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

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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, payout and research and development (R&D) expenditures, (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 IDB presence plays a valuable role in shaping some corporate policies and allocating corporate resources.

Keywords: Agency problems; corporate governance; boards of directors; blockholders; corporate policies; cash holdings; dividends; investment; financial leverage; firm risk; firm valuation.

JEL Classifications: G32, G34, G35

1. Introduction

Separation of ownership and control creates agency problems between managers and shareholders (see, e.g., Berle and Means, 1932; Jensen and

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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 *et al.* (2007)). In this paper, we examine (1) the relation between a potent governance mechanism, namely the presence of an independent director who is a blockholder (IDB), and several key corporate policies and (2) the market valuation of the changes in these policies associated with IDB presence.

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 chief executive officers (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 her 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 (IB) 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 her 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 *et al.* (2011) suggests, likely holds an underdiversified portfolio. So an IDB may prefer the firm to take less risk than other shareholders, who typically hold well-diversified portfolios. Thus, whether an IDB acts to reduce agency problems or exacerbate them is an empirical issue. Prior empirical evidence suggests that on net, IDB presence reduces managerial agency problems (see, e.g., Bertrand and Mullainathan (2001) and Agrawal and Nasser (2018)).

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, some financial policies, such as debt and dividends, themselves serve as control mechanisms that reduce managerial discretion by committing (or quasi-committing, in the case of dividends) the firm to pay out cash. Here, an IDB's presence acts as an alternate control mechanism that can substitute or complement the discipline imposed by debt and dividends.

Alternatively, an IDB can mitigate agency problems by better contracting with the CEO, as prior evidence (see, e.g., Bertrand and Mullainathan (2001), Cyert *et al.* (2002) and Agrawal and Nasser (2018)) suggests, and leave the decisions on financial and investment policies to the CEO. The IDB, in this case, avoids being a "back seat driver", instead of second-guessing management on specific 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. We rely on prior evidence that IDB presence reduces agency problems and try to characterize the nature of the dominant agency problem that arises when choosing different corporate policies. Specifically, we 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 Sec. 2 below. Our approach follows Bertrand and Mullainathan (2003), who try to distinguish between two competing agency hypotheses about the nature of the agency problem that plagues corporate investment decisions, and assume that closer monitoring of managers reduces agency problems.

Second, while prior evidence suggests that firm value is higher in IDB presence because of lower agency problems (see Agrawal and Nasser (2018)), it does not identify the particular channels via which this value-increase occurs. We provide direct evidence on this issue by building on the recent literature that examines how the market evaluates changes in corporate cash holdings associated with various firm and governance attributes. This

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

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 *et al.* (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 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 her monitoring are divided pro rata among all stockholders, while she 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 *et al.* (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). We develop an instrument for IDB based on the idea that wealthy individuals tend to invest in public companies located nearby, either due to better monitoring ability or lower asymmetric information (see, e.g., Becker *et al.* (2011)).[2] Given individual wealth constraints and preferences for the type of firm they want to invest in, a wealthy individual investor is more likely to build up a substantial ownership stake in a local firm when there is a large selection of small and mid-sized firms to choose from. Getting a board seat is also somewhat easier in such firms

[2] The tendency of individuals to invest locally is well-established in the literature on local bias in investing (see, e.g., Lerner (1995), Coval and Moskowitz (1999), and Bailey *et al.* (2008)).

compared to large firms. Moreover, a wealthy individual is more likely to be prominent in an area that has fewer other wealthy investors, making it somewhat easier for her to obtain a board seat in the firm. This is essentially a "big fish in a small pond" effect. The instrument we develop, which we call the *ease of IDB formation* (*EIF*), is a product of three binary variables that together capture the ease of block formation and obtaining a board seat in a firm. EIF = (*Fewer wealthy individuals* $*$ *More Compustat firms* $*$ *More small firms*). *Fewer wealthy individuals* $= 1$, if the number of million dollar homes in the area is less than the sample median for the year. *More Compustat firms* $= 1$, if the number of Compustat firms in the area is greater than the sample median for the year. *More small firms* $= 1$, if at least two-thirds of the Compustat firms in the area have market values below the top quartile of the sample during the year. All three binary variables are based on an area that includes all counties within a 30-mile radius of the headquarters of a given firm. While EIF can explain IDB presence in a firm, and empirically it does so significantly, it is plausibly exogenous to our main dependent variables (corporate policies such as the levels of cash holdings, payout, debt, investment, and risk-taking).[3]

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 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 firm fixed-effects regressions to mitigate endogeneity concerns stemming from possible omitted variables. When we use firm fixed-effects regressions, instead of OLS, the results are qualitatively similar. As with most studies in corporate finance, endogeneity is hard to completely rule out. Despite any residual concerns about this issue, our results are quite interesting.

We analyze these issues using a panel containing about 9,050 firm-years of data on S&P 1500 firms over 1998–2006. 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) lower levels of R&D expenditures, (3) higher levels of capital spending, particularly in high growth firms, and (4) lower systematic, unsystematic and total risk. Finally, overall firm valuation is higher in firms with IDBs and the market appears to

[3] We also use the predicted value of IDB presence using a probit model as an instrument. Using this nonlinear 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.

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 risky R&D spending, while increasing less risky capital expenditures. Second, lower payout 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 *et al.* (2003) results point to managers' proclivity toward "empire building". Our finding of higher levels of capital spending in IDB presence suggests that the dominant agency problem with corporate investments is managers' tendency toward a "quiet life". Overall, our results suggest that IDBs play a valuable role in valuable role in shaping some corporate policies and allocating corporate resources.

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, (2) accounting for the endogeneity of the presence of such IBs 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 *et al.* (2011) examine the effect of the presence of an individual, non-managerial blockholder 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 Becker *et al.* work by providing a direct examination of these issues. Our findings about IDBs' effects are similar to their findings about blockholders' 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 characterize the nature of the dominant agency problem that plagues each corporate policy choice. In doing this, we assume that managers who are monitored closely are less likely to put their own interests ahead of shareholders. We rely on prior empirical evidence that the presence of an independent director who owns a large block serves as an effective monitoring mechanism and reduces managerial agency problems (see, e.g., Bertrand and Mullainathan (2001) and Agrawal and Nasser (2018)). We then attempt to distinguish among predictions of competing agency models regarding an IDB's effect on each corporate policy choice. This approach follows Bertrand and Mullainathan (2003). 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 *et al.* (2009) for supportive

[4] Slovin and Sushka (1993) use a complementary approach to analyzing causality from blocks to corporate policies. They find (in Table 7) a large positive stock price reaction to the announcement of sale of a deceased insider's block to an outsider, suggesting that the market views outside block formation favorably.

Table 1. IDB presence and corporate policies.

Corporate Policy	Hypothesis	Prediction on IDB's Effect on the Policy
Cash Holdings	Free Cash Flow (Jensen, 1986)	↓
	Corporate Control (Harford *et al.*, 2008)	↑
	Efficient Contracting	—
Capital Expenditure	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	—

Note: This table summarizes the predictions of competing agency hypotheses regarding an IDB's effect on each corporate policy choice, assuming that IDB presence reduces agency problems.

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 *et al.* (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 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 act as control mechanisms that reduce managerial discretion by bonding (or quasi-bonding, in case of dividends) the firm to pay out cash. Since the presence of 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 do not 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, IDB presence 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*.

Next, as we find in Sec. 3.1 later, most IDBs are individual investors.[5] Individual wealth constraints and the evidence in Faccio *et al.* (2011) imply that IDBs hold under-diversified portfolios. Consequently, IDBs likely prefer lower risk-taking by the firm compared to well-diversified investors. Accordingly, they appear to lower CEOs' risk-incentives (see Agrawal and Nasser (2018)). Therefore, we expect firms with IDBs to invest less in R&D, which are particularly high-risk, lottery-like projects (see, e.g., Adhikari and Agrawal (2016)), and to take less risk overall. We also expect IDBs to be

[5] This is perhaps not surprising, given the variety of constraints that prevent institutional investors from holding board seats (see, e.g., Roe (1994)).

averse to both systematic and idiosyncratic risk, which implies that stocks of firms with IDBs should have lower levels of both risk components.

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 aforementioned 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.[6] 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 financial and utility firms.

3.1. *Main explanatory variable and sample construction*

We define a blockholder as an individual who owns at least US$15 million of a firm's equity in inflated-adjusted year 2000.[7] This value is roughly equal to 1% of

[6] 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.

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

the median market capitalization (US$1.6 billion) of our sample firm-years.[8] We define independent directors as directors classified as independent or designated in RM Directors.[9] So an IDB is an independent director who is (or represents) a blockholder. The main variable of interest for our analysis is *IDB*, which is a binary variable that equals 1 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 16,967 distinct firm-calendar years in RM Directors.[10] 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

[8] 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 later.

[9] RM Directors defines an independent director as one 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.

[10] 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.

Table 2. Sample construction.

Number of Firm-Years in the Sample *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	
		9,107
Exclude Observations with Missing Information to Construct EIF Dummy	57	
Number of Firm-Years in the Final Sample		9,050

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

omits observations for the 1997 fiscal year because information on board committees starts in RM Directors database in 1998. In addition, we exclude 1,223 firm-year observations on dual-class firms because such firms tend to be family-controlled (see DeAngelo and DeAngelo (1985)). After excluding financial and utility firms from our sample and excluding the observations with missing information to construct the IV, our final sample for the main analysis consists of 9,050 firm-years over 1998–2006.

