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Multiple blockholders, power, and firm value ☆

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ABSTRACT

Using a comprehensive sample of US firms we show that most of them have multiple blockholders whose presence and ownership stakes lead to a significant difference between ownership and power. This difference matters. First, we find that insider power (ownership) is negatively (positively) related to firm value. Second, we show that outsider power is positively related to firm value. Our direct blockholder-level measure of power explains firm value over and above the explanatory power of firm-level measures used in the literature (such as the number of blockholders and the dispersion of their ownership stakes).

1. Introduction

The separation of ownership from control (power) has attracted a lot of attention in the academic literature over the years. The main focus of this literature has been on the conflict of interest between dispersed shareholders and managers.[1] The difference between ownership and power that arises from the presence of multiple blockholders in a firm, however, has received very little attention in the literature.[2] This largely neglected topic is the main focus of the paper. In particular, we document the significant difference between ownership and power for a comprehensive sample of US firms.[3] More importantly, we show that this difference matters – ownership and power have opposite influences on firm value.

Intuitively, the power of a particular blockholder depends upon two factors: (1) the size of her ownership stake and (2) ownership structure.[4] While power generally increases with the level of ownership, the ownership structure can either moderate or magnify this relationship. Consider the following examples. First, on February 27, 2009, Amkor Technology Inc., provider of outsourced semiconductor packaging and testing services, had two blockholders. The company's founder, James J. Kim (and his family), owned 44.46% of the outstanding shares and FMR Corp (Fidelity Management and Research Corp), owned 6.29%. Second, as of February 29, 2004, the ownership structure of Great Lakes Aviation, Ltd (a regional US airline) was as follows: Douglas G. Voss, co-founder and Chairman of the board, owned 40.5%; Raytheon Aircraft Credit Corp – 38.2%, and Tennenbaum & Co, LLC – 6.1% of the shares.

Mr. Voss and Mr. Kim in the above examples hold ownership stakes of similar size. It is clear, however, that the power wielded by Mr. Voss is quite different from that wielded by Mr. Kim, due to the presence and size of the blocks held by Raytheon Aircraft Credit Corporation and Tennenbaum & Co, LLC. Formally, using Shapley value (Milnor and Shapley, 1978) as a measure of power, Mr. Kim's ownership stake of 44.46% translates into power of 78.77%, while the FMR Corp's 6.29% ownership stake yields only

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[1] This can be traced back to Berle and Means (1932) and Fama and Jensen (1983).

[2] Much of the literature has used ownership (or a function thereof) as a proxy for the power of a shareholder. For a notable exception, see Maury and Pajuste (2005).

[3] We define power as the ability or right to influence the firm's decisions.

[4] Our definition of ownership structure includes two dimensions – the number of blockholders present in a firm and the size of their ownership stakes.

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1.27% power. This is due to the fact that the founder's stake will, in most situations, have the dominant influence on the outcome of voting and therefore FMR Corp's influence will be minimal. In the Great Lakes Aviation, Ltd example, Mr. Voss's ownership stake translates into 32.59% power, while those of Raytheon Aircraft Credit Corp and Tennenbaum & Co, LLC – into 23.53% and 18.53%, respectively. Due to the presence of two corporate blockholders the power of Mr. Voss is effectively lower than his ownership stake. At the same time, power of Tennenbaum & Co, LLC is significantly higher than its ownership. In situations where the two largest blockholders are on opposing sides, the vote of Tennenbaum & Co, LLC becomes pivotal in determining the winner.

The above examples highlight some of the variations in ownership structures (and therefore power) that we show for all CRSP- and COMPUSTAT-listed US firms. First, there is a large variation in the number of blockholders – from firms without any blockholders to firms with as many as 11 blockholders. Firms with no blockholders represent only 3.2% of our sample, while multiple blockholders are present in almost 80% of our sample firms. Second, a large variation in the ownership stakes of various blockholders persists even after controlling for the number of blockholders. These variations in the ownership structure have a direct and significant influence on the power wielded by a blockholder in a firm. In particular, we find that for all ownership levels the differences between ownership and power are statistically significant. Further, even for a particular level of ownership, there is a large variation in power. For example, we find that the power for blockholders with ownership stakes between 10% and 15% varies from zero to 31.58%. Taken together, these findings strongly suggest that the difference between ownership and power due to the presence of multiple blockholders is an important issue for empirical research.

We then examine the influence of power on firm value. We build on the large and established literature on the relationship between insider ownership and firm value that can be traced back to Morck et al. (1988) and McConnell and Servaes (1990). This literature has, for the most part, developed by exploring the hypothesis that increasing insider ownership affects firm value in two ways. On the one hand, it motivates the insiders to exert more effort and thus increase the value of the firm (the "incentive alignment effect"). On the other hand, as the level of insider ownership increases they face fewer restrictions in expropriating firm value at the expense of minority shareholders (the "entrenchment effect"). Intuitively, the first effect depends on the level of ownership, while the second effect – on power (of which ownership is but an imperfect proxy). We find that, consistent with the above arguments, insider power has a negative influence on firm value, while insider ownership – a positive one. Further, we show that the influence of power on firm value depends on the blockholder's identity. In particular, we show that the influence of the insiders' power (be they the largest inside blockholder, all officers and directors as a group, or the firm's CEO) on firm value is negative, while that of the largest outside blockholder's is positive. These findings are consistent with inside blockholders using their power to entrench themselves and with outside blockholders using their power to monitor the insiders.

Finally, we contrast our approach of measuring the influence of ownership structure on firm value to those used in the multiple blockholder literature (see, e.g., Konijn et al., 2011; Laeven and Levine, 2008). Theoretically, there are three ways in which presence of multiple blockholders can influence firm value. First, multiple blockholders can use their power to form a coalition to expropriate value at the expense of other shareholders (Bennedsen and Wolfenzon, 2000). Second, they can monitor each other (Pagano and Röell, 1998; Bloch and Hege, 2003). Third, they can use a threat of exit through trading to discipline the insiders (Admati and Pfleiderer, 2009; and Edmans and Manso, 2011). A segment of the empirical literature on multiple blockholders has proxied for these three influences using firm-level measures of ownership dispersion, such as the number of blockholders and the Herfindahl index of their ownership stakes (see, e.g., Konijn et al., 2011). In contrast, we use a blockholder-level measure of power (Shapley value) computed taking into account the ownership stakes of all blockholders. By doing so we are able to achieve two things. First, we are able to show that firm-level measures of dispersion are likely to proxy for dimensions of ownership structure other than power. We find that our measure of power has low correlations with the measures of ownership dispersion. Further, we find that Shapley value continues to have a significant influence on firm value even after controlling for the firm-level dispersion measures. Also, the magnitude and significance of dispersion measures remains largely unchanged after controlling for power.

Second, we are able to differentiate between situations where power is concentrated in the hands of insiders from those where power is concentrated in the hands of outsiders. The level of insider ownership, as we discuss below, has a significant influence on the interpretation of firm-level dispersion measures. Our work is also related to that of Laeven and Levine (2008). For a large sample of European firms, they use information on all blockholders to calculate blockholder ownership, power (as proxied by Shapley values), and measures of ownership dispersion. We contribute to this literature by analyzing a comprehensive sample of US firms and by distinguishing between insider and outsider ownership.[5]

Our paper contributes to several streams of literature. First, we show that the presence of multiple blockholders has significant implications for blockholder power – it creates a significant difference between ownership and power for all levels of ownership. To our knowledge this is the first study to document the existence and the extent of such a difference for all US firms, not just for firms with dual share classes.[6]

Second, we contribute to the literature on the relationship between insider ownership and firm value.[7] The literature has used various transformations of ownership to proxy for power.[8] One shortcoming of these approaches is that they do not incorporate the effects of multiple blockholder presence. As shown in the above examples, the presence of additional blockholders can lead to significantly different power for the same level of ownership. Another is that they are forced to rely on the empirical relationship between ownership and firm value to disentangle the (positive) incentive effect and the (negative) entrenchment effect of ownership.[9] By taking into account the presence and ownership stakes of additional blockholders, our approach of separately measuring ownership and power provides a more precise way of disentangling the incentive alignment and entrenchment effects. Our findings of positive (negative) and statistically significant relationship between insider

[5] In addition, our sample of 4058 unique US firms differs from theirs which includes 1657 European firms. As such our findings add to the literature on ownership structure by analyzing the issue in a different legal and institutional context.

