# Corporate Financial and Investment Policies In the Presence of a Blockholder on the Board

Anup Agrawal and Tareque Nasser*

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Comments welcome

* Agrawal: University of Alabama, Culverhouse College of Business, Tuscaloosa, AL 35487-0224, aagrawal@cba.ua.edu, (205) 348-8970. Nasser: Kansas State University, Department of Finance, Calvin Hall 2B, Manhattan, KS 66506, tnasser@k-state.edu, (785) 532-4375. We are grateful to Lucian Bebchuk, Gennaro Bernile, Tim Burch, Jay Cai, Alex Edmans, Jeff Gordon, Vidhan Goyal, Nandini Gupta, Anzhela Knyazeva, Diana Knyazeva, Praveen Kumar, Junsoo Lee, Jim Ligon, John McConnell, Daniel Metzger, Kevin Murphy, Roberto Mura, DJ Nanda, Tom Noe, Harris Schlesinger, Shane Underwood, Tracie Woidtke, Rusty Yerkes, and seminar and conference participants at ALEA-Columbia, CELS-Yale, CRSP Forum, Corporate Governance Conference at Erasmus University, FIRS-Minneapolis, University of Alabama and University of Miami for helpful comments and suggestions. Agrawal acknowledges financial support from the William A. Powell, Jr. Chair in Finance and Banking.

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## Abstract

We examine the relation between the presence of an independent director who is a blockholder (IDB) and corporate policies, risk-taking and market valuation. After accounting for endogeneity, firms with an IDB have significantly (1) lower levels of cash holdings and payout, (2) higher levels of capital expenditures, and (3) lower risk. The market appears to value IDB presence and the associated decrease in dividend yield. About 75% of the IDBs in our sample are individual investors, who drive most of our results. Our findings suggest that IDBs play a valuable role in reallocating corporate resources and reducing agency costs.



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# Corporate Financial and Investment Policies In the Presence of a Blockholder on the Board

## 1. Introduction

Separation of ownership and control creates agency problems between managers and shareholders (see, e.g., Berle and Means (1932) and Jensen and Meckling (1976)). These problems can affect a firm's financial and investment policies (see, e.g., Easterbrook (1984), Jensen (1986), and La Porta et al. (2000)). Several control mechanisms, both internal and external to the firm, work to reduce these agency problems (see, e.g., Shleifer and Vishny (1986, 1997), Agrawal and Knoeber (1996), and Becht, Bolton and Röell (2007)). In this paper, we examine the relation between the presence of a potentially potent governance mechanism, an independent director who is a blockholder (IDB), and several key corporate policies and the market valuation of these effects.

The crux of agency problems is weak monitoring and inefficient contracting with managers. In firms with dispersed shareholdings, free-rider problems impede monitoring by shareholders. As representatives of shareholders, boards of directors are charged with hiring, compensating, monitoring and disciplining CEOs. But boards' ability to monitor CEOs hinges on having strong, motivated and independent directors. Morck (2008) argues that a powerful CEO can usually subdue nominally independent directors, who often owe their board seats to the CEO. An IDB can serve as a powerful control mechanism in a firm because she has both a strong incentive and the ability to monitor managers. The incentive comes from his substantial shareholdings in the firm, while the ability comes from several sources. A board seat gives an IDB a regular forum for monitoring managers. Large shareholdings give an IDB direct voting power, the ability to form coalitions with other large shareholders, and greater influence on the board relative to other outside directors, who typically have negligible stockholdings. Thus, an IDB can play a more potent governance role than an independent blockholder without a board seat or an independent director without a large shareholding.

But an IDB's interests can diverge from those of other shareholders for at least two reasons. First, an IDB can use his power and position to extract private benefits from the firm. Second, an IDB may be more risk-averse than other shareholders. An IDB holds a substantial ownership stake in the firm and, as the evidence in Faccio, Marchica and Mura (2011) suggests, likely holds an under-diversified portfolio. So his risk tolerance may be lower than that of other shareholders, who typically hold well-diversified portfolios. Thus, whether an IDB acts to reduce agency problems or exacerbate them is an empirical issue.

An IDB can influence a firm's investment and financial policies in two ways.[1] First, these major decisions are often subject to board approval, giving an IDB a direct say on them. Second, in case of debt and dividends, which can serve as control mechanisms that reduce managerial discretion by committing (or quasi-committing, in the case of dividends) the firm to pay out cash, an IDB's presence can act as a substitute control mechanism.

Alternatively, an IDB can mitigate agency problems by better contracting with the CEO, as prior evidence (see, e.g., Bertrand and Mullainathan (2001), Cyert, Kang and Kumar (2002) and Agrawal and Nasser (2011)) suggests, and leave the decisions on financial and investment policies to the CEO. The IDB, in this case, avoids being a 'back seat driver', second-guessing management on corporate policies. Under this 'hands-off' approach, there would be no relation between IDB presence and these corporate policies, but the presence of an IDB would still be valuable.

In this paper, we examine three issues. First, we investigate the relation between IDB presence and four key corporate financial and investment policy choices: the levels of cash holdings, payout, investment, and financial leverage. Based on prior evidence, we assume that IDB presence reduces agency problems. We then attempt to distinguish among competing agency explanations of each corporate policy choice based on their implications regarding an IDB's effect on the policy, as discussed in section 2 below.

Second, while prior evidence suggests that firm value is higher in IDB presence because of lower agency problems (see Agrawal and Nasser (2011)), it does not identify the particular channels via which this value-increase occurs. We provide direct evidence on this issue by following the recent literature that examines how the market evaluates changes in corporate cash holdings associated with various firm and governance attributes. This literature uses a methodology developed by Faulkender and Wang (2006), who examine how the marginal value of a firm's cash holdings is related to its other financial policies. Dittmar and Mahrt-Smith (2007) use this methodology to examine the relation between the quality of a firm's governance (as measured by shareholder rights and institutional ownership) and the valuation of its cash holdings. Masulis, Wang and Xie (2009) extend this approach to dual-class firms and examine changes in corporate cash holdings and capital expenditures associated with the divergence between insiders' voting rights and cash flow rights, and how the market values these changes. We contribute to

[1] Anecdotal evidence suggests that IDBs do influence these policies. For instance, Kirk Kerkorian forced Chrysler to pay out about $8 billion in dividends and share repurchases in 1996 (see Henderson and Stern (1996)). Similarly, Carl Icahn pressured Time Warner to carry out a $20 billion stock repurchase program in 2006 (see Siklos and Sorkin (2006)).

this literature by examining how the market values changes in each of the four corporate policy choices associated with IDB presence.

Finally, we investigate the relation between IDB presence and risk-taking by a firm. A blockholder is likely to underinvest in monitoring when the benefits of his monitoring are divided pro rata among all stockholders, while he alone bears the costs. A firm becomes more valuable when this free-rider problem can be reduced. Huddart (1993) argues that blockholder monitoring works best when stock returns are not too risky, implying that blockholders would want to reduce risk. But different types of blockholders may care about different types of risk. For instance, institutional shareholders may not be too concerned about idiosyncratic risk because they hold well-diversified portfolios, but would be concerned about systematic risk. IDBs' portfolios, on the other hand, are likely under-diversified (see Faccio, Marchica and Mura (2011)), so they would care about both systematic and unsystematic risk. This implies that stocks of firms with IDBs should have lower levels of systematic, unsystematic and total risk.

An important issue in our analysis is the potential endogeneity of IDB presence in a firm. We attempt to mitigate this concern using three different approaches. Our first approach exploits exogenous variation in IDB presence using instrumental variables (IVs). Given that there is substantial variation in IDB presence across industries and across geographic locations of firms' headquarters in our sample, we use lagged IDB-industry density and lagged IDB-state density as instruments for IDB presence in a two-stage least squares (2SLS) regression framework.[2] We discuss the justification for using these instruments in Section 3 below. Our second approach attempts to correct for the endogeneity caused by selection bias. Because our main explanatory variable of interest, IDB, is binary, we use the Heckman two-stage and MLE treatment effect models. Identification of these models is achieved through exclusion restrictions, a less demanding way of identification than the IV approach. Third, we use two approaches to mitigate endogeneity concerns stemming from possible omitted variables bias. When we use firm fixed-effects regressions (not tabulated) instead of OLS, the results are qualitatively similar. In addition, although not reported in most tables, we use the lagged dependent policy choice variable as an additional regressor to account for this bias, with qualitatively similar results. As with any study in corporate finance, endogeneity is hard to completely rule out. Despite any residual concerns about this issue, our results are quite interesting.

[2] We also use the predicted value of IDB presence using a probit model as an instrument. Using this non-linear fitted value as an instrument (i.e., generated-IV) provides a 'back-door' identification (see, e.g., Angrist and Pischke (2009)). Since results from the 2SLS and generated-IV approaches are qualitatively similar, we only report the 2SLS results.

We analyze these issues using a panel containing about 9,100 firm-years of data on S&P 1500 firms over 1998 to 2006. After controlling for other variables and accounting for the potential endogeneity of IDB presence, we find that firms with IDBs have significantly (1) lower levels of cash holdings and payout (dividend yields, repurchases, and total payout), (2) higher levels of capital spending, and (3) lower systematic, unsystematic and total risk. Finally, overall firm valuation is higher in firms with IDBs and the market appears to value a decrease in dividend yield associated with IDB presence. About 75% of the IDBs in our sample are individual investors, who drive most of our results.

These results have three implications. First, IDBs appear to take a hands-off approach for firms' financial leverage, but take an active role in reducing cash holdings and increasing investment spending. Second, lower dividends in firms with IDBs and their higher market valuation suggest that IDB presence acts as a substitute to dividends as a control mechanism. Third, the prior literature has mixed findings on managerial preferences about the level of corporate investment. The findings of Bertrand and Mullainathan (2003) and Aggarwal and Samwick (2006) suggest that managers prefer a 'quiet life', while Gompers, Ishii and Metrick's (2003) results point to managers' proclivity toward 'empire building'. Our finding that IDB presence leads to higher levels of capital spending suggests that IDBs reduce managers' tendency toward a 'quiet life'. Overall, our results suggest that IDBs play a valuable role in reallocating corporate resources and reducing agency costs.

In an excellent review article on blockholders, Holderness (2003) discusses that the endogeneity of blockholder presence makes it difficult to assess their impact on corporate policies. He concludes, "Surprisingly few major corporate decisions have been shown to be different in the presence of a blockholder". Our paper contributes to the literature on large shareholders' impact on firms by (1) directly analyzing a potential channel, namely the board of directors, via which they may effect corporate policies,[3] (2) accounting for the endogeneity of the presence of such independent blockholders with board seats via several econometric methodologies, and (3) examining how the market values the changes in corporate policies associated with IDB presence. We find that several corporate policies are significantly different in IDB presence.

In related work, Cronqvist and Fahlenbrach (2009) argue that heterogeneity in blockholder effects on corporate policies masks blockholder effects in prior studies. They find significant blockholder fixed effects in corporate financial and investment policies and firm performance, which are larger when blockholders hold larger blocks, have board seats or have management involvement. Becker, Cronqvist and Fahlenbrach (2011) examine the effect of the presence of an individual, non-managerial blockholder

[3] See Pierre (2012) for a formal model of the effect of an independent blockholder on the board.

on several corporate policies and firm performance. Using an instrument to separate selection and treatment effects of blockholder presence, they find that blockholder presence reduces a firm's investment, cash holdings and top executive pay, and increases payout and firm performance.[4] They conjecture that blockholders influence corporate policies via the board, but do not examine whether blockholders indeed have board seats and whether they exercise their influence via those seats. We extend their work by providing a direct examination of these issues. Our findings about IDB effects are similar to Becker, et al.'s findings about blockholder effects on cash holdings and firm performance, but differ on investment and payout. In addition, we examine the market valuation of the changes in corporate policies associated with IDB presence. Finally, we examine how firms' risk-taking changes in IDB presence, as issue not examined by Becker, et al.

The rest of the paper proceeds as follows. Section 2 discusses predictions of competing agency models about an IDB's effect on each corporate policy choice. Section 3 discusses the sample, data and methodology. Section 4 presents the results on levels of cash holdings, dividends, investments, and leverage. Section 5 presents the results on the valuation of corporate financial and investment policies associated with IDB presence. Section 6 presents the results on firm risk. Section 7 concludes.

## 2. IDB presence and corporate policies

In this section, we attempt to distinguish among predictions of competing agency models regarding an IDB's effect on each corporate policy choice. In doing this, we assume that IDB presence reduces agency problems, as prior evidence (see, e.g., Bertrand and Mullainathan (2001) and Agrawal and Nasser (2011)) suggests. Table 1 summarizes these predictions.

The first policy we examine is the level of corporate cash holdings. Cash creates two types of agency problems. Jensen (1986) argues that excessive cash holdings allow managers to extract private benefits from the firm (see Dittmar and Mahrt-Smith (2007) and Bates, Kahle, and Stulz (2009) for supportive evidence).  This is the agency problem of free cash flow. If IDBs reduce this agency problem, their presence should decrease the level of cash holdings, after controlling for other factors. This is the *free cash flow hypothesis*. On the contrary, Harford, Mansi and Maxwell (2008) argue that managers of firms with weaker governance hold less cash to avoid a change in control. Large cash holdings can make a firm more susceptible to takeover because a potential acquirer can use a highly leveraged bid to take over the firm and use the target's cash holdings to reduce debt after takeover. If IDBs reduce firms' aversion to

[4] Slovin and Sushka (1993) use a complementary approach to analyzing causality from blocks to corporate policies. They find (in Table VII) a large positive stock price reaction to the announcement of sale of a deceased insider's block to an outsider.

holding cash, the level of cash holdings ought to be higher in IDB presence. We refer to this as the *corporate control hypothesis*.

The second policy we investigate is the level of corporate investment. Jensen (1986) argues that managers have a taste for empire-building because they like the prestige, power and higher compensation that comes with managing a larger firm. So overinvestment is a manifestation of agency problems. IDB presence should reduce overinvestment, and consequently reduce investment levels. This is the *empire-building hypothesis*. Alternatively, Bertrand and Mullainathan (2003) argue that mangers' preference for a 'quiet life' can lead firms to underinvest. Here, IDB monitoring can force managers to increase investment level. We refer to this as the *quiet life hypothesis*.

The next two corporate policies we analyze are the levels of debt and payout to shareholders. Unlike the earlier two policies, debt and dividends can themselves serve as control mechanisms that reduce managerial discretion by bonding the firm to pay out cash. Since an IDB can also act as a control mechanism, the effect of IDB presence on these two policies depends on whether IDB presence acts as a substitute or a complement to debt and dividends.

Easterbrook (1984) argues that higher payout reduces agency problems by increasing a firm's reliance on external capital and the resulting scrutiny from capital markets. Similarly, Jensen (1986) argues that even when firms have large free cash flows, managers don't like to pay it out because of the discretion that cash provides them. Thus, low payout creates an agency problem by avoiding scrutiny from capital markets and by increasing managerial discretion. To reduce the agency problem, an IDB may force the firm to increase payout. Here, IDB monitoring complements payout as a control mechanism. This argument implies that IDB presence should increase payout levels. We refer to this as the *complementary mechanism hypothesis*. Alternatively, IDB monitoring can substitute payout as a control mechanism, implying lower payout levels in IDB presence. We call this the *substitute mechanism hypothesis*.

Similarly, Jensen (1986) argues that weak governance allows managers to choose less than the optimal debt level to avoid market disciplining. IDBs can pressure managers to increase debt levels, implying higher debt in IDB presence. Here, an IDB complements debt as a control mechanism. This is the *complementary mechanism hypothesis*. Alternatively, IDB monitoring can substitute for monitoring by debtholders, implying lower debt levels in IDB presence. This is the *substitute mechanism hypothesis*.

Finally, as discussed in the introduction, an IDB can mitigate agency problems by better contracting with the CEO and leave decisions on specific corporate policies to the CEO. Under this hands-off approach, there would be no relationship between IDB presence and any of the above corporate policies, but the presence of an IDB would still be valuable. We call this the *efficient contracting hypothesis*.

## 3. Sample, data and methodology

Our sample comes from firm-years that are common in three databases—RiskMetrics Directors (RM Directors), Center for Research in Securities Prices (CRSP) and Compustat—over fiscal years 1998-2006 and meet our data requirements. Our main sample of IDBs comes from RM Directors database, which compiles its data from corporate proxy statements.[5] We obtain data on several control variables from RiskMetrics Governance (RM Governance), Thomson Reuters Institutional Ownership Data (TFN Institutional) and ExecuComp databases. Finally, we hand-collect data on the identities of all the IDBs in our sample. For each IDB, we started by reading their director profile in the proxy statement, accessed using Livedgar. We then identified the nature of their ownership and investment vehicles from Wikipedia, Who's Who publications, business descriptions of investment vehicles on their Websites, news stories in Factiva, and a variety of other Internet sources. Firms in our sample belong to the S&P 1500, which consists of the S&P 500, S&P Mid-cap 400 and S&P Small-cap 600. This is the universe of firms covered by RM Directors, RM Governance and Execucomp databases. We exclude finance and utility firms.

### *3.1 Main variable and sample construction*

We define a blockholder as an individual who owns at least $15 million of a firm's equity in 2000 dollars.[6] This value is roughly equal to 1% of the median market capitalization ($1.6 billion) of our sample firm-years.[7] We define independent directors as directors classified as independent or designated in RM Directors.[8] So an IDB is an independent director who is (or represents) a blockholder. The main

[5] We confirm the validity of our data on IDB presence in a random sample of firm-years from corporate proxy statements (accessed via Livedgar), news stories (from Factiva), Wikipedia, and other Internet sources.

[6] All variables that are that represent dollar value are expressed in constant 2000 dollars, using the CPI-All Urban Consumer series from the US Department of Labor.

[7] In our main analysis, we use a dollar, rather than a percentage, threshold definition of a blockholder because a blockholder's incentives are stronger when she invests significant personal wealth in the firm; that does not necessarily require her to own a significant proportion of the firm's market capitalization. Nonetheless, we have replicated all of our results on corporate policies and risk-taking using a 1% ownership threshold to define a blockholder. These results are generally quite similar to those reported below.

[8] RM Directors defines as independent a director who is neither a current company employee nor is 'affiliated'. An affiliated director is a director who is a former employee of the company or of a majority-owned subsidiary; a provider of professional services — such as legal, consulting or financial — to the company or an executive of the service provider; a customer or supplier of the company; a designee (i.e., a designated director) under a documented agreement between the company and a group, such as a significant shareholder; a director who controls more than 50% of the company's voting power; a family member of an employee; an interlocking director or an employee of an organization or institution that receives charitable gifts from the company.

variable of interest for our analysis is *IDB*, which is a binary variable that equals one if there is at least one IDB in a given firm-year, and equals zero otherwise.

Table 2 explains the construction of our sample. RM Directors obtains its data from proxy statements for shareholder meeting dates starting in 1996. Some of the key variables needed to compute a director's shareholding are missing in the database for 1996. Also, some variables required for our analysis were not available after 2006 at the time of data collection. Hence, our analysis makes use of data for 1997-2006.

During 1997-2006, there are 15,967 distinct firm-calendar years in RM Directors.[9] We find all 15,967 firm-calendar years on CRSP. Since we use a fiscal year as the unit of time, we match each annual shareholder meeting date for a firm with the fiscal year in which the meeting is held. We obtain the fiscal year ending month for each firm from Compustat. We next match these 15,967 firm-fiscal years (henceforth, firm-years) with Compustat, and find 15,477 matches. After matching the annual meeting dates to the appropriate fiscal year, 83 firm-years fall under the 2007 fiscal year. Due to data limitations, we drop these observations. That leaves us with 15,394 RM Directors-CRSP-Compustat matched firm-years. Out of these, we find 13,929 firm-years with non-missing CEO data in Execucomp. Our main analysis omits observations for the 1997 fiscal year because, as discussed in section 3.2 below, we use instrumental variables that are lagged by one year. In addition, we exclude 1,223 firm-year observations on dual-class firms because they tend to be family-controlled (see, e.g., DeAngelo and DeAngelo (1985)). After excluding financial and utility firms from our sample, our final sample for the main analysis consists of 9,107 firm-years over 1998-2006.