Appendix Table A.1 provides an overview of our sample. Panel C shows that of the 9,050 firm-years in our sample, 1,221 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 1,610 unique firms. Of these, 543 firms are present in all nine years during 1998–2006 and 1,214 firms 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, 1,189 firms have no IDB during 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 940 in 2006 to 1,064 in 2001. The percentage of firms with IDBs ranges from 12.22 in 1998 to 15.25 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 indirectly via a beneficial trust or investment vehicle (12%). The remaining IDBs represent hedge funds (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 1,221 firm-years in our sample with at least one IDB. The mean (median) stock ownership is US$215.20 million (US$39.05 million) in constant year 2000, representing about 13.20% (2.40%) of the median market capitalization (US$1,630 million) in our total sample of firm-years.

3.2. *IVs 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. In addition to including a large set of explanatory variables in our regressions to reduce the possibility of omitted variables, we employ two main approaches to mitigate concerns about the endogeneity of IDB presence in a firm: two-stage least squares (2SLS) and treatment effect models. We discuss these models in the next two subsections. Moreover, we also use fixed-effects regressions and a generated IV approach, with qualitatively similar results (un-tabulated).

3.2.1. 2*SLS models*

We estimate 2SLS models 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. As discussed in the introduction, we develop an instrument for IDB presence based partly on the findings of the literature on “home bias at home” (see, e.g., Coval and Moskowitz (1999)) that individuals tend to invest more in stocks of local firms. Given individual wealth constraints, block formation by an individual investor is more likely if there are a large number of small to mid-size firms to choose from in an area. Consistent with a "big fish in a small pond" effect, an individual blockholder is more likely to obtain a board seat in the firm if she is prominent in the area near the firm headquarters. Our instrument for IDB presence is the IV *ease of IDB formation* (EIF). EIF equals 1 if the area covering all counties within a 30-mile radius centered at the firm headquarters has the following characteristics: (1) the number of million dollar homes in the area is less than the sample median for the year, (2) the number of firms in the area is greater than the sample median for the year, and (3) at least two-thirds of the firms in the area have market values below the top quartile of the sample during the year; it equals zero otherwise. While we expect EIF to explain IDB presence in a firm, and empirically it does so significantly, there is no reason why it should explain our main dependent variables (i.e., levels of cash holdings, dividends, investment, leverage, firm risk and excess return), except via its effects on IDB presence in a firm.

We obtain data on residential property values for each county from the National Historical Geographic Information System (NHGIS). We find zip codes of firm headquarters from Compustat, and cross-check them with EDGAR filings to account for any changes of headquarters locations. We use the SAS map area identification variables, particularly Federal Information Processing Standards (FIPS) codes for identifying each county's primary postal zip codes. We then use the SAS *Zipcitydistance* Function to measure the distance between a firm's headquarters location and the neighboring counties' primary postal zip codes.

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. 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), which holds in our case. Given Bertrand and Schoar (2003) finding of systematic differences in corporate decision-making across individual CEOs, we compute robust standard errors clustered at the CEO-firm level.

Some of our main dependent variables in Sec. 4 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 instrument 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.[11]

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)).

3.2.2. *Treatment effect models*

We next account for endogeneity stemming from a selection bias in IDB presence in a firm by using treatment effect models. Heckman (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 follow Agrawal and Nasser (2018) 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

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

our dollar threshold definition of a blockholder in Table 3 ($IDB_{\$}$ or IDB). Panel A presents univariate tests of 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.[12]

Panel B of Table 3 presents regression results of IDB presence on its potential determinants. Models 1–3 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.

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 capitalization; dividend dummy is a binary

[12] 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 IBs have strong incentives and the ability to monitor the CEO, powerful CEOs are likely to resist their appointment to the board.

Table 3. Determinants of IDB presence.

Panel A: Univariate tests and correlations

	Non-IDB Firm-Years				IDB Firm-Years						Pearson Correlation		Spearman Correlation	
	N	Mean	S.D.	Median	N	Mean	S.D.	Median	t-Test	z-Value	ρ	p-Value	ρ	p-Value
CEO is Chairman (1/0)	7,829	0.628			1,221				4.436***		−0.047	0.000		
CEO on Nomination Comm. (1/0)	7,747	0.308			1,212				−0.695		0.008	0.487		
Outside CEO-Directors	7,829	0.143	0.133	0.125	1,221	0.135	0.119	0.125	1.852*	1.213	−0.020	0.064	−0.013	0.225
Board Size	7,829	8.773	2.372	9.000	1,221	9.879	2.557	10.000	−14.991***	−14.538***	0.156	0.000	0.153	0.000
Fraction of Independent Directors	7,829	0.664	0.173	0.670	1,221	0.664	0.163	0.670	0.081	0.819	−0.001	0.936	−0.009	0.413
Classified Board (1/0)	7,351	0.617			1,114				3.829***				−0.042	0.000
Net E-Index	7,351	1.697	0.999	2	1,114	1.502	1.502	2	6.000***	5.928***	−0.065	0.000	−0.065	0.000
Firm Age	7,829	27.128	20.087	20.000	1,221	28.029	19.715	22.000	−1.461	−2.301**	0.015	0.144	0.024	0.020
Market Capitalization$_{t-1}$($ Mill.)	7,817	7,084	22,458	1,421	1,220	15,847	36,132	3,194	−11.503***	−16.768***	0.120	0.000	0.176	0.000
Cash Holdings$_{t-1}$	7,826	14.789	17.671	6.960	1,221	13.366	17.562	5.560	2.619***	4.073***	−0.028	0.009	−0.043	0.000
Dividend Yield$_{t-1}$	7,817	0.868	1.329	0.000	1,220	0.908	1.317	0.205	−0.982	−2.359**	0.010	0.326	0.025	0.018
OPS$_{t-1}$	7,802	14.410	17.442	13.480	1,213	18.233	18.563	17.780	−7.038***	−10.832***	0.074	0.000	0.114	0.000
R&D Expenditures$_{t-1}$	7,827	3.478	5.656	0.460	1,221	2.927	5.189	0.160	3.203***	2.868***	−0.034	0.001	−0.030	0.004
Sales Growth	7,808	13.006	16.445	9.677	1,215	17.759	21.010	12.842	−8.997***	−7.406***	0.094	0.000	0.078	0.000
Tobin's q_{t-1}	7,814	2.197	1.705	1.656	1,220	2.719	2.298	1.931	−9.432***	−8.990***	0.100	0.000	0.095	0.000
Stock Return Volatility$_{t-1}$	7,722	0.030	0.013	0.027	1,202	0.028	0.012	0.025	5.980***	6.219***	−0.063	0.000	−0.066	0.000
Institutional Ownership$_{t-1}$	7,829	0.618	0.264	0.680	1,221	0.561	0.262	0.607	7.097***	8.498***	−0.074	0.000	−0.089	0.000
Ease of IDB Formation (1/0)	7,829	0.054			1,221	0.087			−4.503***	−4.498***	0.047	0.000		

Table 3. (*Continued*)

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)	−0.0472	0.000	−0.432	0.000	−0.230	0.000	−0.229	0.000
CEO on Nominating Committee (1/0)	0.0223	0.106	0.238	0.078	0.127	0.073	0.137	0.052
Outside CEO-Directors	−0.1224	0.003	−1.340	0.002	−0.718	0.002	−0.700	0.002
Fraction of Independent Directors	0.0837	0.016	0.862	0.011	0.437	0.016	0.390	0.030
Board Size	0.0185	0.000	0.150	0.000	0.085	0.000	0.085	0.000
Classified Board (1/0)	−0.0266	0.050	−0.240	0.059	−0.136	0.043	−0.127	0.058
Net E-Index	−0.0089	0.220	−0.060	0.364	−0.035	0.317	−0.034	0.329
Firm Age	−0.0010	0.008	−0.009	0.013	−0.005	0.014	−0.005	0.007
Log Market Capitalization$_{t-1}$	0.0288	0.000	0.254	0.000	0.137	0.000	0.143	0.000
Cash Holdings$_{t-1}$	−0.0005	0.181	−0.006	0.196	−0.003	0.153		
Dividend Yield$_{t-1}$	0.0002	0.629	0.003	0.547	0.001	0.664		
OPS$_{t-1}$	−0.0034	0.466	−0.044	0.388	−0.023	0.391		

Table 3. (*Continued*)

Panel B: Regressions

	1 OLS		2 Logit		3 Probit		4 Probit	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
R&D Expenditures$_{t-1}$	−0.0001	0.912	−0.003	0.796	−0.001	0.838		
Tobin's q_{t-1}	0.0110	0.018	0.077	0.019	0.047	0.012	0.037	0.037
Sales Growth	0.0016	0.000	0.015	0.000	0.008	0.000	0.008	0.000
Stock Return Volatility$_{t-1}$	−0.0150	0.006	−0.172	0.007	−0.093	0.004	−0.106	0.001
Institutional Ownership$_{t-1}$	−0.1088	0.000	−0.898	0.000	−0.500	0.000	−0.494	0.000
Ease of IDB Formation	0.0689	0.008	0.541	0.005	0.306	0.004	0.313	0.003
N	8,256		8,256		8,256		8,286	
Adjusted R^2/Pseudo R^2	0.082		0.106		0.107		0.105	

Notes: 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 LPM, logit and probit regressions of IDB. IDB is a binary variable that equals 1 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.

variable that equals 1 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.[13]

Appendix Table A.2 provides descriptive statistics of these variables. The median cash holding is 7.10% of total assets. About 50% of our sample firm-years pay no dividends and the median dividend yield for the firms that pay dividend is about 1.14% (not tabulated). Similarly, in un-tabulated data, 42% (25%) of the sample firm-years have no repurchases (payouts). The median capital expenditures, R&D expenditure and total debt are about 4.17%, 0.43% and 21.43% of total assets, respectively. In our sample, about 12% of the firm-years have no debt and 46% of the firm-years incur no R&D expenditures (un-tabulated).