[6] Dual class share structures are unique in that they explicitly differentiate between cash flow rights and voting rights (Adams and Ferreira, 2008; Bergstrom and Rydqvist, 1990; Gompers et al., 2010; Jiang et al., 2011; Maury and Pajuste, 2011). For other mechanisms that lead to disproportional ownership structures, see, e.g., Bennedsen and Nielsen (2010).

[7] Surveys by Shleifer and Vishny (1997) and Denis and McConnell (2003) provide excellent summaries of this stream of research.

[8] Among others, Morck et al. (1988) and Holderness et al. (1999) employ a piecewise linear specification, McConnell and Servaes (1990) and Kim and Lu (2011) employ a quadratic specification, De Miguel et al. (2004) and Short and Keasey (1999) employ a cubic specification, while Davies et al. (2005) propose a higher (fifth) order polynomial to model the relationship between insider ownership and firm value.

[9] For a notable exception, see Adams and Santos (2006), who circumvent this problem by using the wedge between voting and cash-flow rights created by the banks exercising voting control over their own shares held in trust accounts.

ownership (power) and firm value suggests that both effects are present. In addition, we show that the influence of power on firm value depends on the identity of a blockholder. While the influence of inside blockholder's power is negative, that of the outside blockholder's power is positive.

Third, we contribute to the multiple blockholder literature by examining the extent to which the influence of dispersion is driven by the ability of the controlling shareholder to expropriate firm value. There are several reasons why measures of dispersion differ from those of power. First, the influence of dispersion measures on insider power varies with the level of insider ownership. Consider a hypothetical example. Suppose there are two firms with the same number of blockholders and the same dispersion of their ownership stakes. Firm A has only outside blockholders (i.e., the insider ownership is below 5%), while firm B has a dominant inside blockholder and several outside blockholders. For firm A, increased dispersion would reduce the outside blockholders' incentives to monitor the management and therefore increase insider power (and lower firm value). For firm B, increased dispersion would lead to lower entrenchment and therefore lower insider power (and higher firm value). While measures of ownership dispersion do not account for this difference in the influence of ownership dispersion on power (and firm value), our measure of power does. In particular, an increase in ownership dispersion leads to an increase (decrease) in the power of insiders of firm A (firm B). Second, firm-level measures of ownership dispersion do not allow for the influence of power to vary based on the blockholder identity. Yet, as discussed above, such a variation in the influence does exist.

The rest of the paper is organized as follows. Section 2 describes the data used in this study. Section 3 describes the ownership structure of US firms as well as the relationship between ownership and Shapley value. Section 4 describes the empirical tests and discusses the results. Section 5 concludes.

2. Data and sample selection

To provide a comprehensive view of the influence of ownership structure on power, we start with all Compustat- and CRSP-listed firms that have sufficient accounting and stock price data to calculate all the necessary variables for 2004 and 2009 fiscal years.[10] We eliminate financial firms, utilities, foreign firms, and those for which traded security is other than common stock. For the remaining firms, we manually collect the ownership of all blockholders as well as the ownership of all insiders (as a group) and that of the CEO from the closest proxy statement, 10K, or IPO prospectus preceding the fiscal year end.[11] Thus, our final ownership sample consists of 3567 firms in 2004 and 2737 firms in 2009, for a total of 6304 firm-years. These firm-years represent 4058 unique firms.

Since the focus of this paper is on the power wielded by blockholders, we use the voting rights (as opposed to the cash flow rights) as our measure of ownership. We define a blockholder as any entity owning more than 5% of voting rights. In cases where there are multiple classes of shares, we use the information provided in the company filings to calculate the voting and cashflow rights for each blockholder. Appendix A provides an example of how we deal with such situations. We treat ownership stakes held by all family members as one block.[12] We also classify each blockholder as either an insider or an outsider. We consider officers and directors of the company to be inside blockholders; all other blockholders are considered outsiders.

Table 1 provides summary statistics on the number of blockholders and their total ownership, as well as the total insider ownership. The maximum number of blockholders is 11, with the mean (median) of 3.02 (3). The mean (median) total blockholder ownership is 38.54% (35.9%). The mean (median) total insider ownership is 17.59% (9.2%). Further, we also explore the changes in the ownership structure of US firms between 2004 and 2009.[13] In particular, in Fig. 1 we depict the average number of blockholders, the total blockholder ownership, total insider ownership, and Herfindahl index for each of the two years. We document an increase in the number of blockholders as well as in their aggregate ownership between 2004 and 2009. During the same time period, there has been a decrease in the total insider ownership and the Herfindahl index. All of these changes are statistically significant at the 1% level.

3. Ownership structure and Shapley value

3.1. Ownership structure

In Table 2 we describe the number of blockholders and the size of their ownership stakes for our sample firms. We find that a vast majority of US firms have at least one blockholder. Firms with no blockholders account for only 3.2% of firm-years. Single-blockholder firms account for additional 17% of firm-years. Thus, multiple blockholder firms account for almost 80% of the firm-years, while firms with at least three blockholders account for 58%.

In an average single-blockholder firm, the blockholder controls 34.5% of voting rights. As expected, the ownership stake of the largest blockholder declines with the presence of additional blockholders, reaching a low of 15.2% in an average firm with at least six blockholders. The ownership stakes of the additional blockholders, however, are increasing with the number of blockholders. For example, the average (median) ownership stake of the second largest blockholder increases from 8.9% (6.9%) in a two-blockholder firm to 10.64% (10%) in a firm with at least six blockholders. A similar pattern is observed for blockholders ranked below the second.

Even when keeping the number of blockholders constant, there is substantial variation in the ownership stakes. For example, the size of the second blockholder's ownership stake in a two-blockholder firm ranges from 5% to 45.9%. A similar variation is present in firms with more than two blockholders, but the range is smaller. Further, the same observation also applies to the range of the ownership stakes of blockholders ranked below the second.

The above discussion can be summarized as follows. First, the presence of multiple blockholders is a widespread phenomenon in the US. Second, there is a large variation in the number of blockholders and their ownership stakes (even after controlling for their number).

3.2. Shapley value

The significant variation in the number of blockholders and the size of their ownership stakes described above suggest that the

[10] To keep data collection manageable, we had to focus on a sufficiently small number of years. Our choice of 2004 and 2009 was motivated by the fact that they are relatively recent and at the same time sufficiently spread out.

[11] As noted by Anderson and Lee (1997) and Dlugosz et al. (2006), there can be serious issues related to errors in the ownership data provided in certain databases that have been used in the literature. We overcome these issues in two ways. First, as discussed by Holderness (2009), we rely on manually collected data from various filings with the Securities and Exchange Commission (SEC) in order to avoid any errors (e.g., data entry, double counting, etc.). Second, we collect data for the universe of firms that are listed in CRSP and COMPUSTAT, thereby avoiding potential biases engendered by using a specific subsample of the data.

[12] Ownership stakes of family members are added together even if their individual ownership stakes fall below 5% of voting rights. The assumption that founding family members work in concert and that therefore it is reasonable to add their ownership stakes has been widely accepted in the literature (see, e.g., Anderson and Reeb, 2003; Anderson et al., 2003; Wang, 2006).

[13] We thank an anonymous referee for suggesting this.

ownership stake of a particular blockholder may not be a good measure of the actual power she has in the firm. The true extent of a blockholder's influence in a firm is hardly observable. To formally capture this influence, we need a measure that captures both the size of the blockholder's ownership stake and the presence and size of other blockholders' ownership stakes. Shapley and Shubik (1954) provide such an *a priori* measure of power for each blockholder.[14] In this paper, we use the oceanic formulation of Shapley value developed by Milnor and Shapley (1978). Shapley value calculation transforms the voting rights of a blockholder into a measure of her ability to change the outcome of a voting session. In other words, the power of a particular blockholder is measured as the percentage of times she casts the decisive vote.[15] (For a detailed discussion on the calculation of Shapley values please refer to Appendix B.)

