and hence better corporate governance. For additional evidence, we use a fourth measure and replace block ownership with the sum of all ownership positions by public pension funds, also from the Thomson Financial Data. We use pension fund ownership as an alternative measure because pension funds often monitor firms in their portfolios more actively than do other investors.[7] The names of the funds as they appear in Thomson with their manager numbers are provided in Appendix 2.

We include governance in our analysis as a 1 – 0 dummy by splitting the sample into terciles: the highest governance tercile is coded as 1, the lowest tercile is coded as 0, and the middle tercile is discarded. We later show that a simple high-low dummy split at the median provides 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 15 on the Gompers et al. (2003) index is 'far away' from a score of 14, or whether a 6% institutional block likely leads to very different investor monitoring than a 7% block. In addition, the dummy variables should mitigate any measurement problems, which are sometimes an issue with block ownership data. We hypothesize that better governance leads to a more a positive effect of excess cash on firm value. We test this by interacting each of the governance dummy variables with excess cash to determine the incremental impact on value. Thus, we predict that the coefficient of interest in the following equation, $\beta_2$ in equation (1), will be positive.

The following equation describes the main regression of the paper, which is run separately for each measure of corporate governance. Other than the excess cash and

[6] In unreported results, we also repeat the analysis using the data described in Dlugosz, Fahlenbrach, Gompers and Metrick (2004), which cleans the 13F data for possible errors and double filings. The sample is smaller, but the results are significant and similar in magnitude. We thank Andrew Metrick for providing the governance index and ownership data.

[7] See Del Guercio and Hawkins (1999) and others cited in fn 2.

governance measures, it is a standard value regression and the control variables are the same as in the previous literature. They are size, profitability, asset composition, year dummies to capture macro-economic effects, as well as firm dummies (fixed effects) to capture unobserved heterogeneity and industry effects.

$$\frac{Market\ Value_{i,t}}{Assets_{i,t}} = \beta_o + \beta_1 \frac{Excess\ Cash_{i,t}}{Sales} + \beta_2 \frac{Excess\ Cash_{i,t}}{Sales} \times Gov_{i,t} + \beta_3 Gov_{i,t} + \beta_4 Assets_{i,t} + \beta_5 \frac{PP\ \&\ E_{i,t}}{Assets_{i,t}} + \beta_6 \frac{Cash\ Flow_{i,t}}{Assets_{i,t}} + Year\ Dummies + Firm\ Fixed\ Effects + \varepsilon_{i,t} \quad (1)$$

The variables (and Compustat data codes) are as follows: firm value is measured by the market-to-book ratio, which is defined as the fiscal year end market price (199) times the number of shares (25) plus the book value of total liabilities (181), divided by the book value of total assets (6) net of cash (1); real size [*Assets*] is defined as total assets net of cash deflated to 2000 dollars using the GDP deflator; asset composition is as the ratio of property, plant, and equipment (8), divided by total assets net of cash; profitability is defined as the ratio of operating income before depreciation (13) minus taxes (16) minus interest (15), divided by total assets net of cash. As we explain in the appendix, we normalize cash by sales throughout the paper, because other authors have argued that 'normal' cash levels are driven to a large extent by the transactions needs of firms [Keynes (1936), Frazer (1964) and Harford et al. (2004)]. Normalizing by assets net of cash leads to similar results as shown in the robustness section.

Because we are using 'excess' cash as a factor to explain firm value, we are able to alleviate potential concerns about endogeneity between cash and value. These concerns arise because market-to-book, as a proxy for investment opportunities, determines total cash holdings;

but, as we show in this paper, cash holdings also affect the market value of the firm and therefore the market-to-book ratio. We can address this concern because estimating optimal cash levels involves controlling for market-to-book, and therefore any residual amount (excess cash) is by construction orthogonal to market-to-book. Therefore, as shown in the appendix, as long as we instrument for market-to-book in the first stage regression which estimates optimal cash, we can then use excess cash – and its interaction with corporate governance – as a factor in a regression of firm value. Of course, excess cash is also the theoretically preferred variable when examining agency problems surrounding cash holdings and the impact of corporate governance on these problems. We will address potential endogeneity concerns about governance and firm value in the robustness section below and find that they have little impact on our results.

In addition to the endogeneity issues, by focusing on the interaction between excess cash and governance, we are able to overcome an additional methodological hurdle faced by many governance papers: since governance measures do not change much over time, it is difficult to control for important firm fixed effects. By interacting governance and excess cash, we are able to use the variation in excess cash (or the need for governance) to provide enough variation to estimate the value of governance including firm fixed effects. This improves the estimation and interpretation of our results. In order to have a robust specification, we also include governance and excess cash by themselves in the regression in addition to the interaction effect of interest.

We estimate our value regression (1) on all firms with *positive* excess cash. We focus our analysis 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 will likely differ for negative excess cash (cash constrained) firms.[8] We will,

[8] In untabulated results, we estimate our regressions on negative excess cash firms. We find that, while each dollar of cash now has a very high value for a cash constrained firm, corporate governance has no statistically significant

however, show that the specific cut-off of true excess cash (merely positive excess cash versus excess cash greater than the 75$^{th}$ percentile) does not qualitatively affect the results.

In addition to the value methods discussed above, we also use alternative methods based on firm stock returns proposed by Faulkender and Wang (2005). We discuss these methods and results in section 3. We also postpone the discussion of the methods for estimating the effect of corporate governance on the *use* of excess cash reserves to section 4.

### 2.2. Sample

Our sample consists of all US publicly traded firms from 1990 to 2003 that have the needed data items available. We begin our sample in 1990 because one of our main corporate governance measures, the Gompers et al. (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 that have the main data items available is comprised of 1,958 firms with 13,250 firm-year observations. In all of the analysis, ratios are winsorized at the 1% and 99% level in order to minimize the effect of outliers.

Summary statistics for all variables are presented in Panel A of Table 1. On average, firms hold 23% of sales in cash. However, this ratio is highly skewed, with the median firm holding 5% of sales as cash. In addition, the median cash holdings in our sample have increased from 4% in 1990 to 11% in 2003. These statistics indicate that firms hold a substantial portion

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impact on the value of this cash (shortfall). These results are consistent with firms that are cash constrained having "their backs against the wall" and being motivated regardless of governance. Of course, they may also be the result of the presence of conflicting effects of governance on firms with capital constraints. More analysis is needed to thoroughly explore this issue and we therefore leave this to future research. We thank Henri Servaes and Alexander Dyck for clarifying comments on this issue.

of their value in cash. The median firm has about $1 billion in sales and $866 million in assets, measured in 2000 dollars. The median firm has a 15 on the Gompers et al. index and 11% of its stock is held by block holders, with substantial variation across the distribution; a firm at the 25$^{th}$ percentile has 13 on the Gompers et al. index and 0% of its stock held by block holders, compared to a firm at the 75$^{th}$ percentile, which as 17 on the Gompers et al. index and 20.7% of its stock held by block holders. We present correlation statistics in Panel B of Table 1. None of the unconditional correlations indicate reasons for concern when including the variables in a multiple regression framework. Because the relationships between size, governance, value, profitability, and asset structure have been shown to be complex in the previous literature, we refrain from attempting to interpret simple correlations between any two variables and postpone examination until the regression analysis.

Panel C of Table 1 shows cash holdings by industry. Industries are defined as the Fama and French 48 industries.[9] The industries with the highest levels of cash holdings in 1990 are Precious Metals, Pharmaceutical Products, Medical Equipment, Entertainment, Business Services, and Computers, with only Precious Metals being a real outlier. By 2003, the leaders are Pharmaceutical Products, Precious Metals, Electronic Equipment, Computers, and Business Services, with Pharmaceutical Products joining Precious Metals in the outlier zone. Since, all our main regressions are run allowing for fixed effects, time-invariant industry effects are not a concern. We also deal with the secular trend by including year dummies everywhere.

The estimation of excess cash, which is a key input in our value regressions, is discussed in Appendix 1 and our results are robust to alternative estimation techniques. Table 2 presents the results of cash level regressions, and excess cash is the residual from that regression. The

[9] We gratefully acknowledge that 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.

regression results are generally consistent with the existing literature as discussed in the appendix. In Table 3, we report the characteristics of firms with high and low excess cash, which show that the sub-samples are quite similar. For clarification and to illustrate the tail of the distribution, Table 3 also reports the 95$^{th}$ percentile of the excess cash distribution as well as the excess cash holdings of Microsoft as an example. Microsoft holds excess cash higher than almost 95% of the firms in the sample. This is remarkable as everything is scaled by sales, and thus Microsoft's huge sales nevertheless are dwarfed by its even larger cash balance. Again, by employing the firm fixed effects specification, we will allow the model to estimate the other parameters accurately even in the presence of such firm level idiosyncrasies. In addition to the summary statistics, it is interesting to note that excess cash seems to be a rather persistent firm level phenomenon. In fact, of firms which were classified as having positive excess cash in year t, 85.4% remain classified as having positive excess cash in year t + 1. Three years later, 78.4% still have positive excess cash. Negative excess cash shows the same stability, and even firms in the highest 25$^{th}$ percentile of excess cash remain there (83% of the time) in the following year. Nevertheless, the numerical level of excess cash shows significant firm level variation over time.