Appendix Table A.1 provides an overview of our sample. Of the 9,107 firm-years in our sample, 1,229 or 13.5% of the firm-years have an IDB. Panel A reports the distribution of the number of fiscal years a firm is present in our sample. Over the 1998-2006 period, our sample contains 1,621 unique firms. Of these, there are 545 firms that are present in all nine years during 1998-2006 and 1,223 firms that are present in at least three years. Panel B shows the distribution of the proportion of a given firm's fiscal years that have an IDB. For example, 1,197 firms have no IDB for all the fiscal years that they are present in our sample. Panel C presents the number of firm-years in each fiscal year for IDB, non-IDB, and all firms in the sample. The sample size ranges from 943 in 2006 to 1,070 in 2001. The percentage of firms with IDBs ranges from 12.31 in 1998 to 15.24 in 2000. Panel D shows the sample distribution by IDB-identity. About 74% of the IDBs in our sample are individual investors, who either own the stock directly (62%) or via a beneficial trust or investment vehicle (12%). The remaining IDBs represent hedge funds

[9] A single firm-calendar year often includes data from multiple proxy statements. Since directors are usually elected at the annual general meeting of shareholders, typically held three months after the end of a fiscal year, we use the list of directors from the proxy statement for this meeting.

(3%), private equity funds (7%), venture capital firms (2%), corporations (6%), and fiduciary trusts (8%). Most of our results are driven by individual investor IDBs, which is not surprising given their preponderance in the sample. It is difficult to make inferences about the effects of the remaining types of IDBs given their small presence in our sample.

Row 1 in Appendix Table A.2 reports the distribution of dollar stock ownership of the largest IDB in the 1,229 firm-years in our sample with at least one IDB. The mean (median) stock ownership is $218.79 ($39.19) million in constant 2000 dollars, representing about 13.29% (2.38%) of the median market capitalization ($1,646 million) in our total sample of firm-years.

### *3.2 Instrumental variables and empirical methodology*

Our main variable of interest, IDB, is likely endogenous. Individuals decide which firms to invest in and whether to try to obtain a board seat. This endogeneity can affect our analysis through either omitted variables or selection bias. We employ three different approaches to mitigate concerns about the endogeneity of IDB presence in a firm. First, we use two-stage least squares (2SLS) estimation to account for potential endogeneity caused by unobservable omitted variables. Because the potential endogenous variable is binary, we use the linear probability model (LPM) in the first stage. We develop instruments for IDB based on the fact that there are significant variations in IDB density by geographic location and industry. Becker, Cronqvist and Fahlenbrach (2011) find that wealthy individuals tend to cluster more in certain geographic areas and invest in public companies located nearby, either due to better monitoring ability or lower asymmetric information.[10] Similarly, wealthy investors may tend to congregate in certain industries, either because they have specific industry-expertise or have skills that are more useful to certain industries.[11] Such industry-expertise can reduce the risk of their investments to them despite their portfolios being likely under-diversified, as suggested by the evidence in Faccio, Marchica and Mura (2011). These factors can give rise to variations in blockholder and IDB presence by state and industry. While state- and industry-level densities of IDBs can explain IDB presence in a firm, these variables should not explain our main dependent variables (i.e., levels of cash holdings, dividends, investment, leverage, firm risk and excess return) except via their effects on IDB presence in a firm.[12]

[10] The tendency of wealthy individuals to invest locally is consistent with the literature on local bias in investing (see, e.g., Lerner (1995), Coval and Moskowitz (1999), and Bailey, Kumar and Ng (2008)).

[11] An example is Warren Buffett, who invests only in ‘low-tech’ industries.

[12] A possible issue with our industry-level instrument is that blockholders may take a position in an industry in response to poor performance and leave it after performance improves. That would invalidate the instrument because industry performance may affect both firm policies and the likelihood of IDB presence. However, we find

We compute the state-level density of IDBs (denoted as IDB state-density) as the average value of the IDB dummy for all the public companies in our sample headquartered in a state in a given fiscal year. For instance, an IDB density of 0.05 in California for fiscal year 2008 means that 5% of the public companies headquartered there in that year had an independent blockholder on their boards. We define the industry density of IDBs (denoted as IDB industry-density) for each of the 48 Fama and French (1997) industries similarly. We use these variations to develop instrumental variables for identification.

We use lagged IDB state-density and lagged IDB industry-density as instruments for IDB. By design, these instrumental variables (IVs) are highly correlated with IDB presence. Using lagged densities as instruments helps us to remove any look-ahead bias in creating IVs and further reduces the possibility of the IVs being related to our main dependent variables. We calculate these instruments for fiscal years 1997-2006. The use of lagged densities forces us to exclude the 1997 data from our main analysis.

The instruments equal the number of firms with IDBs in a state (or industry) divided by the total number of firms in the state (or industry). Since the denominator may be related to valuations in the state or industry for reasons other than IDB presence, our instruments may be invalid if they are driven by the denominator. We find that the instruments are driven by the numerator. The Pearson and Spearman correlations between the instruments and their numerators are highly statistically significant and range between 0.17 and 0.60; the correlations between the instruments and their denominators are mostly statistically insignificant.

While the 2SLS estimator is potentially biased, it is consistent; and having a large sample makes the 2SLS results more reliable. We test for exogeneity using the Durbin-Wu-Hausman test, which examines the statistical difference between OLS and 2SLS coefficient estimates of the suspect endogenous variable. With two different IVs, we are also able to conduct an over-identification test. We use Wooldridge's (1995) over-identification test since we compute robust standard errors clustered at either the firm-level or the CEO-firm-level.[13] In addition, Bound, Jeager and Baker (1995) caution about weak instruments and suggest that one should not rely solely on the over-identifying restriction. Staiger and Stock (1997) suggest that the F-statistic of the IVs used in the first-stage regression should be reasonably high (more than 10).

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that while IDB presence varies greatly *across* industries, it tends to be fairly 'sticky' over time *within* industries, suggesting that blockholders do not pick industries based on variation in industry performance.

[13] We compute robust standard errors clustered at the CEO-firm level because each CEO brings in distinct skills, strategy, and leadership style to a firm. Bertrand and Schoar (2003) find that there are systematic differences in corporate decision-making across individual CEOs, which are related to differences in firm performance.

Some of our main dependent variables in section 4 below take on a limited range of values. Given that our main explanatory variable, IDB, is potentially endogenous, we use the methods suggested by Rivers and Vuong (1988) and Smith and Blundell (1986) to test for potential endogeneity in regressions of binary (e.g., dividend dummy) and censored (e.g., dividends, R&D expenditures or financial leverage) dependent variables, respectively. Both of these methods use a two-stage procedure. In the first stage, the residual is computed from the OLS regression of the potentially endogenous variable (i.e., IDB) on the instruments and all the control variables of the main equation. In the second stage, the main probit (Rivers-Vuong) or Tobit (Smith-Blundell) regression is estimated using the first-stage residual as an additional regressor. If the t-test of the first-stage residual is insignificant, we conclude that IDB is not endogenous. One advantage of these two methods is that if the first-stage residual is insignificant, the test of exogeneity is valid without any distributional assumption on the error term in the first-stage regression (see Wooldridge (2002, p. 474 and 531)). If these methods fail to reject endogeneity, we use IV-probit or IV-Tobit methodology as an imperfect solution.[14]

When the dependent variable is censored, we use the IV-Tobit maximum likelihood estimator (MLE). In this framework, the main set of equations has a typical Tobit structure (i.e., the structural equation and the selection equation). In addition, we regress the endogenous variable on all exogenous variables from the structural equation and the IVs. We also conduct a Wald test for the exogeneity of the instrumented variable. When the dependent variable is binary, we use the MLE of the probit model with an endogenous explanatory variable, namely IV-probit (see Wooldridge (2002, p. 476)).

Second, we control for endogeneity in the form of selection bias of IDB by using treatment effect models. Heckman's (1979) two-stage treatment effect model is appropriate for estimating the average treatment effect and correcting for sample selection bias. In this model, the inverse Mill's ratio (Lambda), computed from the first-stage probit regression, is added as a covariate in the second-stage regression to account for any selection bias. We also use a MLE treatment effect model to estimate the selection and main equations simultaneously. We use the likelihood ratio (LR) test for the correlation between the error terms of the two equations to check for endogeneity.

We follow Agrawal and Nasser (AN, 2011) to develop the first-stage selection equation. However, they define IDB presence based on a 1% ownership threshold definition of a blockholder ($IDB_{\%}$). Hence, we report the descriptive statistics and regressions of determinants of IDB presence in a firm based on our dollar threshold definition of a blockholder in Table 3 ($IDB_{\$}$ or IDB). Panel A presents univariate tests of

[14] These methods assume that the endogenous variable is continuous.

the determinants of IDB presence for firm-years with and without IDBs. Both mean and median differences between IDB and non-IDB firms are significantly different for all except two variables.[15]

Panel B of Table 3 presents regression results of IDB presence on its potential determinants. Models 1, 2 and 3 implement OLS, Logit and Probit regressions, respectively, and include as covariates the set of variables shown in Panel A. The results are similar to AN, except for a few interesting differences. First, firms with $IDB_{\$}$ are larger in size, while firms with $IDB_{\%}$ (in AN) are smaller. Second, $IDB_{\$}$ firms have significantly higher Tobin's q but are unrelated to past performance measured by operating performance to sales (OPS); $IDB_{\%}$ firms, on the other hand, are unrelated to Tobin's q but have significantly lower OPS. Finally, corporate policy variables such as cash holdings, dividend yields and R&D expenditures are unrelated to $IDB_{\$}$ presence but are significantly negatively related to $IDB_{\%}$ presence. All these differences appear to be natural concomitants of the dollar threshold definition of a blockholder.

Model 4 is the same as Model 3, except that we exclude cash holdings, dividend yield, R&D expenditures and OPS as covariates. Using either Model 3 or 4 as the selection model of the treatment effect models shows no qualitative differences in results. Hence, for reporting purpose we use Model 3 as the selection equation for all treatment effect models.

Third, following Harford, Mansi and Maxwell (2008), we use the lagged dependent variable as a covariate to mitigate a potential omitted variable bias in regressions of corporate policy choices. Our results are similar with or without the inclusion of lagged dependent variable. Hence, in most cases we report results without the lagged dependent variable as a covariate. In addition, we include a large set of covariates that can explain the relevant dependent variables in an attempt to mitigate the potential endogeneity caused by omitted variables. Finally, as noted in the introduction, we also use fixed-effects regressions and a generated IV approach, with qualitatively similar results (un-tabulated).

### *3.3 Dependent variables*

We construct all of the financial and investment policy variables of a firm using Compustat data. To measure the level of cash, we define cash holdings as cash plus marketable securities divided by total assets. We use four different variables to measure firms' payout policies: dividend yield, dividend dummy, repurchases and total payout. Dividend yield is defined as common dividends divided by market

[15] These two variables are the fraction of independent directors on the board and the CEO's presence on the nominating committee. In the regression framework, only the former variable is statistically significant. For the latter variable, a measure of CEO power, there are two opposing forces at work, which appear to offset each other. Firms with strong (and perhaps entrenched) CEOs stand to benefit more from IDB presence, increasing an investor's incentive to acquire a large block and seek a board seat. But since independent blockholders (IBs) have strong incentives and the ability to monitor the CEO, powerful CEOs are likely to resist their appointment to the board.

capitalization; dividend dummy is a binary variable that equals one if a firm pays dividends in a given fiscal year, and equals zero otherwise. We define repurchases as the total expenditure on the purchase of common and preferred stock divided by equity market capitalization. Total payout is sum of dividend yield and repurchases. We measure the level of a firm's investment as capital expenditures or R&D expenditures, both scaled by total assets. We also examine total investment, measured as the sum of capital expenditures and R&D expenditures. Finally, we measure a firm's debt level as leverage, which equals total debt as a percentage of total assets.

We use three measures of equity risk: total risk, systematic risk and unsystematic risk. Using CRSP data, we measure total risk as the variance of daily stock returns over a fiscal year. We then decompose total risk using a market model. Variance of the predicted portion of the market model is defined as the systematic risk and variance of the residual of the market model is defined as unsystematic risk. Since all of these risk measures have skewed distributions, we use their natural logarithm in the regressions. For valuation regressions, we use excess return as the dependent variable. We define excess return as a firm's buy and hold stock return over a fiscal-year minus the return on the corresponding Fama and French (1993) 5×5 size and market-to-book value portfolio.[16]

Appendix Table A.2 provides descriptive statistics of these variables. The median cash holding is 7.12% of total assets. About 50% of our sample firm-years pay no dividends and the median dividend yield is about 1.44%. Similarly, 41.86% (25.43%) of the sample firm-years have no repurchases (payouts). The median capital expenditures, R&D expenditure and total debt are about 7.33%, 4.69% and 33.38% of the book value of total assets, respectively. In our sample, about 12.10% of the firm-years have no debt and 46.50% of the firm-years incur no R&D expenditures.

### *3.4 Independent variables*

In addition to IDB, our main explanatory variable of interest, the independent variables in our analysis consist of financial ratios and characteristics of boards, CEOs, and firms. We also include year dummies and Fama and French 12 industry dummies.[17] We winsorize the top and bottom one-half percent of the observations of all financial variables, ownership and compensation variables, firm size variables, sales

[16] We obtain Fama and French 5×5 size and book-to-market portfolio returns from Professor Kenneth French's website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. We also obtain Fama and French industry classifications from this website.

[17] Finer classifications, such as Fama and French (1997) 48 industries, result in partitions with many industries having only one or two firms in our sample. Since many of the board characteristic variables (e.g., IDB, board size) are highly persistent over time, using industry dummies based on finer industry classifications would be tantamount to including firm-specific dummies.

growth, Tobin's q, stock returns and volatility. Appendix Table A.2 provides definitions and descriptive statistics of these variables.

The typical firm in the sample is fairly large, with median market capitalization and total assets of about $1.65 billion and $1.46 billion, respectively, in 2000 dollars. The median firm age (using earliest of CRSP and Compustat listing dates) is 20 years. The median board size is 9 and the median fraction of independent directors is 0.67. The median total ownership of a firm's top five executives is 1.68% and the median institutional ownership is 70%. The ratio of incentive pay to total pay for the top five managers has a median value of 42%.

## 4. IDB presence and corporate policies

This section examines the relations between IDB presence in a firm and levels of cash holdings (section 4.1), dividends and payout (section 4.2), investment (section 4.3), and financial leverage (section 4.4). Panel A of Table 4 shows univariate comparisons of mean and median values between IDB and non-IDB firms. The mean (median) levels of cash holdings of IDB and non-IDB firms are 12.91% (5.96%) and 14.87% (7.35%), respectively. Univariate tests show that firms with IDB presence hold significantly lower levels of cash than firms without an IDB. A significantly higher proportion of IDB firms pay dividends than non-IDB firms, about 55% as opposed to 49%; this is reflected in the higher median dividend yields in IDB firms. But the mean difference in dividends yields between IDB and non-IDB firms is statistically insignificant. Although the mean ratio of repurchases to market capitalization is significantly lower in IDB firms than in non-IDB firms, total payout is not significantly different. As indicated by univariate tests, firms with IDB presence are associated with lower R&D expenditures but higher capital expenditures. However, the levels of investment expenditures (sum of R&D and investment expenditures) are not significantly different in IDB and non-IDB firms. Finally, both the mean and median levels of financial leverage are significantly higher in IDB firms than in non-IDB firms. So the univariate evidence shows that IDB presence is related to several financial and investment policies of firms. But this evidence is preliminary, because it does not control for other determinants of financial and investment policy choices and does not account for the potential endogeneity of IDB presence, issues we deal with next.

### *4.1 IDB presence and the level of cash holdings*

In this section, we examine the relation between IDB presence and the level of a firm's cash holdings using several regression-based methodologies. The results of these regressions are presented in Table 5.

We follow prior studies (see, e.g., Opler et al. (1999), Harford, Mansi and Maxwell (2008), and Bates, Kahle and Stulz (2009)) to identify the control variables for cash holdings.

Cash holdings measure the liquid resources available to a firm, and provide a cushion against bankruptcy risk. We control for a firm's liquidity and bankruptcy risk via net working capital net of cash, cash flow, leverage, and a loss indicator variable (i.e., whether the firm has suffered a negative net income in a given fiscal year). Firms with stronger growth opportunities and limited access to capital markets carry higher cash holdings. We control for growth opportunities via the average sales growth rate over the prior five years, Tobin's q and R&D expenditures. We control for a firm's ability to access capital markets via firm size (log of market capitalization). In addition, we include a bond rating dummy, a variable that equals one if a firm has S&P long-term bond ratings, and zero otherwise. Bates, Kahle, and Stulz (2009) argue that a firm has more cash immediately after raising capital; reduces cash as it pays back debt or repurchases stock. Hence, we control for firms' net equity issuance and net debt issuance. Firms with greater precautionary needs require higher levels of cash holdings. We control for a firm's business condition via cash flow volatility, measured as the standard deviation of cash flows over the prior ten years. Firms with higher levels of capital expenditures and acquisition activity tend to have lower levels of cash holdings; we also control for these.

In addition to IDB presence in a firm, we control for other internal and external governance mechanisms such as board structure (board size and fraction of independent directors on the board), institutional ownership, managers' option-based pay (i.e., the percentage of total pay for the top five managers that is option-based), and G-index (Gompers, Ishii and Metrick's (2003) shareholder rights index). Following Harford el al. (2008), we include the lagged value of cash holdings as an independent variable. The regressions also include year dummies and Fama and French 12 industry dummies.

Models 1 and 2 are both OLS regressions of cash holdings; model 1 excludes lagged cash holdings as a covariate. We find that IDB presence is unrelated to a firm's cash holdings in both models. Not surprisingly, lagged cash holdings explain a significant proportion of a firm's current levels of cash holdings (un-tabulated t-statistic = 77.23). Most of the control variables in the OLS regression take their expected signs in model 1. Firms with lower cash holdings are larger, tend to have higher leverage and net working capital, pay dividends, have a bond rating, and make more investments via capital expenditures and acquisitions. On the other hand, firms with higher cash holdings have greater growth opportunities (Tobin's q and R&D expenditures), cash flow volatility, net debt issuance, and net equity issuance. Consistent with the prior literature (e.g., Harford, Mansi and Maxwell (2008)), lower G-index and higher institutional ownership, as measures of better governance, are associated with higher cash holdings. In model 2, some of the control variables lose statistical significance. Interestingly, while cash flow is significant in both models, it has opposite signs.

When we instrument for IDB presence using IDB industry-density and IDB state-density in 2SLS framework, we find IDB presence to be endogenous. The results from the over-identification test and the F-test for the IVs in the first-stage regression mitigate the concern about weak IVs. After accounting for endogeneity, IDB presence significantly reduces the level of cash holdings by more than 2%. This amounts to a 15% decrease from the unconditional mean cash holdings of 14.60%.

We also estimate Heckman's two-stage treatment effect (model 4) and MLE treatment effect (model 5) models to account for possible selection bias. Model 4 shows that the inverse Mills ratio is significantly positive, consistent with endogenous selection of IDB presence. Similarly, in model 5, the LR test for rho is highly significant, indicating selection bias. In both models 4 and 5, IDB presence reduces the level of cash holdings by 1.75% and 2.77%, respectively. Hence, after accounting for potential endogeneity of IDB presence, results are consistent with the idea that IDB presence mitigates agency problems by reducing excess cash holdings.

