CEO Share Ownership and Firm Valuation

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Abstract

We estimate the relation between Tobin's Q and CEO share ownership with firm and CEO-firm fixed effects. Our results reveal an inverted U-shaped relation only when external pressure for good governance is weak, where the pressure is measured by product market competition and institutional ownership concentration. The inverted U-shaped relation seems to be a manifestation of some CEOs capturing the incentive contracting process under weak external governance. When external governance is strong, CEO share ownership is unrelated to Tobin's Q, which is consistent with the predictions of principal-agent models. Our results are robust to various alternative explanations based on variable definitions, different statistical properties of the ownership variables under strong and weak external governance regimes, reverse causality, and time varying omitted variables.

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I. Introduction

When contracting theory is applied to managerial incentive contracts, most models assume that shareholders play the role of principals within the principal-agent framework. However, there is increasing evidence that CEOs are capturing important parts of the incentive contracting process. The evidence includes Bertrand and Mullainathan (2000), who demonstrate that in the absence of adequate monitoring by shareholders, CEOs manipulate the compensation process to pay themselves what they can; Bebchuk and Fried (2004), who argue that powerful CEOs reduce the linkage between CEO compensation and firm performance and enjoy "pay without performance"; and Morse, Nanda, and Seru (2009), who show that powerful CEOs rig incentive contracts.

As if to vindicate these academic studies, amid the current economic crisis of 2008-2009 media stories abound about CEOs receiving unearned bonuses in tens of millions of dollars for negative performance or tweaking "performance targets to make goals easier to achieve" (*Wall Street Journal*, March 18, 2009, B1). However, the same *Journal* article reports that of "50 big nonfinancial companies …, 16 cut bonuses (for CEOs) and two others didn't award them." Thus, while some CEOs appear to capture the compensation process, weakening the ability of shareholders to act as principals in setting and enforcing incentive contracts, many others do not, illustrating the heterogeneity in CEOs' ability or inclination to capture the contracting process.

According to contracting theory, firms enter contracts to align managerial incentives with those of shareholders, and managerial share ownership is an important type of these contracts. How the share ownership affects firm valuation has been a contentious issue. The early evidence by Morck, Shleifer, and Vishny (1988); McConnell and Servaes (1990); and others, shows inverted U-shaped relations between Tobin's Q and managerial share ownership. The suggested interpretation is that the relation at

low levels of share ownership is positive due to incentive effects, while the negative relation at high levels of ownership is due to managerial entrenchment effects.

This interpretation is challenged by Demsetz and Lehn (1985); Kole (1996); Cho (1998); Himmelberg, Hubbard, and Palia (1999); and others. Demsetz and Lehn and Himmelberg et al., in particular, view share ownership as an endogenous variable within a contracting context, wherein shareholders choose a set of equilibrium contracts to align managerial incentives to maximize shareholder value. Thus, they argue that if contracting environments are properly accounted for, firm valuation should be unrelated to managerial share ownership. Himmelberg et al. control for a set of observable firm variables and time-invariant, unobservable firm characteristics with firm fixed effects to estimate the relation between Tobin's Q and managerial share ownership. Their estimation shows no significant relation. Thus, they conclude, the previously observed relation between firm valuation and share ownership is spurious.

This conclusion may not apply to cases of CEO share ownership where the ownership is not determined according to the contracting view. When a CEO captures the contracting process, the observed share ownership is unlikely to reflect the optimality conditions from the shareholder perspective[2] and, hence, may exhibit a systematic relation with firm valuation. That is, the crux of the issue is whether share ownership is determined according to the contracting view or the capturing view, which, in turn, depends on the ability of shareholders to preserve their inherent rights as principal owners of capital.

We argue that for public corporations with diffuse share ownership, the ability of shareholders to perform the principals' role depends on the strength of external governance mechanisms

[2] A practical example of deviation from optimal incentive contracts is illustrated by Dittmann and Maug (2007) when they show that the observed stock option contracts cannot be explained by an efficient contracting model in the standard principal-agent framework.

constraining the CEOs' ability to exert their wills to alter the equilibrium contracts to their advantage. Thus, we hypothesize that, when firms are subject to strong external pressure for good governance, CEO share ownership is determined by the contracting environment and, hence, is unrelated to firm valuation. When firms are subject to weak external governance, however, CEOs may capture the contracting process and their share ownership may exhibit a systematic relation to firm valuation.

To proxy for the strength of external pressure for good governance, we use product market competition, which eliminates inefficient producers. This threat of elimination is the ultimate anecdote against non-profit maximizing managerial behavior. Strong product market competition limits managerial slack and complacency, reducing agency problems between managers and shareholders (Alchian, 1950; Friedman, 1953; Stigler, 1958; Hart, 1983; Giroud and Mueller, 2008). The competition is proxied by the Herfindahl-Hirschman Index (HHI), where a lower index indicates greater product competition. The HHI is based on the Fama-French (1997) industry classification or two-digit SIC code.