## 3. Value of Excess Cash

In this section, we examine the results of the valuation methods discussed above. In section 3.1, we present evidence from estimating equation (1). In section 3.2, we describe alternative methods for estimating the value impact of governance on cash reserves and present the related results.

### 3.1. Results of using Market-to-book as a Measure of Value

The results from the analysis of equation (1) are presented in Table 4. In the first two

columns of Table 4, we show the impact of governance on the value of excess cash for all firms with positive 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. 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 more than doubles. This result holds for firms that are monitored by institutional investors and for firms in which the management is not entrenched by anti-takeover provisions.

In columns three and four of Table 4, we present results from a similar analysis using only the smaller sub-sample of firms in the top twenty-five percent of the excess cash distribution. Thus, these results focus only on those firms that hold the most excessive amounts of cash reserves and therefore have a much greater portion of total cash resources that can be wasted. We therefore expect the difference in the value of cash reserves to be greater. The results support our predictions. The coefficients provide similar but even stronger indications that good governance increases the value of excess cash.

In the first two columns of Table 5, we examine our previously described two additional proxies for governance. In column 1, we replace the block ownership with ownership by public pension funds. The results are again consistent with our previous findings. Specifically, the value of excess cash by a well monitored firm is seventy-five percent greater than that of a lesser

monitored firm. In column 2, we replace the Gompers et al. (2003) measure for anti-takeover provisions with the Bebchuk et al. (2004) measure. Again, the results are consistent with our previous findings.

In the specifications presented in Tables 4 and 5, we also include governance alone – in addition to the interaction variable of interest – since previous research has shown that governance improves firm value and cash is only one way in which governance may do this [Gompers et al. (2003), Bebchuk et al. (2004), and Cremers and Nair (2004)]. Thus, the interpretation of our results on the interaction variable is that *governance has an impact on cash holdings which 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 either insignificant or negative. The sign and lack of significance on the governance variable may be due to the lack of variability in these measures in our fixed effects specification. As discussed earlier, however, the variation in cash levels from year to year ensures that the marginal effect of governance on value via the channel of cash can be clearly picked up by a fixed effects regression. To verify that the fixed effects model is appropriate, we perform a statistical test to determine that there are fixed effects in the data (and hence pure cross-sectional models may be mis-specified). We find that the fixed effects model is the correct specification; the test statistic for the presence of firm level fixed effects has a p-value of 0.000.

The lack of significance or negative coefficient on governance alone may also arise because governance and firm value are endogenously determined [Himmelberg, Hubbard and Palia (1999) and Palia (2001)]. Unfortunately, finding a good instrument for governance is difficult. Thus, in columns three and four of Table 5, we force governance to remain constant by taking the average of all years of the continuous governance measure and then forming our

dummy variable using this measure (columns 3 and 4), or by using only the initial year of governance data and forming the dummy variable (columns 5 and 6). In other words, we replace the slowly changing – but potentially endogenously changing – governance variable by its average or initial value. While this approach no longer allows us to examine the non-cash effect that governance has on firm value, it does ensure that the regression is free of endogeneity issues. The interpretation of the results is now that 'average' or 'initial' governance affects firm cash values as indicated by the coefficient on the interaction variable.[10] We perform this analysis using the primary governance measures used in Table 4. We show that our interaction term remains positive and significant in each of the specifications. Additionally, the coefficients on the interaction term and the excess cash variable are stable and comparing these indicates that good governance approximately doubles the value of excess cash relative to a poorly governed firm.

In Table 6, we report several robustness checks to the results presented thus far that use alternative specifications of the cash regression used to calculate excess cash, described in Appendix 1. These results show that our findings and conclusions are not sensitive to how excess cash is computed. In columns one and two, we report results from the value regressions when the level of excess cash is measured without including a control variable for corporate governance (i.e., this treats governance as a firm fixed effect). We perform this analysis because, as discussed earlier, it is unclear from previous research if firms hold more or less cash if they have strong corporate governance. The results and economic significance of the value regression are similar to that discussed above. Columns three and four report results from the value regression when excess cash is measured using results reported in column three of Table 2,

[10] For consistency, we also replace governance by the 'average' or 'initial value' in the first stage cash level regressions used to estimate excess cash in appendix 1 – this does not affect our results.

which uses Fama-MacBeth type regressions. While this precludes the use of firm fixed effects, it mirrors some of the methodologies used in the previous literature. The results and economic significance of the value regression are similar to those discussed above. Columns five and six of Table 6 present results using a cash regression similar to our primary specification except that the cash ratio is defined as cash to net assets instead of cash to sales. In this analysis, we also use excess cash to net assets in the value regression. The results are similar to those using cash to sales. In untabulated results, we also examine if our results are robust to an alternative specification of the market-to-book ratio. Specifically, we define value as the market value of the firm *net of cash* divided by the book value of assets net of cash. These results confirm the earlier findings that good corporate governance has a positive impact on the value of corporate cash holdings.

Because both the coefficient on cash itself, as well as the coefficient on the interaction variable, vary across specifications, we also run an entirely different specification based on stock returns rather than market-to-book ratios in the next section. This alternative specification is advocated by Faulkender and Wang (2005) and arguably more suited to picking up the unconditional marginal value of total cash holdings. Using that measure, we find that our results hold with similar magnitude. Furthermore, we are able to more accurately estimate the value of a dollar of excess cash for the average firm, rather than just the ratio of the value of that dollar in a well governed and a poorly governed firm. We discuss these methods and results in the next section.

### 3.2. Estimating the Value of Excess Cash using Stock Returns as a Measure of Value

The methods described in this section are an exact analogue to Faulkender and Wang

(2005), and the reader is referred to that paper for more details. The basic idea is to examine if changes in cash holdings impact the annual stock returns of firms. The justification for this is that investors, who determine market prices, would express their expectations of the value of cash holdings by bidding up or down the stock price when the firm experiences *changes* in the amount of cash it holds; thus, this is an analysis of the value of a change in cash. Faulkender and Wang argue that this method is more robust to data and endogeneity issues than methods which rely on the market-to-book ratio of the firm. In all specifications, they control for other determinants of firm returns by normalizing them relative to Fama and French's (1993) benchmark size and book-to-market portfolio returns, and by including other firm level controls. We employ what Faulkender and Wang call their baseline specification given in the equation below, which is exactly as in their paper, except that we add the interaction between corporate governance and cash to evaluate the impact of good governance on cash value. Unconditionally, one might expect that an extra dollar of cash added to the firm over the year would cause its market value to go up by one dollar, controlling for everything else. 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.

The following equation describes the value regression of the paper, which is run separately for each measure of corporate governance.

$$\begin{aligned} r_{i,t} - R^{B}_{i,t} = {} & \gamma_0 + \gamma_1 \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_2 \frac{\Delta E_{i,t}}{M_{i,t-1}} + \gamma_3 \frac{\Delta NA_{i,t}}{M_{i,t-1}} + \gamma_4 \frac{\Delta RD_{i,t}}{M_{i,t-1}} + \gamma_5 \frac{\Delta I_{i,t}}{M_{i,t-1}} + \gamma_6 \frac{\Delta D_{i,t}}{M_{i,t-1}} \\ & + \gamma_7 \frac{C_{i,t-1}}{M_{i,t-1}} + \gamma_8 L_{i,t} + \gamma_9 \frac{NF_{i,t}}{M_{i,t-1}} + \gamma_{10} \frac{C_{i,t}}{M_{i,t-1}} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \gamma_{11} L_{i,t} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} \\ & + \gamma_{12} GOV_{i,t} \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \varepsilon_{i,t} \end{aligned} \tag{2}$$

where $\Delta X$ indicates a change in $X$ from year (t-1) to t and – using Compustat codes:

$r_{i,t} = (M_{i,t} - M_{i,t\text{-}1}) / M_{i,t\text{-}1}$ = Stock return over year t – 1 to t

$M_{i,t}$ = Market Value of Equity at time t computed as Price (199) times Shares (25)

$R^{B}_{i,t}$ = Fama and French (1993) size and book-to-market matched portfolio return over year t – 1 to t

$C_{i,t}$ = Cash (1) at time t

$E_{i,t}$ = Earnings before Extraordinaries (18 + 15 + 50 + 51) over 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) over year t – 1 to t

$I_{i,t}$ = Interest Expenses (15) over year t – 1 to t

$D_{i,t}$ = Common Dividends paid (21) over 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 over year t – 1 to t = Net New Equity Issues (108 – 115) + Net New Debt Issues (111 – 114)

$GOV_{i,t}$ = Governance measure

The regression is run as OLS with robust standard errors. To be consistent with the results in the first part of this paper, we expect to find that the interaction term between changes in cash holdings and the corporate governance variable is positive and statistically significant. In addition, we can now compute the marginal value of a dollar of total cash, as this regression is specified in terms of total cash holdings rather than excess cash holdings. This methodology is

not meaningful if applied to *excess* cash, because excess cash varies over a year both due to changes in cash as well as due to changes in the determinants of optimal cash. There is no theoretical prediction about how these latter changes should affect firm returns, but they are unlikely to be value neutral or independent of governance. Thus, in this analysis, we investigate total cash, relying on the arguments in Faulkender and Wang (2005) who demonstrate that the regression is specified correctly and is robust to endogeneity concerns.