### *4.2 IDB presence and the levels of dividends and payout*

We next examine the relation between IDB presence and four measures of firms' payout (dividend yield, dividend dummy, repurchases and total payout) in regression frameworks, after controlling for other determinants of payout policies. Young growth firms are less prone to pay out cash (see, e.g., Grullon and Michaely (2002), Fama and French (2002) and Grullon et al. (2011)). Hence, we control for firm age, size, sales growth, and future growth options via Tobin's q and R&D expenditures. Among firms that pay out cash, riskier firms use repurchases whereas safer firms use dividends (e.g., Jagannathan, Stephens and Weisbach (2000), Guay and Harford (2000), and Grullon and Michaely (2002)); we use a firm's cash flow volatility to control for this effect. Following the prior literature, we also control for stock return volatility as an additional measure of risk (see, e.g., Grullon and Michaely (2007) and Grullon et al. (2011)). John and Knyazeva (2008) find that dividends are preferred over repurchases when agency problems are severe. Hence, in addition to IDB presence, we control for firms' governance via the G-index, institutional ownership, board size, the fraction of independent directors, insider ownership, and proportion of the top management's pay that is option based. We also control for firms' financial leverage and profitability. Finally, the regressions include year dummies and Fama and French 12 industry dummies.

Panel A of Table 6 reports the results of regressions of dividend yield and dividend dummy. Since about 50% of the firm-years in our sample have no dividends, we use the Tobit regression model to regress dividend yield and the probit regression model to regress the dividend dummy on IDB and other covariates. We find the coefficient estimate of IDB to be significantly negative in the Tobit regression but insignificant in the probit regression. While IDB presence is unrelated to a firm's decision on whether to pay dividends, it is negatively related to dividend yield. The latter finding is consistent with La Porta et al.'s (2000) 'substitute model' of dividends. The idea that the monitoring effect of IDB presence substitutes for higher dividends is bolstered by the fact that G-index has significant positive coefficients in both the probit and Tobit models, which suggests that firms with lower shareholder rights use dividends as a substitute governance mechanism.

The magnitude of the decrease in dividend yield in IDB presence is non-trivial. A coefficient of -0.154 represents a 17% reduction compared to the unconditional mean dividend yield of 0.898%. This result, however, does not account for the potential endogeneity of IDB presence in the context of dividend yield. So we estimate Smith-Blundell regressions, where the potentially endogenous IDB variable is instrumented by IDB state-density and IDB industry-density. However, based on the p-value of the residual term, we conclude that IDB presence is not endogenous. Similarly, the p-value of the residual term in the Rivers-Vuong method indicates that IDB presence is not endogenous.

We next examine the relation between IDB presence and the levels of repurchases and total payout. Similar to dividend yield, both of these variables contain a disproportionate mass at zero. Hence, we use Tobit regressions. Panel B of Table 6 reports these results. We find that IDB presence reduces both repurchases and total payout significantly. When we account for the potential endogeneity of IDB presence using Smith-Blundell regressions (unreported), we find that IDB presence is endogenous in both repurchases and total payout regressions. The p-values of the residual terms are 0.032 and 0.040, respectively, in repurchases and total payout regressions. Hence, we estimate IV-Tobit regressions and find the results are even stronger in IV-Tobit regressions than in Tobit regressions.

Overall, the results in Table 6 suggest that in addition to IDB presence being a 'substitute' for higher dividends as a governance mechanism, it is also negatively related to the level of repurchases. When we include the lagged dependent variable as an additional regressor in all the regressions (unreported), the results on IDB presence remain qualitatively unchanged. The results on the remaining covariates are mostly consistent with the prior literature. Larger, older, low growth and low risk firms are more likely to pay dividends and to have larger payouts. Firms with lower cash flow volatility, lower shareholder rights, lower option-based pay and larger board size have higher dividend yields but lower repurchases. Firms with a higher fraction of independent directors and lower institutional ownership have larger payouts. All of these results are statistically significant.

### *4.3 IDB presence and the levels of investment expenditures*

In this section, we examine the relation between IDB presence and a firm's investment policies using several regression-based methodologies. Specifically, we examine capital expenditures, R&D expenditures, and investment expenditures as the sum of capital and R&D expenditures. The regressions control for other determinants of investment expenditures. First, a firm incurs capital and R&D expenditures to exploit its future growth opportunities but is constrained by its funding limitations (see, e.g., Fazzari, Hubbard and Petersen (1988) and Hubbard (1998)). Hence, we need to control for a firm's growth prospects and financial or liquidity constraints. We use lagged Tobin's q to control for a firm's growth opportunities; we control for firm size, cash flow, cash holdings and leverage to account for funding availability. Second, following prior literature, we control for firm profitability via lagged ROA and stock returns (see, e.g., Coles, Daniel and Naveen (2006)). We control for other internal and external governance mechanisms via board structure (board size and fraction of the independent directors), institutional ownership, proportion of the top management pay that is option-based, and G-index. Finally, we include year dummies and Fama and French 12 industry dummies.

Panels A and C of Table 7 report regressions of capital expenditures and investment expenditures on IDB and other covariates. In OLS regressions, both capital expenditures and investment expenditures are unrelated to IDB presence. To account for potential endogeneity, we instrument IDB presence with IDB state-density and IDB industry-density using 2SLS regressions. Tests of exogeneity indicate that IDB presence is endogenous in both capital expenditures and investment expenditures regressions. In addition, we find that over-identification restrictions hold, and the F-statistics for the joint significance of the IVs in the first-stage regressions are quite large; both results imply that the IVs are not weak. After accounting for endogeneity, we find that both capital expenditures and investment expenditures are positively and significantly related to IDB presence. IDB presence increases the levels of capital expenditures and investment expenditures by 62% and 39% from their respective unconditional mean levels.

We next use treatment effects models to account for the possible selection bias introduced by IDB presence in a firm. First, we employ Heckman's treatment effects model. Identification in this model is achieved via exclusion restrictions. In both capital and investment expenditures regressions, the estimated coefficients of the inverse Mills ratios are negative and significant. This result indicates that self-selection is important here. That is, characteristics that cause an IDB to be present in a firm-year are negatively related to investment expenditures. The coefficients of IDB in both regressions are significantly positive. This is similar to 2SLS results, except that the coefficient of investment expenditures regression is slightly smaller. Next, we use joint estimation of the selection and main equations using MLE. LR tests find that the correlation between the error terms of the two equations is statistically significant. This result also suggests the presence of selection bias. The effects of IDB presence in both regressions are qualitatively similar to the effects in 2SLS regressions, but their magnitudes are substantially larger in the MLE treatment effects models.

As a whole, these findings suggest that IDBs self-select into firms where there is relative underinvestment and that their presence in the firms increases capital expenditures and investment. However, an important and strategic component of firms' investment is R&D expenditures. We next examine whether IDB presence is related to firms' R&D expenditures.

Panel B of Table 7 reports regression results of R&D expenditures on IDB and other covariates. Because significant numbers of firm incur zero R&D expenditures, we use the Tobit regression model in column (1). We find that IDB presence is unrelated to R&D expenditures. To account for the potential endogeneity of IDB presence in a firm, we instrument for IDB presence with IDB state-density and IDB industry density in a Smith-Blundell framework. However, the p-value of the residual term indicates that IDB presence is not endogenous here. These results imply that IDBs have no significant impact on the level of a firm's R&D spending.

The results on other covariates in the regressions are also interesting. While firm size measured as sales is negatively related to the levels of all three of our measures of investment spending, the proportion of option-based pay for top executives is positively related to them. Firms with lower debt level, higher Tobin's q, lower return on assets and lower insider ownership have higher levels of R&D and investment expenditures. Higher cash flows and higher stock returns are associated with higher levels of capital and investment expenditures but with lower levels of R&D expenditures. More shareholder rights, measured inversely with the G-index, are associated with higher levels of capital and investment expenditures; a higher fraction of independent director is associated with higher R&D expenditures. In unreported regressions, when we include the lagged dependent variable as an additional regressor, the results on IDB presence remain qualitatively unchanged.

### *4.4 IDB presence and the level of financial leverage*

In Table 8, we examine the relation between IDB presence and a firm's financial leverage in regression frameworks. The regressions control for following variables. First, Stulz (1990) argues that debt level is determined as a trade-off between the need for financial flexibility and the need to prevent the waste of free cash flow. Hence, we include cash holdings, firm size, physical-to-total assets (PPE), and R&D expenditures as covariates (see, e.g., Parsons and Titman (2008) for a discussion of the relevance of these variables to financial leverage). Second, firms with more volatile cash flows, which are exposed to a higher probability of bankruptcy for any given level of debt, should choose less debt. We use cash flow volatility as a measure of firm risk. Third, Faulkender and Petersen (2006) find that firms with access to public bond markets tend to have higher debt levels. We use the presence of S&P bond ratings for a firm as a proxy for the firm's access to public bond markets. Fourth, in trade-off models of financial leverage, firms choose their leverage by balancing the tax advantage and the bankruptcy cost of debt (see, e.g., Titman and Wessels (1988), and MacKie-Mason (1990)).[18] Ceteris paribus, firms with higher risk of bankruptcy tend to choose lower levels of debt, while firms with higher tax benefits choose higher levels of debt. We measure a firm's bankruptcy risk using the Altman (1968) Z-score, as modified by MacKie-Mason (1990). We also control for a firm's internal and external governance via board structure (board size and the fraction of independent directors), institutional ownership, managers' option-based pay, and G-index. Finally, we include year and Fama and French 12 industry dummies.

We use the Tobit model to regress financial leverage on IDB and other covariates because about 12% of the firm-years in our sample have no debt. We find that IDB presence is unrelated to the level of financial leverage. The coefficients of the other explanatory variables are mostly consistent with prior studies and are generally statistically significant. To account for the potential endogeneity of IDB presence, we next estimate the Smith-Blundell regressions using IDB state-density and IDB industry-density as instruments. However, the p-value of the residual term indicates that IDB presence is not endogenous in this context. As an additional measure to account for possible omitted variables, we use lagged leverage as a covariate, but find no changes in our results on IDB presence (not tabulated). Overall, our findings suggest that IDBs take a 'hands off' approach when it comes to financial leverage.

## 5. IDB presence and the valuation of firm policy choices

In this section, we examine the market valuation of various policy choices of a firm in the presence of an IDB. To do this, we build on the framework developed by Faulkender and Wang (2006). Masulis, Wang and Xie (2009) use this methodology to examine how the excess control rights of dual class firms are

[18] Graham, Lemmon and Schallheim (1998) find a positive relationship between a firm's simulated the marginal tax rate before financing ($MTR_B$) and its debt levels. When $MTR_B$ is included as an explanatory variable (we thank Professor John Graham for providing us with this data), we find that it is unrelated to debt levels. Importantly, the inclusion of $MTR_B$ leaves our main results essentially unchanged. Since the inclusion of this variable causes a loss of one-third of our observations, we do not report them as our baseline results in the table.

related to the market valuation of firms' cash holdings or capital expenditures in separate regressions. We modify their model to examine the relation between IDB presence and the market valuation of five different policy choices in the same regression. Specifically, our main regression equation is specified as follows:

$$r_{i,t} - R_{i,t}^{B} = \alpha_0 + \alpha_1 \cdot IDB_{i,t} + \sum_{j=1}^{5} \beta_j \cdot IDB_{i,t} \cdot \frac{\Delta X_{j,i,t}}{Mktcap_{i,t-1}} + \sum_{j=1}^{5} \gamma_j \cdot \frac{\Delta X_{j,i,t}}{Mktcap_{i,t-1}} + \delta \cdot \frac{\mathbb{X}}{Mktcap_{i,t-1}} + \text{industry and year fixed-effects} + \varepsilon_{i,t} \quad (1)$$

The dependent variable is stock $i$'s excess return over the fiscal year, defined as its return over fiscal year $t$ minus the return on its benchmark portfolio, $R_{i,t}^{B}$, during fiscal year $t$. Following prior studies, we use the Fama and French (1993) size and book-to-market portfolio (5×5) return as the benchmark portfolio. We follow Faulkender and Wang's (2006) procedure to calculate $R_{i,t}^{B}$.

In equation (1), in addition to the IDB dummy variable, there are three sets of variables whose coefficients are represented by $\beta_j$, $\gamma_j$, and $\delta$. There are five variables associated with the coefficient vector $\gamma$; each of them represents the change in the variable from year $t$ -1 to $t$ and is scaled by lagged market capitalization. The variables are: 1) cash holdings, 2) dividends, 3) capital expenditures, 4) R&D expenditures, and 5) total debt. The variable set associated with the vector $\beta$ are the same five change variables associated with $\gamma_j$, but interacted with the IDB dummy variable. The vector $\mathbb{X}$ (associated with the coefficient vector $\delta$) represents the control variables: change in equity, change in interest expense, change in earnings, change in net asset, lagged cash holdings, and total debt, all scaled by lagged market capitalization. The regressions also control for year and Fama and French 12 industry dummies.

The main coefficients of interest are $\alpha_1$ and $\beta_j$. Since, the dependent variable measures excess return and all of the non-binary variables are scaled by lagged market capitalization, the coefficients $(\beta_j + \gamma_j)$ and $\gamma_j$ measure the dollar change in shareholder wealth for a one-dollar change in the policy variables for firms with and without IDB presence, respectively.

Panel A of Table 4 reports that mean (median) excess returns are 9.80% (1.36%) and 2.78% (-3.15%) for firms with and with an IDB, respectively; these differences are highly significant. Hence, univariate tests suggest that the market values IDB presence significantly. Panel B of Table 4 reports mean and median values of the covariates in equation (1) for IDB and non-IDB firm-years and tests for differences between them. Mean changes in dividends, capital expenditure and R&D expenditures are significantly higher in IDB firms than in non-IDB firms; but mean changes in cash holdings and debt are not statistically different. We next present regression-based evidence on how the market values IDB presence and the changes in policy choices in presence of an IDB.

Table 9 presents regression results based on several variants of equation (1). We begin with model 1, which is equation (1) except that it does not have the interaction terms. Using OLS estimation, we find that excess returns are 5% higher in IDB presence. The coefficient of IDB is statistically significant. The adjusted-$R^2$ of the regression is 0.106. The coefficient estimates of other covariates are consistent with prior studies. Excess returns are related positively to changes in cash holdings, dividends, capital expenditures, equity, earnings, and net assets; they are related negatively to changes in interest expenses. These results hold up in all the regression models.

To account for the potential endogeneity of IDB presence, we estimate 2SLS regressions using IDB state-density and IDB industry-density as instruments. Model 2 is same as model 1, except that it is estimated in 2SLS framework. In this regression, the over-identifying restriction holds, and F-statistics of joint significance of the IVs in the first-stage regressions are quite large; both results indicate that the IVs are not weak. But the test of exogeneity is insignificant, suggesting that IDB is not endogenous. This implies that the OLS estimate is preferable to 2SLS, because the former estimate is unbiased and more efficient.

Next, we employ Heckman's treatment effect model to account for possible selection bias. The identification of the model is mainly derived from exclusion criteria. Using the two-stage treatment effect model (model 3 in Table 9), we find that the estimated coefficient of inverse Mill's ratio is insignificant with a p-value of 0.938. This suggests that there is no selection bias. Model 4 in Table 9 jointly estimates the main equation and selection equation using MLE and yields a similar result; the LR test for the null hypothesis that the two error terms are uncorrelated cannot be rejected with a p-value of 0.944. Models 2, 3 and 4 suggest that IDB presence is neither endogenous nor suffers from selection bias vis-à-vis excess returns.

Model 5 is the same as equation (1) in OLS framework. Since we have sufficiently eliminated the possibility of endogeneity or selection bias of IDB presence in the context of excess returns, we can rely on OLS estimates. In Model 5, we find that excess return is 4.77% higher in IDB presence with a p-value of 0.003. Among all the interaction variables, only the interaction of changes in dividends with the IDB dummy is significant with a p-value of 0.03 and has a coefficient of -3.86. The coefficient of change in dividends is 3.59 and is significant at the 1% level. Together, these coefficients suggest that a one dollar decrease in dividends in the presence of IDB increases shareholder wealth by 27 cents. Together with our finding in section 3.2 of lower dividends in IDB presence, this finding supports the idea that shareholder wealth increases via dividend policy in IDB presence.

In Model 6, we keep the interaction of dividend changes and IDB dummy and drop other interaction terms. The coefficients in this model suggest that a one dollar decrease in dividends in IDB presence increases shareholder wealth by 24 cents, a result similar to model 5. In unreported regressions, we also examined each interactions variable in the absence of other interactions, with results similar to model 5.

## 6. IDB presence and firm risk

In this section we examine firm risk in the presence of an IDB. We use three measures of risk: total risk, systematic risk and unsystematic risk. We measure total risk as the variance of daily stock returns over the fiscal year and require at least two-third of the daily return observations be present. We then decompose total risk into systematic risk and unsystematic risk by using the market model and with the CRSP equal-weighted market portfolio as the proxy for the market portfolio. Unsystematic risk is measured as the variance of the residuals from the market model. Systematic risk equals total risk minus unsystematic risk. All risk measures are annualized and transformed using natural log.

Panel A of Table 4 presents means and medians for non-IDB and IDB firms and the corresponding univariate tests. IDB firms have significantly lower mean and median values of all three measures of risk than non-IDB firms. The Pearson product-moment correlations between the IDB dummy variable and total risk, systematic risk, and unsystematic risk are -0.06, -0.03, and -0.06, respectively, and all are highly significant. While univariate tests and correlations are consistent with the hypothesis that IDB presence reduces firm risk, they do not control for other determinants of risk and do not account for the potential endogeneity of IDB presence, a task we turn to next.

Panels A, B and C of Table 10 show coefficient estimates from regressions of total risk, systematic risk and unsystematic risk, respectively. Our main explanatory variable is IDB presence. We control for the other determinants of risk found to be important by prior studies (see, e.g., Anderson and Reeb (2003), Coles, Daniel and Naveen (2006), and Low (2009)). We use the natural log of total assets to control for firm size, lagged Tobin's q as a proxy for investment opportunities and lagged return on assets to control for profitability. Firm risk can be affected by the levels of financial leverage, capital expenditures and R&D expenditures; hence we include them as controls. Characteristics of managers' option-based compensation, in particular, the sensitivity of CEO wealth to stock volatility (vega) affects firm risk (Guay (1999)). Coles, Daniel and Naveen (2006) argue that the sensitivity of CEO wealth to stock price (delta) should also be used alongside vega in explaining firm risk. We use both delta and vega as controls. We measure delta as the dollar change in CEO wealth for a one percent change in stock price and scaled by the CEO's total compensation.[19] We measure vega as the dollar change in a CEO's option holdings for a one percent change in stock return volatility. In calculating both delta and vega, we follow the Core and Guay (2002) methodology. Firm risk is also affected by firm focus as measured by both the number of business segments and the Herfindahl index (for sales across segments); we control for these variables. Since a more entrenched management may take less risk, we control for governance characteristics, in addition to IDB, via G-index. We also include year and Fama and French 12 industry dummies.

First, we examine the results from OLS regressions. In Panel A, total risk is significantly negatively related to IDB presence. In firms with IDB, total risk is 5.35% [= $e^{-0.055} - 1$] lower than the total risk in non-IDB firms, after controlling for its other determinants. Panel B shows that IDB presence is unrelated to systematic risk. In Panel C, unsystematic risk is 4.97% [= $e^{-0.051} - 1$] lower in IDB firms than in non-IDB firms. Consistent with prior studies, all these risk-measures are significantly negatively related to firm size and the return on assets, and positively related to Tobin's q, R&D expenditures, Herfindahl index of segment sales, and vega. Leverage is negatively related to systematic risk and positively related to unsystematic risk. As expected, higher G-index is negatively related to all these types of risk. These relations continue to hold under other regression methodologies below.

Second, we employ an instrumental variables approach to account for the potential endogeneity of IDB presence using 2SLS regressions with IDB state-density and IDB industry-density as IVs. In 2SLS regressions, IDB presence is unrelated to all three measures of firm risk. Although the results of the over-identification test and the F-test for the IV in the first-stage suggest IVs are not weak, the tests for endogeneity do not find IDB to be endogenous in all these 2SLS regressions, suggesting that OLS is unbiased. Given that OLS is more efficient, OLS results are preferable to 2SLS.