Under ideal conditions, it would be desirable to modify our calculation of the Shapley index of power (as indicated by Owen, 1977) by incorporating the predispositions of different groups of blockholders (including individuals such as managers, activist investors, founding families and others as well as corporate blockholders such as manufacturing and service corporations, passive financial institutions, hedge funds and others) to prefer alliances with one group rather than another. We are unfortunately unable to do so for two reasons. First, it is an empirically daunting challenge to identify the antecedents of each blockholder for our entire sample of 19,072 blockholders. Second, the literature that theorises on the alliances among corporate blockholders (see, e.g., Bloch and Hege, 2003) does not, at this point, provide much guidance as to which blockholders are more likely to form a coalition. Further, even if we could gather the relevant identification of each of our blockholders and identify which of them are more likely to form coalitions, we would still need to construct (choose) the weights that would be required for such an analysis. To the best of our knowledge, no guidance on choosing the weights currently exists. As a result, our analysis is restricted to the un-weighted Shapley value.

In the empirical tests, we use Shapley values of four types of shareholders (or groups thereof). First, we use the Shapley value of officers and directors as a group (we refer to this as *Total insider Shapley*). We calculate it based on the total insider ownership as well as the ownership of all outside blockholders. Consider the ownership structure of Great Lakes Aviation, Ltd described above. The *Total insider Shapley* in this case is calculated based on insider ownership of 41.3% (which includes 40.5% owned by Mr. Voss, the firm's founder and chairman), 38.2% ownership stake of Raytheon Aircraft Credit Corp, and a 6.1% stake of Tennenbaum & Co, LLC.[16] Second, we calculate Shapley value of each firm's CEO (we refer to this as *CEO Shapley*). We do so even if the CEO's ownership stake is below 5%. In the case of Great Lakes Aviation, Ltd, the CEO, Mr. Charles R. Howell IV, owned 0.71% of the firm's equity. His Shapley value is calculated based on his ownership, that of Mr. Voss, as well as the ownership stakes of Raytheon Aircraft Credit Corp and Tennenbaum & Co, LLC. Finally, we also use Shapley values of the largest inside and outside blockholders. We refer to these as *Largest inside Shapley* and *Largest outside Shapley*. In the case of Great Lakes Aviation, Ltd, these are Shapley values of Mr. Voss and Raytheon Aircraft Credit Corp, respectively, and are calculated based on the ownership stakes of all three blockholders present in the firm.

3.3. Shapley value and ownership

We now explore the relationship between blockholder ownership and power. In Table 3 we group blockholders in our sample by their level of ownership and report the Shapley value for each group. We find that the relationship between ownership and Shapley value is nonlinear (see Fig. 2). It is exponential for ownership stakes of less than 50%. For ownership above 50%, the relationship is constant at 100% power, since at this level of ownership a blockholder has complete control regardless of her exact ownership stake (i.e., such blockholders have Shapley value equal to one). This suggests that, for an average blockholder, there exists a difference between her power in the firm and her ownership stake. This difference can be seen in Fig. 2 as the distance between the mean Shapley value and the 45-degree line.[17]

In the last two columns of Table 3 we report the mean and median differences between power and ownership. We find that all differences are positive and statistically significant at the 1 percent level, suggesting that power of an average blockholder exceeds her ownership stake. The exception is the 5–10% ownership range, for which the mean difference between power and ownership is negative. This negative difference is due to the 3499 blockholders (representing 28.86% of the total number of blockholders in this ownership range), for whom power is less than their ownership stake.

The above discussion suggests that the presence of additional blockholders and the size of their ownership stakes lead to a significant variation of power around the average. Consider the 5–10% ownership range. The minimum Shapley value in this range is zero, while the maximum is 18.67%. Small Shapley values are usually observed for minority blockholders in the presence of a very large (or majority) blockholder, similar to FMR Corp in the Amkor Technology Inc. example. Maximum Shapley values, on the other hand, are commonly observed for minority blockholders who become pivotal to any contest between two large blockholders, similar to Tennenbaum & Co, LLC in the Great Lakes Aviation Ltd example. In general, the range of Shapley values for a particular level of ownership is increasing up to ownership levels close to 50%. Note that the minimum Shapley value for ownership levels of less than 45% is still zero. For the full sample, there are 4390 blockholders, representing 23% of all blockholders in our sample, with power less than their ownership stake. This suggests that for a significant number of blockholders the overall positive relationship between power and ownership is tempered by the presence and ownership stakes of other blockholders. The relationship between Shapley value and ownership stake reported in Table 3 is consistent with our initial conjecture that variation in the ownership structure leads to a significant difference between power and ownership of a particular blockholder.

4. Empirical tests and results

4.1. Power and firm value

The discussion till this point suggests that ownership and power often diverge, even in firms with a single class of equity.

[14] Prior research has shown that the Shapley value has desirable properties as an indicator of power (see, e.g., the survey by Bandyopadhyay and Chatterjee, 2006). In light of this, we believe that the Shapley value does capture power in our context of blockholders. Nevertheless, all tests in this paper can be seen as joint tests of (1) validity of the relationship being examined and (2) the validity of Shapley value as proxy for power.

[15] A number of studies have used Shapley value to capture the voting power of a particular blockholder or a group thereof (see, e.g., Eckbo and Verma, 1994; Baker and Gompers, 1999; Baker and Gompers, 2003; Maury and Pajuste, 2005). Other studies use Shapley value as a measure of dispersion between the ownership stakes of the largest and the second largest blockholders (see, e.g., Laeven and Levine, 2008) or as a measure of the probability of a control contest (see, e.g., Nenova, 2003; Zingales, 1994). Most of these studies (with the exceptions of Baker and Gompers (1999) and Baker and Gompers (2003) have used Shapley value in non-US settings.

[16] If there are no inside blockholders and the total insider ownership falls below 5%, we use the actual ownership of all officers and directors (as opposed to forcing it to be zero) in our calculations of their Shapley value.

[17] We find that there are no statistically significant differences in the relationship between ownership and Shapley value during our sample period.

Table 1
Summary statistics of ownership structure. The table reports the number of blockholders and their total ownership, as well as the total insider ownership and Herfindahl index. Firm-years with no blockholders are counted as having zero blockholder ownership. The ownership data is collected for all Compustat- and CRSP-listed firms (excluding financials, utilities, foreign firms as well as those for which traded security is other than common stock) with available data for 2004 and 2009 fiscal years.

	Number of blockholders	Total blockholder ownership (%)	Total insider ownership (%)	Herfindahl (%)
Maximum	11.00	100.00	100.00	100.00
75th percentile	4.00	53.75	23.60	64.94
Mean	3.02	38.54	17.59	50.32
Median	3.00	35.90	9.20	39.93
25th percentile	2.00	21.60	4.05	27.36
Minimum	0.00	0.00	0.00	20.02