Column one in Panel A of Table 7, replicates Faulkender and Wang's (2005) specification using our sample, which differs from their sample in that it is a shorter and later time period and we have fewer and larger firms due to the governance data requirement. In Panel B, we use the coefficients from Panel A to calculate the marginal value of a dollar of cash. To do this, we use the coefficient on the change in cash and each coefficient that is interacted with the change in cash. We hold all variables at their mean to calculate the marginal value of cash for the average firm. These mean values are provided in Panel B as well. The results in column 1 show that the average value of a dollar of cash is $1.29. When we add the governance interaction variable, in columns 2 and 3, the average value of a dollar of cash in our sample is either $1.03 or $1.05.

The results in columns two and three of Table 7 provide similar evidence to those discussed in section 3.1 of this paper. We find that the value of an additional dollar of cash is significantly greater if the firm is well governed, as evidenced by the positive and significant coefficient on the interaction between governance and change in cash. In Panel B, we calculate the value of a dollar of cash for well and poorly governed firms. We show that the value of a dollar of cash is less than a dollar if the firm is poorly governed but greater than a dollar for a well governed firm. Using block ownership to measure governance, the value of a dollar of cash

is $0.87 in a poorly governed firm but $1.23 in a well governed firm. Using management entrenchment due to anti-takeover provisions as a governance proxy, the value of a dollar is only $0.38 in a poorly governed firm but $1.54 in a well governed firm. These findings indicate that even though, as Faulkender and Wang (2005) discuss, there are value enhancing benefits to holding cash, these benefits are eroded if a firm is not well governed. In other words, if left unchecked, a dollar of cash is worth much less than a dollar.

## 4. Uses of Excess Cash

In the previous section, we show that good corporate governance improves the value of excess cash holdings and provide support our first hypothesis. In this section, we further explore the effect of governance on excess cash by investigating *how governance alters the use of excess cash to improve value*. According to Jensen (1986), firms with poor corporate governance might be found to invest their excess cash inefficiently; we therefore hypothesize that poorly governed firms dissipate cash more quickly than well governed firms and spend it on investments that drive down the firm's return on invested capital.

Figures 1 – 3 show what happens to firms' excess cash. To do this, we start with any year a firm has positive excess cash and label this year t = 0. We then calculate the ratio of excess cash in years t + 1 to t + 5 for that firm divided (each time) by the level in year t = 0. The figures present the median ratio for all firms with positive excess cash in year 0, for poorly governed firms, and for well governed firms. Figure 1 shows that the median firm in the sample dissipates almost 30% of its excess cash within five years. Figures 2 and 3 show that governance strongly impacts the rate of dissipation. Figure 2 divides the sample into good and bad governance based on the managerial entrenchment due to anti-takeover provisions. The

difference is dramatic. Whereas good governance firms hold onto their cash, poorly governed firms use up over half of these excess cash resources. Figure 3 presents similar, though less dramatic, results for firms with high and low block ownership. This finding is consistent with results in Harford et al. (2004), who also show that firms with poor governance have smaller total cash reserves.

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. We hypothesize that firms that draw down their excess cash from year t – 1 to year t will later have lower operating performance if they have poor governance. We examine this issue by investigating the return on assets (ROA) for the sub-sample of our firms that had positive excess cash at time t – 1 and used up some of it by time t. In other words, we examine firms that dissipated excess cash. We measure ROA as operating income before depreciation (Compustat code 13) divided by total assets net of cash. We run a regression of firm ROA on 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 ROA in these regression, which are run as firm fixed effects regressions with year dummies. The regression equation is given as follows.

$$ROA_{i,t} = \delta_0 + \delta_1 \frac{Excess\ Cash_{i,t-1}}{Sales_{i,t-1}} + \delta_2 GOV_{i,t-1} + \delta_3 \frac{Excess\ Cash_{i,t-1}}{Sales_{i,t-1}} \times GOV_{i,t-1} + \delta_4 Assets_{i,t} + \delta_5 \frac{PPE_{i,t}}{Assets_{i,t}} + \delta_6 ROA_{i,t-1} + Year\ Dummies + Firm\ Fixed\ Effects + \varepsilon_{i,t} \quad (3)$$

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. The coefficient on lagged excess cash by itself shows that for firms that use up excess cash holdings over the year, a larger beginning balance of excess cash results in lower future operating performance. However, the interaction coefficient shows that this negative effect is almost completely reversed if the firm has good governance. Thus, excess cash leads to lower operating performance *only* if a firm is poorly governed. In columns 1 and 2, we show this without controlling for lagged ROA. In columns 3 and 4, we include lagged ROA and thus interpret our findings as evidence of the impact of excess cash and governance on the change in operating performance. When we control for lagged ROA in the regressions, we cannot reject the hypothesis that good governance *completely* reverses the negative effect that excess cash holdings have on future firm profitability. An F-test of the coefficient on lagged cash plus the interaction indicates that well governed firms do not experience a significantly lower return on assets after they dissipate excess cash. The p-values for the sum being different from zero are 0.22 for block holdings and 0.46 for the Gompers et al. index. This evidence shows that when poorly governed firms dissipate cash, they experience a decline in operating performance, but the same is not true of well governed firms. These results provide insight into *how* good governance improves the value of cash resources and show that well governed firms have their excess resources better "fenced in" and thus do not waste excess cash on poor return, value reducing investments.

## 6. Conclusion

Jensen (1986) argues that entrenched managers – left unmonitored – may waste free cash flows. We extend this argument to excess cash reserves and provide empirical evidence by examining the effect of governance on the value of excess cash. We find that the value of excess 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.

The findings in this paper contribute to both our understanding of the role of governance and cash policy. They provide direct evidence of how governance can enhance value and thus contribute to the growing literature studying the value of corporate governance. These results also shed light on the role of governance in cash policy and highlight both the potential for agency conflicts surrounding cash holdings as well as the potential for good governance to solve these problems. Our conclusion with respect to cash holdings then is that it may simply not matter if a firm holds excess cash if it is well governed.

**References**


Baker, M. and J. Wurgler, (2002) Market Timing and Capital Structure, Journal of Finance 57, 1-32.

Bebchuck, L., A. Cohen, and A. Ferrell, (2004) What matters in corporate governance, Harvard Law School working paper.

Bertrand, M. and S. Mullainathan, (2003) Enjoying the Quiet Life? Corporate Governance and Managerial Preferences, Journal of Political Economy 111, 1043-75.

Black, B., H. Jang, and W. Kim, (2003) Does Corporate Governance Predict Firms' Market Values? Evidence from Korea, Stanford University Law School working paper.

Blanchard, O. J., F. Lopez-de-Silanes and A. Shleifer, (1994) What do Firms do with Cash Windfalls? Journal of Financial Economics, 36, 337-360.

Cremers, M. and V. Nair, (2005) Governance Mechanisms and Equity Prices, Journal of Finance (forthcoming).

DeAngelo, H. and E. Rice, (1983) Antitakeover Charter Amendments and Stockholder Wealth, Journal of Financial Economics, 329-359.

Del Guercio, D., J. Hawkins, (1999) The Motivation and Impact of Pension Fund Activism, Journal of Financial Economics 52, 193–340.

Denis, D., D. Denis, and A. Sarin, (1997) Agency Problems, Equity Ownership, and Corporate Diversification, Journal of Finance 52(1), 135-160.

DeWitt, W., and R. Ruback, (1996) The Chrysler Takeover Attempts, Harvard Business School Case 9-296-078.

Dittmar, A., J. Mahrt-Smith, and H. Servaes, (2003) International corporate governance and corporate cash holdings, Journal of Financial and Quantitative Analysis 38, 111-133.

Dlugosz, J., R. Fahlenbrach, P. Gompers, and A. Metrick, (2004) Large Blocks of Stock: Prevalence, Size, and Measurement, NBER Working Paper Nr. 10671.

Faleye, O., (2004) Cash and Corporate Control, Journal of Finance 59, 2041-2060.

Fama, E., and K. French, (1993) Common risk factors in the returns on stocks and bonds, Journal of Financial Economics 33, 3-56.