Finally, we account for the possible selection bias in IDB presence using treatment effect models. We estimate Heckman's two-stage treatment effect models, where the first-stage probit regression is model 3 in Table 3. The inverse Mills ratio in the regression of each of the three risk measures is positive and significant at the 1% level, consistent with endogenous selection of IDB presence. Positive coefficient estimates of the inverse Mill's ratio imply that factors that induce IDBs to self-select into particular firm years are related to higher risk. The treatment effects of IDB imply that IDB presence significantly reduces total risk, systematic risk and unsystematic risk by about 29% [= $e^{-0.344} - 1$], 54% [= $e^{-0.766} - 1$]

[19] The literature on executive compensation measures delta either as the dollar change in CEO wealth for a dollar change in firm value as in Jensen and Murphy (1990) or the dollar change in CEO wealth for a percentage change in stock price as in Core and Guay (1999). But neither measure compares the size of this wealth change to the level of CEO wealth, which is what ultimately matters to the CEO (see, e.g., Agrawal and Mandelker (1987) and Edmans, Gabaix and Landier (2009)). Since CEO wealth is unobservable, we use the CEO's total compensation as a proxy that is likely to be correlated with his wealth.

and 22% [= $e^{-0.252}$ – 1], respectively. We also jointly estimate the treatment effect model using MLE. The LR test from these models also suggests endogenous selection of IDB presence in all three risk categories. Estimates from these treatment effect models suggest that IDB presence reduces total risk, systematic risk and unsystematic risk by about 58% [= $e^{-0.865}$ – 1], 82% [= $e^{-1.706}$ – 1] and 57% [= $e^{-0.840}$ – 1], respectively. The estimates of risk reduction due to IDB presence from treatment effects models are substantially larger than the estimates from OLS regressions. Overall, the evidence presented here suggests that IDB presence reduces risk.

## 7. Conclusion

The presence of an independent director who is a blockholder (IDB) can serve as a powerful control mechanism because an IDB has both a strong incentive and the ability to monitor managers. But an IDB can use his position and power to extract private benefits from the firm and may be more risk-averse than well-diversified shareholders. One way to examine the agency implications of IDB presence is to empirically examine whether and how IDB presence influences firms' financial and investment policies and risk-taking.

Although a large literature examines the relations between various governance mechanisms and agency problems manifested in corporate financial and investment policies, no prior study has examined the role of a large independent blockholder on the board in this context. We attempt to fill this gap in the literature by examining the relation between IDB presence and four key financial and investment policy choices of firms: the levels of cash holdings, payout, investment, and financial leverage. Next, using Faulkender and Wang's (2006) methodology, we examine whether agency problems are lower in IDB presence by examining the market valuation of the changes in each policy associated with IDB presence. Finally, we examine how risk-taking by a firm changes in IDB presence.

We analyze these issues using a panel containing about 9,100 firm-years of data. After controlling for other variables and accounting for the possible endogeneity of IDB presence in several ways, we find that firms with IDBs have significantly lower levels of cash holdings and payout (dividend yields, repurchases, and total payout), but higher levels of capital expenditures. IDB presence, however, is unrelated to the levels of a firm's financial leverage and R&D expenditures. Firms with IDBs have lower systematic, unsystematic, and total risk. Finally, the market appears to value a decrease in dividend yield in the presence of an IDB, and overall firm valuation is higher in IDB presence. About 75% of the IDBs in our sample are individual investors, who drive most of our results. Why the market values the changes in dividend policy, but not on cash holdings and investment levels, associated with IDB presence is an interesting question that we leave for future research.

Our results suggest that IDBs largely take a 'hands-off' approach for firms' financial leverage and R&D activities, but take an active role in reducing cash holdings and increasing capital expenditure and overall investment spending. Lower dividends in firms with IDB suggest that IDB presence is a substitute control mechanism to dividends, as evidenced by the higher market valuation of this IDB-induced dividend decrease. Our finding that levels of capital spending are higher in IDB presence suggests that IDBs reduce managers' preference for a 'quiet life', identified as the dominant agency problem by Bertrand and Mullainathan (2003) and Aggarwal and Samwick (2006). Overall, our findings suggest that IDBs play a valuable role in reallocating corporate resources and reducing agency costs.

**Reference**


Aggarwal, Rajesh K. and Andrew A. Samwick, 2006, Empire-builders and shirkers: Investment, firm performance, and managerial incentives, *Journal of Corporate Finance* 12, 489-515.

Agrawal, Anup, and Charles R. Knoeber, 1996, Firm performance and mechanisms to control agency problems between managers and shareholders, *Journal of Financial and Quantitative Analysis* 31, 377-397.

Agrawal, Anup, and Gershon N. Mandelker, 1987, Managerial incentives and corporate investment and financing decisions, *Journal of Finance* 42, 823-837.

Agrawal, Anup, and Tareque Nasser, 2011, Blockholders on boards and CEO compensation, turnover and firm valuation, Working Paper, University of Alabama.

Altman, Edward I., 1968, Financial ratios, discriminant analysis, and the prediction of corporate bankruptcy, *Journal of Finance* 23, 589-609.

Anderson, Ronald C., and David M. Reeb, 2003, Founding-family ownership, corporate diversification, and firm leverage, *Journal of Law and Economics*, 46, 653-684.

Angrist, Joshua D. and Jörn-Steffen Pischke, 2009, *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton University Press, Princeton, NJ.

Bailey, Warren, Alok Kumar, and David T. Ng, 2008, Foreign Investments of U.S. Individual Investors: Causes and Consequences, *Management Science* 54, 443-459.

Bates, Thomas W., Kathleen M. Kahle, and René M. Stulz, 2009, Why do U.S. firms hold so much more cash than they used to? *Journal of Finance*, 64, 1985-2021.

Becht, Marco, Patrick Bolton, and Alisa Röell, 2007, Corporate law and governance, in A. Mitchell Polinsky and Steven Shavell, eds.: *Handbook of Law and Economics, Volume 2*. (Elsevier B.V., Amsterdam).

Becker, Bo, Henrik Cronqvist, and Rüdiger Fahlenbrach, 2011, Estimating the effects of large shareholders using a geographic instrument, *Journal of Financial and Quantitative Analysis* 46, 907-942.

Berle, Adolph A., and Means, Gardiner C., 1932, *The Modern Corporation and Private Property*, (MacMillan, New York).

Bertrand, Marianne and Sendhil Mullainathan, 2001, Are CEOs rewarded for luck? The ones without principals are, *Quarterly Journal of Economics* 116, 901-932.

Bertrand, Marianne, and Sendhil Mullainathan, 2003, Enjoying the quiet life? Corporate governance and managerial preferences, *Journal of Political Economy* 111, 1043-1075.

Bertrand, Marianne, and Antoinette Schoar, 2003, Managing with style: The effects of managers on firm policies, *Quarterly Journal of Economics* 118, 1169-1208.

Bound, John, David A. Jaeger, and Regina M. Baker, 1995, Problems with instrumental variables estimation when the correlation between the instruments and the endogenous explanatory variable is weak, *Journal of the American Statistical Association* 90, 443-450.

Coles, Jeffery L, Naveen D. Daniel, and Lalitha Naveen, 2006, Managerial incentives and risk-taking, *Journal of Financial Economics*, 79, 431-468.

Core, John, Guay, Wayne, 1999, The use of equity grants to manage optimal equity incentive levels, *Journal of Accounting and Economics* 28,151-184.

Core, John, Guay, Wayne, 2002, Estimating the value of employee stock option portfolios and their sensitivities to price and volatility, *Journal of Accounting Research* 40, 613-630.

Cronqvist, Henrik, and Rüdiger Fahlenbrach, 2009, Large shareholders and corporate policies, *Review of Financial Studies* 22, 3941-3976.

Coval, Joshua D., and Tobias J. Moskowitz, 1999, Home bias at home: Local equity preference in domestic portfolios, *Journal of Finance* 54, 2045-2073.

Cyert, Richard M., Sok-Hyon Kang and Praveen Kumar, 2002, Corporate governance, takeovers, and top-management compensation: Theory and evidence, *Management Science* 48, 453-469.

DeAngelo, Harry and Linda DeAngelo, 1985, Managerial ownership of voting rights: A study of public corporations with dual classes of common stock, *Journal of Financial Economics* 14, 33-69.

Dittmar, Amy, and Jan Mahrt-Smith, 2007, Corporate governance and the value of cash holdings, *Journal of Financial Economics* 83, 599-634.

Easterbrook, Frank H., 1984, Two agency-cost explanation of dividends, *American Economic Review* 74, 650-659.

Edmans, Alex, Xavier Gabaix, and Augustine Landier, 2009, A multiplicative model of optimal CEO incentives in market equilibrium, *Review of Financial Studies*, 22, 4881-4917.

Faccio, Mara, Maria-Teresa Marchica, and Roberto Mura, 2011, Large shareholder diversification and corporate risk-taking, *Review of Financial Studies* 24, 3601-3641.

Fama, Eugene F., and Kenneth R. French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics*, 33, 3-56.

Fama, Eugene F., and Kenneth R. French, 1997, Industry costs of equity, Journal *of Financial Economics* 43, 153-193.

Fama, Eugene F., and Kenneth R. French, 2002, Testing tradeoff and pecking order predictions about dividends and debt, *Review of Financial Studies* 15, 1-33.

Faulkender, Michael, and Mitchell A. Petersen, 2006, Does the source of capital affect capital structure? *Review of Financial Studies*, 19, 45-79.

Faulkender, Michael, and Rong Wang, 2006, Corporate financial policy and the value of cash, *Journal of Finance* 61, 1957-1990.

Fazzari, Steven M., R. Glenn Hubbard, and Bruce C. Petersen, 1988, Financing constraints and corporate investment, *Brookings Papers on Economic Activity*, 1988, 141-195.

Gompers, Paul A., Joy Ishii, and Andrew Metrick, 2003, Corporate governance and equity prices, *Quarterly Journal of Economics* 118, 107-55.

Graham, John R., Michael L. Lemmon, and James S. Schallheim, 1998, Debt, leases, taxes and the endogeneity of corporate tax status, *Journal of Finance*, 53, 131-162.

Grullon, Gustavo, and Roni Michaely, 2002, Dividends, share repurchases, and the substitution hypothesis, *Journal of Finance* 57, 1649-1684.

Grullon, Gustavo, and Roni Michaely, 2007, Corporate payout policy and product market competition, Working Paper, http://ssrn.com/abstract=972221.

Grullon, Gustavo, Bradley Paye, Shane Underwood, and James P. Weston, 2011, Has the propensity to pay out declined? *Journal of Financial and Quantitative Analysis* 46, 1-24.

Guay, Wayne R., 1999, The sensitivity of CEO wealth to equity risk: an analysis of the magnitude and determinants, *Journal of Financial Economics* 53, 43-71.

Guay, Wayne, and Jarrad Harford, 2000, The cash-flow permanence and information content of dividend increases versus repurchases, *Journal of Financial Economics* 57, 385-415.

Harford, Jarrad, Sattar A. Mansi, and William F. Maxwell, 2008, Corporate governance and firm cash holdings in the US, *Journal of Financial Economics* 87, 535-555.

Heckman, James J., 1979, Sample selection bias as a specification error, *Econometrica* 47, 153-161.

Henderson, Angelo B. and Gabriella Stern, 1996, Chrysler corp., Kerkorian reach a five-year truce agreement—accord gives investor board representation, bars takeover moves, *Wall Street Journal*, February 9, A3.

Holderness, Clifford G., 2003, A survey of blockholders and corporate control, *Federal Reserve Bank of New York Economic Policy Review* 9, 51-64.

Hubbard, R. Glenn, 1998, Capital-market imperfections and investment, *Journal of Economic Literature*, 36, 193-225.

Huddart, Steven, 1993, The effect of a large shareholder on corporate value, *Management Science*, 39, 1407, 1421.

Jagannathan, Murali, Clifford P. Stephens, and Michael S. Weisbach, 2000, Financial flexibility and the choice between dividends and stock repurchases, *Journal of Financial Economics* 57, 355-384.

Jensen, Michael C., and William H. Meckling, 1976, Theory of the firm: Managerial behavior, agency costs and ownership structure, *Journal of Financial Economics* 3, 305-360.

Jensen, Michael, 1986, Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* 76, 323-329.

Jensen, Michael C., and Kevin J. Murphy, 1990, Performance pay and top-management incentives, *The Journal of Political Economy*, 98, 225-264.

John, Kose and Anzhela Knyazeva, 2008, Corporate governance and payout commitments, Working Paper, http://ssrn.com/abstract=1101062.

La Porta, Rafael, Florencio Lopez-De Silanes, Andrei Shleifer, and Robert W. Vishny, 2000, Agency problems and dividend policy around the world, *Journal of Finance* 55, 1-33.

Lerner, Joshua, 1995, Venture capitalists and the oversight of private firms, *Journal of Finance* 50, 301-318.

Low, Angie, 2009, Managerial risk-taking behavior and equity-based compensation, *Journal of Financial Economics*, 92, 470-490.

Mackie-Mason, Jeffery K., 1990, Do taxes affect corporate financing decisions? *Journal of Finance* 45, 1471-1493.

Masulis, Ronald W., Cong Wang, and Fei Xie, 2009, Agency problems at dual-class companies, *Journal of Finance*, 54, 1697-1727.

Morck, Randall, 2008, Behavioral finance in corporate governance: economics and ethics of the devil's advocate, *Journal of Management and Governance* 12, 179-200.

Opler, Tim, Lee Pinkowitz, René Stulz, Rohan Williamson, 1999. The determinants and implications of corporate cash holdings, *Journal of Financial Economics* 52, 3-46.

Parsons, Christopher, and Sheridan Titman, 2008, Empirical capital structure: A review, *Foundations and Trends in Finance* 3, 1-93.

Pierre, Norbert, 2012, The effect of an independent blockholder on the board of directors, Working Paper, http://ssrn.com/abstract=2130785.

Rivers, Douglas, and Quang H. Vuong, Limited information estimators and exogeneity tests for simultaneous probit models, *Journal of Econometrics* 39, 347-366.

Shleifer, Andrei, and Robert W. Vishny, 1986, Large shareholders and corporate control, *Journal of Political Economy* 94, 461-488.

Shleifer, Andrei, and Robert W. Vishny, 1997, A survey of corporate governance, *Journal of Finance* 52, 737-783.

Siklos, Richard, and Andrew R. Sorkin, 2006, Time Warner and Icahn reach settlement, *New York Times*, February 18, C1.

Slovin, Myron B. and Marie E. Sushka, 1993, Ownership concentration, corporate control activity, and firm value: Evidence from the death of inside blockholders, *Journal of Finance* 48, 1293-1321.

Smith, Richard J., Richard W. Blundell, 1986, An exogeneity test for a simultaneous equation tobit model with an application to labor supply, *Econometrica* 54, 679-685.

Staiger, Douglas, and James H. Stock, 1997, Instrumental variables regression with weak instruments, *Econometrica* 65, 557-586.

Stulz, René M., 1990, Managerial discretion and optimal financing policies, *Journal of Financial Economics* 26, 3-27.

Titman, Sheridan, and Roberto Wessels, 1988, The determinants of capital structure choice, *Journal of Finance*, 43, 1-19.

Wooldridge, Jeffery M., 2002, *Econometric Analysis of Cross Section and Panel Data*, MIT Press, Cambridge, MA.

**Table 1: IDB Presence and Corporate Policies**

This table summarizes the predictions of competing agency explanations regarding an IDB's effect on corporate policy choices, assuming that IDB presence reduces agency problems.

| Policy | Theory | Prediction on IDB's effect on the policy |
|---|---|---|
| Cash holdings | Free cash flow (Jensen, 1986) | ↓ |
| | Corporate control (Harford, Mansi and Maxwell, 2008) | ↑ |
| | Efficient contracting | - |
| Investments | Empire building (Jensen, 1986; Stulz, 1990) | ↓ |
| | Quiet life (Bertrand and Mullainathan, 2003) | ↑ |
| | Efficient contracting | - |
| Dividends | Substitute mechanism | ↓ |
| | Complementary mechanism | ↑ |
| | Efficient contracting | - |
| Leverage | Substitute mechanism | ↓ |
| | Complementary mechanism | ↑ |
| | Efficient contracting | - |

## Table 2: Sample Construction

This table shows the steps in obtaining the base sample for our analysis from S&P 1500 firms for the period 1998-2006.

| Number of firm-year in the sample<br>*Reason for dropping firm-years from the sample* | Number of firm-years dropped | Number of firm-years remaining |
|---|---|---|
| Firm-years available in RM Directors during calendar years 1997-2006 | | 15,967 |
| *Firm-years missing in CRSP* | 0 | |
| | | 15,967 |
| *Firm-years missing in Compustat* | 490 | |
| | | 15,477 |
| *After conversion to fiscal year, number of firms-years that belongs to fiscal year 2007* | 83 | |
| | | 15,394 |
| *Firm-years missing in ExecuComp* | 1,465 | |
| | | 13,929 |
| *Exclude dual-class firms based on RM Governance* | 1,158 | |
| *Exclude additional dual-class firms based on CRSP data* | 65 | |
| | | 12,706 |
| *Exclude fiscal year 1997* | 1,159 | |
| | | 11,547 |
| *Exclude finance and utility firms* | 2,440 | |
| Number of firm-years in the final sample | | 9,107 |

## Table 3: Determinants of IDB

Panel A shows univariate comparisons of mean and median values of some explanatory variables of IDB, followed by t-statistics for differences in means and z-statistics of the Wilcoxon test for differences in distributions, between non-IDB and IDB firms. Statistical significance at the 1%, 5%, and 10% levels in two-tailed tests is indicated by ***, **, and *, respectively. The last four columns report the Pearson product-moment correlation and Spearman rank correlation, and their p-values in two-tailed tests, between IDB and each variable. The sample consists of non-dual class S&P 1500 firms, except finance and utility firms, during the period 1998-2006 with relevant non-missing data. IDB state-density is computed as the average value of the IDB dummy for all public companies headquartered in a state in fiscal year *t*-1. IDB industry-density is computed as the average value of the IDB dummy for each of the 48 Fama and French (1997) industries in fiscal year *t*-1. Panel B of the table shows estimates of the linear probability model, logit and probit regressions of IDB. IDB is a binary variable that equals one if there is at least one IDB in a given firm-year; it equals zero otherwise. The regressions include year dummies, Fama-French 12 industry dummies and an intercept term. P-values of the regression coefficients are computed using robust standard errors clustered at the CEO-firm level. All other variables are defined in Appendix Table A.2. To reduce the influence of outliers, some variables, indicated in Appendix Table A.2, are winsorized at the top and bottom 0.5% of the sample.