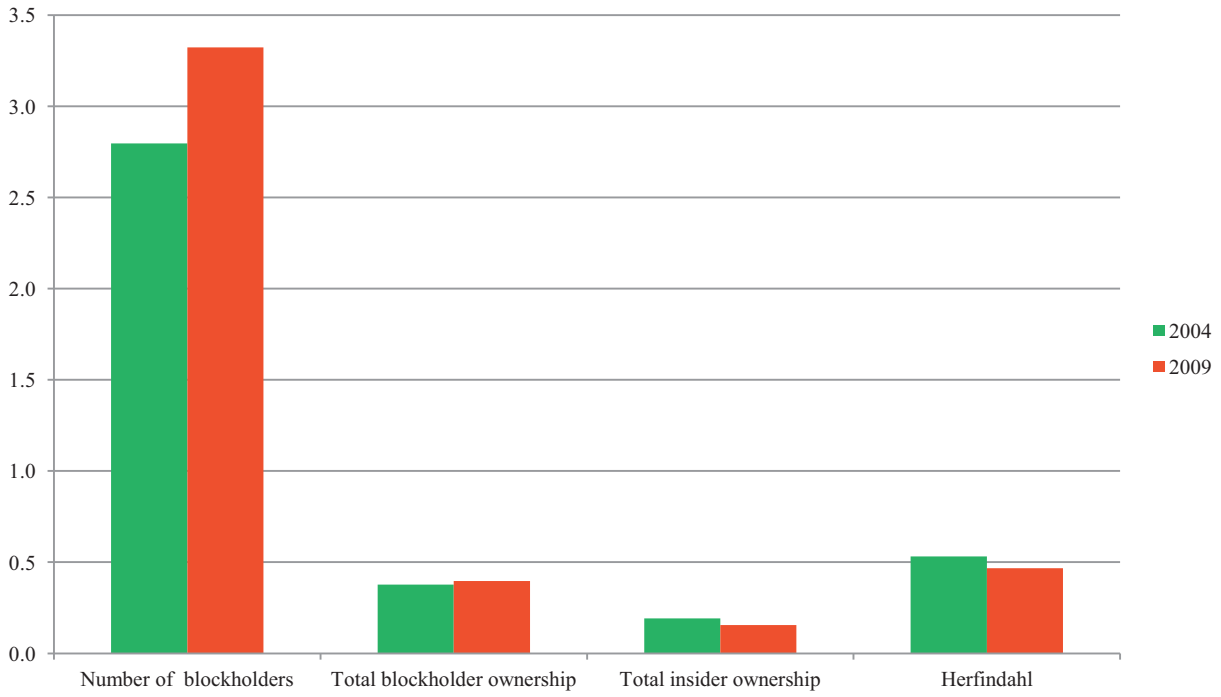

Fig. 1. Evolution of US firm ownership structure between 2004 and 2009. The chart depicts the average number of blockholders, total blockholder ownership, total insider ownership, and Herfindahl index for 2004 and 2009. The ownership data is collected for all Compustat- and CRSP-listed firms (excluding financials, utilities, foreign firms as well as those for which traded security is other than common stock) with available data for 2004 and 2009 fiscal years.

We now turn to the consequences of this divergence by examining the influence of power (as distinct from ownership) on firm value. To do so, we merge the 2004 and 2009 ownership data (described in Section 2 and used for all the tests up to this point) with the data from CRSP and Compustat as follows. The 2004 (2009) ownership data is merged with accounting and stock price data for the 2004 and 2005 (2009 and 2010) fiscal years.[18] We use multiple years of financial data to reduce the dependence of our findings on the financial or stock price performance of firms in a specific year.[19] Also, voting power changes fairly slowly from year to year (see, e.g., Fahlenbrach and Stulz, 2009; Zhou, 2001). Therefore, we believe that the use of the observed ownership structure to approximate that in the year immediately after is fairly accurate. Appendix C lists the variables used in this paper, while Table 4 provides relevant summary statistics.

Following the extensive literature on the influence of insider ownership on firm value, our focus is on the ownership and power of all officers and directors as a group. Our measure of firm value is Tobin's Q, calculated as the ratio of book value of assets plus the market value of equity minus the book value of equity to the book value of assets. We control for firm and industry characteristics using the standard control variables used in the insider ownership-firm value literature: firm size, R&D intensity, leverage, total risk, asset tangibility, capital intensity, and S&P500-listing dummy.[20] We control for industry characteristics using the median Tobin's Q for all COMPUSTAT firms in the same year and Fama-French 48 industry group. Finally, we control for variation in Tobin's Q across years using year dummies.[21]

The results are reported in Panel A of Table 5. In column (1) we report our benchmark case – a model with just the insider

[18] We have chosen not to use the financial data for the 2003 and 2008 fiscal years in order to reduce the potential for reverse causality (i.e., financial data influencing ownership).

[19] A similar approach has been used by Denis et al. (1997).

[20] See, e.g., Anderson and Reeb (2003), Villalonga and Amit (2006), Kim and Lu (2011), Gompers, Ishii, and Metrick (2010), and Morck and Yang (2001). In addition, in unreported results we have also used CEO-Chair duality and state-level antitakeover index of Gompers et al. (2003) as additional control variables. Our findings remain qualitatively unchanged. Finally, our results are robust to using market capitalization as the measure of firm size.

[21] We have also replicated all the subsequent results using −1/Tobin's Q as the dependent variable. This transformation has been suggested by Gompers et al. (2010) who argue that it is likely to be less noisy. Our results remain qualitatively unchanged in this alternative specification.

Table 2
Ownership structure. The ownership data is collected for all Compustat- and CRSP-listed firms (excluding financials, utilities, foreign firms as well as those for which traded security is other than common stock) with available data for 2004 and 2009 fiscal years. The unit of observation is the firm-year and each row summarizes blockholdings for all firm-years with the specified number of blockholders. The number of firm-years and the corresponding percentage (out of the overall sample) is reported for each group in the second column. The remaining columns report the mean, median, and range of blockholder ownership for all blockholder ranks. The last row reports the mean and median ownership for each blockholder rank.

	N		1st blockholder	2nd blockholder	3rd blockholder	4th blockholder	5th blockholder	⩾6th blockholder
No block	202							
	(3.20%)							
One block	1073	Mean	34.54%					
	(17.02%)	Median	(19.00%)					
		Range	[5–100%]					
Two blocks	1372	Mean	25.12%	8.88%				
	(21.76%)	Median	(15.85%)	(6.90%)				
		Range	[5.16–92.56%]	[5–45.87%]				
Three blocks	1389	Mean	20.22%	9.79%	6.77%			
	(22.03%)	Median	(14.45%)	(8.50%)	(6.03%)			
		Range	[5.16–78.90%]	[5–45%]	[5–28.50%]			
Four blocks	1088	Mean	18.24%	10.24%	7.60%	6.12%		
	(17.26%)	Median	(14.21%)	(9.30%)	(6.93%)	(5.70%)		
		Range	[6–73.58%]	[5.24–34.20%]	[5–23.10%]	[5–20.6%]		
Five blocks	642	Mean	17.04%	10.55%	8.30%	6.85%	5.81%	
	(10.18%)	Median	(13.96%)	(9.75%)	(7.80%)	(6.50%)	(5.50%)	
		Range	[6.19–70.36%]	[5.43–28.69%]	[5.09–19.84%]	[5.03–13.7%]	[5–11.7%]	
Six or more	538	Mean	15.24%	10.64%	8.73%	7.49%	6.65%	5.80%[30]
	(8.53%)	Median	(13.90%)	(10.00%)	(8.40%)	(7.20%)	(6.40%)	(5.53%)
		Range	[5.9–52.60%]	[5.66–23.50%]	[5.34–18.1%]	[5.07–16.8%]	[5–12.85%]	[5–10.6%]
Total	6304	*N*	6102	5029	3657	2268	1180	836
		Mean	22.71%	9.83%	7.58%	6.65%	6.19%	5.80%
		Median	(14.65%)	(8.70%)	(7.00%)	(6.27%)	(5.90%)	(5.53%)

[30] The mean, median, and range reported are based on 836 blockholders in 538 firm-years that have more than six blockholders.

Table 3
Blockholder ownership and Shapley value. The ownership data is collected for all blockholders in Compustat- and CRSP-listed firms (excluding financials, utilities, foreign firms as well as those for which traded security is other than common stock) with available data for 2004 and 2009 fiscal years. The table report the number of observations as well as the mean, median, minimum, and maximum of Shapley values for each ownership range. The last two columns of the table report mean and median differences between Shapley values and ownership. *** denotes significance at 1% level.

Ownership range (%)	*N*	Shapley value				Shapley less ownership	
		Mean (%)	Median (%)	Minimum (%)	Maximum (%)	Mean (%)	Median (%)
5–10	12,125	6.72	6.63	0.00	18.67	−0.22***	0.18***
10–15	3482	12.32	12.50	0.00	31.58	0.29***	0.97***
15–20	1130	18.47	18.96	0.00	33.33	1.38***	2.35***
20–25	522	25.22	26.34	0.00	33.02	2.99***	4.52***
25–30	354	32.65	34.21	0.00	42.77	5.32***	7.77***
30–35	264	42.15	44.31	0.00	53.61	9.65***	12.50***
35–40	203	52.55	55.49	0.00	66.32	15.22***	18.80***
40–45	168	66.56	68.70	0.00	81.82	24.29***	27.05***
45–50	122	84.35	86.69	25.00	99.21	36.96***	39.86***
⩾50	702	100.00	100.00	100.00	100.00	32.69***	35.68***

ownership as an explanatory variable. We find that the insider ownership has a positive and statistically significant influence on firm value. In column (2) we use insider Shapley value as an additional explanatory variable. The coefficient estimate on insider Shapley value is negative and statistically significant, while that on insider ownership remains positive and statistically significant. Our results are consistent with a positive incentive alignment effect (ownership) and a negative entrenchment effect (power).