Fama, E., and J. MacBeth, (1973) Risk, Return, and Equilibrium: Empirical Tests, Journal of Political Economy 81, 607-636.

Faulkender, M. and R. Wang, (2005) Corporate Financial Policy and the Value of Cash, Journal

of Finance (forthcoming).

Frazer, W.J., (1964) Financial structure of manufacturing corporations and the demand for money: some empirical Findings, Journal of Political Economy, 176 -183.

Gillan, S. L., L. T. Starks, (2000) Corporate Governance Proposals and Shareholder Activism: The Role of Institutional Investors, Journal of Financial Economics 57, 275–305.

Gompers, P., J. Ishii, and A. Metrick, (2003) Corporate Governance and Equity Prices, Quarterly Journal of Economics 118, 107-155.

Gompers, P. and A. Metrick, (2001) Institutional Investors and Equity Prices, Quarterly Journal of Economics 116, 229–259.

Harford, J., (1999) Corporate cash reserves and acquisitions, Journal of Finance 54 , 1969-1997.

Harford, J., S. Mansi and W. Maxwell, (2004) Corporate Governance and Firm Cash Holdings, Working Paper, University of Washington.

Himmelberg, C, R. G. Hubbard, and D. Palia, (1999) Understanding the determinants of managerial ownership and the link between ownership and performance, Journal of Financial Economics, 53, 353-384.

Jensen, M.C., (1986), Agency costs of free-cash-flow, corporate finance, and takeovers, American Economic Review 76, 323-329.

Kalcheva, I. and K. Lins, (2005) International Evidence on Cash Holdings and Expected Managerial Agency Problems, Working Paper, University of Utah.

Keynes, J.M., (1936) The General Theory of Employment. In: Interest and Money. Harcourt Brace, London.

Kim, C., D. Mauer, and A. Sherman, (1998) The determinants of corporate liquidity: Theory and evidence, Journal of Financial and Quantitative Analysis 33, 335-359.

Linn, S. and J. McConnell, (1983) An Empirical Investigation of the Impact of 'Antitakeover' Amendments on Common Stock Prices, Journal of Financial Economics 11, 361-399.

Mikkelson, W. and M. Partch, (2003) Do persistent large cash reserves hinder performance, Journal of Financial and Quantitative Analysis 38, 275-294.

Myers, S.C., Majluf, N., (1984) Corporate financing and investment decisions when firms have information that investors do not have, Journal of Financial Economics 13, 187 – 221.

Myers, S.C., and R. G. Rajan, (1998) The Paradox of Liquidity, Quarterly Journal of Economics, 113, 733-771.

Opler, T., L. Pinkowitz, R. Stulz, and R. Williamson, (1999) The determinants and implications of cash holdings, Journal of Financial Economics 52, 3-46.

Palia, D., (2001) The Endogeneity of Managerial Compensation in Firm Valuation: A Solution, Review of Financial Studies 14, 735-764.

Pinkowitz, L., R. Stulz, and R. Williamson, (2003) Why do firms in countries with poor protection of investor rights hold more cash, working paper, NBER No.10188.

Pinkowitz, L. and R. Williamson, (2004), What is a dollar worth? The market value of Cash Holdings, Georgetown University working paper.

Qiu, L., (2004) Which Institutional Investors Monitor? Evidence from Acquisition Activity, Yale University Working paper.

Smith, M., (1996) Shareholder Activism by Institutional Investors: Evidence From CalPERS. The Journal of Finance 51, 227–252.

Wahal, S., (1996) Pension Fund Activism and Firm Performance. Journal of Financial and Quantitative Analysis 31, 1–23.

## Appendix 1

## Measuring Excess Cash

This appendix describes our methodology for estimating excess cash holdings. We first run a regression to establish the normal cash holdings for a U.S. firm. This first step is based on the work of Opler et al. (1999) and Harford et al. (2004). 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. If there are imperfections, however, then there are various reasons for firms to hold cash. First and foremost is the idea that 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) and Frazer (1964)] suggests that the level of activity of the firm is a key determinant. Thus, we scale cash by total sales. Scaling by assets, however, leads to similar results as shown in the robustness checks. We also include a measure of other, non-cash liquid assets in order to control for potential cash substitutes. We use working capital 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)]. We therefore include controls for cash flow, investment opportunities measured by (instrumented) market-to-book, and access to financial markets measured – similar to previous research – by the presence of a bond rating and by total firm size (real assets). Harford et al. (2004) and other papers show that corporate governance may also impact the level of cash holdings. We therefore also include our corporate governance measures in the levels regression. However, we show in the robustness checks that including or excluding governance in the first stage cash levels regression does not affect our results. Over time, macro-economic 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), so we include firm fixed effects in our main regression. The statistical tests for fixed effects strongly confirm their need (the p-value of a test for fixed effects is 0.000), but our results are robust to alternatives.

We employ several methodologies 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, and its residuals are used to compute excess cash:

$$Ln\left(\frac{Cash_{i,t}}{Sales_{i,t}}\right) = \beta_o + \beta_1 Assets_{i,t} + \beta_2 \frac{Cash\ Flow_{i,t}}{Assets_{i,t}} + \beta_3 \frac{Net\ Working\ Capital_{i,t}}{Assets_{i,t}}$$
$$+\beta_4 Bond\ Rating_{i,t} + \beta_5 \frac{\widehat{Market_{i,t}}}{Book_{i,t}} + \beta_6 Gov.\ Index_{i,t} + \beta_7 Block\ Holdings_{i,t} \quad (4)$$
$$+Year\ Dummies + Firm\ Fixed\ Effects + \varepsilon_{i,t}$$

The variables (and Compustat data codes) are: the natural log[11] of cash and equivalents (1) to sales as the dependent variable; real size [*Assets*], as measured by total assets (6) net of cash and equivalents deflated to 2000 dollars using the GDP deflator; cash flow, as measured earnings before interest, taxes and depreciation (13) minus taxes (16) minus interest (15), divided by total assets net of cash; net working capital, as measured by current assets (4) minus cash minus current liabilities (5), divided by total assets net of cash; bond ratings, as measured by a dummy variable equal to one if the firm has a long-term corporate bond rating (280); and market-to-book, calculated as the ratio of fiscal year end market price (199) times the number of shares (25) plus the book value of total liabilities (181), divided by the book value of total assets net of cash. The governance measures in this regression are the variables discussed in the main body of the paper in section 2, and include the Gompers et al. (2003) index and measures of large investor block holdings. We also include year dummies and firm fixed effects. In some specifications, we also include the ratio of capital expenditures (128) dividend by total assets net of cash; the ratio of research and development expenses (46) divided by sales (R&D is set equal to zero for any firm missing this data); the ratio of long term debt (9) plus short term debt (34), divided by total assets net of cash; a dummy variable if the firm pays dividends (127). We estimate this regression using all sample firms as described in Section 2.2.

The measure of investment opportunities – the market-to-book ratio – presents a problem: as discussed in the main body of the paper, we hypothesize and find evidence for the fact that

[11] The previous literature also uses the log value whenever cash levels are estimated in order to deal with the highly skewed distribution of cash holdings. The log values look significantly more 'normal'. In addition, even though we already winsorize all variables, outliers are less of a concern with logs.

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 use instrumental variables to control for investment opportunities. Similar to previous papers, we use three year lagged sales growth and R&D to Sales as instruments for the market-to-book ratio.[12] We address potential endogeneity issues with respect to corporate governance in the main body of the paper in section 3.

We define excess cash as the residual from regression(4). The estimated firm fixed effect is not included in the computation of the residual. In other words, if there is a firm fixed effect for (say) Microsoft - lets call it the 'Bill Gates' effect - we will still classify the resulting high levels of cash as *excess*. The fixed effect is only used in the regression so as to avoid omitting an important factor influencing a firm's decision to hold cash, which would lead to biased coefficients on other variables (clearly in the case of Microsoft, if the fixed effect were omitted it would lead to a bias in the estimated 'size' coefficient). Because we are only interested in 'normal' cash levels, in order to subtract them from actual cash 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.