Panel A: Univariate tests and correlations

| | Non-IDB firm-years | | | | IDB firm-years | | | | t-test | z-value | Pearson's correlation | | Spearman's correlation | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | S.D. | Median | N | Mean | S.D. | Median | | | ρ | p-value | ρ | p-value |
| CEO is chairman (1/0) | 7,878 | 0.630 | | | 1,229 | 0.565 | | | 4.393*** | | -0.046 | 0.000 | | |
| CEO on nomination comm. (1/0) | 7,796 | 0.307 | | | 1,229 | 0.318 | | | -0.779 | | 0.008 | 0.436 | | |
| Outside CEO-directors | 7,878 | 0.143 | 0.132 | 0.125 | 1,229 | 0.136 | 0.119 | 0.125 | 1.791* | 1.130 | -0.019 | 0.073 | -0.012 | 0.259 |
| Board size | 7,878 | 8.78 | 2.37 | 9 | 1,229 | 9.88 | 2.55 | 10 | -15.009*** | -14.546*** | 0.155 | 0.000 | 0.153 | 0.000 |
| Fraction of independent directors | 7,878 | 0.664 | 0.173 | 0.670 | 1,229 | 0.664 | 0.163 | 0.670 | 0.039 | 0.775 | 0.000 | 0.968 | -0.008 | 0.439 |
| Classified board (1/0) | 7,392 | 0.618 | | | 1,117 | 0.556 | | | 3.972*** | | -0.043 | 0.000 | | |
| Net E-index | 7,392 | 1.696 | 0.997 | 2 | 1,117 | 1.499 | 1.090 | 2 | 6.084*** | 6.007*** | -0.066 | 0.000 | -0.065 | 0.000 |
| Firm age | 7,878 | 27.16 | 20.08 | 20 | 1,229 | 28.28 | 19.85 | 22 | -1.830* | -2.534** | 0.019 | 0.067 | 0.027 | 0.011 |
| Market capitalization$_{t-1}$(\$ mill.) | 7,866 | 7,117 | 22,457 | 1,430 | 1,228 | 16,011 | 36,141 | 3,242 | -11.713*** | -16.853*** | 0.122 | 0.000 | 0.177 | 0.000 |
| Cash holdings$_{t-1}$ | 7,875 | 14.761 | 17.636 | 6.960 | 1,229 | 13.381 | 17.518 | 5.630 | 2.553** | 3.928*** | -0.027 | 0.011 | -0.041 | 0.000 |
| Dividend yield$_{t-1}$ | 7,866 | 0.867 | 1.327 | 0 | 1,228 | 0.912 | 1.315 | 0.227 | -1.111 | -2.567*** | 0.012 | 0.267 | 0.027 | 0.010 |
| OPS$_{t-1}$ | 7,851 | 14.441 | 17.412 | 13.490 | 1,221 | 18.249 | 18.505 | 17.840 | -7.048*** | -10.903*** | 0.074 | 0.000 | 0.115 | 0.000 |
| R&D expenditures$_{t-1}$ | 7,876 | 3.475 | 5.649 | 0.470 | 1,229 | 2.927 | 5.172 | 0.170 | 3.198*** | 2.743*** | -0.034 | 0.001 | -0.029 | 0.006 |
| Sales growth | 7,857 | 13.025 | 16.464 | 9.676 | 1,223 | 17.715 | 20.966 | 12.802 | -8.901*** | -7.322*** | 0.093 | 0.000 | 0.077 | 0.000 |
| Tobin's q$_{t-1}$ | 7,863 | 2.194 | 1.701 | 1.654 | 1,228 | 2.718 | 2.291 | 1.937 | -9.527*** | -9.205*** | 0.099 | 0.000 | 0.097 | 0.000 |
| Stock return voaltility$_{t-1}$ | 7,771 | 3.007 | 1.335 | 2.709 | 1,210 | 2.760 | 1.226 | 2.475 | 6.047*** | 6.291*** | -0.064 | 0.000 | -0.067 | 0.000 |
| Institutional ownership$_{t-1}$ | 7,878 | 0.617 | 0.265 | 0.680 | 1,229 | 0.560 | 0.262 | 0.607 | 7.012*** | 8.495*** | -0.073 | 0.000 | -0.089 | 0.000 |
| IDB state-density $_{t-1}$ | 7,877 | 0.137 | 0.073 | 0.130 | 1,229 | 0.167 | 0.088 | 0.156 | -12.959*** | -11.631*** | 0.135 | 0.000 | 0.122 | 0.000 |
| IDB industry density $_{t-1}$ | 7,877 | 0.127 | 0.075 | 0.117 | 1,229 | 0.162 | 0.112 | 0.135 | -14.068*** | -11.456*** | 0.146 | 0.000 | 0.120 | 0.000 |

**Table 3 (cont.)**

| Panel B: Regressions | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | |
| | OLS | | Logit | | Probit | | Probit | |
| | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value |
| CEO is chairman (1/0) | -0.0473 | 0.000 | -0.435 | 0.000 | -0.229 | 0.000 | -0.226 | 0.000 |
| CEO on nominating committee (1/0) | 0.0186 | 0.170 | 0.223 | 0.100 | 0.120 | 0.091 | 0.131 | 0.065 |
| Outside CEO-directors | -0.1213 | 0.003 | -1.333 | 0.002 | -0.680 | 0.003 | -0.662 | 0.004 |
| Fraction of independent directors | 0.0910 | 0.007 | 0.926 | 0.007 | 0.452 | 0.013 | 0.402 | 0.026 |
| Board size | 0.0177 | 0.000 | 0.150 | 0.000 | 0.084 | 0.000 | 0.084 | 0.000 |
| Classified board (1/0) | -0.0268 | 0.042 | -0.253 | 0.046 | -0.139 | 0.037 | -0.128 | 0.053 |
| Net E-index | -0.0079 | 0.257 | -0.053 | 0.415 | -0.031 | 0.358 | -0.031 | 0.361 |
| Firm age | -0.0011 | 0.004 | -0.010 | 0.007 | -0.005 | 0.009 | -0.006 | 0.004 |
| Log market capitalization$_{t-1}$ | 0.0265 | 0.000 | 0.237 | 0.000 | 0.127 | 0.000 | 0.133 | 0.000 |
| Cash holdings$_{t-1}$ | -0.0004 | 0.268 | -0.005 | 0.249 | -0.003 | 0.189 | | |
| Dividend yield$_{t-1}$ | 0.0002 | 0.667 | 0.003 | 0.557 | 0.001 | 0.674 | | |
| OPS$_{t-1}$ | -0.0030 | 0.510 | -0.052 | 0.300 | -0.026 | 0.315 | | |
| R&D expenditures$_{t-1}$ | -0.0003 | 0.766 | -0.005 | 0.717 | -0.002 | 0.760 | | |
| Tobin's $q_{t-1}$ | 0.0107 | 0.020 | 0.074 | 0.026 | 0.046 | 0.014 | 0.037 | 0.038 |
| Sales growth | 0.0015 | 0.000 | 0.014 | 0.000 | 0.008 | 0.000 | 0.008 | 0.000 |
| Stock return volatility$_{t-1}$ | -0.0140 | 0.010 | -0.168 | 0.009 | -0.090 | 0.007 | -0.100 | 0.002 |
| Institutional ownership $_{t-1}$ | -0.0947 | 0.000 | -0.787 | 0.000 | -0.439 | 0.000 | -0.430 | 0.000 |
| IDB state-density $_{t-1}$ | 0.5058 | 0.000 | 4.245 | 0.000 | 2.316 | 0.000 | 2.298 | 0.000 |
| IDB industry density $_{t-1}$ | 0.4619 | 0.000 | 3.025 | 0.000 | 1.733 | 0.000 | 1.777 | 0.000 |
| N | 8,300 | | 8,300 | | 8,300 | | 8,330 | |
| Adjusted $R^2$ /Pseudo $R^2$ | 0.103 | | 0.128 | | 0.129 | | 0.127 | |

## Table 4: Univariate tests and correlations

Panel A (B) shows univariate comparisons of mean and median values of dependent (independent) variables, followed by t-statistics for differences in means and z-statistics of the Wilcoxon test for differences in distributions, between non-IDB and IDB firms. Statistical significance at the 1%, 5%, and 10% levels in two-tailed tests is indicated by ***, **, and *, respectively. The last four columns report the Pearson product-moment correlation and Spearman rank correlation, and their p-values in two-tailed tests, between IDB and each variable. The sample consists of non-dual class S&P 1500 firms, except finance and utility firms, during the period 1998-2006 with relevant non-missing data. All variables are defined in Appendix Table A.2, which also indicates the variables winsorized at the top and bottom 0.5% of the sample.

| | Non-IDB firm-years | | | | IDB firm-years | | | | t-test | z-value | Pearson's correlation | | Spearman's correlation | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | S.D. | Median | N | Mean | S.D. | Median | | | ρ | p-value | ρ | p-value |
| **Panel A: Dependent variables** | | | | | | | | | | | | | | |
| Cash holdings$_t$ | 7,874 | 14.869 | 17.390 | 7.347 | 1,229 | 12.906 | 16.185 | 5.960 | 3.697 *** | 3.948 *** | -0.039 | 0.000 | -0.042 | 0.000 |
| Dividend yield$_t$ | 7,868 | 0.892 | 1.389 | 0 | 1,229 | 0.931 | 1.347 | 0.261 | -0.919 | -2.784 *** | 0.010 | 0.358 | 0.029 | 0.005 |
| Dividend dummy$_t$ (1/0) | 7,877 | 0.489 | | | 1,229 | 0.548 | | | -3.868 *** | | 0.041 | 0.000 | | |
| Repurchases$_t$ | 7,868 | 2.201 | 4.124 | 0.270 | 1,229 | 1.949 | 3.570 | 0.316 | 2.028 ** | 0.167 | -0.021 | 0.043 | -0.002 | 0.867 |
| Total payout$_t$ | 7,868 | 3.124 | 4.535 | 1.717 | 1,229 | 2.917 | 4.044 | 1.696 | 1.512 | -0.548 | -0.016 | 0.131 | 0.006 | 0.584 |
| Capital expenditures$_t$ | 7,877 | 5.688 | 5.120 | 4.150 | 1,229 | 6.062 | 5.535 | 4.330 | -2.358 ** | -2.173 ** | 0.025 | 0.018 | 0.023 | 0.030 |
| R&D expenditures$_t$ | 7,877 | 3.443 | 5.567 | 0.470 | 1,229 | 2.840 | 4.883 | 0.200 | 3.585 *** | 2.734 *** | -0.038 | 0.000 | -0.029 | 0.006 |
| Investment expenditures$_t$ | 7,877 | 9.169 | 7.166 | 7.300 | 1,229 | 8.938 | 7.109 | 6.890 | 1.053 | 1.522 | -0.011 | 0.292 | -0.016 | 0.128 |
| Leverage$_t$ | 7,877 | 21.925 | 17.604 | 21.400 | 1,229 | 23.243 | 18.008 | 21.920 | -2.433 ** | -2.396 ** | 0.026 | 0.015 | 0.025 | 0.017 |
| Total risk$_t$ | 7,872 | -7.222 | 0.867 | -7.277 | 1,228 | -7.378 | 0.847 | -7.419 | 5.854 *** | 5.543 *** | -0.061 | 0.000 | -0.058 | 0.000 |
| Systematic risk$_t$ | 7,872 | -9.339 | 1.340 | -9.276 | 1,228 | -9.461 | 1.276 | -9.414 | 2.966 *** | 3.800 *** | -0.031 | 0.003 | -0.040 | 0.000 |
| Unsystematic risk$_t$ | 7,872 | -7.418 | 0.889 | -7.468 | 1,228 | -7.578 | 0.867 | -7.618 | 5.855 *** | 5.495 *** | -0.061 | 0.000 | -0.058 | 0.000 |
| Excess return$_t$ | 7,818 | 2.782 | 55.930 | -3.146 | 1,219 | 9.801 | 56.992 | 1.363 | -4.065 *** | -4.528 *** | 0.043 | 0.000 | 0.048 | 0.000 |
| **Panel B: Independent variables** | | | | | | | | | | | | | | |
| Market capitalization$_t$ ($ mill.) | 7,868 | 7,352 | 23,231 | 1,464 | 1,229 | 16,900 | 37,171 | 3,616 | -12.179 *** | -18.699 *** | 0.127 | 0.000 | 0.195 | 0.000 |
| Total asset$_t$ ($ mill.) | 7,877 | 5,184 | 12,924 | 1,316 | 1,229 | 8,668 | 14,848 | 2,636 | -8.605 *** | -14.734 *** | 0.090 | 0.000 | 0.154 | 0.000 |
| Sales$_t$ ($ mill.) | 7,876 | 4,968 | 11,429 | 1,374 | 1,229 | 7,672 | 13,676 | 2,367 | -7.500 *** | -11.443 *** | 0.078 | 0.000 | 0.120 | 0.000 |
| PPE$_t$ | 7,859 | 28.639 | 21.570 | 22.57 | 1,229 | 30.695 | 22.606 | 25.745 | -3.087 *** | -2.972 *** | 0.032 | 0.002 | 0.031 | 0.003 |
| NWC$_t$ | 7,875 | 7.379 | 14.479 | 6.590 | 1,229 | 5.668 | 14.143 | 3.667 | 3.863 *** | 4.851 *** | -0.041 | 0.000 | -0.051 | 0.000 |
| Acquisition$_t$ | 7,877 | 2.895 | 6.311 | 0 | 1,229 | 2.872 | 6.170 | 0.122 | 0.121 | -1.386 | -0.001 | 0.904 | 0.015 | 0.166 |
| Cash flow$_t$ | 7,859 | 8.390 | 8.185 | 8.668 | 1,224 | 9.182 | 8.119 | 9.044 | -3.153 *** | -3.304 *** | 0.033 | 0.002 | 0.035 | 0.001 |
| Cash flow volatility | 7,878 | 5.047 | 6.004 | 3.132 | 1,224 | 4.883 | 6.505 | 2.937 | 0.880 | 4.001 *** | -0.009 | 0.379 | -0.042 | 0.000 |
| Loss indicator (1/0) | 7,875 | 0.198 | | | 1,229 | 0.142 | | | 4.694 *** | | -0.049 | 0.000 | | |
| Bond rating (1/0) | 7,878 | 0.510 | | | 1,229 | 0.613 | | | -6.743 *** | | 0.071 | 0.000 | | |

# Table 4 (cont.)

Panel B: Independent variables (cont.)

| | Non-IDB firm-years | | | | IDB firm-years | | | | t-test | z-value | Pearson's correlation | | Spearman's correlation | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | S.D. | Median | N | Mean | S.D. | Median | | | ρ | p-value | ρ | p-value |
| $ROA_{t-1}$ | 7,876 | 4.036 | 11.068 | 5.255 | 1,229 | 5.429 | 10.097 | 5.710 | -4.152 *** | -4.403 *** | 0.044 | 0.000 | 0.046 | 0.000 |
| Stock $return_{t-1}$ ($\times10^4$) | 7,768 | 8.523 | 18.494 | 7.919 | 1,210 | 9.714 | 18.086 | 8.330 | -2.090 ** | -1.975 ** | 0.022 | 0.037 | 0.021 | 0.048 |
| Return $volatility_t$ | 7,853 | 2.977 | 1.384 | 2.633 | 1,226 | 2.744 | 1.273 | 2.447 | 5.554 *** | 5.669 *** | -0.058 | 0.000 | -0.060 | 0.000 |
| Net equity $issuance_t$ | 7,876 | -1.012 | 6.894 | 0.005 | 1,229 | -1.575 | 6.721 | 0 | 2.657 *** | 2.063 ** | -0.028 | 0.008 | -0.022 | 0.039 |
| Net debt $issuance_t$ | 7,842 | 1.240 | 9.522 | 0 | 1,229 | 1.704 | 9.490 | 0 | -1.590 | -1.424 | 0.017 | 0.112 | 0.015 | 0.155 |
| Percentage of option-based $pay_t$ | 7,878 | 39.849 | 28.002 | 41.768 | 1,229 | 40.426 | 29.610 | 41.381 | -0.667 | -0.330 | 0.007 | 0.505 | 0.004 | 0.742 |
| Insider $ownership_t$ | 7,870 | 3.438 | 7.245 | 0.706 | 1,229 | 3.164 | 7.060 | 0.635 | 1.278 | 3.398 *** | -0.013 | 0.216 | -0.036 | 0.001 |
| Institutional $ownership_t$ | 7,878 | 0.648 | 0.260 | 0.705 | 1,229 | 0.601 | 0.252 | 0.650 | 5.946 *** | 7.800 *** | -0.062 | 0.000 | -0.082 | 0.000 |
| Firm age | 7,878 | 27.16 | 20.08 | 20 | 1,229 | 28.28 | 19.85 | 22 | -1.830 * | -2.534 ** | 0.019 | 0.067 | 0.027 | 0.011 |
| Altman Z | 7,675 | 2.034 | 1.385 | 2.040 | 1,187 | 1.928 | 1.250 | 2.003 | 1.311 | 2.148 ** | -0.014 | 0.120 | -0.023 | 0.032 |
| G-index | 7,392 | 9.32 | 2.59 | 9 | 1,117 | 9.16 | 2.65 | 9 | 1.855 * | 1.963 ** | -0.020 | 0.064 | -0.021 | 0.050 |
| Number of business segments | 7,264 | 3.26 | 2.58 | 3 | 1,102 | 3.66 | 3.11 | 3 | -4.591 *** | -2.730 *** | 0.050 | 0.000 | 0.030 | 0.000 |
| Herfindahl segment sales | 7,264 | 0.680 | 0.303 | 0.678 | 1,102 | 0.658 | 0.319 | 0.665 | 2.175 ** | 2.462 ** | -0.024 | 0.030 | -0.027 | 0.138 |
| Delta | 7,870 | 7.612 | 14.021 | 4.405 | 1,228 | 12.108 | 23.958 | 5.604 | -9.314 *** | -8.490 *** | 0.097 | 0.000 | 0.089 | 0.000 |
| Vega ($ 000) | 7,878 | 56.621 | 118.254 | 23.536 | 1,229 | 94.557 | 242.052 | 27.179 | -8.746 *** | -4.064 *** | 0.091 | 0.000 | 0.043 | 0.000 |
| Δ Cash $holdings_t$ | 7,861 | 1.264 | 8.764 | 0.414 | 1,228 | 1.142 | 6.983 | 0.371 | 0.469 | -0.032 | -0.005 | 0.639 | 0.000 | 0.975 |
| Δ $Dividends_t$ | 7,851 | 0.005 | 0.587 | 0 | 1,226 | 0.039 | 0.598 | 0 | -1.883 * | -4.929 *** | 0.020 | 0.060 | 0.052 | 0.000 |
| Δ $Capex_t$ | 7,865 | -0.162 | 5.085 | 0.123 | 1,228 | 0.281 | 4.342 | 0.124 | -2.898 *** | -0.808 | 0.030 | 0.004 | 0.009 | 0.419 |
| Δ $R\&D_t$ | 7,865 | 0.049 | 1.351 | 0 | 1,228 | 0.133 | 1.035 | 0 | -2.076 ** | -1.481 | 0.022 | 0.038 | 0.016 | 0.139 |
| Δ $Debt_t$ | 7,865 | 0.981 | 13.503 | 0 | 1,228 | 1.272 | 12.421 | 0 | -0.709 | -1.906 * | 0.007 | 0.478 | 0.020 | 0.057 |
| Δ $Equity_t$ | 7,865 | -0.390 | 5.373 | 0.009 | 1,228 | -0.507 | 4.962 | 0 | 0.718 | 1.515 | -0.008 | 0.473 | -0.016 | 0.130 |
| Δ Interest $expense_t$ | 7,865 | 0.142 | 1.292 | 0 | 1,228 | 0.150 | 0.993 | 0.002 | -0.226 | -1.239 | 0.002 | 0.821 | 0.013 | 0.216 |
| Δ $Earnings_t$ | 7,863 | 0.656 | 14.027 | 0.679 | 1,228 | 1.185 | 10.162 | 0.716 | -1.272 | -1.663 * | 0.013 | 0.204 | 0.017 | 0.096 |
| Δ Net $assets_t$ | 7,861 | 4.912 | 31.040 | 3.455 | 1,228 | 8.154 | 28.402 | 3.636 | -3.442 *** | -2.328 ** | 0.036 | 0.001 | 0.024 | 0.020 |
| $C_{t-1}$ | 7,865 | 11.566 | 15.805 | 6.044 | 1,228 | 7.586 | 11.210 | 4.278 | 8.496 *** | 9.742 *** | -0.089 | 0.000 | -0.102 | 0.000 |
| $L_t$ | 7,867 | 20.139 | 19.984 | 14.824 | 1,229 | 18.108 | 18.053 | 13.715 | 3.355 *** | 2.284 ** | -0.035 | 0.001 | -0.024 | 0.022 |

## Table 5: Levels of cash holdings

This table shows estimates of OSL, 2SLS instrumental variable, Heckman 2-stage treatment effect, and MLE treatment effect regressions of cash holdings. The sample consists on non-dual class S&P 1500 excluding financial utility firms during the period 1998-2006 with relevant non-missing data. Cash holdings variable is defined as cash plus marketable securities scaled by total asset and expressed in percentage. IDB is a binary variable that equals one if there is at least one IDB in a given firm-year; it equals zero otherwise. In addition to all explanatory variables presented in the table, all regressions include year dummies, Fama-French 12 industry dummies and a constant term. All variables are defined in Appendix Table A.2. To reduce the influence of outliers, some variables, indicated in Appendix Table A.2, are winsorized at the top and bottom 0.5% of the sample. We use robust standard errors clustered at the CEO-firm level for the OLS regression. The second stage of the 2SLS instrumental variable estimation instruments IDB by lagged IDB state-density and lagged IDB industry-density. Lagged IDB state-density is computed as the average value of the IDB dummy for all public companies headquartered in a state in fiscal year *t*-1. Lagged IDB industry-density is computed as the average value of the IDB dummy for each of the 48 Fama and French (1997) industries in fiscal year *t*-1. The table reports the p-value of Wooldridge's (1995) over-identification test, the p-value of Durbin-Wu-Hausman test for exogeneity, and the F-test for the IVs of the first stage estimation; standard errors are clustered at the CEO-firm level. The second stage of Heckman's 2-stage treatment effect model uses the same covariates as the OLS and the inverse Mills ratio (Lambda). Lambda is computed in the first stage by regressing IDB on the variables in Model #3 in Panel B of Table 3. The MLE treatment effect model estimates the main and selection equations simultaneously. The main equation is the same as the OLS and the selection equation is for IDB with the variables in Model #3 in Panel B of Table 3. The table reports the p-value of LR test for rho (correlation between first and second stage error terms); standard errors are clustered at the CEO-firm level.