Ownership, as alluded to above, is relatively stable over time and therefore regression residuals may not be independent. As suggested by Petersen (2009), clustering of standard errors by firm is the preferred approach in such a situation. In column (3) we cluster standard errors at the firm level. The results remain unchanged in this alternative specification.[22] Finally, we examine the extent to which our results are driven by the presence of dual class firms in our sample. In particular, we re-estimate the regression model in column (2) excluding dual class firms. The results, reported in column (4), remain qualitatively unchanged in this alternative specification.

In Panel B of Table 5 we use CEO ownership and Shapley value as explanatory variables (instead of total insider ownership and Shapley value). The results are similar to those reported in Panel A of Table 5 and suggest that even though the interests of all insiders may not always be aligned, such potential disagreements are unlikely to influence our results.

As with most studies in corporate governance, endogeneity of ownership and power are causes of potential concern. To address them, we would need valid instruments for both of these variables. There is, however, little theoretical or empirical guidance as to what would be good instruments for power. In an attempt to find such instruments, we follow Gompers et al. (2010), who use a novel set of instruments to address endogeneity of the dual class status and ownership. Our (unreported) results for the two stage least squares estimation indicate that our conclusions remain qualitatively unchanged. However, our tests suggest that a subset of

[22] Note that since our sample is mostly cross-sectional (i.e., with a rather short-time series dimension), clustering at the firm level severely reduces the power of our tests.

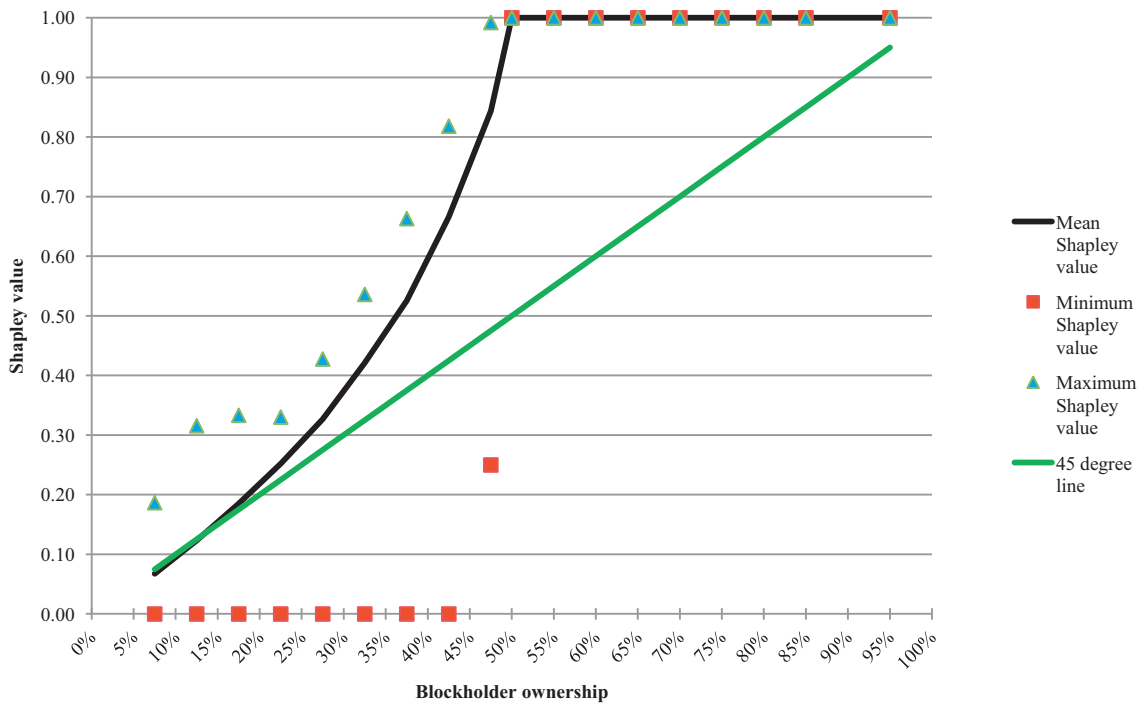

Fig. 2. Ownership versus Shapley value. The mean, minimum, and maximum Shapley values are depicted for each 5% ownership bracket reported in Table 3. Deviations of the mean Shapley value from the 45-degree line represent differences between power and ownership. The ownership data is collected for all blockholders in Compustat- and CRSP-listed firms (excluding financials, utilities, foreign firms as well as those for which traded security is other than common stock) with available data for 2004 and 2009 fiscal years.

Table 4
Summary statistics of financial and accounting variables. The sample is obtained by merging the ownership data, as described in the heading of Table 1, with annual accounting and stock price data for fiscal 2004 and 2005 (for 2004 ownership data) and 2009 and 2010 (for 2009 ownership data). All variables are as defined in the Appendix C. Tobin's Q is winsorized at 5. R&D is winsorized at 2. Leverage is winsorized at 1. Total risk and Capex are winsorized at the 99th percentile.

	Mean	Median
Tobin's Q	1.989	1.603
Ln(Firm size)	9.725	9.637
R&D	0.142	0.005
Leverage	0.155	0.101
Total risk	0.030	0.026
PPE	0.227	0.151
Capex	0.096	0.029
S&P500	0.121	0.000
Median firm value	1.788	1.632

their instruments, which are exogenous in our sample, are nevertheless weak. Consequently, all of our results should be interpreted as associations and not causal relationships.

4.2. Power, firm value, and ownership dispersion

As discussed earlier, the literature has used firm-level measures of ownership dispersion to examine the interactions among multiple blockholders. We now contrast these measures to our (blockholder-level) measure of power. We do so in two ways. First, we calculate pairwise correlations between Shapley value on the one hand and the number of blockholders and the Herfindahl index on the other. The results are reported in Table 6. We find that the correlations are rather low: the correlation between Shapley value and the number of blockholders (the Herfindahl index) is −0.115 (0.273). This suggests that on its own the number of blockholders (the Herfindahl index) explains about 1.3% (7.7%) of variation in Shapley value. Clearly, Shapley value seems to be significantly different from the firm-level measures of ownership dispersion.

We further confirm this in Table 7 where we replicate the regressions reported in Panel A of Table 5 using the number of blockholders and the Herfindahl index as additional control variables. In columns (1) and (4) we report the results without insider Shapley value as an explanatory variable. Interestingly, in both columns the addition of measures of ownership dispersion leads to a significant reduction in the significance of the coefficient estimates on insider ownership. In columns (2) and (5) we add the insider Shapley value as an explanatory variable. We find that the coefficient estimates of Shapley value are negative and statistically significant in both columns. At the same time, the magnitude and statistical significance of the coefficient estimates on the measures of ownership dispersion remain almost unchanged. As before, the results remain qualitatively unchanged when using standard errors clustered at the firm level (see columns (3) and (6)).

Overall, our results suggest that measures of dispersion are capturing dimensions of ownership structure other than power, at least as proxied by Shapley value. This difference could, as alluded to above, stem from the fact that the influence of ownership dispersion on firm value is likely to depend on the level of insider ownership. Consider the following examples. First, in 2009 the ownership structure of USG Corp was as follows. The firm had three blockholders: Berkshire Hathaway with a 32.3% ownership stake, Fairfax Financial Holdings Limited with 11.9%, and Gebr. Knauf Verwaltungsgellschaft KG with 10.98%. This ownership structure results in a Herfindahl index of 0.429. The total insider ownership was 0.9%. Second, the ownership structure of Marriott International Inc. in 2009 was as follows. The largest blockholder, the founding family, owned 24.51%, followed by T. Rowe Price Inc. with 11.3%, and Southeastern Asset Management, Inc. with 7.3%. This ownership structure resulted in a Herfindahl index of 0.421. Total insider ownership was 19.1%.