The results of the cash levels regression estimation are presented in table 2. All regressions have good explanatory power and lead to parameter estimates that are generally consistent with the previous literature. The base-line specification is in column 1 of the table. This model is based on Opler et al. (1999), but includes instruments for market-to-book. For reference only, the results from the first stage of the instrumental variables regression are presented in the last column of Table 2 – they show that the instruments are strongly positively correlated with market-to-book and hence a good choice. The data indicates 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. Though this result makes intuitive sense, it conflicts with the results of some other papers. We postulate that this

[12] Lagged sales growth, clearly exogenous to current cash holdings, can also be used alone as an instrument and our results remain.

difference is due to the endogenous relation between cash and market-to-book and that we obtain different results because we control for this endogeneity using instrumental variables. Thus, in column 2, we replicate the results from Opler et al. (1999) without instrumenting for market-to-book and find a positive relation between cash and market-to-book.[13]

In both columns 1 and 2, we include corporate governance as measured by the Gompers et al. (2003) index and the percentage of block holder ownership to control for the influence of agency problems on cash policy. We find that firms with better governance hold less cash. As mentioned in the introduction, the literature on this is inconclusive. When we run the regression as a Fama and MacBeth (1973) type annual series of cross-sections, instead of a fixed effects regression, we find that governance has a positive impact on cash holdings. However, as we show in section 3 of the paper, our results are not sensitive to these alternative specifications. Similarly, excluding governance all together in the cash levels regression equation (4) does not alter the results concerning the effect of governance on the value of cash. Due to the statistical evidence, we consider the fixed effects regression in column 1 as our main specification.

[13] We also run a regression which includes lagged market-to-book as an additional control. If firms raise money to opportunistically take advantage of temporarily high valuations, then we might observe high cash levels following periods with high valuation (see Baker and Wurgler (2002)). Controlling for this in our cash levels regression leaves results regarding the value of cash and corporate governance unchanged. The results are available on request.

**Appendix 2**
**Public Pension Funds from Thomson Financial Data**

| Fund Name on Thomson | Manager Number |
|---|---|
| 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 |

## Table 1
## Summary Statistics

This table provides summary statistics for the data employed in the analysis. Panel A provides mean, median and standard deviations. For all variables, assets are computed net of cash. The variables are: ratio of cash to sales (Cash/Sales), firm sales (Sales), firm assets adjusted for inflation to 2000 (Assets), ratio of cash flow to assets (Cash Flow/Assets), ratio of net working capital to assets (NWC/Assets), 24 minus the Gompers et al. governance index (Gompers et al. index), sum of the 5% block holdings of common equity by institutions (Blocks), sum of all public pension fund holdings (Pension Funds), dummy if the firm has a long-term bond rating (Bond Rating), market-to-book ratio (MktVal/Assets), 3-year compound sales growth (Sales Growth), ratio of property, plant, and equipment to assets (PP&E/Assets). All variables 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 Cash/Sales and Cash/Assets, because that is how they will appear in the regression models. Panel C shows the median cash holdings and sales levels by industry for both 1990 and 2003.

Panel A:

| | Mean | Median | StDev | 25th Percentile | 75th Percentile |
|---|---|---|---|---|---|
| Cash/Sales | 0.23 | 0.05 | 1.05 | 0.02 | 0.15 |
| Cash/Sales (1990) | 0.11 | 0.04 | 0.27 | 0.01 | 0.11 |
| Cash/Sales (2003) | 0.54 | 0.11 | 1.84 | 0.03 | 0.37 |
| Sales | 3737.24 | 1045.87 | 9755.68 | 419.70 | 3037.71 |
| Assets | 3543.70 | 865.88 | 9241.07 | 340.90 | 2628.16 |
| Cash Flow/Assets | 0.09 | 0.10 | 0.21 | 0.06 | 0.15 |
| NWC/Assets | 0.10 | 0.10 | 0.22 | -0.01 | 0.22 |
| Gompers et al. index | 14.76 | 15.00 | 2.78 | 13.00 | 17.00 |
| Blocks | 0.13 | 0.11 | 0.13 | 0.00 | 0.21 |
| Bond Rating | 0.52 | 1.00 | 0.50 | 0.00 | 1.00 |
| MktVal/Assets | 2.53 | 1.64 | 3.32 | 1.24 | 2.52 |
| Sales Growth | 0.10 | 0.07 | 0.22 | 0.00 | 0.16 |
| PP&E/Assets | 0.37 | 0.33 | 0.22 | 0.20 | 0.51 |
| N | 13250 | | | | |
| Firms | 1958 | | | | |

## Table 1 (cont.)
## Summary Statistics

This table provides summary statistics for the data employed in the analysis. Panel B shows the unconditional, pair-wise correlations. The variables are as in Panel A, except that we report the natural logarithm of Cash/Sales and Cash/Assets, because that is how they will appear in the regression models.

Panel B:

| | Cash / Sales | Assets | Cash Flow / Assets | NWC / Assets | Gompers et al. index | Blocks | Bond Rating | MktVal / Assets | Sales Growth | PP&E / Assets |
|---|---|---|---|---|---|---|---|---|---|---|
| Cash/Sales | 1.00 | | | | | | | | | |
| Assets | -0.22 | 1.00 | | | | | | | | |
| Cash Flow/Assets | -0.52 | 0.21 | 1.00 | | | | | | | |
| NWC/Assets | -0.20 | -0.12 | 0.26 | 1.00 | | | | | | |
| Gompers et al. index | 0.09 | -0.24 | -0.03 | -0.02 | 1.00 | | | | | |
| Blocks | 0.02 | -0.18 | -0.04 | 0.06 | 0.03 | 1.00 | | | | |
| Bond Rating | -0.10 | 0.65 | 0.03 | -0.16 | -0.23 | -0.09 | 1.00 | | | |
| MktVal/Assets | 0.36 | -0.17 | -0.09 | -0.26 | 0.14 | -0.02 | -0.13 | 1.00 | | |
| Sales Growth | -0.01 | 0.05 | 0.07 | 0.00 | 0.12 | -0.05 | -0.01 | 0.22 | 1.00 | |
| PP&E/Assets | 0.00 | 0.19 | 0.01 | -0.27 | -0.03 | -0.07 | 0.19 | -0.09 | -0.01 | 1.00 |

## Table 1 (cont.)
## Summary Statistics

This table provides summary statistics for the data employed in the analysis. Panel C shows the median cash holdings and sales levels by industry for both 1990 and 2003.

Panel C:

| | Cash/Sales (1990) | Sales (1990) | Cash/Sales (2003) | Sales (2003) |
|---|---|---|---|---|
| Agriculture | 0.07 | 1983.83 | 0.09 | 3568.59 |
| Food Products | 0.02 | 1685.86 | 0.05 | 1453.00 |
| Candy & Soda | 0.02 | 3169.52 | 0.01 | 10283.4 |
| Beer & Liquor | 0.08 | 10489.9 | 0.09 | 17595.3 |
| Tobacco Products | 0.03 | 789.38 | 0.28 | 3482.64 |
| Recreation | 0.09 | 1099.20 | 0.15 | 718.54 |
| Entertainment | 0.11 | 692.05 | 0.08 | 1682.55 |
| Printing and Publishing | 0.06 | 1676.10 | 0.01 | 1345.62 |
| Consumer Goods | 0.05 | 732.60 | 0.07 | 1344.86 |
| Apparel | 0.02 | 807.27 | 0.08 | 1278.51 |
| Healthcare | 0.04 | 594.95 | 0.05 | 1380.95 |
| Medical Equipment | 0.11 | 282.81 | 0.15 | 611.43 |
| Pharmaceutical Products | 0.16 | 1368.58 | 1.04 | 264.84 |
| Chemicals | 0.03 | 1124.83 | 0.07 | 1654.69 |
| Rubber and Plastic Products | 0.02 | 1072.57 | 0.03 | 1183.40 |
| Textiles | 0.02 | 544.06 | 0.05 | 647.54 |
| Construction Materials | 0.02 | 563.48 | 0.06 | 1140.71 |
| Construction | 0.04 | 1631.49 | 0.13 | 1231.34 |
| Steel Works Etc | 0.03 | 1190.32 | 0.04 | 892.02 |
| Fabricated Products | 0.02 | 203.35 | 0.06 | 560.78 |
| Machinery | 0.04 | 729.56 | 0.09 | 838.46 |
| Electrical Equipment | 0.03 | 317.89 | 0.05 | 695.39 |
| Automobiles and Trucks | 0.02 | 1035.64 | 0.05 | 1605.87 |
| Aircraft | 0.02 | 3211.49 | 0.09 | 23103.0 |
| Shipbuilding, Railroad Equipment | 0.03 | 752.15 | 0.05 | 717.92 |
| Defense | 0.03 | 8041.97 | 0.04 | 2366.19 |
| Precious Metals | 0.60 | 137.83 | 0.76 | 1665.21 |
| Non-Metallic and Industrial Metal Mining | 0.02 | 765.32 | 0.08 | 835.70 |
| Coal | 0.08 | 551.39 | 0.06 | 1535.13 |
| Petroleum and Natural Gas | 0.06 | 1283.40 | 0.05 | 1162.00 |
| Communication | 0.03 | 2440.25 | 0.24 | 1557.80 |
| Personal Services | 0.08 | 384.76 | 0.11 | 659.58 |
| Business Services | 0.11 | 295.68 | 0.33 | 482.92 |
| Computers | 0.11 | 403.85 | 0.44 | 414.54 |
| Electronic Equipment | 0.07 | 322.60 | 0.52 | 363.85 |
| Measuring and Control Equipment | 0.07 | 458.88 | 0.25 | 438.88 |
| Business Supplies | 0.02 | 1252.91 | 0.03 | 1506.63 |
| Shipping Containers | 0.02 | 1021.34 | 0.03 | 2758.33 |
| Transportation | 0.05 | 1866.89 | 0.07 | 2344.90 |
| Wholesale | 0.01 | 1031.99 | 0.02 | 1965.73 |
| Retail | 0.02 | 2266.73 | 0.05 | 3196.91 |
| Restaurants, Hotels, Motels | 0.04 | 925.99 | 0.03 | 990.14 |