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

[13] 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.

French 12 industry dummies.[14] We winsorize the top and bottom one-half percent of the observations of all financial variables, ownership and compensation variables, firm size variables, sales 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 US$1.63 billion and US$1.45 billion, respectively, in constant year 2000. The median firm age (using earliest of CRSP and Compustat listing dates) is 20 years. The median board size is nine and the median fraction of independent directors is 0.67. The median total ownership of a firm's top five executives is 0.70% 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 (Sec. 4.1), dividends and payout (Sec. 4.2), investment (Sec. 4.3), and financial leverage (Sec. 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 12.88% (5.92%) and 14.89% (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 barely significantly different. As indicated by univariate tests, firms with IDB presence are associated with lower R&D expenditures but higher capital expenditures. 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

[14] 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.

Table 4. Univariate tests and correlations.

	Non-IDB Firm-Years				IDB Firm-Years						Pearson Correlation		Spearman Correlation	
	N	Mean	S.D.	Median	N	Mean	S.D.	Median	t-Test	z-Value	ρ	p-Value	ρ	p-Value
Panel A: Dependent variables														
Cash $Holdings_t$	7,826	14.894	17.519	7.345	1,221	12.879	16.222	5.920	3.773***	4.105***	−0.040	0.000	−0.043	0.000
Dividend $Yield_t$	7,820	0.893	1.390	0	1,221	0.928	1.348	0.256	−0.807	−2.589***	0.009	0.420	0.027	0.010
Dividend $Dummy_t$ (1/0)	7,828	0.490			1,221	0.545			−3.638***		0.038	0.000		
$Repurchases_t$	7,820	2.205	4.128	0.276	1,221	1.934	3.489	0.316	2.179**	0.200	−0.023	0.029	−0.002	0.842
Total $Payout_t$	7,820	3.130	4.540	1.723	1,221	2.900	3.966	1.695	1.675*	−0.444	−0.018	0.094	0.005	0.657
Capital $Expenditures_t$	7,829	5.690	5.127	4.140	1,221	6.056	5.548	4.310	−2.294**	−2.062**	0.024	0.022	0.022	0.039
R&D $Expenditures_t$	7,829	3.445	5.572	0.460	1,221	2.840	4.899	0.170	3.579***	2.852***	−0.038	0.000	−0.030	0.004
$Leverage_t$	7,829	21.909	17.618	21.350	1,221	23.176	18.022	21.800	−2.331**	−2.298**	0.025	0.020	0.024	0.022
Total $Risk_t$	7,823	−7.221	0.867	−7.275	1,220	−7.377	0.849	−7.419	5.828***	5.523***	−0.061	0.000	−0.058	0.000
Systematic $Risk_t$	7,823	−9.339	1.341	−9.276	1,220	−9.460	1.277	−9.414	2.937***	3.781***	−0.031	0.003	−0.040	0.000
Unsystematic $Risk_t$	7,823	−7.417	0.890	−7.466	1,220	−7.577	0.869	−7.615	5.835***	5.475***	−0.061	0.000	−0.058	0.000
Excess $Return_t$	7,770	2.828	56.025	−3.095	1,211	9.924	57.086	1.396	−4.090***	−4.540***	0.043	0.000	0.048	0.000
Panel B: Independent variables														
Market $Capitalization_t$ ($ Mill.)	7,820	7,316	23,225	1,456	1,221	16,736	37,171	3,586	−11.979***	−18.514***	0.125	0.000	0.195	0.000
Total $Asset_t$ ($ Mill.)	7,829	5,133	12,818	1,304	1,221	8,589	14,833	2,602	−8.569***	−14.690***	0.090	0.000	0.154	0.000
$Sales_t$ ($ Mill.)	7,828	4,943	11,400	1,366	1,221	7,627	13,691	2,332	−7.435***	−11.337***	0.078	0.000	0.120	0.000
PPE_t	7,811	28.593	21.558	22.550	1,220	30.724	22.674	25.785	−3.188***	−3.000***	0.034	0.001	0.032	0.003
NWC_t	7,826	7.395	14.512	6.607	1,221	5.693	14.178	3.682	3.823***	4.792***	−0.040	0.000	−0.050	0.000
$Acquisition_t$	7,828	2.890	6.302	0	1,221	2.875	6.182	0.120	0.081	−1.363	−0.001	0.936	0.014	0.173
Cash $Flow_t$	7,811	8.396	8.203	8.669	1,216	9.184	8.142	9.044	−3.119***	−3.225***	0.033	0.002	0.034	0.001
Cash Flow Volatility	7,829	5.058	6.020	3.132	1,221	4.893	6.524	2.921	0.878	4.015***	−0.009	0.380	−0.042	0.000
Loss Indicator (1/0)	7,827	0.198			1,221	0.142			4.631***		−0.049	0.000		
Bond Rating (1/0)	7,829	0.508			1,221	0.613			−6.791***		0.071	0.000		
ROA_{t-1}	7,827	4.039	11.095	5.270	1,221	5.438	10.113	5.710	−4.144***	−4.370***	0.044	0.000	0.046	0.000
Stock Return $_{t-1}$ ($\times 10^4$)	7,719	8.536	18.516	7.936	1,202	9.708	18.117	8.307	−2.046**	−1.902**	0.022	0.041	0.020	0.057
Return $Volatility_t$	7,823	0.030	0.014	0.026	1,220	0.028	0.013	0.024	5.418***	5.581***	−0.057	0.000	−0.059	0.000
Net Equity $Issuance_t$	7,828	−1.016	6.908	0.003	1,221	−1.556	6.652	0	2.557**	2.031**	−0.027	0.011	−0.021	0.042

Table 4. (*Continued*)

	Non-IDB Firm-Years				IDB Firm-Years						Pearson Correlation		Spearman Correlation	
	N	Mean	S.D.	Median	N	Mean	S.D.	Median	t-Test	z-Value	ρ	p-Value	ρ	p-Value
Net Debt Issuance$_t$	7,794	1.230	9.510	0	1,217	1.685	9.431	0	−1.552	−1.438	0.016	0.121	0.015	0.150
Percentage of Option-Based Pay$_t$	7,829	39.753	27.989	41.599	1,221	40.340	29.640	41.115	−0.676	−0.332	0.007	0.499	0.004	0.740
Insider Ownership$_t$	7,822	3.451	7.265	0.707	1,221	3.184	7.078	0.647	1.199	3.20***	−0.013	0.230	−0.034	0.001
Institutional Ownership$_t$	7,829	0.649	0.259	0.706	1,221	0.601	0.252	0.650	6.047***	7.814***	−0.063	0.000	−0.082	0.000
Firm Age	7,829	27.128	20.087	20	1,221	28.029	19.715	22	−1.461	−2.301**	0.015	0.144	0.024	0.021
Altman Z	7,628	2.038	1.389	2.050	1,179	1.979	1.254	2.011	1.364	2.225**	−0.015	0.173	−0.024	0.026
G-Index	7,351	9.318	2.590	9	1,114	9.171	2.649	9	1.752*	1.863*	−0.019	0.080	−0.020	0.063
Number of Business Segments	7,222	3.253	2.571	3	1,099	3.647	3.099	3	−4.599***	−2.796***	0.050	0.000	0.031	0.000
Herfindahl Segment Sales	7,222	0.681	0.303	0.683	1,099	0.659	0.318	0.665	2.275**	2.555**	−0.025	0.023	−0.028	0.011
Delta	7,821	7.611	14.057	4.398	1,220	12.114	24.030	5.577	−9.273***	−8.390***	0.097	0.000	0.088	0.000
Vega ($ 000)	7,829	55.699	114.875	23.294	1,221	93.232	239.286	27.021	−8.818***	−3.993***	0.092	0.000	0.043	0.000
Δ Cash Holdings$_t$	7,813	1.263	8.771	0.416	1,220	1.145	6.997	0.367	0.449	−0.014	−0.005	0.654	0.000	0.989
Δ Dividends$_t$	7,803	0.005	0.589	0	1,218	0.040	0.599	0	−1.919*	−4.896***	0.020	0.055	0.052	0.000
Δ Capex$_t$	7,816	−0.159	5.081	0.124	1,220	0.288	4.354	0.125	−2.912***	−0.862	0.031	0.004	0.009	0.389
Δ R&D$_t$	7,816	0.048	1.351	0	1,220	0.134	1.038	0	−2.125**	−1.559	0.022	0.034	0.016	0.119
Δ Debt$_t$	7,816	0.979	13.537	0	1,220	1.266	12.445	0	−0.696	−1.870*	0.007	0.486	0.020	0.062
Δ Equity$_t$	7,816	−0.390	5.384	0.007	1,220	−0.495	4.944	0	0.640	1.479	−0.007	0.522	−0.016	0.139
Δ Interest Expense$_t$	7,816	0.142	1.195	0	1,220	0.150	0.995	0.002	−0.217	−1.274	0.002	0.828	0.013	0.203
Δ Earnings$_t$	7,815	0.659	14.062	0.679	1,220	1.187	10.185	0.716	−1.260	−1.658*	0.013	0.208	0.017	0.097
Δ Net Assets$_t$	7,813	4.894	31.053	3.459	1,220	8.214	28.479	3.636	−3.510***	−2.424**	0.037	0.000	0.026	0.015
C_{t-1}	7,816	11.577	15.834	6.047	1,220	7.580	11.240	4.247	8.489***	9.819***	−0.089	0.000	−0.103	0.000
L_t	7,819	20.127	20.001	14.799	1,221	18.126	18.102	13.715	3.293***	2.243**	−0.035	0.001	−0.024	0.025

Notes: 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.