Table 5
The relationship between firm value and insider power. The dependent variable is Tobin's Q, defined as the ratio of the book value of assets plus the market value of equity minus the book value of equity to the book value of assets. The sample is obtained by merging the ownership data, as described in the heading of Table 1, with annual accounting and stock price data for fiscal 2004 and 2005 (for 2004 ownership data) and 2009 and 2010 (for 2009 ownership data). All independent variables are as defined in Appendix C. The dependent variable is winsorized at 5. In Panel A we use total insider ownership and Shapley values as explanatory variables, while Panel B we use CEO ownership and Shapley values. The results reported in columns 1 to 3 are based on the full sample, while those in column 4 are based only on non-dual class firm subsample. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses, except for column 3 where standard errors are clustered at the firm-level. *** and ** indicate significance at the 1% and 5% levels, respectively.

	(1)	(2)	(3)	(4)
	Full sample	Full sample	Full sample	Non-dual subsample
Panel A: Firm value and total insider power				
Total insider ownership	0.187	0.904	0.904	0.915
	(3.14)***	(4.31)***	(3.18)***	(3.26)***
Total insider Shapley		−0.462	−0.462	−0.465
		(3.57)***	(2.64)***	(2.72)***
Total insider wedge	−0.621	−0.725	−0.725	
	(5.67)***	(6.49)***	(4.41)***	
Ln(Firm size)	−0.328	−0.322	−0.322	−0.333
	(9.85)***	(9.65)***	(5.93)***	(9.24)***
R&D	0.443	0.440	0.440	0.430
	(11.09)***	(11.02)***	(8.48)***	(10.64)***
Leverage	−1.136	−1.133	−1.133	−1.140
	(20.91)***	(20.89)***	(15.42)***	(19.22)***
Median firm value	0.528	0.529	0.529	0.541
	(20.23)***	(20.27)***	(14.60)***	(19.98)***
Total risk	−3.657	−3.693	−3.693	−3.845
	(5.73)***	(5.78)***	(4.88)***	(5.72)***
PPE	−0.254	−0.245	−0.245	−0.236
	(5.79)***	(5.60)***	(4.04)***	(5.06)***
Capex	0.231	0.230	0.230	0.216
	(4.71)***	(4.67)***	(3.91)***	(4.37)***
S&P500	0.428	0.432	0.432	0.421
	(13.03)***	(13.16)***	(8.63)***	(12.02)***
Constant	4.327	4.256	4.256	4.396
	(13.02)***	(12.76)***	(7.89)***	(12.18)***
Year dummies	Yes	Yes	Yes	Yes
Observations	11,586	11,586	11,586	10,685
Adjusted *R*-squared	0.23	0.23	0.23	0.23
Panel B: Firm value and CEO power				
CEO ownership	0.033	0.781	0.781	1.091
	(0.47)	(3.22)***	(2.41)**	(2.97)***
CEO Shapley		−0.499	−0.499	−0.700
		(3.23)***	(2.48)**	(3.02)***
CEO wedge	−0.555	−0.632	−0.632	
	(4.31)***	(4.81)***	(3.25)***	
Ln(Firm size)	−0.334	−0.332	−0.332	−0.341
	(9.95)***	(9.90)***	(6.07)***	(9.40)***
R&D	0.437	0.438	0.438	0.430
	(10.94)***	(10.97)***	(8.45)***	(10.64)***
Leverage	−1.148	−1.148	−1.148	−1.159
	(21.14)***	(21.16)***	(15.61)***	(19.54)***
Median firm value	0.526	0.526	0.526	0.537
	(20.17)***	(20.16)***	(14.52)***	(19.80)***
Total risk	−3.458	−3.508	−3.508	−3.715
	(5.45)***	(5.53)***	(4.67)***	(5.57)***
PPE	−0.247	−0.240	−0.240	−0.228
	(5.65)***	(5.47)***	(3.95)***	(4.89)***
Capex	0.233	0.231	0.231	0.215
	(4.74)***	(4.70)***	(3.94)***	(4.35)***
S&P500	0.410	0.413	0.413	0.404
	(12.49)***	(12.59)***	(8.24)***	(11.59)***
Constant	4.411	4.378	4.378	4.508
	(13.17)***	(13.10)***	(8.08)***	(12.45)***
Year dummies	Yes	Yes	Yes	Yes
Observations	11,586	11,586	11,586	10,685
Adjusted *R*-squared	0.23	0.23	0.23	0.23

While the number of blockholders and the Herfindahl index in the two examples are (almost) the same, the ownership structures of the two firms have very different implications for the insiders. If in the case of USG Corp, the outside blockholders completely dominate the insiders, the opposite is true for Marriott International Inc. This implies that dispersion has significantly different influence on insider power in each of the above examples. In particular, in USG-type firms, higher dispersion increases insider power since the outside blockholders become less influential and/or have lower incentives to monitor (Shleifer and Vishny, 1986). In Marriott-type firms, higher dispersion decreases insider power as it reduces the relative importance of insiders and increases that

Table 6
The relationship between Shapley value and measures of ownership dispersion. The table reports correlations between Total insider ownership, Total insider Shapley, and two measures of ownership dispersion – Number of blocks and Herfindahl. The ownership data is collected for all Compustat- and CRSP-listed firms (excluding financials, utilities, foreign firms as well as those for which traded security is other than common stock) with available data for 2004 and 2009 fiscal years. All variables are as defined in Appendix C.

	Total insider ownership	Total insider Shapley	Number of blocks	Herfindahl
Total insider ownership	1			
Total insider Shapley	0.972	1		
Number of blocks	−0.107	−0.115	1	
Herfindahl	0.274	0.273	−0.837	1

Table 7
The relationship between firm value and insider power, controlling for measures of ownership dispersion. The dependent variable is Tobin's Q, defined as the ratio of the book value of assets plus the market value of equity minus the book value of equity to the book value of assets. The sample is obtained by merging the ownership data, as described in the heading of Table 1, with annual accounting and stock price data for fiscal 2004 and 2005 (for 2004 ownership data) and 2009 and 2010 (for 2009 ownership data). All independent variables are as defined in Appendix C. The dependent variable is winsorized at 5. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses, except for columns 3 and 6 where standard errors are clustered at the firm-level. *** and ** indicate significance at the 1% and 5% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Total insider ownership	0.160	0.956	0.956	0.131	0.894	0.894
	(2.69)***	(4.55)***	(3.36)***	(2.15)**	(4.26)***	(3.14)***
Total insider Shapley		−0.513	−0.513		−0.492	−0.492
		(3.95)***	(2.92)***		(3.79)***	(2.81)***
Total insider wedge	−0.717	−0.835	−0.835	−0.703	−0.817	−0.817
	(6.47)***	(7.38)***	(5.03)***	(6.32)***	(7.19)***	(4.90)***
Ln(Firm size)	−0.366	−0.361	−0.361	−0.408	−0.403	−0.403
	(10.86)***	(10.68)***	(6.56)***	(10.78)***	(10.59)***	(6.59)***
R&D	0.446	0.443	0.443	0.445	0.442	0.442
	(11.17)***	(11.09)***	(8.56)***	(10.88)***	(10.81)***	(8.44)***
Leverage	−1.120	−1.117	−1.117	−1.107	−1.105	−1.105
	(20.65)***	(20.62)***	(15.25)***	(20.21)***	(20.18)***	(14.94)***
Median firm value	0.524	0.525	0.525	0.528	0.529	0.529
	(20.07)***	(20.10)***	(14.51)***	(19.71)***	(19.74)***	(14.43)***
Total risk	−3.842	−3.887	−3.887	−4.029	−4.075	−4.075
	(6.03)***	(6.10)***	(5.15)***	(6.17)***	(6.23)***	(5.26)***
PPE	−0.252	−0.243	−0.243	−0.269	−0.260	−0.260
	(5.77)***	(5.55)***	(4.02)***	(6.09)***	(5.89)***	(4.27)***
Capex	0.226	0.225	0.225	0.235	0.234	0.234
	(4.61)***	(4.57)***	(3.83)***	(4.72)***	(4.67)***	(3.93)***
S&P500	0.399	0.403	0.403	0.407	0.411	0.411
	(12.05)***	(12.17)***	(8.04)***	(12.03)***	(12.13)***	(8.15)***
Number of blocks	−0.041	−0.042	−0.042			
	(7.19)***	(7.38)***	(5.28)***			
Herfindahl				0.209	0.215	0.215
				(5.72)***	(5.87)***	(4.24)***
Constant	4.860	4.796	4.796	5.032	4.959	4.959
	(14.27)***	(14.04)***	(8.69)***	(13.38)***	(13.12)***	(8.21)***
Observations	11,586	11,586	11,586	11,198	11,198	11,198
Adjusted *R*-squared	0.24	0.24	0.24	0.24	0.24	0.24

of outsiders. In unreported results we find this intuition to be true. In particular, we find that there exists a statistically significant negative correlation between Herfindahl index and insider power in firms with no inside blockholders. In firms with inside blockholders, we find the correlation to be positive and statistically significant.