## Table 2
## Predicting the Level of Cash

This table shows the regression results for the level of cash. In all variables, assets are net of cash. The dependent variable in all models is the natural logarithm of the ratio of cash divided by sales. The independent variables include: firm real assets (Assets), ratio of cash flow to assets (Cash Flow/Assets), ratio of net working capital to assets (NWC/Assets), 24 minus the Gompers et al. governance index (Gompers et al. index), sum of the 5% block holdings of common equity by institutions (Blocks), dummy if the firm has a long-term bond rating (Bond Rating), market-to-book ratio (MktVal/Assets), ratio of capital expenditures to assets (CAPX/Assets), ratio of total debt over assets (Leverage), ratio of R&D over sales (R&D/Sales), dividend dummy (Dividend Dummy), and 3-year compound sales growth (Sales Growth). All variables are winsorized at the 1% and 99% levels. Model [1] is run as a fixed-effects panel and uses Sales Growth and R&D-to-Sales as instruments for MktVal/Assets. The results of the first stage of the IV model (MktVal/Assets as dependent variable) are given in the last column of the table. Model [2] is run as a fixed effects panel and uses no instruments. Model [3] is run as a Fama-MacBeth regression and uses Sales Growth and R&D-to-Sales as instruments for MktVal/Assets. P-Values are given in brackets.

| | [1] | [2] | [3] | First Stage of [1] | |
|---|---|---|---|---|---|
| Assets | -0.43 | -0.27 | -0.101 | Assets | -1.13 |
| | [0.000] | [0.000] | [0.006] | | [0.000] |
| Cash Flow/Assets | 0.24 | 0.28 | -1.297 | Cash Flow | 1.32 |
| | [0.005] | [0.000] | [0.004] | | [0.000] |
| NWC/Assets | -0.79 | -0.47 | 0.271 | NWC | -2.87 |
| | [0.000] | [0.000] | [0.151] | | [0.000] |
| Gompers et al. index | -0.02 | -0.02 | 0.017 | Gompers et al. index | -0.05 |
| | [0.011] | [0.034] | [0.001] | | [0.037] |
| Blocks | -0.39 | -0.26 | 0.206 | Blocks | -0.63 |
| | [0.000] | [0.008] | [0.168] | | [0.006] |
| Bond Rating | 0.00 | 0.02 | 0.037 | Bond Rating | 0.07 |
| | [0.956] | [0.752] | [0.428] | | [0.425] |
| MktVal/Assets | -0.12 | 0.04 | 0.424 | Sales Growth | 1.71 |
| | [0.000] | [0.000] | [0.000] | | [0.000] |
| CAPX | | -0.75 | | R&D / Sales | 1.68 |
| | | [0.000] | | | [0.000] |
| Leverage | | -0.23 | | | |
| | | [0.000] | | | |
| R&D/Sales | | 0.62 | | | |
| | | [0.000] | | | |
| Dividend Dummy | | -0.07 | | | |
| | | [0.082] | | | |
| Constant | 0.54 | -0.95 | -3.645 | Constant | 10.54 |
| | [0.149] | [0.000] | [0.000] | | [0.000] |
| Year Dummies | Yes | Yes | N/A | Year dummies | Yes |
| N | 13250 | 13245 | 13250 | N | 13250 |
| Firms | 1958 | 1958 | 1958 | Firms | 1958 |

## Table 3
## Excess Cash Summary Statistics

This table provides summary statistics of excess cash. 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: ratio of excess cash to sales (Excess Cash/Sales), ratio of cash to sales (Cash/Sales), firm real assets (Assets), ratio of cash flow to assets (Cash Flow/Assets), ratio of net working capital to assets (NWC/Assets), 24 minus the Gompers et al. governance index (Gompers et al. index), sum of the 5% block holdings of common equity by institutions (Blocks), dummy if the firm has a long-term bond rating (Bond Rating), market-to-book ratio (MktVal/Assets), 3-year compound sales growth (Sales Growth). All variables are winsorized at the 1% and 99% levels. All differences are significant except that for cash flow to assets and Bond Rating. Panel B lists the median ratio of Excess Cash to Sales in the sample over the years, as well as the 95th percentile and the ratio of Microsoft.

Panel A:

| | Mean | | Median | |
|---|---|---|---|---|
| | Low Excess Cash | High Excess Cash | Low Excess Cash | High Excess Cash |
| Excess Cash/Sales | -0.04 | 0.42 | -0.03 | 0.14 |
| Cash/Sales | 0.02 | 0.43 | 0.01 | 0.14 |
| Assets | 2428.17 | 4583.42 | 802.53 | 942.83 |
| Cash Flow/Assets | 0.09 | 0.09 | 0.10 | 0.12 |
| NWC/Assets | 0.13 | 0.07 | 0.12 | 0.07 |
| Gompers et al. index | 14.47 | 15.03 | 14.00 | 15.00 |
| Blocks | 0.14 | 0.12 | 0.12 | 0.10 |
| Bond Rating | 0.52 | 0.52 | 1.00 | 1.00 |
| MktVal/Assets | 1.62 | 3.38 | 1.40 | 2.08 |
| Sales Growth | 0.08 | 0.11 | 0.07 | 0.07 |
| N | 6392 | 6858 | 6392 | 6858 |

Panel B:

| | Median | 95th Percentile | Microsoft |
|---|---|---|---|
| 1990 | 0.00 | 0.37 | 0.37 |
| 1991 | 0.00 | 0.38 | 0.36 |
| 1992 | 0.00 | 0.37 | 0.48 |
| 1993 | 0.00 | 0.42 | 0.60 |
| 1994 | 0.00 | 0.39 | 0.77 |
| 1995 | 0.00 | 0.38 | 0.80 |
| 1996 | 0.00 | 0.35 | 0.80 |
| 1997 | 0.00 | 0.36 | 0.79 |
| 1998 | 0.00 | 0.62 | 0.96 |
| 1999 | 0.00 | 0.74 | 0.87 |
| 2000 | 0.00 | 0.82 | 1.03 |
| 2001 | 0.00 | 0.87 | 1.24 |
| 2002 | 0.03 | 1.91 | 1.36 |
| 2003 | 0.03 | 1.53 | 1.51 |

## Table 4
## Analysis of Impact of Governance on Value of Excess Cash

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 (net of cash). The independent variables include: the ratio of excess cash computed as the residual from regression [1] in Table 2 divided by sales (Excess Cash/Sales), a governance dummy based on whether the firm was in the top or bottom tercile of the modified Gompers et al. index or Blocks distribution (Gompers et al. index and Blocks), the interaction between Excess Cash/Sales and the governance dummy (Excess Cash x Gov. Dummy), firm real assets (Assets), ratio of property, plant and equipment over assets (PP&E/Assets), ratio of cash flow to assets (Cash Flow/Assets). All variables are winsorized at the 1% and 99% levels. Models [1] and [2] use the sub-sample of positive excess cash firms, models [3] and [4] use the highest quartile of the excess cash distribution. P-Values are given in brackets.

| | [1] | [2] | [3] | [4] |
|---|---|---|---|---|
| Excess Cash/Sales | 0.86 | 1.70 | 0.39 | 1.14 |
| | [0.003] | [0.006] | [0.399] | [0.256] |
| Excess Cash x Gov. Dummy | 2.46 | 3.66 | 3.11 | 3.90 |
| | [0.000] | [0.000] | [0.000] | [0.000] |
| Blocks Dummy | -0.62 | | -1.07 | |
| | [0.001] | | [0.020] | |
| Gompers et al. index Dummy | | -1.72 | | -4.69 |
| | | [0.172] | | [0.176] |
| Assets | -1.43 | -1.28 | -2.20 | -2.18 |
| | [0.000] | [0.000] | [0.000] | [0.000] |
| PP&E/Assets | 1.35 | 1.30 | 0.66 | 2.46 |
| | [0.062] | [0.18] | [0.645] | [0.164] |
| Cash Flow/Assets | 1.01 | 2.64 | 0.47 | 2.24 |
| | [0.004] | [0.000] | [0.392] | [0.001] |
| Constant | 12.53 | 10.14 | 17.87 | 16.8 |
| | [0.000] | [0.000] | [0.000] | [0.000] |
| Year Dummies | Yes | Yes | Yes | Yes |
| N | 4548 | 3381 | 2150 | 1633 |
| Firms | 1245 | 859 | 754 | 519 |
| Overall R-Squared | 0.17 | 0.21 | 0.14 | 0.15 |