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 *et al.* (2008), and Bates *et al.* (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

Table 5. Levels of cash holdings.

	OLS (1)		IV-2SLS (2)		Treatment Effect (3)	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
IDB (1/0)	−0.535	0.274	−7.633	0.343	−22.563	0.001
Sales Growth	−0.014	0.365	−0.001	0.950	0.024	0.169
Tobin's q_{t-1}	2.022	0.000	2.104	0.000	2.369	0.000
R&D Expenditures$_t$	0.662	0.000	0.655	0.000	0.636	0.000
NWC$_t$	−0.242	0.000	−0.234	0.000	−0.245	0.000
Cash Flow$_t$	−0.184	0.000	−0.194	0.000	−0.187	0.000
Leverage$_t$	−0.237	0.000	−0.233	0.000	−0.238	0.000
Capital Expenditures$_t$	−0.538	0.000	−0.523	0.000	−0.527	0.000
Acquisitions$_t$	−0.422	0.000	−0.416	0.000	−0.418	0.000
Dividend Indicator$_t$ (1/0)	−1.713	0.001	−1.908	0.001	−1.881	0.000
Loss Indicator$_t$ (1/0)	−0.985	0.053	−1.000	0.051	−0.961	0.020
Log Market Capitalization$_t$	−0.585	0.006	−0.278	0.510	−0.111	0.578
Cash Flow Volatility	0.252	0.000	0.247	0.000	0.234	0.000
Bond Rating (1/0)	−1.365	0.025	−1.559	0.017	−1.303	0.000
Net Equity Issuance$_t$	0.089	0.005	0.081	0.015	0.089	0.001
Net Debt Issuance$_t$	0.151	0.000	0.148	0.000	0.156	0.000
G-Index	−0.242	0.009	−0.273	0.008	−0.393	0.000
Board Size	−0.692	0.000	−0.584	0.000	−0.305	0.038
Fraction of Independent Directors	−0.387	0.786	−0.177	0.903	0.125	0.899
Institutional Ownership$_t$	1.793	0.061	1.132	0.358	−0.359	0.687
Log Insider Ownership	0.074	0.600	0.077	0.591	0.052	0.549
Percentage of Option-Based Pay$_t$	0.004	0.590	−0.002	0.882	0.003	0.642

Table 5. (*Continued*)

	OLS (1)		IV-2SLS (2)		Treatment Effect (3)	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
N	8,382		8,382		8,217	
Adjusted R^2 [χ^2 p-Value]	0.558		0.539		0.000	
Test for Exogeneity p-Value			0.365			
F-Statistic for First-Stage IV			19.24			
Inverse Mills Ratio					12.258	0.001

Notes: This table shows estimates of OLS, 2SLS IV, and Heckman two-stage treatment effect regressions of cash holdings. The sample consists of 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 1 if there is at least one IDB in a given firm-year; it equals zero otherwise. We use robust standard errors clustered at the CEO-firm level for the OLS regression. The second stage of the 2SLS IV estimation instruments IDB by the ease of IDB formation (EIF) dummy. The table reports the 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 two-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. Standard errors of the treatment effect model are estimated with bootstrapping method using 1,000 replications. 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.

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 1 if a firm has S&P long-term bond ratings, and zero otherwise. Bates *et al.* (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 10 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 *et al.* (2003) shareholder rights index). Following Harford *et 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.

Model 1 is the OLS regression of cash holdings, and we find that IDB presence is unrelated to a firm's cash holdings. 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 *et al.* (2008)), lower G-index and higher institutional ownership, as measures of better governance, are associated with higher cash holdings.

In Model 2, we instrument for IDB presence using EIF in the 2SLS framework. The F-statistic for the IV in the first-stage regression is 19.24, far above the cutoff value of 10 recommended by Staiger and Stock (1997), mitigating the concern about weak IV. However, the test for exogeniety indicates that IDB presence is not endogenous in this regression.

We also estimate Heckman's two-stage treatment effect model to account for possible selection bias. Model 3 shows that the inverse Mills ratio is significantly positive, consistent with endogenous selection of IDB presence. In this model, IDB presence reduces the level of cash holdings by 22.56%. Hence, after accounting for potential selection bias of IDB presence, the result is 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 *et al.* (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 (2014) and Grullon *et al.* (2011)). John *et al.* (2015) 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 model to regress dividend yield and the probit 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.* (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 nontrivial. A coefficient of -0.160 represents an 18% 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 EIF. However, based on the p-value of the residual term, we conclude that IDB presence is not endogenous in the dividend yield regression. Similarly, the p-value of the residual term in the Rivers–Vuong model indicates that IDB presence is not endogenous in the regression of the dividend dummy.

We next examine the relation between IDB presence and the levels of repurchases and total payout. Similar to dividend yield, both of these

Table 6. Levels of dividends and payout.

Panel A: Dividends

	Dividend Yield				Dividend Dummy			
	Tobit (1)		Smith–Blundell (2)		Probit (3)		Rivers–Vuong (4)	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
IDB (1/0)	−0.160	0.062	−0.642	0.792	−0.078	0.278	−1.537	0.380
Sales Growth	−0.024	0.000	−0.023	0.000	−0.012	0.000	−0.009	0.037
Tobin's q_{t-1}	0.008	0.787	0.019	0.769	0.064	0.005	0.096	0.032
R&D Expenditures$_t$	−0.035	0.011	−0.035	0.011	−0.017	0.111	−0.017	0.111
Firm Age	0.018	0.000	0.018	0.000	0.014	0.000	0.013	0.000
Log Sales$_t$	0.032	0.421	0.039	0.435	0.131	0.000	0.151	0.000
ROA$_t$	0.008	0.076	0.008	0.074	0.015	0.000	0.015	0.000
Leverage$_t$	0.002	0.484	0.002	0.471	−0.003	0.091	−0.003	0.103
Cash Flow Volatility	−0.050	0.000	−0.051	0.000	−0.041	0.000	−0.043	0.000
Return Volatility$_t$	−0.680	0.000	−0.688	0.000	−0.442	0.000	−0.468	0.000
G-Index	0.042	0.010	0.039	0.046	0.025	0.070	0.017	0.304
Board Size	0.089	0.000	0.099	0.075	0.068	0.000	0.098	0.016
Fraction of Independent Directors	0.646	0.010	0.656	0.011	0.269	0.172	0.302	0.130
Institutional Ownership$_t$	−0.767	0.000	−0.813	0.007	−0.297	0.039	−0.436	0.050
Log Insider Ownership	−0.018	0.441	−0.020	0.416	0.019	0.287	0.013	0.485
Percentage of Option-Based Pay$_t$	−0.012	0.000	−0.012	0.000	−0.007	0.000	−0.008	0.000
Residual			0.483	0.844			1.463	0.404
N	8,422		8,422		8,422		8,422	
Pseudo R^2	0.188		0.188		0.374		0.374	

Table 6. (*Continued*)

Panel B: Repurchase and total payout

	Repurchases				Total Payout			
	Tobit (1)		Smith–Blundell (2)		Tobit (3)		Smith–Blundell (4)	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
IDB (1/0)	−0.546	0.019	3.772	0.455	−0.441	0.016	−0.304	0.939
Sales Growth	−0.014	0.070	−0.023	0.080	−0.018	0.011	−0.018	0.095
Tobin's q_{t-1}	−0.230	0.000	−0.324	0.010	−0.233	0.000	−0.236	0.021
R&D Expenditures$_t$	0.031	0.235	0.031	0.236	0.003	0.908	0.003	0.908
Firm Age	−0.027	0.000	−0.023	0.002	0.001	0.889	0.001	0.894
Log Sales$_t$	0.258	0.004	0.200	0.077	0.133	0.081	0.131	0.166
ROA$_t$	0.075	0.000	0.075	0.000	0.058	0.000	0.058	0.000
Leverage$_t$	−0.007	0.272	−0.008	0.250	0.005	0.434	0.005	0.438
Cash Flow Volatility	0.054	0.001	0.061	0.001	0.026	0.096	0.026	0.112
Return Volatility$_t$	−1.088	0.000	−1.013	0.000	−1.237	0.000	−1.234	0.000
G-Index	−0.038	0.312	−0.014	0.759	0.017	0.582	0.018	0.643
Board Size	−0.034	0.459	−0.123	0.266	0.024	0.533	0.022	0.809

Table 6. (*Continued*)

Panel B: Repurchase and total payout

	Repurchases				Total Payout			
	Tobit (1)		Smith–Blundell (2)		Tobit (3)		Smith–Blundell (4)	
	Coeff.	*p*-Value	Coeff.	*p*-Value	Coeff.	*p*-Value	Coeff.	*p*-Value
Fraction of Independent Directors	0.840	0.175	0.741	0.237	1.249	0.018	1.246	0.020
Institutional Ownership$_t$	−1.018	0.021	−0.604	0.374	−1.544	0.000	−1.531	0.005
Log Insider Ownership	−0.033	0.548	−0.017	0.764	−0.052	0.305	−0.051	0.328
Percentage of Option-Based Pay$_t$	0.013	0.001	0.015	0.001	−0.001	0.876	0.000	0.906
Residual			−4.328	0.392			−0.137	0.972
N	8,422		8,422		8,422		8,422	
Pseudo R^2	0.025		0.025		0.035		0.035	

Notes: 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 of 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 1 if the firm pays dividend in that fiscal year; it equals zero otherwise. IDB is also a binary variable that equals 1 if there is at least one IDB in a given firm-year; it equals zero otherwise. 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 the control variables from the main (Tobit or Probit) regression and the ease of IDB formation (EIF) dummy. Panel B shows estimates of Tobit and second-stage Smith–Blundell 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. We use robust standard errors clustered at the CEO-firm level for all regressions. 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.