Further, significant percentages of both types of firms are present in our sample. In Table 8 we provide a description of our sample in terms of the presence of inside and outside blockholders. Almost half of our sample firm-years have only outside blockholders, similar to the USG example above. 35.6% of firm-years, on the other hand, have ownership structures similar to that of the Marriott International Inc. Overall, the opposite power-dispersion relationships in the two types of firms could explain why, for the full sample, the dispersion measures are unrelated to insider power. Our blockholder-level measure takes into account the level of insider ownership and therefore provides a better measure of power.

4.3. Blockholder identity, power, and firm value

The second advantage of our blockholder-level measure of power is that it allows us to examine the manner in which the influence of power on firm value varies between blockholders, based on the identity of the blockholder. In particular, we examine the influence of the power of the largest inside and outside blockholder on firm value. We expect that outside blockholders will be more likely to use their power to increase firm value (as compared to inside blockholders). This is because the value obtained by an outside blockholder from her ownership stake depends (mostly) on the value of her shares, while the value of an inside blockholder's stake depends on both the value of his shares and his private benefits of control.

The results are reported in Table 9. As before, we start with a benchmark case of the ownership and firm value relationship (columns (1) and (4)). We find that the ownership of the largest inside

Table 8
Presence and ownership of inside and outside blockholders. The table reports presence as well as ownership of the largest inside and outside blockholders. The ownership data is collected for all Compustat- and CRSP-listed firms (excluding financials, utilities, foreign firms as well as those for which traded security is other than common stock) with available financial and ownership data for 2004 and 2009 fiscal years. Officers and directors of the firm are considered inside blockholders. All other blockholders are classified as outside ones. The sample is split by the type of blockholders present in the firm. The number of firm-years in each category as well as the corresponding percentage (out of the overall sample) is reported in the second column. The mean and median ownership of the largest inside and outside blockholder for each category are reported next. Last row reports the mean and median ownership of the largest inside and outside blockholder for the full sample.

	N	Largest inside block		Largest outside block	
		Mean	Median	Mean	Median
No blocks	202 (3.20%)				
Only inside blocks	742 (11.77%)	42.16%	38.10%	0	0
Only outside blocks	3113 (49.38%)	0	0	16.85%	11.70%
Inside and outside blocks	2247 (35.64%)	20.60%	14.06%	13.16%	10.40%
Total	6304	25.95%	17.60%	15.30%	11.15%

Table 9
The relationship between firm value and blockholder power. The dependent variable is Tobin's Q, defined as the ratio of the book value of assets plus the market value of equity minus the book value of equity to the book value of assets. The sample is obtained by merging the ownership data, as described in the heading of Table 1, with annual accounting and stock price data for fiscal 2004 and 2005 (for 2004 ownership data) and 2009 and 2010 (for 2009 ownership data). All independent variables are as defined in Appendix C. The dependent variable is winsorized at 5. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses, except for columns 3 and 6 where standard errors are clustered at the firm-level. *** and ** indicate significance at the 1% and 5% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Largest inside ownership	0.173 (2.88)***	0.862 (4.17)***	0.862 (3.03)***			
Largest inside Shapley		−0.465 (3.49)***	−0.465 (2.58)***			
Largest inside wedge	−0.723 (6.65)***	−0.787 (7.23)***	−0.787 (4.92)***			
Largest outside ownership				−0.051 (0.65)	−0.840 (3.38)***	−0.840 (2.47)**
Largest outside Shapley					0.529 (3.37)***	0.529 (2.46)**
Largest outside wedge				0.075 (0.32)	0.258 (1.08)	0.258 (0.68)
Ln(Firm size)	−0.331 (9.96)***	−0.329 (9.85)***	−0.329 (6.05)***	−0.338 (10.05)***	−0.342 (10.20)***	−0.342 (6.25)***
R&D	0.444 (11.11)***	0.445 (11.15)***	0.445 (8.58)***	0.437 (10.95)***	0.437 (10.96)***	0.437 (8.44)***
Leverage	−1.136 (20.94)***	−1.135 (20.93)***	−1.135 (15.45)***	−1.157 (21.21)***	−1.158 (21.22)***	−1.158 (15.70)***
Median firm value	0.525 (20.15)***	0.526 (20.15)***	0.526 (14.52)***	0.530 (20.32)***	0.529 (20.30)***	0.529 (14.64)***
Total risk	−3.611 (5.69)***	−3.661 (5.77)***	−3.661 (4.87)***	−3.323 (5.26)***	−3.395 (5.38)***	−3.395 (4.53)***
PPE	−0.256 (5.86)***	−0.247 (5.61)***	−0.247 (4.06)***	−0.246 (5.60)***	−0.243 (5.53)***	−0.243 (3.99)***
Capex	0.231 (4.70)***	0.227 (4.63)***	0.227 (3.88)***	0.235 (4.79)***	0.234 (4.76)***	0.234 (3.98)***
S&P500	0.421 (12.87)***	0.422 (12.89)***	0.422 (8.44)***	0.413 (12.61)***	0.408 (12.45)***	0.408 (8.14)***
Constant	4.381 (13.19)***	4.350 (13.05)***	4.350 (8.07)***	4.436 (13.23)***	4.503 (13.46)***	4.503 (8.31)***
Observations	11,586	11,586	11,586	11,586	11,586	11,586
Adjusted *R*-squared	0.23	0.24	0.24	0.23	0.23	0.23

blockholder has a positive influence on firm value, while that of the largest outside blockholder has a (marginally) negative influence.[23] In columns (2) and (4) we use Shapley values of the largest inside and outside blockholders, respectively, as additional explanatory variables. We find that the coefficient estimate of the largest inside blockholder's power is negative, while that of the largest outside blockholder's is positive. Both coefficient estimates are statistically significant at the 1 percent level. As before, we also cluster the standard errors at the firm level. The results, reported in columns (3) and (6) of Table 9, are qualitatively unchanged. Overall, the influence of power on firm value depends on the identity of the blockholder. These findings underscore the advantage of using our blockholder-level measure of power (as compared to a firm-level one).

[23] The negative influence of outside blockholder's ownership on firm value has been documented by, among others, Anderson and Reeb (2003), Konijn et al. (2011), and Villalonga and Amit (2006).

The following persons are known to the Company to be the beneficial owners of more than 5% of the voting securities of the Company as of December 16, 2003:

	Common Shares		Class B Common Shares(1)		
Name of Beneficial Owner	Number of Shares Beneficially Owned	Percent of Class	Number of Shares Beneficially Owned	Percent of Class	Percentage of Total Voting Power
Joseph P. Keithley	438,386(2)	3.2%	2,130,878(3)	99.1%	61.6%
Barclays Global Investors, N.A. (4)	849,449	6.3%	—	—	2.4%

The beneficial ownership of Common Shares and Class B Common Shares by each of the Company's Directors, nominees for Director, each of the Company's executive officers named in the Summary Compensation Table and by all executive officers and Directors of the Company as a group on December 16, 2003, is set forth in the table below:

	Common Shares		Class B Common Shares(1)		
Name and Address of Beneficial Owner	Number of Shares Beneficially Owned(2)	Percent of Class	Number of Shares Beneficially Owned	Percent of Class	Percentage of Total Voting Power
Brian R. Bachman	57,947	*	—	—	*
James T. Bartlett	65,062	*	—	—	*
James B. Griswold	67,652	*	—	—	*
Leon J. Hendrix, Jr.	97,160	*	—	—	*
William J. Hudson, Jr.	61,627	*	—	—	*
Joseph P. Keithley	438,386(3)	3.2%	2,130,878(4)	99.1%	61.6%
Dr. N. Mohan Reddy	28,143	*	—	—	*
R. Elton White	55,459	*	—	—	*
John A. Pesec	44,295(5)	*	—	—	*
Mark J. Plush	141,778(6)	1.1%	—	—	*
Linda C. Rae	28,508	*	—	—	*
Gabriel A. Rosica	224,570	1.6%	—	—	*
All executive officers and Directors as a group (16 persons)	1,492,849	10.3%	2,130,878	99.1%	63.2%

Fig. 3. Beneficial ownership table from the January 6th, 2004 proxy statement of Keithley Instruments, Inc.