Previous researchers also demonstrate the important monitoring role of institutional investors and block holders in shaping corporate governance (e.g., Shleifer and Vishny, 1986; Bertrand and Mullainathan, 2000, 2001; Hartzell and Starks, 2003; and Cremers and Nair, 2005). We follow Hartzell and Starks (2003) and estimate institutional ownership concentration (IOC) by the Herfindahl Index of institutional ownership or by the percentage of institutional holdings held by the top five institutions. These measures of IOC are used to check robustness to alternative proxies for the strength of external governance.

Our investigation focuses primarily on CEO share ownership for several reasons. First, decision making authority is concentrated in the CEO, giving her the most influence on firm performance and valuation. Second, CEOs are in a better position to capture the incentive contracting process than other top executives, making CEO ownership more likely to deviate from the equilibrium. Third, focusing on

CEOs provides a cleaner test than that on a management team, which over time undergoes changes in both the composition and the number of executives. The changes in the composition make it difficult to control for unobserved agent characteristics, while the changes in the number of executives included in the computation of managerial share ownership create noise in within firm variation of the ownership. Both of these problems are mitigated by dealing with only CEO share ownership. Finally, CEO share ownership has a higher mean (2.8% in our sample) and a higher average within firm variation (1.6%) than those of four top non-CEO executives combined (1.3% and 1.1%, respectively). Thus, focusing on CEO ownership may help alleviate the issue of power of test raised by Zhou (2001), who argues that the within firm variation in managerial share ownership is too small to detect any relation with firm fixed effects.

Our empirical investigation begins with replicating Himmelberg et al.'s baseline model with firm fixed effects, using share ownership data for up to five top executives covered by the ExecuComp database. The data covers the period 1992 through 2006 and includes more firm year observations over a longer and more recent period than those used in Himmelberg et al. Unsurprisingly, our estimation results confirm theirs; there is no significant relation between Tobin's Q and top managerial share ownership.

However, ExecuComp often changes the number of executives it covers for the same firm over time such that the within firm variation in the fraction of shares held by up-to-five-top executives reflects not only real changes in the executives' share holdings but also changes in the number of executives included in the computation of the ownership. Of 2,482 firms in our sample, only 99 report the same number of executives throughout the sample period. [3] For the remaining 96% of sample firms, the number of executives changes during their sample periods. The noise arising from this inconsistent

[3] This tabulation ignores variation between five or more executives because we cap the number of executives at five.

coverage is particularly relevant for regressions using firm fixed effects, because all variations for estimation come from the within firm variation. To reduce the noise, we restrict the sample to only firm year observations for which all top five executives are covered by ExecuComp.

With this sample restriction, the same regression model shows a statistically significant inverted U-shaped relation between Tobin's Q and top management share ownership. However, this inverted U-shaped relation is driven by observations under weak external governance, an environment in which CEOs are more likely to capture the incentive contracting process. When firms are subject to strong external governance, by contrast, we observe no statistical relation between Tobin's Q and share ownership for either CEOs or non-CEO top executives. These results hold regardless of whether the strength of external governance is measured by product market competition or by institutional ownership concentration.

We conduct a number of tests to check the robustness of these results. First, following Bertrand and Schoar (2003) and Graham, Li, and Qiu (2009), we allow the contracting environment to be affected by agent characteristics by including CEO-firm fixed effects. Second, we re-estimate all regressions using alternative definitions of share ownership; external governance and demarcation point for strong and weak external governance; and sample construction. Third, we test the sensitivity of our estimation results to differences in statistical properties between observations subject to strong and weak external governance. None of these tests alters our conclusion.

We also address reverse causality issues (Kole, 1996, and Cho, 1998) by first using one year lagged value of CEO ownership. The results are robust. We also estimate a simultaneous equation system of ownership, investment, and Tobin's Q, using the three-stage least squares method. The system of equations is similar to the one used by Cho, except we use panel data, firm fixed effects, and CEO-firm fixed effects in place of the cross-sectional data and industry fixed effects used by Cho. The

inverted U-shaped valuation-ownership relation continues to be highly significant for the full and weak external governance samples, but not for the strong external governance sample. We also attempt to account for the time-variant omitted variables problem by using the same instrumental variables used in Himmelberg et al. in two-stage least squares regressions. No relation of any kind is observed whether external governance is weak or strong. As Himmelberg et al. point out, using instrumental variables while at the same time controlling for firm fixed effects reduces the precision of estimates to the point at which such a test have little power. To counter this problem, we restrict the analysis to observations under weakest external governance. For these observations, the inverted U-shaped relation is significant, regardless of whether we control for firm- or CEO-firm fixed effects.