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, we find that IDB presence is not endogenous in both repurchases (Model 2) and total payout (Model 4) 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. 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 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 *et al.* (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 the prior literature, we control for firm profitability via lagged ROA and stock returns (see, e.g., Coles *et al.* (2006)). We control for other internal and external governance mechanisms via board structure (board size and the fraction of 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.

Panel A of Table 7 reports regressions of capital expenditures on IDB presence and control variables. In OLS regressions, we find that capital expenditures are unrelated to IDB presence. To account for potential endogeneity, we instrument IDB presence with EIF in a 2SLS regression.

The F-statistic for significance of the IV in the first-stage regression is much larger than the minimum recommended cut-off value of 10, a result that implies that the IVs are not weak. But the test of exogeneity indicates that IDB presence is not endogenous in this regression, implying that OLS should be preferred in this case.

We next use Heckman's treatment effect model to account for the possible selection bias introduced by IDB presence in a firm. Identification in this model is achieved via exclusion restrictions. The estimated coefficient of the inverse Mills ratio is highly significant. This result indicates that self-selection is important here. A negative coefficient of the inverse Mills ratio suggests that the characteristics that cause an IDB to be present in a firm-year are negatively related to capital expenditures. We find that the coefficient of IDB in Model 3 is significantly positive. This finding suggests that IDBs self-select into firms where there is relative underinvestment and that their presence increases capital expenditure. However, an important and strategic component of firms' investment is R&D expenditures. We next examine whether IDB presence is related to R&D expenditure.

Table 7. Levels of investment.

Panel A: Regressions of capital expenditure

	OLS (1)		IV-2SLS (2)		Treatment Effect (3)	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
IDB (1/0)	0.207	0.319	1.138	0.801	2.376	0.004
Tobin's q_{t-1}	0.069	0.230	0.045	0.724	0.009	0.836
Log Sales$_t$	−0.373	0.000	−0.387	0.000	−0.410	0.000
Cash Flow$_t$	0.145	0.000	0.145	0.000	0.156	0.000
ROA$_{t-1}$	−0.011	0.133	−0.011	0.132	−0.012	0.042
Leverage$_t$	0.007	0.163	0.007	0.164	0.007	0.020
Stock Return$_{t-1}$	0.012	0.000	0.012	0.000	0.012	0.000
G-Index	−0.127	0.001	−0.120	0.017	−0.108	0.000
Board Size	0.082	0.037	0.063	0.552	0.043	0.112
Fraction of Independent Directors	−0.599	0.240	−0.593	0.243	−0.589	0.080
Institutional Ownership$_t$	0.184	0.561	0.254	0.587	0.383	0.079
Log Insider Ownership	0.048	0.350	0.048	0.350	0.038	0.221
Percentage of Option-Based Pay$_t$	0.015	0.000	0.015	0.000	0.014	0.000
N	8,356		8,356		8,247	
Adjusted (Pseudo) R^2/[χ^2 p-Value]	0.308		0.305		[0.000]	

Table 7. (*Continued*)

Panel A: Regressions of capital expenditure

	OLS (1)		IV-2SLS (2)		Treatment Effect (3)	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
Test for Exogeneity p-Value			0.772			
F-Statistic for First-Stage IVs			18.22			
Inverse Mills Ratio					−1.243	0.006

Panel B: Regressions of R&D expenditure

	Tobit (1)		Smith–Blundell (2)		IV-Tobit (3)	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
IDB (1/0)	−0.340	0.273	−18.128	0.017	−18.128	0.068
Tobin's q_{t-1}	0.936	0.000	1.389	0.000	1.389	0.000
Log Sales$_t$	−0.451	0.000	−0.179	0.269	−0.179	0.410
Cash Flow$_t$	−0.146	0.000	−0.139	0.000	−0.139	0.000
ROA$_{t-1}$	−0.082	0.000	−0.082	0.000	−0.082	0.000
Leverage$_t$	−0.062	0.000	−0.060	0.000	−0.060	0.000
Stock Return$_{t-1}$	−0.011	0.013	−0.010	0.016	−0.010	0.075
G-Index	−0.018	0.743	−0.141	0.057	−0.141	0.153
Board Size	0.042	0.517	0.403	0.017	0.403	0.070
Fraction of Independent Directors	3.575	0.000	3.461	0.000	3.461	0.001
Institutional Ownership$_t$	−0.386	0.487	−1.737	0.029	−1.737	0.076
Log Insider Ownership	−0.340	0.000	−0.344	0.000	−0.344	0.001
Percentage of Option-Based Pay$_t$	0.025	0.000	0.019	0.000	0.019	0.007
Residual			17.827	0.019		
N	8,356		8,356		8,356	
Adjusted (Pseudo) R^2/[χ^2 p-Value]	(0.188)		(0.188)		[0.000]	
Test for Exogeneity p-Value					0.073	

Panel C: Regressions with IDB and Tobin's q interactions

	Capital Expenditure OLS (1)		R&D Expenditure Tobit (2)	
	Coeff.	p-Value	Coeff.	p-Value
IDB × High Tobin's q_{t-1} (1/0)	0.488	0.053	−0.097	0.794
IDB × Low Tobin's q_{t-1} (1/0)	−0.196	0.502	−0.787	0.097
Tobin's q_{t-1}	0.054	0.353	0.923	0.000

Table 7. (*Continued*)

Panel C: Regressions with IDB and Tobin's q interactions

	Capital Expenditure		R&D Expenditure	
	OLS (1)		Tobit (2)	
	Coeff.	p-Value	Coeff.	p-Value
Log Sales_t	−0.374	0.000	−0.452	0.000
Cash Flow_t	0.145	0.000	−0.146	0.000
ROA_{t-1}	−0.011	0.121	−0.083	0.000
Leverage_t	0.008	0.143	−0.062	0.000
Stock Return_{t-1}	0.012	0.000	−0.011	0.012
G-Index	−0.126	0.001	−0.017	0.750
Board Size	0.083	0.035	0.042	0.521
Fraction of Independent Directors	−0.625	0.220	3.547	0.000
Institutional Ownership_t	0.195	0.536	−0.370	0.505
Log Insider Ownership	0.046	0.377	−0.342	0.000
Percentage of Option-Based Pay_t	0.015	0.000	0.025	0.000
N	8,356		8,356	
Adjusted R^2/[χ^2 p-Value]	0.309		[0.000]	

Notes: Panel A shows estimates of OLS, 2SLS IV and Heckman's treatment effect regressions of capital expenditure. The sample consists of non-dual class S&P 1500 firms, excluding financial and utility firms, during the period 1998–2006 with relevant non-missing data. Capital expenditure is scaled by total assets and expressed as a percentage. IDB is a binary variable that equals 1 if there is at least one IDB in a given firm-year; it equals zero otherwise. The second stage of the 2SLS IV estimation instruments IDB by the ease of IDB formation (EIF) dummy. The table reports the p-value of Durbin–Wu–Hausman test for exogeneity, and the F-test for the IVs of the first stage estimation. We use robust standard errors clustered at the CEO-firm level for all the regressions. Panel B reports Tobit, second-stage Smith–Blundell and IV-Tobit 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 presence on all the control variables from the main (Tobit) regression and the ease of IDB formation (EIF) dummy as the instrument for IDB presence. Panel C presents regressions of capital expenditures and R&D expenditures with additional interaction terms. Models 1 and 2 here are similar to Model 1 of Panels A and B, respectively, except that the IDB dummy is replaced with two interaction variables IDB × High Tobin's q_{t-1} and IDB × Low Tobin's q_{t-1}. High Tobin's q_{t-1} (Low Tobin's q_{t-1}) equals 1 when Tobin's q_{t-1} is above (below) the sample median, and zero otherwise. All the regressions include year dummies, Fama–French 12 industry dummies and a constant term. All the variables are defined in the 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 B of Table 7 reports regression results of R&D expenditures on IDB and other covariates. Because a substantial proportion of firm incur zero R&D expenditures, we use the Tobit regression in Model 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 EIF in a Smith–Blundell framework. The *p*-value of the residual term in Model 2 indicates that IDB presence is endogenous in the context of R&D expenditures. We therefore estimate an IV-Tobit regression in Model 3, and find that after accounting for endogeneity IDB presence has a significant negative impact on the level of a firm's R&D spending. As discussed earlier, the IV-Tobit methodology is an imperfect solution here because this method assumes that the endogenous variable is continuous. So we refrain from interpreting the magnitude of this coefficient.

The results on other covariates in the regressions in Panels A and B are also interesting. While firm size measured as sales is negatively related to both capital and R&D expenditure, the proportion of option-based pay for top executives is positively related to them. Firms with lower debt levels, higher Tobin's q, lower return on assets and lower insider ownership have higher levels of R&D expenditures. Higher cash flows and higher stock returns are associated with higher levels of capital 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 R&D expenditures; and a higher fraction of independent directors is associated with higher R&D expenditures.