5. Conclusions

Much of the literature on the relationship between ownership and firm value has implicitly assumed that a blockholder's power in the firm is equal to (a function of) her ownership stake. In this paper, we examine the validity of this assumption. In particular, we document the presence of multiple blockholders in a vast majority of US firms and show that it leads to a significant difference between power and ownership. Further, we show that power of insiders has a negative influence on firm value, while the influence of outside blockholder's power is positive. Finally, we show that dispersion measures used in the multiple blockholder literature mainly proxy for dimensions of ownership structure other than power.

Our findings suggest several reasons that favor using a direct blockholder-level measure of power (as compared to either dispersion measures or a function of only the ownership stake). First, our findings question the ability of firm-level dispersion measures to proxy for insider power. The use of a blockholder-level measure of power takes into account the level of insider ownership, which, as we have argued, influences the interpretation of dispersion measures. Second, the use of a blockholder-level measure of power also allows for the influence of power to vary with the blockholder's identity, which, as we have shown, has a significant influence on the way in which she will use the power. Third, for almost a quarter of blockholders in our sample power is less than their ownership stake. For these blockholders the implicit assumption of a positive cross-sectional relationship between power and ownership (used in the ownership-firm value literature) may not apply. As a result, such cases may distort inferences drawn in conventional tests of the relationship between ownership and firm value. Further, the influence of our direct measure of power on firm value is the opposite of that of ownership and consistent with the entrenchment effect for inside blockholders and the monitoring effect for outside blockholders.

Several of the limitations of our paper suggest potential venues for future research, both theoretical and empirical. First, even though an examination of the causal relationship between power and firm value is beyond the scope of this paper, our findings underscore the importance of this issue. A theoretical guidance on the determinants of a blockholder's power in the firm would help in finding appropriate instruments and thus would provide insights into the direction of causality.

Second, our treatment of blockholders assumes that all potential coalitions between blockholders are equally likely. It is possible, for example, that the identity of the blockholders could affect the way they interact. Laeven and Levine (2008) suggest that the interaction of similar blockholders is different from the interaction of blockholders of different types (i.e., individual versus institutional blockholders). Our general findings with regard to blockholder power could be further refined by taking into account the details of each blockholder's identity. This, however, would require a formal modeling of the role of blockholder identity in a coalition formation. At this time, we are not aware of any model providing guidance in this regard.

Appendix A

Consider the ownership structure of Keithley Instruments, Inc. (see Fig. 3 which shows the ownership table from the company's 2004 proxy statement). As disclosed in the proxy statement, on the record date (December 16, 2003), 13,418,202 shares of Common stock and 2,150,502 shares of Class A common stock were outstanding and eligible to be voted at the annual meeting. Holders of Common stock were entitled to cast one vote for each share held, while holders of Class A common stock were entitled to cast ten votes for each share held. This implies that holders of Common shares were eligible to cast $13{,}418{,}202/(13{,}418{,}202 * 1 + 2{,}150{,}502 * 10) = 38.42\%$ of all votes, while the holders of Class

A shares were eligible to cast the remaining 61.58% of votes. At the same time, the holders of Common shares were entitled to 13,418,202/(13,418,202 + 2,150,502) = 86.19% of cashflows, with the holders of Class A shares receiving the remaining 13.81% of cashflows.

The company' founder, CEO, and Chairman of the board, Joseph P. Keithley, owned 438,386 Common shares and 2,130,878 Class A shares. His voting rights, therefore, are (438,386 + 2,130,878 * 10)/(13,418,202 * 1 + 2,150,502 * 10) = 62.27% of all votes, whiles his cashflow rights are (438,386 + 2,130,878)/(13,418,202 + 2,150,502) = 16.50%. While Barclays Global Investors, N.A. owns more than 5% of Common shares, its voting rights (2.43%) are below 5%. The cashflow rights are 5.46%. Finally, total insider ownership of Keithley Instruments, Inc. is 65.29% in terms of voting rights and 23.28% in terms of cashflow rights.

Appendix B

B.1. Shapley value calculations

Let N be a finite set of major players and $v(S)$ be a voting game where S denotes a set of players supporting the resolution (also called coalition) and $w(S)$ denotes their total votes. Let n represents the number of major players in the game, and s represents the number of major players in coalition S. Let c be the cut-off votes required to pass the resolution; we define the game as,

$$v(S) = \begin{cases} 0 & \text{if } w(S) < c \\ 1 & \text{if } w(S) \geqslant c \end{cases}$$

Player i, who is not a part of coalition S, is said to be decisive if $c - w_i < w(S) < c$. The power of player i is then defined by Shapiro and Shapley (1978) as the of the total number of times player i becomes decisive in different ordering of players, or mathematically,

$$\varphi_i = \sum_{S \subseteq N - \{i\}} \frac{n!(n-s-1)!}{n!}[v(S \cup \{i\}) - v(S)]$$

Milnor and Shapley (1978) extends this definition to the limiting case of a set of major players, N as before, and a continuum of non-atomic minor players, with a total weight of $\theta = 1 - \sum_{i \in N} w_i$. The power of each major player is defined by,

$$\varphi_i = \sum_{S \subseteq N - \{i\}} \int_{t_1}^{t_2} x_i^s (1 - x_i)^{n-s-1} dx_i$$

where $t_1 = \langle c - w(S)/\theta \rangle$, and $t_2 = \langle c - w(S \cup \{i\})/\theta \rangle$ such that

$$\langle x \rangle = \text{median of}(0, x, 1) = \begin{cases} 0 & \text{if } x \leqslant 0 \\ x & \text{if } 0 \leqslant x \leqslant 1 \\ 1 & \text{if } x \geqslant 1 \end{cases}$$

The power of minor players is then given by $\Phi = 1 - \sum_{i \in N} \phi_i$.

Appendix C

Variable description

Variable	Description
Total insider ownership	The percentage of voting rights (directly) owned by the officers and directors of the firm
Total insider Shapley	The Shapley value of officers and directors; for this calculation, the ownership of officers and directors is treated as a block
Total insider wedge	The difference between voting rights and cashflow rights of officers and directors
CEO ownership	The percentage of voting rights controlled by the firm's CEO
CEO Shapley	The Shapley value of the firm's CEO
CEO wedge	The difference between voting rights and cashflow rights of the firm's CEO
Largest inside ownership	The percentage of voting rights controlled by the largest inside blockholder; inside blockholders are those involved in management and/or governance of the firm
Largest inside Shapley	The Shapley value of the largest inside blockholder
Largest inside wedge	The difference between voting rights and cashflow rights of the largest inside blockholder
Largest outside ownership	The percentage of voting rights controlled by the largest outside blockholder; outside blockholders are those not involved in management and/or governance of the firm
Largest outside Shapley	The Shapley value of the largest outside blockholder
Largest outside wedge	The difference between voting rights and cashflow rights of the largest outside blockholder
Tobin's Q	The ratio of book value of assets plus the market value of equity minus the book value of equity to the book value of assets
Ln(Firm size)	The natural logarithm of the book value of net sales
R&D	Ratio of research and development expenditure to net sales
Leverage	Ratio of the book value of debt to the book value of assets
Total risk	The standard deviation of stock returns calculated over 100 trading days ending on the day preceding the fiscal year end date; we require at least 30 observations for these calculations
PPE	Ratio of total property, plant, and equipment to the book value of assets
Capex	Ratio of capital expenditure to net sales
S&P500	Dummy variable that takes on a value of one if a firm is part of the S&P500 index, and zero otherwise
Median firm value	Median *Tobin's Q* for all COMPUSTAT firms in the same year and Fama-French 48 industry group
Number of blocks	The number of blockholders present in the firm
Herfindahl	Scaled Herfindahl index, calculated as $Herfindahl = \sum_{i=1}^{5} own_i^2 / (\sum_{i=1}^{5} own_i)^2$

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