## Table 5
## Analysis of Impact of Governance on Value of Excess Cash with Alternative Specifications of Governance Measures

This table shows the regression results for the value regressions. In all variables, assets are computed net of cash. The dependent variable is the ratio of market value over assets. In Models [1] and [2], the independent variables include: a governance dummy based on whether the firm was in the top or bottom tercile of the Bebchuk et al. index, or public pension fund holdings distribution (Bebchuk et al. Dummy, and Pension Fund Dummy), the interaction between excess cash and the governance dummy (Excess Cash x Gov. Dummy), firm real assets (Assets), ratio of property, plant and equipment over assets (PP&E/Assets), ratio of cash flow to assets (Cash Flow/Assets). In columns [3] through [6], the independent variables include: the ratio of excess cash to sales as the residuals from regression [1] in Table 2 (Excess Cash/Sales) excluding the governance variables, firm assets (Assets), the ratio of property, plant, and equipment to assets (PP&E/Assets), and the ratio of cash flow to assets (Cash Flow/Assets). The interaction variable (Excess Cash x Gov Dummy) is the level of excess cash multiplied by the respective governance dummy variable (Blocks or Gompers et al. index). Models [3] and [4] utilize as governance variables the time-series averages of 24 minus the Gompers et al. governance index [3] and the block holdings [4]. Models [5] and [6] utilize as governance variables the first year observation of the Gompers et al. index [5] and the block holdings [6]. The sample is the entire group of firms with positive excess cash. All models are run as fixed effects. All variables are winsorized at the 1% and 99% levels. P-Values are given in brackets.

| | [1] | [2] | [3] | [4] | [5] | [6] |
|---|---|---|---|---|---|---|
| Excess Cash/Sales | 1.82 | 0.21 | 1.19 | 2.06 | 2.3 | 2.11 |
| | [0.000] | [0.29] | [0.000] | [0.000] | [0.000] | [0.000] |
| Excess Cash x Gov Dummy | 1.37 | 4.33 | 2.83 | 2.24 | 2.17 | 2.03 |
| | [0.000] | [0.00] | [0.000] | [0.000] | [0.000] | [0.000] |
| Pension Fund Dummy | -0.47 | | | | | |
| | [0.014] | | | | | |
| Bebchuk et al. Index Dummy | | 0.90 | | | | |
| | | [0.62] | | | | |
| Assets | -1.54 | -1.63 | -1.27 | -1.13 | -1.45 | -1.02 |
| | [0.000] | [0.00] | [0.000] | [0.000] | [0.000] | [0.000] |
| PP&E/Assets | -0.9 | 1.40 | 0.79 | 1.57 | 2.21 | 1.91 |
| | [0.171] | [0.15] | [0.247] | [0.034] | [0.002] | [0.040] |
| Cash Flow/Assets | 0.29 | 1.25 | -0.4 | 0.84 | 1.9 | 0.31 |
| | [0.300] | [0.00] | [0.142] | [0.010] | [0.000] | [0.411] |
| Constant | 12.6 | 11.22 | 10.24 | 9.66 | 10.37 | 7.91 |
| | [0.000] | [0.00] | [0.000] | [0.000] | [0.000] | [0.000] |
| Year Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 4341 | 3261 | 4410 | 4275 | 4836 | 3416 |
| Firms | 1242 | 827 | 973 | 896 | 1031 | 690 |
| Overall R-Squared | 0.22 | 0.19 | 0.25 | 0.26 | 0.24 | 0.32 |

## Table 6
## Analysis of Impact of Governance on Value of Alternative Measures of Excess Cash

This table shows the results for the value regressions. In all variables, assets are computed net of cash. The independent variables include: a governance dummy based on whether the firm was in the top or bottom tercile of the Gompers et al. index or Blocks (Gompers et al. index and Blocks), the interaction between excess cash and the governance dummy (Excess Cash x Gov. Dummy), firm real assets (Assets), ratio of property, plant and equipment over assets (PP&E/Assets), ratio of cash flow to assets (Cash Flow/Assets). All variables are winsorized at the 1% and 99% levels. Models [1] and [2] use Excess Cash/Sales based on the residual from regression [1] in Table 2 but without the governance variables; models [3] and [4] use Excess Cash/Sales based on the residual from regression [3] in Table 2; models [5] and [6] use excess cash over assets (net of cash), which is based on a regression otherwise identical to regression [1] in Table 2. All models are run as fixed effects. All variables are winsorized at the 1% and 99% levels. P-Values are given in brackets.

| | [1] | [2] | [3] | [4] | [5] | [6] |
|---|---|---|---|---|---|---|
| Excess Cash/Sales (or net assets) | 0.84 | 1.57 | 1.43 | 0.84 | 3.46 | 3.21 |
| | [0.004] | [0.012] | [0.002] | [0.376] | [0.000] | [0.000] |
| Excess Cash x Gov Dummy | 2.49 | 3.8 | 3.44 | 6.9 | 1.16 | 4.09 |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Blocks Dummy | -0.63 | | -0.68 | | -0.22 | |
| | [0.001] | | [0.016] | | [0.186] | |
| Gompers et al. index Dummy | | -1.74 | | -1.92 | | -1.32 |
| | | [0.173] | | [0.189] | | [0.246] |
| Assets | -1.44 | -1.29 | -2.01 | -1.73 | -0.84 | -0.14 |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.341] |
| PP&E/Assets | 1.35 | 1.23 | 1.46 | 3.65 | 1.02 | 0.41 |
| | [0.068] | [0.213] | [0.175] | [0.008] | [0.140] | [0.638] |
| Cash Flow/Assets | 1 | 2.64 | 0.38 | 2.76 | 0.91 | 3.28 |
| | [0.005] | [0.000] | [0.467] | [0.000] | [0.005] | [0.000] |
| Constant | 12.57 | 10.21 | 18.09 | 14.84 | 7.66 | 2.51 |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.055] |
| Year Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 4440 | 3303 | 2931 | 2228 | 4759 | 3523 |
| Firms | 1233 | 851 | 970 | 686 | 1265 | 865 |
| Overall R-Squared | 0.21 | 0.22 | 0.19 | 0.17 | 0.39 | 0.32 |

## Table 7
## Analysis of Impact of Governance on the Value of Cash using Returns Regressions

This table uses alternative methods to value cash. Panel A contains the 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 25 size and book-to-market portfolios. The independent variables are (with the exception of leverage) all normalized by the market value of equity of the firm at the beginning of the year. Lagged variables are computed at the end of the previous the year. Δ indicates the change since the previous year. Cash is cash plus marketable securities. Gompers et al. index is 24 minus the Gompers et al. governance index, Blocks is the sum of institutional block holdings > 5%, Earnings are earnings before extraordinary items plus interest, deferred taxes, and investment tax credit, Assets are net of cash, R&D and Interest are straight from Compustat, Dividends are common dividends, Leverage is long term plus current debt divided by market value of equity plus long term plus current debt, New Financing is net equity issues plus net debt issues. P-Values based on robust standard errors are in brackets. In Panel B, we use the mean (in-sample for each regression) levels of cash, leverage, and governance variables to compute the marginal value of $1 in cash for the average firm in the sample.

Panel A:

| | [1] | [2] | [3] |
|---|---|---|---|
| ΔCash | 1.72 | 0.65 | 1.07 |
| | [0.000] | [0.022] | [0.000] |
| Gompers et al. index ×ΔCash | | 1.16 | |
| | | [0.004] | |
| Blocks ×ΔCash | | | 0.36 |
| | | | [0.044] |
| ΔEarnings | 0.47 | 0.55 | 0.41 |
| | [0.000] | [0.000] | [0.000] |
| ΔAssets | 0.21 | 0.27 | 0.14 |
| | [0.000] | [0.005] | [0.000] |
| ΔR&D | -0.18 | -0.58 | 1.11 |
| | [0.857] | [0.723] | [0.056] |
| ΔInterest | -1.46 | -0.68 | -1.25 |
| | [0.004] | [0.522] | [0.015] |
| ΔDividend | 0.97 | 1.89 | 1.12 |
| | [0.203] | [0.120] | [0.191] |
| Lagged Cash | 0.49 | 0.63 | 0.37 |
| | [0.000] | [0.007] | [0.000] |
| Leverage | -0.47 | -0.47 | -0.46 |
| | [0.000] | [0.000] | [0.000] |
| New Financing | -0.21 | -0.3 | -0.18 |
| | [0.000] | [0.004] | [0.000] |
| Lagged Cash × ΔCash | 0.43 | 0.83 | -0.16 |
| | [0.553] | [0.462] | [0.422] |
| Leverage × ΔCash | -2.06 | -1.63 | -0.78 |
| | [0.022] | [0.262] | [0.032] |
| Constant | 0.04 | 0.02 | 0.05 |
| | [0.010] | [0.440] | [0.000] |
| Observations | 13074 | 6537 | 8628 |
| Adjusted R-squared | 0.138 | 0.172 | 0.131 |