## Table 5 (cont.)

| | OLS (1) | | OLS (2) | | IV-2SLS (3) | | Treatment effect two-stage (4) | | Treatment effect MLE (5) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value |
| IDB (1/0) | -0.502 | 0.304 | -0.165 | 0.463 | -2.206 | 0.073 | -1.754 | 0.041 | -2.773 | 0.016 |
| Cash holdings $_{t-1}$ | | | 0.805 | 0.000 | 0.804 | 0.000 | 0.804 | 0.000 | 0.803 | 0.000 |
| Sales growth | -0.015 | 0.346 | -0.008 | 0.224 | -0.005 | 0.535 | -0.004 | 0.524 | -0.002 | 0.828 |
| Tobin's q $_{t-1}$ | 2.026 | 0.000 | 0.076 | 0.461 | 0.102 | 0.322 | 0.125 | 0.042 | 0.142 | 0.186 |
| R&D expenditures$_t$ | 0.661 | 0.000 | 0.086 | 0.008 | 0.085 | 0.008 | 0.080 | 0.000 | 0.078 | 0.016 |
| NWC net of cash/TA $_t$ | -0.242 | 0.000 | -0.094 | 0.000 | -0.092 | 0.000 | -0.096 | 0.000 | -0.097 | 0.000 |
| Cash flow $_t$ | -0.186 | 0.000 | 0.092 | 0.000 | 0.089 | 0.000 | 0.086 | 0.000 | 0.085 | 0.000 |
| Leverage $_t$ | -0.237 | 0.000 | -0.048 | 0.000 | -0.047 | 0.000 | -0.049 | 0.000 | -0.049 | 0.000 |
| Capital expenditures $_t$ | -0.537 | 0.000 | -0.339 | 0.000 | -0.335 | 0.000 | -0.338 | 0.000 | -0.337 | 0.000 |
| Acquisitions $_t$ | -0.422 | 0.000 | -0.487 | 0.000 | -0.485 | 0.000 | -0.494 | 0.000 | -0.492 | 0.000 |
| Dividend indicator $_t$ (1/0) | -1.718 | 0.001 | -0.273 | 0.121 | -0.328 | 0.067 | -0.267 | 0.127 | -0.268 | 0.129 |
| Loss indicator$_t$ (1/0) | -1.022 | 0.043 | -0.890 | 0.001 | -0.895 | 0.001 | -0.919 | 0.000 | -0.919 | 0.001 |
| Log market capitalization$_t$ | -0.588 | 0.006 | -0.137 | 0.103 | -0.049 | 0.632 | -0.093 | 0.214 | -0.073 | 0.418 |
| Cash flow volatility | 25.261 | 0.000 | 1.957 | 0.349 | 1.837 | 0.376 | 2.443 | 0.109 | 2.371 | 0.259 |
| Bond rating (1/0) | -1.369 | 0.025 | -0.299 | 0.157 | -0.357 | 0.102 | -0.302 | 0.130 | -0.300 | 0.158 |
| Net equity issuance$_t$ | 0.087 | 0.006 | 0.252 | 0.000 | 0.249 | 0.000 | 0.255 | 0.000 | 0.255 | 0.000 |
| Net debt issuance$_t$ | 0.151 | 0.000 | 0.131 | 0.000 | 0.130 | 0.000 | 0.136 | 0.000 | 0.135 | 0.000 |
| G-index | -0.245 | 0.008 | -0.032 | 0.286 | -0.042 | 0.189 | -0.048 | 0.125 | -0.055 | 0.086 |
| Board size | -0.692 | 0.000 | -0.191 | 0.000 | -0.161 | 0.000 | -0.165 | 0.000 | -0.146 | 0.002 |
| Fraction of independent directors | -0.414 | 0.770 | 0.727 | 0.132 | 0.782 | 0.109 | 0.858 | 0.064 | 0.883 | 0.076 |
| Institutional ownership $_t$ | 1.811 | 0.056 | 0.476 | 0.179 | 0.292 | 0.426 | 0.343 | 0.288 | 0.253 | 0.500 |
| Log insider ownership | 0.073 | 0.602 | 0.006 | 0.898 | 0.007 | 0.888 | 0.007 | 0.879 | 0.008 | 0.869 |
| Percentage of option-based pay$_t$ | 0.004 | 0.601 | 0.002 | 0.648 | 0.000 | 0.956 | 0.001 | 0.783 | 0.001 | 0.832 |
| N | 8,426 | | 8,426 | | 8,426 | | 8,260 | | 8,260 | |
| Adjusted $R^2$ / [$\chi^2$ p-value] | 0.558 | | 0.858 | | 0.857 | | [0.000] | | [0.000] | |
| Over-identification test p-value | | | | | 0.111 | | | | | |
| Test for exogeneity p-value | | | | | 0.091 | | | | | |
| F-statistic for first-stage IVs | | | | | 43.176 | | | | | |
| Inverse Mills ratio | | | | | | | 0.910 | 0.055 | | |
| LR test for rho (p-value) | | | | | | | | | 0.027 | |

## Table 6: Levels of dividends and payout

Panel A shows estimates of tobit and second-stage Smith-Blundell regressions of dividend yield and probit and second-stage Rivers-Vuong regressions of dividend dummy. The sample consists on non-dual class S&P 1500 excluding financial utility firms during the period 1998-2006 with relevant non-missing data. Dividend yield is defined as common dividends divided by the firm's market capitalization and expressed in percentage. Dividend dummy is a binary variable that equals one if the firm pays dividend in that fiscal year; it equals zero otherwise. IDB is also a binary variable that equals one if there is at least one IDB in a given firm-year; it equals zero otherwise. In addition to all explanatory variables presented in this table, all regressions include year dummies, Fama-French 12 industry dummies and a constant term. All variables are defined in Appendix Table A.2. The second stage of both the Smith-Blundell model and the Rivers-Vuong model use the same covariates as the tobit and probit regressions, respectively, but also include the residual estimated from the first stage regression of IDB on all control variables from the main (tobit or probit) regression and lagged IDB state-density and lagged IDB industry-density as instruments for IDB. Lagged IDB state-density is computed as the average value of the IDB dummy for all public companies headquartered in a state in fiscal year *t*-1. Lagged IDB industry-density is computed as the average value of the IDB dummy for each of the 48 Fama and French (1997) industries in fiscal year *t*-1. Panel B shows estimates of tobit and IV-tobit regressions of repurchases and total payout. Repurchases equal repurchases of common and preferred stock scaled by the firm's market capitalization and expressed as a percentage. Total payout equals dividend yield plus repurchases. The second stage of the MLE IV-tobit uses the same covariates as the tobit regression, but instruments for the potential endogeneity of IDB presence by lagged IDB state-density and lagged IDB industry-density variables. IV-tobit regression reports the Wald test for exogeneity. We use robust standard errors clustered at the CEO-firm level for all regressions. To reduce the influence of outliers, some variables, indicated in Appendix Table A.2, are winsorized at the top and bottom 0.5% of the sample.

| Panel A: Dividends | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Dividend yield | | | | Dividend dummy | | | |
| | Tobit | | Smith-Blundell | | Probit | | Rivers-Vuong | |
| | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value |
| IDB (1/0) | -0.154 | 0.072 | -0.313 | 0.560 | -0.073 | 0.310 | -0.210 | 0.673 |
| Sales growth | -0.025 | 0.000 | -0.024 | 0.000 | -0.012 | 0.000 | -0.012 | 0.000 |
| Tobin's $q_{t-1}$ | 0.010 | 0.736 | 0.014 | 0.678 | 0.066 | 0.004 | 0.069 | 0.007 |
| R&D expenditures $_t$ | 0.018 | 0.000 | 0.018 | 0.000 | 0.014 | 0.000 | 0.014 | 0.000 |
| Firm age | 0.035 | 0.382 | 0.037 | 0.363 | 0.134 | 0.000 | 0.135 | 0.000 |
| Log sales $_t$ | -0.036 | 0.010 | -0.036 | 0.010 | -0.017 | 0.100 | -0.017 | 0.100 |
| ROA $_t$ | 0.008 | 0.071 | 0.008 | 0.070 | 0.015 | 0.000 | 0.015 | 0.000 |
| Leverage $_t$ | 0.002 | 0.405 | 0.002 | 0.402 | -0.003 | 0.124 | -0.003 | 0.126 |
| Cash flow volatility | -0.050 | 0.000 | -0.050 | 0.000 | -0.041 | 0.000 | -0.041 | 0.000 |
| Return volatility $_t$ | -0.679 | 0.000 | -0.681 | 0.000 | -0.441 | 0.000 | -0.443 | 0.000 |
| G-index | 0.043 | 0.007 | 0.043 | 0.011 | 0.026 | 0.052 | 0.026 | 0.065 |
| Board size | 0.087 | 0.000 | 0.090 | 0.000 | 0.066 | 0.000 | 0.069 | 0.001 |
| Fraction of independent directors | 0.617 | 0.013 | 0.620 | 0.013 | 0.251 | 0.201 | 0.254 | 0.197 |
| Institutional ownership $_t$ | -0.785 | 0.000 | -0.800 | 0.000 | -0.320 | 0.024 | -0.332 | 0.029 |
| Log insider ownership | -0.020 | 0.391 | -0.020 | 0.378 | 0.016 | 0.360 | 0.016 | 0.376 |
| Percentage of option-based pay$_t$ | -0.012 | 0.000 | -0.012 | 0.000 | -0.007 | 0.000 | -0.007 | 0.000 |
| Residual | | | 0.164 | 0.760 | | | 0.141 | 0.777 |
| N | 8,466 | | 8,466 | | 8,466 | | 8,466 | |
| Pseudo $R^2$ | 0.189 | | 0.189 | | 0.374 | | 0.374 | |

**Table 6 (cont.)**

Panel B: Repurchase and total payout

| | Repurchases | | | | Total payout | | | |
|---|---|---|---|---|---|---|---|---|
| | Tobit | | IV-Tobit | | Tobit | | IV-Tobit | |
| | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value |
| IDB (1/0) | -0.487 | 0.039 | -3.636 | 0.017 | -0.394 | 0.033 | -2.847 | 0.023 |
| Sales growth | -0.015 | 0.059 | -0.008 | 0.332 | -0.019 | 0.009 | -0.014 | 0.075 |
| Tobin's $q_{t-1}$ | -0.226 | 0.000 | -0.156 | 0.030 | -0.228 | 0.000 | -0.174 | 0.006 |
| R&D expenditures $_t$ | -0.026 | 0.000 | -0.029 | 0.000 | 0.001 | 0.823 | -0.001 | 0.845 |
| Firm age | 0.254 | 0.005 | 0.296 | 0.002 | 0.132 | 0.085 | 0.164 | 0.044 |
| Log sales $_t$ | 0.032 | 0.229 | 0.032 | 0.231 | 0.003 | 0.903 | 0.003 | 0.903 |
| ROA $_t$ | 0.076 | 0.000 | 0.076 | 0.000 | 0.059 | 0.000 | 0.059 | 0.000 |
| Leverage $_t$ | -0.006 | 0.343 | -0.006 | 0.367 | 0.006 | 0.325 | 0.006 | 0.305 |
| Cash flow volatility | 0.055 | 0.001 | 0.050 | 0.003 | 0.026 | 0.091 | 0.022 | 0.156 |
| Return volatility $_t$ | -1.080 | 0.000 | -1.133 | 0.000 | -1.231 | 0.000 | -1.272 | 0.000 |
| G-index | -0.040 | 0.288 | -0.057 | 0.153 | 0.017 | 0.577 | 0.004 | 0.911 |
| Board size | -0.040 | 0.387 | 0.025 | 0.648 | 0.018 | 0.641 | 0.069 | 0.139 |
| Fraction of independent directors | 0.791 | 0.201 | 0.857 | 0.170 | 1.186 | 0.025 | 1.236 | 0.020 |
| Institutional ownership $_t$ | -0.961 | 0.028 | -1.261 | 0.008 | -1.533 | 0.000 | -1.764 | 0.000 |
| Log insider ownership | -0.036 | 0.521 | -0.047 | 0.400 | -0.055 | 0.272 | -0.065 | 0.208 |
| Percentage of option-based pay$_t$ | 0.013 | 0.001 | 0.011 | 0.004 | -0.001 | 0.820 | -0.002 | 0.575 |
| N | 8,466 | | 8,466 | | 8,466 | | 8,466 | |
| Pseudo $R^2$ / [$\chi^2$ p-value] | 0.025 | | [0.000] | | 0.035 | | [0.000] | |
| Test for exogeneity (p-value) | | | 0.036 | | | | 0.046 | |

## Table 7: Levels of investment

Panel A shows estimates of OSL, 2SLS instrumental variable, Heckman 2-stage treatment effect, and MLE treatment effect regressions of capital expenditures. The sample consists on non-dual class S&P 1500 excluding financial utility firms during the period 1998-2006 with relevant non-missing data. Capital expenditure variable is defined as capital expenditures scaled by total asset and expressed in percentage. IDB is a binary variable that equals one if there is at least one IDB in a given firm-year; it equals zero otherwise. In addition to all explanatory variables presented in this table, all regressions include year dummies, Fama-French 12 industry dummies and a constant term. All variables are defined in Appendix Table A.2. We use robust standard errors clustered at the CEO-firm level for the OLS regression. The second stage of the 2SLS instrumental variable estimation instruments IDB by lagged IDB state-density and lagged IDB industry-density. Lagged IDB state-density is computed as the average value of the IDB dummy for all public companies headquartered in a state in fiscal year *t*-1. Lagged IDB industry-density is computed as the average value of the IDB dummy for each of the 48 Fama and French (1997) industries in fiscal year *t*-1. The table reports the p-value of Wooldridge's (1995) over-identification test, the p-value of Durbin-Wu-Hausman test for exogeneity, and the F-test for the IVs of the first stage estimation; standard errors are clustered at the CEO-firm level. The second stage of Heckman's 2-stage treatment effect model uses the same covariates as the OLS and the inverse Mills ratio (Lambda). Lambda is computed in the first stage by regressing IDB on the variables in Model #3 in Panel B of Table 3. The MLE treatment effect model estimates the main and selection equations simultaneously. The main equation is the same as the OLS and the selection equation is for IDB with the variables in Model #3 in Panel B of Table 3. The table reports the p-value of LR test for rho (correlation between first and second stage error terms); standard errors are clustered at the CEO-firm level. Panel B of this Table shows estimates of tobit and second-stage Smith-Blundell regressions of R&D expenditures. R&D expenditure variable is defined as R&D expenditures scaled by total asset and expressed in percentage. The second stage of the Smith-Blundell regression uses the same covariates as the tobit regression, but includes the residual estimated from the first stage regression; the first stage is the regression of IDB on all the control variables from the main (tobit or probit) regression and lagged IDB state-density and lagged IDB industry-density as instruments for IDB. Panel C shows estimates of OSL, 2SLS instrumental variable, Heckman 2-stage treatment effect, and MLE treatment effect regressions of investment expenditures. Investment expenditure variable is the sum of capital expenditure and R&D expenditure variables. Regressions in Panel C are identical to that of Panel A, except the dependent variable is investment expenditure. To reduce the influence of outliers, some variables, indicated in Appendix Table A.2, are winsorized at the top and bottom 0.5% of the sample.