To further tease out whether IDB presence mitigates either "quiet life" or "empire building" or both types of agency problems for capital and R&D expenditures, we perform additional regression analyses in Panel C of Table 7, where we replace the IDB dummy with two interaction variables: $IDB \times High\ Tobin's\ q_{t-1}$ and $IDB \times Low\ Tobin's\ q_{t-1}$. Here, *High* (*Low*) *Tobin's* q equals 1, when Tobin's q is above (below) the sample median; it equals zero otherwise. This specification allows us to examine whether the effect of IDB presence is different in high growth and low growth firms. Model 1 shows OLS estimates of capital expenditure regressions. We only perform the OLS regression here, because in Panel A we find that IDB presence is not endogenous in the 2SLS framework. The other explanatory variables are the same as in Model 1 of Panel A. IDB presence has a significant effect on capital expenditure only in firms with above median Tobin's q. IDB presence increases capital expenditure by about 10.5% compared to the median capital expenditure of 4.67% in High Q firms.

We next estimate a Tobit regression of R&D expenditure in Model (2), where the explanatory variables are the same as in Model (1). We do not estimate an IV-Tobit model because (1) the endogenous IDB term now appears in two variables and we have only one IV and (2) in the Tobit model in Panel B, the IDB variable suffers from an attenuation bias (i.e., it is biased toward zero), implying that the bias is against finding a significant result. If we find a significant result in Model (2) despite this bias, that would imply that the true significance level is higher. We find that while the coefficient of IDB is negative for both High q and Low q firms, it is statistically significant only for Low q firms, for which its absolute magnitude is much larger. Based on the estimated coefficient of IDB for Low q firms, the effect of IDB presence on R&D expenditure for a firm at the median level of Tobin's q is about -1.33 ($= -0.787 * 1.687$) percentage points or about 40% of the sample mean R&D of 3.36%. Thus, IDB presence reduces R&D spending substantially in firms with lower growth opportunities.

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)).[15] *Ceteris paribus*,

[15] Graham *et al.* (1998) find a positive relationship between a firm's simulated 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.

Table 8. Level of financial leverage.

	Tobit (1)		Smith–Blundell (2)	
	Coeff.	p-Value	Coeff.	p-Value
IDB (1/0)	0.523	0.543	3.990	0.739
Tobin's q_{t-1}	1.077	0.001	1.023	0.010
Cash Holding$_t$	−0.330	0.000	−0.327	0.000
Log Market Capitalization$_t$	−2.750	0.000	−2.892	0.000
R&D Expenditures$_t$	−0.287	0.002	−0.283	0.002
PPE$_t$	0.032	0.102	0.032	0.098
Cash Flow Volatility	0.137	0.278	0.137	0.278
Bond Rating (1/0)	15.020	0.000	15.119	0.000
Altman-Z	−4.867	0.000	−4.826	0.000
G-Index	−0.058	0.652	−0.031	0.847
Board Size	0.391	0.009	0.345	0.119
Fraction of Independent Directors	0.955	0.625	0.942	0.629
Institutional Ownership$_t$	3.862	0.008	4.152	0.022
Log Insider Ownership$_t$	−0.109	0.517	−0.120	0.487
Percentage of Option-Based Pay$_t$	0.000	0.964	0.002	0.877
Residual			−3.479	0.772
N	8,217		8,217	
Pseudo R^2	0.078		0.078	

Notes: This table shows estimates of Tobit and second-stage Smith–Blundell regressions of leverage. The sample consists of 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 1 if there is at least one IDB in a given firm-year; it equals zero otherwise. 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) regression and the ease of IDB formation (EIF) dummy as instrument for IDB. We use robust standard errors clustered at the CEO-firm level for all regressions. 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.

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 EIF as an instrument. However, the p-value of the residual term indicates that IDB presence is not endogenous in this context. 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 *et al.* (2009) use this methodology to examine how the excess control rights of dual class firms are 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:

$$
\begin{aligned}
r_{i,t} - R^B_{i,t} = {} & \alpha_0 + \alpha_1 \cdot \mathrm{IDB}_{i,t} + \sum_{j=1}^{5} \beta_j \cdot \mathrm{IDB}_{i,t} \cdot \frac{\Delta X_{j,i,t}}{Mktcap_{i,t-1}} \\
& + \sum_{j=1}^{5} \gamma_j \cdot \frac{\Delta X_{j,i,t}}{Mktcap_{i,t-1}} + \delta \cdot \frac{\mathbb{X}}{Mktcap_{i,t-1}} \\
& + \text{industry and year fixed} - \text{effects} + \varepsilon_{i,t}. \qquad (1)
\end{aligned}
$$

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, $R^B_{i,t}$, 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 $R^B_{i,t}$.

In Eq. (1), in addition to the IDB dummy variable, there are three sets of variables whose coefficients are represented by β_j, γ_j, and δ. There are five variables associated with the coefficient vector γ; 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 β are the same five change variables associated with γ_j, but interacted with the IDB dummy variable. The vector $\mathbb{X}$ (associated with the coefficient vector δ) 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 α_1 and β_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 γ_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 shows that the mean (median) excess returns are 9.92% (1.40%) and 2.83% (−3.10%) for firms with and without an IDB, respectively; these differences are highly statistically 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 Eq. (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 all 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 Eq. (1). We begin with Model 1, which is Eq. (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 the 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 EIF as the instrument for IDB. Model 2 is same as Model 1, except that it is estimated in 2SLS framework. In this regression, the

Table 9. Market valuation of IDB presence and policy choices.

	1 OLS		2 IV-2SLS		3 Treatment Effect		4 OLS		5 OLS	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
IDB (1/0)	5.060	0.003	−27.423	0.325	6.537	0.349	4.848	0.003	5.212	0.002
IDB $*$ Δ Cash Holdings$_t$							0.342	0.390		
IDB $*$ Δ Dividends$_t$							−3.839	0.032	−3.807	0.030
IDB $*$ Δ Capex$_t$							0.312	0.391		
IDB $*$ Δ R&D$_t$							−1.137	0.587		
IDB $*$ Δ Debts$_t$							0.043	0.790		
Δ Cash Holdings$_t$	0.602	0.000	0.570	0.000	0.547	0.000	0.572	0.000	0.602	0.000
Δ Dividends$_t$	3.032	0.000	3.154	0.000	3.298	0.000	3.597	0.000	3.577	0.000
Δ Capex$_t$	0.814	0.000	0.845	0.000	0.732	0.000	0.778	0.000	0.810	0.000
Δ R&D$_t$	0.982	0.134	1.100	0.102	0.677	0.293	1.077	0.124	0.981	0.134
Δ Debts$_t$	−0.053	0.415	−0.049	0.457	−0.042	0.501	−0.056	0.401	−0.051	0.430
Δ Equity$_t$	0.552	0.000	0.550	0.000	0.447	0.005	0.551	0.000	0.554	0.000
Δ Interest Expense$_t$	−3.193	0.000	−3.195	0.000	−3.009	0.000	−3.181	0.000	−3.195	0.000
Δ Earnings$_t$	0.325	0.000	0.340	0.000	0.345	0.000	0.328	0.000	0.325	0.000
Δ Net Assets$_t$	0.205	0.000	0.208	0.000	0.197	0.000	0.205	0.000	0.205	0.000
C_{t-1}	−0.075	0.124	−0.141	0.054	−0.032	0.535	−0.073	0.134	−0.075	0.127
L_t	−0.424	0.000	−0.443	0.000	−0.408	0.000	−0.424	0.000	−0.423	0.000

Table 9. (*Continued*)

	1 OLS		2 IV-2SLS		3 Treatment Effect		4 OLS		5 OLS	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
N	8,958		8,958		8,237		8,958		8,958	
Adjusted R^2/[χ^2 p-Value]	0.106		0.068		[0.000]		0.106		0.106	
Test for Exogeneity p-Value			0.339							
F-Statistic for First-Stage IVs			21.28							
Inverse Mills Ratio					1.423	0.714				

Notes: This table shows estimates of OLS, 2SLS IV, and Heckman two-stage treatment effect regressions of excess return. The sample consists of 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 1 if there is at least one IDB in a given firm-year; it equals zero otherwise. Models 4 and 5 include interaction variables, other variables interacting with IDB. We use robust standard errors clustered at the CEO-firm level for the OLS regression. The second stage of the 2SLS IV estimation instruments IDB by the ease of IDB formation (EIF) dummy. The table reports 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 two-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 2. Standard errors of the treatment effect model are estimated with bootstrapping method using 1,000 replications. 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.

F-statistic for the significance of the IV in the first-stage regressions is quite large at 21.28, suggesting that the IV is not weak. But the test of exogeneity is insignificant, suggesting that IDB presence is not endogenous here. 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 0.714. This suggests that there is no selection bias. Models 2 and 3 suggest that IDB presence is neither endogenous nor suffers from selection bias vis-à-vis excess returns.

Model 4 is the same as Eq. (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 4, we find that excess return is 4.85% higher in IDB presence with a p-value of 0.003. Among all the interaction variables, only the interaction of dividend changes with the IDB dummy is statistically significant with a p-value of 0.03 and has a coefficient of −3.84. The coefficient of the change in dividends is 3.60 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 24 cents. Together with our finding in Sec. 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 5, 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 23 cents, a result similar to that in Model 4. In unreported regressions, we also examined each interactions variable in the absence of other interactions, with results similar to Model 4.

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–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 *et al.* (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 *et al.* (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.[16] 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,

[16] 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 *et al.* (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.

Table 10. Firm risk.