## Table 7 (cont.)
## Analysis of Impact of Governance on the Value of Cash using Returns Regressions

This table uses alternative methods to value cash. In Panel B, we use the mean (in-sample for each regression) levels of cash, leverage, and governance variables to compute the marginal value of $1 in cash for the average firm in the sample based on the results presented in Panel A (column numbers correspond to Panel A).
Panel B:

| | | [1] | [2] | [3] |
|---|---|---|---|---|
| Sample Means for Cash Value Computation | Lagged Cash | 0.12 | 0.12 | 0.12 |
| | Leverage | 0.23 | 0.22 | 0.24 |
| | Gompers et al. index Dummy | | 0.56 | |
| | Block Holdings Dummy | | | 0.50 |
| Marginal Value of $1 (Good Governance) | | | 1.54 | 1.23 |
| Marginal Value of $1 (Poor Governance) | | | 0.38 | 0.87 |
| Marginal Value of $1 (Average Firm) | | 1.29 | 1.03 | 1.05 |

## Table 8
## Analysis of Impact of 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 Net Assets). The independent variables include: the one-year lagged excess cash/sales from regression [1] in Table 2 (Lag Excess Cash/Sales), a one-year lagged governance dummy based on whether the firm was in the top or bottom tercile of the Blocks or Gompers et al. index distribution (Lag Blocks and Lag Gompers et al. index), the interaction between Lag Excess Cash/Sales and the lagged governance dummy (Lag Excess Cash x Gov Dummy), firm real assets (Assets), ratio of property, plant and equipment over assets (PP&E/Assets), ratio of cash flow to assets (Cash Flow/Assets), and lagged ROA. All variables are winsorized at the 1% and 99% levels. All models are run as fixed effects. The sample is the intersection of firms with positive lagged excess cash and firms for which excess cash has declined over the previous year. P-Values are given in brackets.

| | [1] | [2] | [3] | [4] |
|---|---|---|---|---|
| Lag Excess Cash/Sales | -0.14 | -0.1 | -0.11 | -0.09 |
| | [0.000] | [0.000] | [0.000] | [0.000] |
| Lag Excess Cash x Gov Dummy | 0.08 | 0.06 | 0.09 | 0.07 |
| | [0.000] | [0.068] | [0.000] | [0.011] |
| Lag Blocks Dummy | -0.01 | | -0.01 | |
| | [0.458] | | [0.314] | |
| Lag Gompers et al. index Dummy | | 0.13 | | 0.12 |
| | | [0.005] | | [0.006] |
| Assets | -0.01 | -0.04 | -0.02 | -0.04 |
| | [0.249] | [0.000] | [0.000] | [0.000] |
| PP&E/Assets | 0.04 | -0.02 | 0.02 | -0.02 |
| | [0.393] | [0.726] | [0.528] | [0.683] |
| Lagged ROA | | | 0.36 | 0.48 |
| | | | [0.000] | [0.000] |
| Constant | 0.2 | 0.32 | 0.27 | 0.31 |
| | [0.001] | [0.000] | [0.000] | [0.000] |
| Year Dummies | Yes | Yes | Yes | Yes |
| N | 2147 | 1591 | 2147 | 1591 |
| Firms | 935 | 663 | 935 | 663 |
| Overall R-Squared | 0.06 | 0.01 | 0.58 | 0.53 |

**Figure 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 2 in a particular year are included. The year with positive excess cash is considered time 0. The ratio plotted is the amount of excess cash in year t divided by the amount of excess cash in year 0.

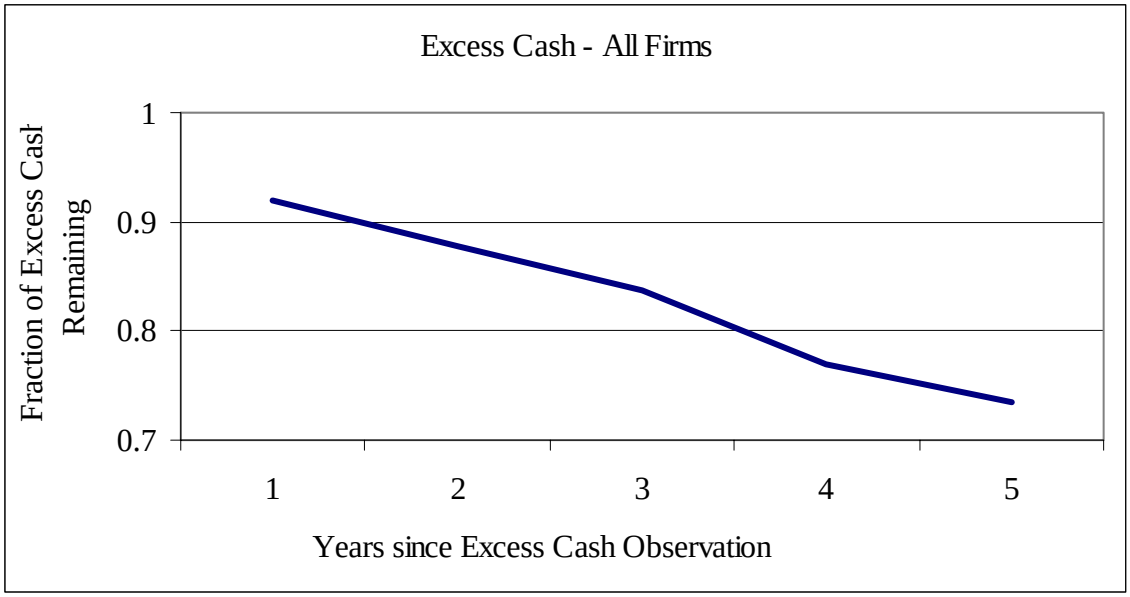

**Figure 2**
**Dissipation of Excess Cash by Governance: Using Gompers et al. index**

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 2 in a particular year are included. The year with positive excess cash is considered time 0. The ratio plotted is the amount of excess cash in year t divided by the amount of excess cash in year 0. Firms are divided into those with 24 minus the Gompers et al. index higher or lower than the sample median.

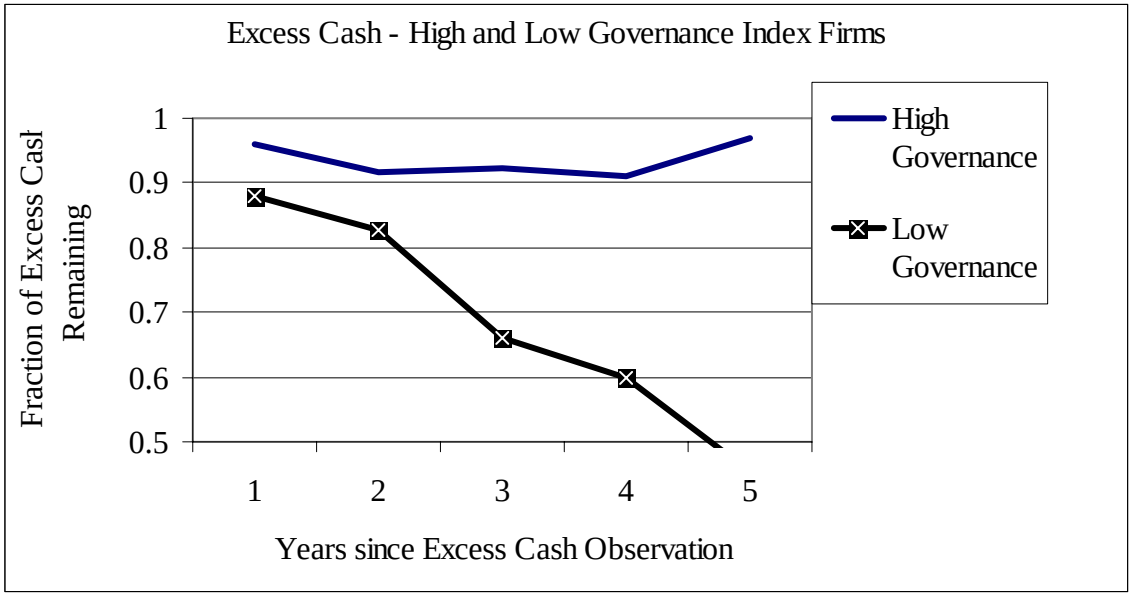

**Figure 3**
**Dissipation of Excess Cash by Governance: Using Blocks**

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 2 in a particular year are included. The year with positive excess cash is considered time 0. The ratio plotted is the amount of excess cash in year t divided by the amount of excess cash in year 0. Firms are divided into those with Blocks higher or lower than the median.