## Table 7 (cont.)

Panel A: Capital expenditure

| | OLS | | IV-2SLS | | Treatment effect two-stage | | Treatment effect MLE | |
|---|---|---|---|---|---|---|---|---|
| | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value |
| IDB (1/0) | 0.195 | 0.346 | 3.544 | 0.009 | 3.095 | 0.000 | 5.615 | 0.000 |
| Leverage $_t$ | 0.007 | 0.165 | 0.007 | 0.204 | 0.008 | 0.013 | 0.005 | 0.284 |
| Log sales $_t$ | -0.380 | 0.000 | -0.430 | 0.000 | -0.435 | 0.000 | -0.506 | 0.000 |
| Cash flow $_t$ | 0.146 | 0.000 | 0.144 | 0.000 | 0.156 | 0.000 | 0.156 | 0.000 |
| Tobin's q $_{t-1}$ | 0.070 | 0.222 | -0.016 | 0.815 | -0.008 | 0.843 | -0.058 | 0.314 |
| ROA $_{t-1}$ | -0.011 | 0.129 | -0.011 | 0.134 | -0.012 | 0.023 | -0.015 | 0.036 |
| Stock return $_{t-1}$ | 1.172 | 0.000 | 1.165 | 0.000 | 1.198 | 0.000 | 1.087 | 0.000 |
| G-index | -0.126 | 0.001 | -0.102 | 0.009 | -0.099 | 0.000 | -0.083 | 0.032 |
| Board size | 0.085 | 0.030 | 0.018 | 0.724 | 0.033 | 0.219 | -0.002 | 0.955 |
| Fraction of independent directors | -0.585 | 0.248 | -0.559 | 0.288 | -0.578 | 0.061 | -0.498 | 0.365 |
| Institutional ownership $_t$ | 0.183 | 0.557 | 0.430 | 0.204 | 0.442 | 0.038 | 0.640 | 0.047 |
| Log insider ownership | 0.048 | 0.348 | 0.050 | 0.354 | 0.035 | 0.212 | 0.038 | 0.439 |
| Percentage of option-based pay$_t$ | 0.015 | 0.000 | 0.016 | 0.000 | 0.013 | 0.000 | 0.012 | 0.000 |
| N | 8,400 | | 8,400 | | 8,291 | | 8,291 | |
| Adjusted $R^2$ / [$\chi^2$ p-value] | 0.309 | | 0.262 | | [0.000] | | [0.000] | |
| Over-identification test p-value | | | 0.783 | | | | | |
| Test for exogeneity p-value | | | 0.009 | | | | | |
| F-statistic for first-stage IVs | | | 43.459 | | | | | |
| Inverse Mills ratio | | | | | -1.697 | 0.000 | | |
| LR test for rho (p-value) | | | | | | | 0.000 | |

Panel B: R&D Expenditure

| | Tobit | | Smith-Blundell | |
|---|---|---|---|---|
| | coeff. | p-value | coeff. | p-value |
| IDB (1/0) | -0.315 | 0.308 | -0.888 | 0.659 |
| Leverage $_t$ | -0.063 | 0.000 | -0.063 | 0.000 |
| Log sales $_t$ | -0.439 | 0.000 | -0.431 | 0.001 |
| Cash flow $_t$ | -0.146 | 0.000 | -0.146 | 0.000 |
| Tobin's q $_{t-1}$ | 0.934 | 0.000 | 0.949 | 0.000 |
| ROA $_{t-1}$ | -0.083 | 0.000 | -0.083 | 0.000 |
| Stock return $_{t-1}$ | -1.053 | 0.013 | -1.051 | 0.013 |
| G-index | -0.021 | 0.694 | -0.025 | 0.688 |
| Board size | 0.040 | 0.532 | 0.052 | 0.522 |
| Fraction of independent directors | 3.565 | 0.000 | 3.559 | 0.000 |
| Institutional ownership $_t$ | -0.285 | 0.610 | -0.328 | 0.610 |
| Log insider ownership $_t$ | -0.338 | 0.000 | -0.338 | 0.000 |
| Percentage of option-based pay$_t$ | 0.025 | 0.000 | 0.025 | 0.000 |
| Residual | | | 0.589 | 0.769 |
| N | 8,400 | | 8,400 | |
| Pseudo $R^2$ | 0.189 | | 0.188 | |

**Table 7 (cont.)**

| Panel C: Investment expenditure | OLS | | IV-2SLS | | Treatment effect two-stage | | Treatment effect MLE | |
|---|---|---|---|---|---|---|---|---|
| | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value |
| IDB (1/0) | 0.024 | 0.928 | 3.591 | 0.030 | 1.491 | 0.043 | 8.929 | 0.000 |
| Leverage $_t$ | -0.026 | 0.001 | -0.026 | 0.001 | -0.025 | 0.000 | -0.021 | 0.006 |
| Log sales $_t$ | -0.809 | 0.000 | -0.863 | 0.000 | -0.840 | 0.000 | -0.972 | 0.000 |
| Cash flow $_t$ | 0.026 | 0.284 | 0.025 | 0.305 | 0.037 | 0.000 | 0.052 | 0.020 |
| Tobin's q $_{t-1}$ | 0.833 | 0.000 | 0.741 | 0.000 | 0.795 | 0.000 | 0.592 | 0.000 |
| ROA $_{t-1}$ | -0.082 | 0.000 | -0.082 | 0.000 | -0.083 | 0.000 | -0.066 | 0.000 |
| Stock return | 0.729 | 0.084 | 0.722 | 0.093 | 0.753 | 0.057 | 0.631 | 0.121 |
| G-index | -0.165 | 0.001 | -0.140 | 0.005 | -0.153 | 0.000 | -0.096 | 0.049 |
| Board size | 0.069 | 0.220 | -0.003 | 0.966 | 0.049 | 0.184 | -0.091 | 0.154 |
| Fraction of independent directors | 0.504 | 0.466 | 0.532 | 0.453 | 0.561 | 0.182 | 0.919 | 0.229 |
| Institutional ownership $_t$ | 0.347 | 0.463 | 0.610 | 0.221 | 0.521 | 0.074 | 0.908 | 0.055 |
| Log insider ownership | -0.117 | 0.094 | -0.115 | 0.110 | -0.130 | 0.001 | -0.071 | 0.256 |
| Percentage of option-based pay$_t$ | 0.030 | 0.000 | 0.031 | 0.000 | 0.028 | 0.000 | 0.022 | 0.000 |
| N | 8,400 | | 8,400 | | 8,291 | | 8,291 | |
| Adjusted $R^2$ / [$\chi^2$ p-value] | 0.302 | | 0.274 | | [0.000] | | [0.000] | |
| Over-identification test p-value | | | 0.396 | | | | | |
| Test for exogeneity p-value | | | 0.024 | | | | | |
| F-statistic for first-stage IVs | | | 43.458 | | | | | |
| Inverse Mills ratio | | | | | -0.858 | 0.037 | | |
| LR test for rho (p-value) | | | | | | | 0.000 | |

## Table 8: Level of Financial Leverage

This table shows estimates of tobit and second-stage Smith-Blundell regressions of leverage. The sample consists on non-dual class S&P 1500 excluding financial utility firms during the period 1998-2006 with relevant non-missing data. Leverage is defined as total debt divided by the firm's market capitalization and expressed in percentage. IDB is a binary variable that equals one if there is at least one IDB in a given firm-year; it equals zero otherwise. In addition to all explanatory variables presented in this table, all regressions include year dummies, Fama-French 12 industry dummies and a constant term. All variables are defined in Appendix Table A.2. To reduce the influence of outliers, some variables, indicated in Appendix Table A.2, are winsorized at the top and bottom 0.5% of the sample. The second stage of the Smith-Blundell uses the same covariates as the tobit regression, but includes the residual estimated from the first-stage regression; the first stage is the regression of IDB on all the control variables from the main (tobit or probit) regression and lagged IDB state-density and lagged IDB industry-density as instruments for IDB. Lagged IDB state-density is computed as the average value of the IDB dummy for all public companies headquartered in a state in fiscal year *t*-1. Lagged IDB industry-density is computed as the average value of the IDB dummy for each of the 48 Fama and French (1997) industries in fiscal year *t*-1. We use robust standard errors clustered at the CEO-firm level for all regressions.

| | Tobit | | Smith-Blundell | |
|---|---|---|---|---|
| | coeff. | p-value | coeff. | p-value |
| IDB (1/0) | 0.844 | 0.308 | -0.351 | 0.947 |
| Cash holding $_t$ | -0.313 | 0.000 | -0.314 | 0.000 |
| Log market capitalization $_t$ | -2.218 | 0.000 | -2.159 | 0.000 |
| R&D expenditures $_t$ | -0.247 | 0.005 | -0.248 | 0.009 |
| PPE $_t$ | 0.030 | 0.077 | 0.030 | 0.122 |
| Cash flow volatility | 0.195 | 0.091 | 0.196 | 0.127 |
| Bond rating (1/0) | 14.365 | 0.000 | 14.319 | 0.000 |
| Altman-Z | -4.628 | 0.000 | -4.638 | 0.000 |
| G-index | -0.070 | 0.539 | -0.080 | 0.558 |
| Board size | 0.305 | 0.032 | 0.319 | 0.050 |
| Fraction of independent directors | 0.716 | 0.692 | 0.711 | 0.713 |
| Institutional ownership $_t$ | 3.552 | 0.006 | 3.452 | 0.019 |
| Log insider ownership $_t$ | -0.099 | 0.546 | -0.095 | 0.580 |
| Percentage of option-based pay$_t$ | 0.006 | 0.507 | 0.006 | 0.602 |
| Residual | | | 1.222 | 0.817 |
| N | 8,267 | | 8,267 | |
| Pseudo $R^2$ | 0.077 | | 0.077 | |

## Table 9: Market valuation of IDB presence and policy choices

This table shows estimates of OSL, 2SLS instrumental variable, Heckman 2-stage treatment effect, and MLE treatment effect regressions of excess return. The sample consists on non-dual class S&P 1500 excluding financial utility firms during the period 1998-2006 with relevant non-missing data. Excess return is defined as stock return minus Fama-French size and book-to-market matched portfolio (5×5) returns over firm-fiscal year. IDB is a binary variable that equals one if there is at least one IDB in a given firm-year; it equals zero otherwise. Models 5 and 6 include interaction variables, other variables interacting with IDB. In addition to all explanatory variables presented in the table, all regressions include year dummies, Fama-French 12 industry dummies and a constant term. All variables are defined in Appendix Table A.2. We use robust standard errors clustered at the CEO-firm level for the OLS regression. The second stage of the 2SLS instrumental variable estimation instruments IDB by lagged IDB state-density and lagged IDB industry-density. Lagged IDB state-density is computed as the average value of the IDB dummy for all public companies headquartered in a state in fiscal year *t*-1. Lagged IDB industry-density is computed as the average value of the IDB dummy for each of the 48 Fama and French (1997) industries in fiscal year *t*-1. The table reports the p-value of Wooldridge's (1995) over-identification test, the p-value of Durbin-Wu-Hausman test for exogeneity, and the F-test for the IVs of the first stage estimation; standard errors are clustered at the CEO-firm level. The second stage of Heckman's 2-stage treatment effect model uses the same covariates as the OLS and the inverse Mills ratio (Lambda). Lambda is computed in the first stage by regressing IDB on the variables in Model #3 in Panel B of Table 3. The MLE treatment effect model estimates the main and selection equations simultaneously. The main equation is the same as the OLS and the selection equation is for IDB with the variables in Model #3 in Panel B of Table 3. The table reports the p-value of LR test for rho (correlation between first and second stage error terms); standard errors are clustered at the CEO-firm level. To reduce the influence of outliers, some variables, indicated in Appendix Table A.2, are winsorized at the top and bottom 0.5% of the sample.

**Table 9 (cont.)**

| | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OLS | | IV-2SLS | | Treatment effect two-stage | | Treatment effect MLE | | OLS | | OLS | |
| | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value |
| IDB (1/0) | 5.000 | 0.003 | -1.524 | 0.848 | 3.817 | 0.436 | 3.432 | 0.755 | 4.773 | 0.003 | 5.149 | 0.002 |
| IDB * Δ Cash holdings$_t$ | | | | | | | | | 0.346 | 0.377 | | |
| IDB * Δ Dividends$_t$ | | | | | | | | | -3.863 | 0.033 | -3.813 | 0.032 |
| IDB * Δ Capex$_t$ | | | | | | | | | 0.332 | 0.366 | | |
| IDB * Δ R&D$_t$ | | | | | | | | | -1.093 | 0.596 | | |
| IDB * Δ Debts$_t$ | | | | | | | | | 0.045 | 0.781 | | |
| Δ Cash holdings$_t$ | 0.597 | 0.000 | 0.590 | 0.000 | 0.541 | 0.000 | 0.540 | 0.000 | 0.566 | 0.000 | 0.596 | 0.000 |
| Δ Dividends$_t$ | 3.024 | 0.000 | 3.046 | 0.000 | 3.319 | 0.001 | 3.324 | 0.000 | 3.592 | 0.000 | 3.570 | 0.000 |
| Δ Capex$_t$ | 0.820 | 0.000 | 0.826 | 0.000 | 0.737 | 0.000 | 0.737 | 0.000 | 0.782 | 0.000 | 0.816 | 0.000 |
| Δ R&D$_t$ | 0.968 | 0.126 | 0.991 | 0.117 | 0.665 | 0.133 | 0.665 | 0.297 | 1.060 | 0.121 | 0.968 | 0.126 |
| Δ Debts$_t$ | -0.054 | 0.392 | -0.054 | 0.400 | -0.042 | 0.434 | -0.042 | 0.506 | -0.058 | 0.377 | -0.053 | 0.407 |
| Δ Equity$_t$ | 0.547 | 0.000 | 0.546 | 0.000 | 0.441 | 0.000 | 0.441 | 0.003 | 0.546 | 0.000 | 0.549 | 0.000 |
| Δ Interest expense$_t$ | -3.173 | 0.000 | -3.173 | 0.000 | -2.985 | 0.000 | -2.984 | 0.000 | -3.161 | 0.000 | -3.175 | 0.000 |
| Δ Earnings$_t$ | 0.326 | 0.000 | 0.329 | 0.000 | 0.344 | 0.000 | 0.344 | 0.000 | 0.329 | 0.000 | 0.326 | 0.000 |
| Δ Net assets$_t$ | 0.206 | 0.000 | 0.206 | 0.000 | 0.196 | 0.000 | 0.196 | 0.000 | 0.205 | 0.000 | 0.205 | 0.000 |
| $C_{t-1}$ | -0.077 | 0.112 | -0.090 | 0.078 | -0.039 | 0.341 | -0.039 | 0.460 | -0.075 | 0.122 | -0.076 | 0.115 |
| $L_t$ | -0.422 | 0.000 | -0.426 | 0.000 | -0.408 | 0.000 | -0.408 | 0.000 | -0.422 | 0.000 | -0.421 | 0.000 |
| N | 9,014 | | 9,013 | | 8,281 | | 8,281 | | 9,014 | | 9,014 | |
| Adjusted $R^2$ / [$\chi^2$ p-value] | 0.106 | | 0.104 | | [0.000] | | [0.000] | | 0.106 | | 0.106 | |
| Over-identification test p-value | | | 0.163 | | | | | | | | | |
| Test for exogeneity p-value | | | 0.423 | | | | | | | | | |
| F-statistic for first-stage IVs | | | 53.080 | | | | | | | | | |
| Inverse Mills ratio | | | | | 0.002 | 0.938 | | | | | | |
| LR test for rho (p-value) | | | | | | | 0.945 | | | | | |

## Table 10: Firm risk

Panel A (B) [C] shows estimates of OSL, 2SLS instrumental variable, Heckman 2-stage treatment effect, and MLE treatment effect regressions of total risk (systematic risk) [unsystematic risk]. The sample consists on non-dual class S&P 1500 excluding financial utility firms during the period 1998-2006 with relevant non-missing data. Total risk is the natural log value of the annualized variance of daily stock returns over firm-fiscal year. Systematic risk is the natural log value of the annualized variance of the predicted portion of the market model. Unsystematic risk is the natural log value of the annualized variance of the residual of the market model. IDB is a binary variable that equals one if there is at least one IDB in a given firm-year; it equals zero otherwise. In addition to all explanatory variables presented in the table, all regressions include year dummies, Fama-French 12 industry dummies and a constant term. All variables are defined in Appendix Table A.2. To reduce the influence of outliers, some variables, indicated in Appendix Table A.2, are winsorized at the top and bottom 0.5% of the sample. We use robust standard errors clustered at the CEO-firm level for the OLS regression. The second stage of the 2SLS instrumental variable estimation instruments IDB by lagged IDB state-density and lagged IDB industry-density. Lagged IDB state-density is computed as the average value of the IDB dummy for all public companies headquartered in a state in fiscal year *t*-1. Lagged IDB industry-density is computed as the average value of the IDB dummy for each of the 48 Fama and French (1997) industries in fiscal year *t*-1. The table reports the p-value of Wooldridge's (1995) over-identification test, the p-value of Durbin-Wu-Hausman test for exogeneity, and the F-test for the IVs of the first stage estimation; standard errors are clustered at the CEO-firm level. The second stage of Heckman's 2-stage treatment effect model uses the same covariates as the OLS and the inverse Mills ratio (Lambda). Lambda is computed in the first stage by regressing IDB on the variables in Model #3 in Panel B of Table 3. The MLE treatment effect model estimates the main and selection equations simultaneously. The main equation is the same as the OLS and the selection equation is for IDB with the variables in Model #3 in Panel B of Table 3. The table reports the p-value of LR test for rho (correlation between first and second stage error terms); standard errors are clustered at the CEO-firm level.

Panel A: Total Risk

| | OLS | | IV-2SLS | | Treatment effect two-stage | | Treatment effect MLE | |
|---|---|---|---|---|---|---|---|---|
| | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value |
| IDB (1/0) | -0.055 | 0.032 | 0.014 | 0.924 | -0.344 | 0.000 | -0.865 | 0.000 |
| Log total assets $_t$ | -0.154 | 0.000 | -0.157 | 0.000 | -0.144 | 0.000 | -0.114 | 0.000 |
| Tobin's q $_{t-1}$ | 0.016 | 0.011 | 0.015 | 0.039 | 0.025 | 0.000 | 0.037 | 0.000 |
| ROA $_{t-1}$ | -0.018 | 0.000 | -0.018 | 0.000 | -0.018 | 0.000 | -0.017 | 0.000 |
| Leverage $_t$ | 0.001 | 0.183 | 0.001 | 0.173 | 0.001 | 0.019 | 0.001 | 0.202 |
| R&D expenditures $_t$ | 0.018 | 0.000 | 0.018 | 0.000 | 0.018 | 0.000 | 0.019 | 0.000 |
| Capital expenditures $_t$ | 0.002 | 0.348 | 0.002 | 0.375 | 0.002 | 0.124 | 0.002 | 0.268 |
| Log business segments | 0.019 | 0.527 | 0.019 | 0.547 | 0.011 | 0.619 | 0.016 | 0.563 |
| Herfindahl segment sales | 0.185 | 0.021 | 0.183 | 0.023 | 0.164 | 0.004 | 0.139 | 0.056 |
| Delta ($\times 10^{-3}$) | -0.294 | 0.589 | -0.379 | 0.518 | -0.294 | 0.505 | -0.324 | 0.480 |
| Vega ($\times 10^{-3}$) | 0.380 | 0.000 | 0.382 | 0.000 | 0.376 | 0.000 | 0.278 | 0.000 |
| G-index | -0.028 | 0.000 | -0.028 | 0.000 | -0.030 | 0.000 | -0.032 | 0.000 |
| N | 7,781 | | 7,781 | | 7,592 | | 7,592 | |
| Adjusted $R^2$ / [$\chi^2$ p-value] | 0.565 | | 0.564 | | [0.000] | | [0.000] | |
| Over-identification test p-value | | | 0.592 | | | | | |
| Test for exogeneity p-value | | | 0.640 | | | | | |
| F-statistic for first-stage IVs | | | 48.055 | | | | | |
| Inverse Mills ratio | | | | | 0.171 | 0.000 | | |
| LR test for rho (p-value) | | | | | | | 0.000 | |