	OLS		IV-2SLS		Treatment Effect	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
Panel A: Total risk						
IDB (1/0)	−0.055	0.048	0.404	0.606	−0.558	0.010
Log Total Assets$_t$	−0.154	0.000	−0.171	0.000	−0.136	0.000
Tobin's q_{t-1}	0.016	0.020	0.006	0.741	0.029	0.000
ROA$_{t-1}$	−0.018	0.000	−0.018	0.000	−0.018	0.000
Leverage$_t$	0.001	0.229	0.001	0.186	0.001	0.040
R&D Expenditures$_t$	0.018	0.000	0.019	0.000	0.018	0.000
Capital Expenditures$_t$	0.002	0.394	0.001	0.595	0.002	0.123
Log Business Segments	0.020	0.548	0.015	0.683	0.012	0.576
Herfindahl Segment Sales	0.184	0.033	0.178	0.054	0.161	0.004
Delta ($\times 10^{-3}$)	−0.029	0.588	−0.086	0.462	−0.031	0.519
Vega ($\times 10^{-3}$)	0.381	0.000	0.392	0.000	0.388	0.000
G-Index	−0.028	0.000	−0.026	0.000	−0.031	0.000
N	7,744		7,744		7,555	
Adjusted R^2/[χ^2 p-value]	0.564		0.532		[0.000]	
Test for exogeneity p-Value			0.354			
F-statistic for first-stage IVs			11.60			
Inverse Mills ratio					0.288	0.013
Panel B: Systematic risk						
IDB (1/0)	−0.068	0.151	−0.928	0.444	−1.180	0.000
Log Total Assets$_t$	−0.071	0.000	−0.040	0.415	−0.029	0.090
Tobin's q_{t-1}	0.079	0.000	0.098	0.001	0.108	0.000
ROA$_{t-1}$	−0.016	0.000	−0.016	0.000	−0.016	0.000
Leverage$_t$	−0.002	0.056	−0.003	0.053	−0.003	0.002
R&D Expenditures$_t$	0.031	0.000	0.030	0.000	0.031	0.000
Capital Expenditures$_t$	0.004	0.265	0.005	0.208	0.004	0.113
Log Business Segments	0.032	0.579	0.041	0.493	0.010	0.790
Herfindahl Segment Sales	0.190	0.202	0.202	0.190	0.123	0.249
Delta ($\times 10^{-3}$)	0.068	0.539	0.174	0.349	0.078	0.345
Vega ($\times 10^{-3}$)	0.421	0.001	0.400	0.003	0.419	0.000
G-Index	−0.030	0.000	−0.033	0.000	−0.036	0.000
N	7,744		7,744		7,555	
Adjusted R^2/[χ^2 p-value]	0.319		0.270		[0.000]	
Test for Exogeneity p-Value			0.363			
F-Statistic for First-Stage IVs			11.60			
Inverse Mill's Ratio					0.636	0.000
Panel C: Unsystematic risk						
IDB (1/0)	−0.051	0.067	0.774	0.365	−0.448	0.020
Log Total Assets$_t$	−0.169	0.000	−0.200	0.000	−0.155	0.000
Tobin's q_{t-1}	0.008	0.224	−0.010	0.600	0.018	0.008
ROA$_{t-1}$	−0.017	0.000	−0.017	0.000	−0.017	0.000
Leverage$_t$	0.001	0.076	0.002	0.059	0.001	0.003
R&D Expenditures$_t$	0.017	0.000	0.019	0.000	0.017	0.000
Capital Expenditures$_t$	0.002	0.342	0.001	0.692	0.002	0.104

Table 10. (*Continued*)

	OLS		IV-2SLS		Treatment Effect	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
Log Business Segments	0.019	0.556	0.010	0.794	0.013	0.551
Herfindahl Segment Sales	0.191	0.028	0.180	0.076	0.173	0.003
Delta ($\times 10^{-3}$)	−0.038	0.455	−0.139	0.281	−0.041	0.372
Vega ($\times 10^{-3}$)	0.345	0.000	0.366	0.001	0.355	0.000
G-Index	−0.027	0.000	−0.024	0.000	−0.030	0.000
N	7,744		7,744		7,555	
Adjusted R^2/[χ^2 p-value]	0.580		0.481		[0.000]	
Test for Exogeneity p-Value			0.284			
F-Statistic for First-Stage IVs			11.60			
Inverse Mills Ratio					0.227	0.029

Notes: Panel A (B) [C] shows estimates of OLS, 2SLS IV, and Heckman two-stage treatment effect regressions of total risk (systematic risk) [unsystematic risk]. The sample consists of 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 1 if there is at least one IDB in a given firm-year; it equals zero otherwise. We use robust standard errors clustered at the CEO-firm level for the OLS regression. The second stage of the 2SLS IV estimation instruments IDB by the ease of IDB formation (EIF) dummy. The table reports 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 two-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 2. Standard errors of the treatment effect model are estimated with bootstrapping method using 1,000 replications. 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 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 IVs approach to account for the potential endogeneity of IDB presence using 2SLS regressions with EIF as the IV. In 2SLS regressions, IDB presence is unrelated to all three measures of firm risk. Although the results of the F-test for the IV in the first-stage suggest that the IV is 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 Panel B of 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 the 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 43% [$= e^{-0.558} - 1$], 69% [$= e^{-1.180} - 1$] and 36% [$= e^{-0.448} - 1$], 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 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 IB 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 looking at 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 9,050 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, payout (dividend yields, repurchases, and total payout) and R&D expenditures, but higher levels of capital expenditures. IDB presence, however, is unrelated to the levels of a firm's financial leverage. 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 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, but take an active role in reducing cash holdings and R&D expenditures, and increasing capital expenditure. 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 shaping corporate policies.

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Appendix A

Table A.1. Firm, year, firm-year, and IDB-identity distributions.

Panel A: Number of years a firm is present in the sample			Panel B: Percentage of firm-years of a firm that has IDBs		
Number of Years	Number of Firms	Percentage	Percentage of Firm-Years (pct)	Number of Firms	Percentage
1	202	12.55	pct = 0	1,189	73.85
2	194	12.05	0.00 < pct <= 12.5	63	3.91
3	106	6.58	12.5 < pct <= 25.0	76	4.72
4	146	9.07	25.0 < pct <= 37.5	47	2.92
5	123	7.64	37.5 < pct <= 50.0	70	4.35
6	109	6.77	50.0 < pct <= 62.5	27	1.68
7	94	5.84	62.5 < pct <= 75.0	23	1.43
8	93	5.78	75.0 < pct <= 87.5	15	0.93
9	543	33.73	87.5 < pct < 100	18	1.12
Total	1,610	100	pct = 100	82	5.09
			Total	1,610	100

Table A.1. (*Continued*)

Panel C: Year distribution

Year	Full Sample		IDB Firm-Years		Non-IDB Firm-Years		Proportion	
	Number of Firm-Years	Percentage	Number of Firm-Years	Percentage	Number of Firm-Years	Percentage	IDB	Non-IDB
1998	1,039	11.48	127	10.40	912	11.65	12.22	87.78
1999	1,018	11.25	145	11.88	873	11.15	14.24	85.76
2000	1,023	11.30	156	12.78	867	11.07	15.25	84.75
2001	1,064	11.76	139	11.38	925	11.82	13.06	86.94
2002	1,013	11.19	132	10.81	881	11.25	13.03	86.97
2003	1,010	11.16	143	11.71	867	11.07	14.16	85.84
2004	991	10.95	132	10.81	859	10.97	13.32	86.68
2005	952	10.52	124	10.16	828	10.58	13.03	86.97
2006	940	10.39	123	10.07	817	10.44	13.09	86.91
Total	9,050	100	1,221	100	7,829	100	13.49	86.51

Panel D: Distribution by IDB-identity

	High Powered Incentive IDBs			Representative IDBs		
Individual Investors	Hedge Funds	Private Equity	Venture Capital	Corporations	Fiduciary Trust	Total
74.11	2.98	6.95	2.23	6.04	7.69	100
		12.16		13.73		

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	9,050	0.135				
Stock ownership of the Largest IDB in Millions of Constant 2,000 Dollars When ***IDB* = 1**	1,221	215.20	22.14	39.05	110.55	712.33
% Stock Ownership of the Largest IDB When $ ***IDB* = 1**	1,221	5.83	$0^+(<1)$	2.30	7.49	8.77
Dependent Variables						
Cash Holdings: (Cash and Marketable Securities/Total Assets) ∗ 100; from Compustat.†	9,047	14.622	2.180	7.100	17.256	17.363
Dividend Yield: (Common Dividends/Market Capitalization) ∗ 100; from Compustat.†	9,041	0.898	0	0	1.144	1.384
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)	9,049	0.497				
Repurchase: (Purchases of Common and Preferred Stock/Market Capitalization) ∗ 100; from Compustat.†	9,041	2.168	0	0.282	2.089	4.049
Total Payout: (Common Dividend Plus Purchases of Common and Preferred Stock/Market Capitalization) ∗ 100; from Compustat.†	9,041	3.099	0	1.719	3.629	4.468
Capital Expenditures: (Capital Expenditures/Total Assets) ∗ 100; from Compustat.†	9,050	5.739	2.330	4.170	6.450	5.187
R&D Expenditures: (R&D Expenditures/Total Assets) ∗ 100; from Compustat.†	9,050	3.363	0.000	0.425	3.387	5.489
Leverage: (Total Debt/Total Assets) ∗ 100; from Compustat.†	9,050	22.080	5.980	21.430	30.917	17.677
Total Risk: Log (Variance of Daily Stock Returns Over Firm-Fiscal Year, Annualized); from CRSP.	9,043	−7.242	−7.850	−7.297	−6.824	0.866
Systematic Risk: Log (Variance of the Predicted Portion of the Market Model, Annualized); from CRSP.	9,043	−9.355	−10.065	−9.294	−8.719	1.333
Unsystematic Risk: Log (Variance of the Residual of the Market Model, Annualized); from CRSP.	9,043	−7.439	−8.073	−7.484	−6.989	0.889

Table A.2. (*Continued*)

Variable: Definition and Explanations	Obs.	Mean	Q1	Median	Q3	Std.
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.†	8,981	3.784	−29.377	−2.629	19.662	56.218
Independent Variables						
Market Capitalization$_t$**:** Market Value of Equity, in Millions of Constant 2,000 Dollars; from Compustat.†	9,041	8,588	639	1,630	5,186	25,756
Total Assets$_t$**:** In Millions of Constant 2,000 Dollars; from Compustat.†	9,050	5,600	594	1,449	4,318	13,160
Sales$_t$**:** in Millions of Constant 2,000 Dollars; from Compustat.†	9,049	5,305	589	1,464	4,495	11,770
PPE$_t$**:** (Property, Plant and Equipment/Total Assets) ∗ 100; from Compustat.†	9,031	28.88	12.24	22.86	40.45	21.72
NWC$_t$**:** (Net Working Capital Net of Cash Holdings/Total Assets) ∗ 100; from Compustat.†	9,047	7.17	−1.71	6.19	15.01	14.48
Acquisitions$_t$**:** (Acquisitions/Total Assets) ∗ 100; from Compustat.†	9,049	2.888	0.000	0.016	2.596	6.285
Cash Flow$_t$**:** (Cash Flow/Total Assets) ∗ 100; from Compustat.†	9,027	8.502	5.411	8.733	12.383	8.199
***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.†	9,050	5.036	1.971	3.108	5.622	6.091
***Loss Indicator*:** A Dummy Variable Equal to One if Net Income Is Less Than Zero, and Zero Otherwise; from Compustat. (1/0)	9,048	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)	9,050	0.523				
ROA$_{t-1}$**:** (Net Income/Total Assets) ∗ 100; from Compustat.†	9,048	4.228	1.790	5.330	9.250	10.977
OPS$_{t-1}$**:** (Earnings before Depreciation, Interest, and Tax/Sales) ∗ 100; from Compustat.†	9,015	14.924	8.410	13.860	21.220	17.644
Stock Return$_{t-1}$**:** Average of Daily Stock Returns during the Fiscal Year with Minimum 2/3rd Non-Missing Daily Returns; from CRSP.† ($\times 10^4$, i.e., in Basis Points)	8,921	8.694	−1.698	7.963	17.588	18.694

Table A.2. (*Continued*)

Variable: Definition and Explanations	Obs.	Mean	Q1	Median	Q3	Std.
***Return Volatility$_t$*:** Standard Deviation of Daily Stock Returns during the Fiscal Year with Minimum 2/3$^{\text{rd}}$ Non-Missing Daily Returns; from CRSP.†	9,043	0.030	0.020	0.026	0.036	0.014
***Net Equity Issuance$_t$*:** (Equity Sales Minus Equity Purchases/Total Assets) $*$ 100; from Compustat.†	9,049	−1.089	−2.389	0.000	0.773	6.876
***Net Debt Issuance$_t$*:** (Total Debt Issuance Minus Debt Retirement/Total Assets) $*$ 100; from Compustat.†	9,011	1.292	−2.167	0.000	3.787	9.500
***Sales Growth*:** It Is the Mean of Yearly Sales Growth Rate of the Past 5 Year (i.e., Sales Growth Is Computed as $\frac{1}{5}\sum_{s=1}^{5}\log(\frac{\text{sales}_{t-s}}{\text{sales}_{t-s-1}})$ and Expressed in Percentage); from Compustat.†	9,023	13.646	3.643	10.063	19.558	17.206
***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.†	9,034	2.268	1.269	1.687	2.521	1.805
***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.†	9,050	39.832	14.205	41.554	62.273	28.216
***Insider Ownership$_t$*:** Percentage of Top Five Insider Holdings of Common Stocks to the Total Shares Outstanding; from Compustat.†	9,043	3.415	0.225	0.701	2.500	7.240
***Institutional Ownership$_t$*:** Fraction of the Total Shares Outstanding Held by Institutional Investors; from TFN Institutional.†	9,050	0.642	0.535	0.699	0.821	0.259
***Firm Age*:** Max(CRSP Listing Age, Compustat Listing Age) in Years	9,050	27.249	11	20	39	20.039
***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.†	8,807	2.030	1.342	2.043	2.760	1.372
***Board Size*:** Number of Directors on the Board; Calculated from RM Directors.	9,050	8.922	7	9	10	2.428
***Fraction of Independent Directors*:** Fraction of Independent Directors on the Board; Calculated from RM Directors.	9,050	0.664	0.56	0.67	0.80	0.172
***Classified Board*:** Firm Has a Classified or Staggered Board; Data from RM Governance (1/0)	8,465	0.610	0			

Table A.2. (*Continued*)

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 *et al.* (2003). Missing Values of G-Index in a Given Year Are Replaced by Its Value in the Prior Year. Data from RM Governance.	8,465	9.299	7	9	11	2.598
Net E-Index: Entrenchment Index Minus Classified Board. Entrenchment Index Consists of Six Different Anti-Takeover Provisions from Bylaws and Charter Amendments, from Bebchuk *et al.* (2009); Data from RM Governance.	8,465	1.671	1	2	2	1.014
CEO is Chairman: CEO Is Also the Chairman of the Board; Obtained from Execucomp (1/0)	9,050	0.619				
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)	8,959	0.309				
Outside CEO-Directors: Fraction of Non-Employee Directors That Are Active CEOs; Calculated from RM Director.	9,050	0.142	0.000	0.125	0.222	0.131
Number of Business Segments: Number of Business Segments Reported in Compustat Segment.	8,321	3.305	1	3	5	2.650
Herfindahl Segment Sales: $\sum_{i=1}^{N}$ (Segment Sales$_i$/Firm Sales)^2 Where i Indexes Segments; from Compustat Segment.	8,321	0.678	0.396	0.680	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.†	9,041	8.219	2.154	4.528	8.492	15.848
Vega: Dollar Change in CEO Option Holdings for a 1% Change in Stock Return Volatility, in 2,000 Dollars, Using Core and Guay (2002) Methodology. Data from ExecuComp.†	9,050	60.763	6.484	23.817	63.936	138.923
Δ***Cash Holdings***: ((Cash Holdings$_t$ — Cash Holdings$_{t-1}$)/Market Capitalization$_{t-1}$) $*$ 100; from Compustat.†	9,033	1.247	−1.127	0.408	3.175	8.553
Δ***Dividends***: ((Dividends$_t$ — Dividends$_{t-1}$)/Market Capitalization$_{t-1}$) $*$ 100; from Compustat.†	9,021	0.010	0	0	0.059	0.590

Table A.2. (*Continued*)

Variable: Definition and Explanations	Obs.	Mean	Q1	Median	Q3	Std.
Δ***Capex***: ((Capital Expenditures$_t$ — Capital Expenditures$_{t-1}$)/Market Capitalization$_{t-1}$) $*$ 100; from Compustat.†	9,036	−0.099	−0.731	0.124	1.016	4.991
Δ***R&D***: ((R&D Expenditures$_t$ — R&D Expendituress$_{t-1}$)/Market Capitalization$_{t-1}$) $*$ 100; from Compustat.†	9,036	0.060	0	0	0.153	1.314
Δ***Debts***: (Debt Issuance Minus Debt Redemption/Market Capitalization$_{t-1}$) $*$ 100; from Compustat.†	9,036	1.018	−1.816	0	2.173	13.395
Δ***Equity***: (Equity Issuance Minus Repurchases/Market Capitalization$_{t-1}$) $*$ 100; from Compustat.†	9,036	−0.404	−1.917	0	0.673	5.327
Δ***Interest Expense***: ((Interest Expense$_t$ — Interest Expense$_{t-1}$)/Market Capitalization$_{t-1}$) $*$ 100; from Compustat.†	9,036	0.143	−0.109	0	0.247	1.170
Δ***Earnings***: ((Earnings$_t$ — Earnings$_{t-1}$)/Market Capitalization$_{t-1}$) $*$ 100; from Compustat.†	9,035	0.731	−1.651	0.681	2.886	13.604
Δ***Net Assets***: (Total Asset Minus Cash Holdings$_t$ — Total Asset Minus Cash Holdings$_{t-1}$/Market Capitalization$_{t-1}$) $*$ 100; from Compustat.†	9,033	5.343	−1.502	3.503	11.059	30.738
$\boldsymbol{C_{t-1}}$: (Cash Holdings$_{t-1}$)/Market Capitalization$_{t-1}$) $*$ 100; from Compustat.†	9,036	11.038	2.110	5.752	13.445	15.355
$\boldsymbol{L_t}$: (Total Debt$_t$/Market Capitalization$_{t-1}$) $*$ 100; from Compustat.†	9,040	19.857	3.178	14.570	30.089	19.766
EIF: Ease of IDB Formation Equals One if the Area Covering All Counties within a 30-Mile Radius Centered at Firm Headquarters Has the Following Characteristics: (1) the Number of Million Dollar Homes in the Area Is Less Than the Sample Median for the Year, (2) the Number of Firms in the Area Is Greater Than the Sample Median for the Year, and (3) at Least Two-Thirds of the Firms in the Area Have Market Values Below the Top Quartile of the Sample during the Year; It Equals Zero Otherwise; from Compustat, FIPS County Code and NHGIS. (1/0)	9,050	0.059				

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

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