**Table 10 (cont.)**

| Panel B: Systematic Risk | OLS | | IV-2SLS | | Treatment effect two-stage | | Treatment effect MLE | |
|---|---|---|---|---|---|---|---|---|
| | coeff. | p-value | coeff. | p-value | coeff. | p-value | coeff. | p-value |
| IDB (1/0) | -0.070 | 0.108 | -0.106 | 0.698 | -0.766 | 0.000 | -1.706 | 0.000 |
| Log total assets $_t$ | -0.071 | 0.000 | -0.069 | 0.000 | -0.043 | 0.000 | -0.006 | 0.756 |
| Tobin's q $_{t-1}$ | 0.080 | 0.000 | 0.081 | 0.000 | 0.099 | 0.000 | 0.122 | 0.000 |
| ROA $_{t-1}$ | -0.016 | 0.000 | -0.016 | 0.000 | -0.016 | 0.000 | -0.015 | 0.000 |
| Leverage $_t$ | -0.002 | 0.038 | -0.002 | 0.037 | -0.003 | 0.002 | -0.003 | 0.010 |
| R&D expenditures $_t$ | 0.031 | 0.000 | 0.031 | 0.000 | 0.031 | 0.000 | 0.031 | 0.000 |
| Capital expenditures $_t$ | 0.004 | 0.228 | 0.004 | 0.224 | 0.004 | 0.109 | 0.005 | 0.148 |
| Log business segments | 0.030 | 0.563 | 0.031 | 0.556 | 0.008 | 0.857 | 0.013 | 0.790 |
| Herfindahl segment sales | 0.186 | 0.178 | 0.187 | 0.175 | 0.126 | 0.247 | 0.076 | 0.553 |
| Delta ($\times 10^{-3}$) | 0.684 | 0.524 | 0.729 | 0.518 | 0.813 | 0.336 | 0.621 | 0.491 |
| Vega ($\times 10^{-3}$) | 0.419 | 0.001 | 0.418 | 0.001 | 0.392 | 0.000 | 0.327 | 0.001 |
| G-index | -0.030 | 0.000 | -0.030 | 0.000 | -0.034 | 0.000 | -0.034 | 0.000 |
| N | 7,781 | | 7,781 | | 7,592 | | 7,592 | |
| Adjusted $R^2$ / [$\chi^2$ p-value] | 0.319 | | 0.319 | | [0.000] | | [0.000] | |
| Over-identification test p-value | | | 0.109 | | | | | |
| Test for exogeneity p-value | | | 0.892 | | | | | |
| F-statistic for first-stage IVs | | | 48.055 | | | | | |
| Inverse Mill's ratio | | | | | 0.411 | 0.000 | | |
| Wald test for rho (p-value) | | | | | | | 0.000 | |
| **Panel C: Unsystematic Risk** | | | | | | | | |
| IDB (1/0) | -0.051 | 0.049 | 0.115 | 0.457 | -0.252 | 0.000 | -0.840 | 0.000 |
| Log total assets $_t$ | -0.170 | 0.000 | -0.176 | 0.000 | -0.163 | 0.000 | -0.131 | 0.000 |
| Tobin's q $_{t-1}$ | 0.008 | 0.187 | 0.004 | 0.539 | 0.014 | 0.005 | 0.028 | 0.000 |
| ROA $_{t-1}$ | -0.017 | 0.000 | -0.017 | 0.000 | -0.017 | 0.000 | -0.016 | 0.000 |
| Leverage $_t$ | 0.001 | 0.050 | 0.001 | 0.043 | 0.001 | 0.001 | 0.001 | 0.053 |
| R&D expenditures $_t$ | 0.017 | 0.000 | 0.017 | 0.000 | 0.017 | 0.000 | 0.017 | 0.000 |
| Capital expenditures $_t$ | 0.002 | 0.295 | 0.002 | 0.352 | 0.002 | 0.109 | 0.002 | 0.239 |
| Log business segments | 0.019 | 0.535 | 0.017 | 0.580 | 0.013 | 0.574 | 0.016 | 0.566 |
| Herfindahl segment sales | 0.192 | 0.017 | 0.189 | 0.020 | 0.177 | 0.002 | 0.153 | 0.038 |
| Delta ($\times 10^{-3}$) | -0.374 | 0.459 | -0.578 | 0.306 | -0.399 | 0.371 | -0.391 | 0.374 |
| Vega ($\times 10^{-3}$) | 0.344 | 0.000 | 0.348 | 0.000 | 0.345 | 0.000 | 0.255 | 0.000 |
| G-index | -0.027 | 0.000 | -0.027 | 0.000 | -0.028 | 0.000 | -0.031 | 0.000 |
| N | 7,781 | | 7,781 | | 7,592 | | 7,592 | |
| Adjusted $R^2$ / [$\chi^2$ p-value] | 0.580 | | 0.576 | | [0.000] | | [0.000] | |
| Over-identification test p-value | | | 0.972 | | | | | |
| Test for exogeneity p-value | | | 0.264 | | | | | |
| F-statistic for first-stage IVs | | | 48.055 | | | | | |
| Inverse Mills ratio | | | | | 0.118 | 0.002 | | |
| LR test for rho (p-value) | | | | | | | 0.000 | |

## Appendix Table A.1: Firm, year, and firm-year distributions

Panel A: Number of years a firm is present in the sample

| Number of years | Number of firms | Percentage |
|---|---|---|
| 1 | 204 | 12.58 |
| 2 | 194 | 11.97 |
| 3 | 108 | 6.66 |
| 4 | 146 | 9.01 |
| 5 | 124 | 7.65 |
| 6 | 111 | 6.85 |
| 7 | 96 | 5.92 |
| 8 | 93 | 5.74 |
| 9 | 545 | 33.62 |
| Total | 1,621 | 100 |

Panel B: Percentage of firm-years of a firm that has IDBs

| Percentage of firm-years (pct) | Number of firms | Percentage |
|---|---|---|
| pct = 0 | 1,197 | 73.84 |
| 0.00 < pct <=12.5 | 63 | 3.89 |
| 12.5 < pct <= 25.0 | 77 | 4.75 |
| 25.0 < pct <= 37.5 | 47 | 2.90 |
| 37.5 < pct <= 50.0 | 70 | 4.32 |
| 50.0 < pct <= 62.5 | 27 | 1.67 |
| 62.5 < pct <= 75.0 | 23 | 1.42 |
| 75.0 < pct <= 87.5 | 15 | 0.93 |
| 87.5 < pct < 100 | 18 | 1.11 |
| pct = 100 | 84 | 5.18 |
| Total | 1,621 | 100 |

Panel C: Year distribution

| | Full sample | | IDB firm-years | | Non-IDB firm-years | | Proportion | |
|---|---|---|---|---|---|---|---|---|
| Year | Number of firm-years | Percentage | Number of firm-years | Percentage | Number of firm-years | Percentage | IDB | Non-IDB |
| 1998 | 1,048 | 11.51 | 129 | 10.50 | 919 | 11.67 | 12.31 | 87.69 |
| 1999 | 1,026 | 11.27 | 146 | 11.88 | 880 | 11.17 | 14.23 | 85.77 |
| 2000 | 1,030 | 11.31 | 157 | 12.77 | 873 | 11.08 | 15.24 | 84.76 |
| 2001 | 1,070 | 11.75 | 139 | 11.31 | 931 | 11.82 | 12.99 | 87.01 |
| 2002 | 1,020 | 11.20 | 133 | 10.82 | 887 | 11.26 | 13.04 | 86.96 |
| 2003 | 1,017 | 11.17 | 144 | 11.72 | 873 | 11.08 | 14.16 | 85.84 |
| 2004 | 997 | 10.95 | 133 | 10.82 | 864 | 10.97 | 13.34 | 86.66 |
| 2005 | 956 | 10.50 | 125 | 10.17 | 831 | 10.55 | 13.08 | 86.92 |
| 2006 | 943 | 10.35 | 123 | 10.01 | 820 | 10.41 | 13.04 | 86.96 |
| Total | 9,107 | 100 | 1,229 | 100 | 7,878 | 100 | 13.50 | 86.50 |

Panel D: Distribution by IDB-identity

| ndividual investors | High powered incentive IDBs | | | Representative IDBs | | Total |
|---|---|---|---|---|---|---|
| | Hedge funds | Private equity | Venture capital | Corporations | Fiduciary trust | |
| 74.20 | 2.96 | 6.90 | 2.22 | 6.08 | 7.64 | 100 |
| | | 12.08 | | 13.72 | | |

## Appendix Table A.2: Descriptive statistics and variable definitions

| ***Variable***: Definition and explanations | Obs. | Mean | Q1 | Median | Q3 | Std. |
|---|---|---|---|---|---|---|
| Variables of interest | | | | | | |
| ***IDB*** =1, if a firm has an independent director who is at least a $15 million block holder; 0 otherwise | 9,107 | 0.135 | | | | |
| ***Stock ownership*** of the largest IDB in millions of constant 2000 dollars when ***IDB=1*** | 1,229 | 218.79 | 22.14 | 39.19 | 113.94 | 712.80 |
| ***% Stock ownership*** of the largest IDB when $***IDB=1*** | 1,229 | 5.8 | 0(<1) | 2.4 | 7.3 | 8.75 |
| Dependent variables | | | | | | |
| ***Cash holdings***: (Cash and marketable securities / total assets)*100; from Compustat. † | 9,103 | 14.604 | 2.180 | 7.120 | 21.110 | 17.332 |
| ***Dividend yield***: (Common dividends / Market capitalization)*100; from Compustat. † | 9,097 | 0.898 | 0 | 0 | 1.439 | 1.383 |
| ***Dividend dummy***: Dummy variable equal to one if the firm paid a common dividend in that year, and zero if it did not; from Compustat (1/0) | 9,106 | 0.497 | | | | |
| ***Repurchase***: (Purchases of common and preferred stock / Market capitalization)*100; from Compustat. † | 9,097 | 2.167 | 0 | 0.278 | 2.730 | 4.054 |
| ***Total payout***: (Common dividend plus purchases of common and preferred stock / Market capitalization)*100; from Compustat. † | 9,097 | 3.096 | 0 | 1.716 | 4.264 | 4.472 |
| ***Capital expenditures***: (Capital expenditures / total assets)*100; from Compustat. † | 9,106 | 5.738 | 2.330 | 4.190 | 7.330 | 5.179 |
| ***R&D expenditures***: (R&D expenditures / total assets)*100; from Compustat. † | 9,106 | 3.361 | 0 | 1.430 | 4.690 | 5.483 |
| ***Investment expenditure***: (Capital expenditures plus R&D expenditures / total assets)*100; from Compustat. † | 9,106 | 9.138 | 4.140 | 7.240 | 12.130 | 7.158 |
| ***Leverage***: (Total debt / total assets)*100; from Compustat. † | 9,106 | 22.103 | 6.030 | 21.480 | 33.380 | 17.663 |
| ***Total risk***: Log (variance of daily stock returns over firm-fiscal year, annualized); from CRSP. | 9,100 | -7.243 | -7.851 | -7.299 | -6.681 | 0.866 |
| ***Systematic risk***: Log (variance of the predicted portion of the market model, annualized); from CRSP. | 9,100 | -9.356 | -10.065 | -9.294 | -8.557 | 1.331 |
| ***Unsystematic risk***: Log (variance of the residual of the market model, annualized); from CRSP. | 9,100 | -7.440 | -8.073 | -7.485 | -6.845 | 0.888 |
| ***Excess return***: Stock return minus Fama-French size and book-to-market matched portfolio (5×5) returns over firm-fiscal year. From CRSP and Ken French's website. † | 9,037 | 3.729 | -29.351 | -2.690 | 26.466 | 56.123 |
| Independent variables | | | | | | |
| ***Market capitalization$_t$***: Market value of equity, in millions of constant 2000 dollars; from Compustat. † | 9,097 | 8,642 | 641 | 1,646 | 5,227 | 25,767 |
| ***Total assets$_t$***: in millions of constant 2000 dollars; from Compustat. † | 9,106 | 5,564 | 597 | 1,457 | 4,367 | 13,253 |
| ***Sales$_t$***: in millions of constant 2000 dollars; from Compustat. † | 9,105 | 5,333 | 591 | 1,478 | 4,427 | 11,793 |
| ***PPE$_t$***: (Property, plant and equipment / total assets)*100; from Compustat. † | 9,087 | 28.92 | 12.28 | 22.87 | 40.55 | 21.72 |
| ***NWC$_t$***: (Net working capital net of cash holdings / total assets)*100; from Compustat. † | 9,104 | 7.15 | -1.68 | 6.16 | 15.95 | 14.45 |

## Appendix Table A.2 (cont.)

| ***Variable***: Definition and explanations | Obs. | Mean | Q1 | Median | Q3 | Std. |
|---|---|---|---|---|---|---|
| ***Acquisitions$_t$***: (Acquisitions / total assets)*100; from Compustat. † | 9,106 | 2.89 | 0 | 0.02 | 2.60 | 6.29 |
| ***Cash flow$_t$***: (Cash flow / total assets)*100; from Compustat. † | 9,083 | 8.50 | 5.41 | 8.73 | 12.36 | 8.18 |
| ***Cash flow volatility***: Standard deviation of (cash flow/ total assets) over 10 years with a minimum 4 years data; otherwise it is substituted by the mean of the standard deviations of (cash flow/ total assets) over 10 years for firms in the same industry, as defined by Fama-French 48 industries. Form Compustat. † | 9,107 | 5.02 | 1.97 | 3.11 | 5.58 | 6.07 |
| ***Loss indicator***: A Dummy variable equal to one if net income is less than zero, and zero otherwise. From Compustat. (1/0) | 9,104 | 0.190 | | | | |
| ***Bond rating***: A Dummy variable equal to one if a firm has long-term S&P ratings, and zero otherwise. From Compustat. (1/0) | 9,107 | 0.523 | | | | |
| ***ROA$_{t-1}$***: (Net income / total assets)*100; from Compustat. † | 9,105 | 4.22 | 1.79 | 5.32 | 9.23 | 10.52 |
| ***OPS$_{t-1}$***: (Earnings before depreciation, interest, and tax / Sales)*100; from Compustat. † | 9,072 | 14.95 | 8.45 | 13.91 | 21.27 | 17.61 |
| ***Stock return$_{t-1}$***: Average of daily stock returns during the fiscal year with minimum 2/3$^{rd}$ non-missing daily returns; from CRSP. † ($\times 10^4$) | 8,978 | 8.684 | -1.688 | 7.946 | 17.580 | 18.443 |
| ***Return volatility$_t$***: Standard deviation of daily stock returns during the fiscal year with minimum 2/3$^{rd}$ non-missing daily returns; from CRSP. † | 9,079 | 2.95 | 1.97 | 2.60 | 3.55 | 1.37 |
| ***Net equity issuance$_t$***: (Equity sales minus equity purchases / total assets.)*100; from Compustat. † | 9,105 | -1.09 | -2.38 | 0 | 0.78 | 6.87 |
| ***Net debt issuance$_t$***: (Total debt issuance minus debt retirement / total assets)*100; from Compustat. † | 9,067 | 1.30 | -2.17 | 0 | 3.80 | 9.52 |
| ***Sales growth***: It is the mean of yearly sales growth rate of the past 5 year (i.e., sales growth is computed as $\frac{1}{5}\sum_{s=1}^{5} log\left(\frac{sales_{t-s}}{sales_{t-s-1}}\right)$ and expressed in percentage); from Compustat. † | 9,080 | 13.66 | 3.65 | 10.06 | 19.56 | 17.21 |
| ***Tobin's q$_{t-1}$***: (Book value of total assets + Market value of equity - Book value of equity) / Book value of total assets; from Compustat.† | 9,091 | 2.27 | 1.27 | 1.68 | 2.52 | 1.80 |
| ***Percentage of option-based pay$_t$***: Percentage of total pay for the top five managers received in stock options, as the ratio of the value of stock option grants divided by the sum of the value of stock option grants, salary and bonus; from Compustat. † | 9,107 | 39.93 | 14.43 | 41.69 | 62.35 | 28.22 |
| ***Insider ownership$_t$***: Percentage of top five insider holdings of common stocks to the total shares outstanding; from Compustat. † | 9,099 | 3.40 | 0.22 | 0.70 | 2.49 | 7.22 |
| ***Institutional ownership$_t$***: Fraction of the total shares outstanding held by institutional investors; from TFN Institutional. † | 9,107 | 0.641 | 0.535 | 0.698 | 0.821 | 0.260 |
| ***Firm age***: Max(CRSP listing age, Compustat listing age) in years | 9,107 | 27.31 | 11 | 20 | 39 | 20.06 |
| ***Altman Z***: A modified version of the Altman (1968) Z-score, as in MacKie-Mason (1990), computed as ((3.3*EBIT + Sales + 1.4* Retained earnings + 1.2*Working Capital) / Total assets); from Compustat. † | 8,862 | 2.03 | 1.34 | 2.04 | 2.75 | 1.37 |
| ***Board size***: Number of directors on the board; calculated from RM Directors. | 9,107 | 8.93 | 7 | 9 | 10 | 2.42 |
| ***Fraction of independent directors***: Fraction of independent directors on the board; calculated from RM Directors. | 9,107 | 0.66 | 0.56 | 0.67 | 0.80 | 0.17 |
| ***Classified board***: Firm has a classified or staggered board; data from RM Governance (1/0) | 8,509 | 0.61 | | | | |

## Appendix Table A.2 (cont.)

| ***Variable***: Definition and explanations | Obs. | Mean | Q1 | Median | Q3 | Std. |
|---|---|---|---|---|---|---|
| ***G-index***: Governance Index equals the number of anti-takeover provisions in a firm out of 24 different bylaw, charter provisions, and state laws from Gompers, Ishii, and Metrick (2003). Missing values of G-index in a given year are replaced by its value in the prior year. Data from RM Governance. | 8,509 | 9.30 | 7 | 9 | 11 | 2.60 |
| ***Net E-index***: Entrenchment Index minus classified board. Entrenchment index consists of 6 different anti-takeover provisions from bylaws and charter amendments, from Bebchuk, Cohen, and Ferrell (2009); data from RM Governance. | 8,509 | 1.67 | 1 | 2 | 2 | 1.01 |
| ***CEO is chairman***: CEO is also the chairman of the board; obtained from ExecuComp (1/0) | 9,107 | 0.62 | | | | |
| ***CEO on nominating committee***: CEO is on the nominating committee or on the corporate governance committee when there is no nominating committee; based on RM Director and Execucomp (1/0) | 9,019 | 0.31 | | | | |
| ***Outside CEO-directors***: Fraction of non-employee directors that are active CEOs; calculated from RM Director | 9,107 | 0.142 | 0 | 0.125 | 0.222 | 0.131 |
| ***Number of business segments***: Number of business segments reported in Compustat Segment. | 8,366 | 3.32 | 1 | 3 | 5 | 2.66 |
| ***Herfindahl segment sales***: $\sum_{i=1}^{N}(Segment\ sales_i/Firm\ sales)^2$ where $i$ indexes segments; form Compustat Segment. | 8,366 | 0.677 | 0.395 | 0.676 | 1 | 0.305 |
| ***Delta***: Dollar change in CEO stock and option portfolio for 1% change in stock price measured, using Core and Guay (2002) methodology, divided by CEO's total compensation. Data from ExecuComp. † | 9,098 | 8.219 | 2.161 | 4.538 | 8.509 | 1.581 |
| ***Vega***: Dollar change in CEO option holdings for a 1% change in stock return volatility, in 2000 dollars, using Core and Guay (2002) methodology. Data from ExecuComp. † | 9,107 | 61.741 | 6.571 | 24.043 | 64.438 | 142.006 |
| ***Δ Cash holdings***: ((Cash holdings$_t$ – cash holdings$_{t-1}$) / Market capitalization$_{t-1}$)*100; from Compustat. † | 9,089 | 1.25 | -0.11 | 0.41 | 3.14 | 8.54 |
| ***Δ Dividends***: ((Dividends$_t$ – dividends$_{t-1}$) / Market capitalization$_{t-1}$)*100; from Compustat. † | 9,077 | 0.010 | 0 | 0 | 0.059 | 0.589 |
| ***Δ Capex***: ((Capital expenditures$_t$ – Capital expenditures$_{t-1}$) / Market capitalization$_{t-1}$)*100; from Compustat. † | 9,093 | -0.10 | -0.73 | 0.12 | 1.02 | 4.99 |
| ***Δ R&D***: ((R&D expenditures$_t$ – R&D expendituress$_{t-1}$) / Market capitalization$_{t-1}$)*100; from Compustat. † | 9,093 | 0.06 | 0 | 0 | 0.15 | 1.31 |
| ***Δ Debts***: (Debt issuance minus debt redemption/ Market capitalization$_{t-1}$)*100; from Compustat. † | 9,093 | 1.02 | -1.80 | 0 | 2.19 | 13.36 |
| ***Δ Equity***: (Equity issuance minus repurchases/ Market capitalization$_{t-1}$)*100; from Compustat. † | 9,093 | -0.41 | -1.91 | 0 | 0.67 | 5.32 |
| ***Δ Interest*** expense: ((Interest expense$_t$ – Interest expense$_{t-1}$) / Market capitalization$_{t-1}$)*100; from Compustat. † | 9,093 | 0.14 | -0.11 | 0 | 0.24 | 1.17 |
| ***Δ Earnings***: ((Earnings$_t$ – Earnings$_{t-1}$) / Market capitalization$_{t-1}$)*100; from Compustat. † | 9,091 | 0.73 | -1.65 | 0.68 | 2.89 | 13.57 |
| ***Δ Net assets***: (Total asset minus cash holdings$_t$ – total asset minus cash holdings$_{t-1}$ / Market capitalization$_{t-1}$)*100; from Compustat. † | 9,089 | 5.35 | -1.52 | 3.50 | 11.06 | 30.71 |
| ***$C_{t-1}$***: (Cash holdings$_{t-1}$) / Market capitalization$_{t-1}$)*100; from Compustat. † | 9,093 | 11.03 | 2.11 | 5.75 | 13.44 | 15.33 |
| ***$L_t$***: (Total debt$_t$ / Market capitalization$_{t-1}$)*100; from Compustat. † | 9,096 | 19.86 | 3.22 | 14.57 | 30.09 | 19.75 |

† Top and bottom half percent values of the variables are winsorized.