Our findings of the inverted U-shaped relations under weak external governance are consistent with the recent evidence of CEOs capturing the incentive contracting process alluded at the outset of the paper. The capturing view seems to prevail under weak external governance, allowing CEO share ownership to deviate from the optimal level from the shareholder perspective. Thus, when CEOs hold more shares, they will be more closely aligned with shareholder value, which increases firm valuation, as long as the level of shareholdings is small enough to keep the risk of entrenchment low.

When the ownership reaches a certain threshold, however, the entrenchment risk may start to kick in. A further increase in voting rights may help the CEO pursue private benefits with less fear of reprisal from within the firm. The incremental voting rights may not only lead to more private benefits at the expense of shareholders, but also enable the CEO to more effectively entrench from the market for corporate control and protect against dismissal for poor performance (Volpin, 2002; Atanassov and Kim, 2009). These effects will more than offset the benefits of the alignment effect due to increased cash flow rights, leading to lower firm valuation.

These positive and negative effects of incremental CEO share holdings are more pronounced when external governance is weak. This is because weak external governance allows for greater agency problems, providing more room for share ownership to mitigate or exacerbate agency problems, depending on the level of ownership.[4] Strong external governance, by contrast, helps the contracting view prevail, wherein CEO share holdings are endogenously determined by the contracting environment. With the CEO share ownership reflecting the equilibrium contracts designed to minimize agency problems, the share ownership should be unrelated to firm valuation. And indeed this is what we find.

The next section describes data and sample construction. Section III presents main empirical results followed by a number of robustness checks. In Section IV, we address the issues of reverse causality and time-varying omitted variables. Section V contains a brief summary and concluding remarks.

II. Data, Sample Construction, and Summary Statistics

A. Sample Construction

Our empirical investigation is based on panel data from 1992 to 2006, constructed from an intersection of ExecuComp, Compustat, and CRSP. We merge the executive database with accounting data in Compustat and stock return data in CRSP. Observations with incomplete data are dropped from the sample. This panel data allows us to track through time managerial ownership of top executives while controlling for relevant firm characteristics.

The sample is unbalanced panel data. Table I reports by year the number of firms that have necessary variables to construct Tobin's Q and control variables and ownership data for CEO and four top

[4] Durnev and Kim (2005) demonstrate the same point when they relate share ownership to within country variation in the quality of governance practiced by firms in emerging markets.

non-CEO executives, where the ranking of non-CEO executives is determined by the sum of salary and bonus. We restrict our analyses to the top five executives because most companies in ExecuComp report the top five or fewer executives. The number of firms in 1992 and 1993 are smaller, reflecting the limited coverage during the first two years of data compilation by ExecuComp. The full sample for CEO share ownership includes 19,729 firm-year observations, associated with 2,482 firms and 5,262 CEO-firm pairs. Because ExecuComp often reports a different number of executives over time for the same firm, simply summing up shares owned by the executives creates noise that does not reflect real changes on managerial share holdings. Thus, we create another sample restricted to only those firm-year observations which have ownership data of five or more top executives. This screening yields 18,200 firm-year observations associated with 2,428 unique firms.

B. Proxies for External Governance Mechanisms

External pressure for good governance arises from many sources, such as the managerial labor market (Fama, 1980) and the market for corporate control. To measure the strength of external governance, we rely on the more quantifiable measures of product market competition and institutional ownership concentration.[5] The disciplinary pressure from product market competition is proxied by the level of industry concentration as measured by the HHI, where a lower index indicates greater product competition and stronger external pressure for good governance. The HHI is calculated based on the entire sample of firms in Compustat using 48 Fama-French (1997) industry classifications. HHI is also calculated based on the first-two-digit SIC code industry groupings for a robustness check.

The second measure of the strength of external governance is the degree of monitoring by institutional investors and block-holders, proxied by institutional ownership concentration (IOC). Following

[5] A commonly used measure of external governance is the anti-takeover index, first compiled by Gompers, Ishii, and Metrick (2003) and subsequently refined by Bebchuk, Cohen, and Ferrell (2004). These measures cannot be used to proxy for the strength of external governance for our tests. Because anti-takeover provisions are firm choice variables, they may be a part of the equilibrium contracts according to the contracting view.

Hartzell and Starks (2003), our primary measure of the concentration is the sum of the squares of the top five institutional investor ownership, where a higher IOC index indicates greater concentration and more effective monitoring by institutional investors. For every firm in the sample, we obtain institutional ownership for each year between 1992 and 2006 from the CDA Spectrum database. Also following Hartzell and Starks, we use the sum of percentage shareholdings by top five institutions combined as an alternative measure of IOC.

C. Variables

Firm valuation is measured by Tobin's Q, the market value of a firm divided by the replacement value. Q is the ratio of the sum of the market value of common stocks and the book value of total liabilities to the book value of total assets. The main explanatory variable of interest is share ownership of top executives. CEO share ownership, *OWN_CEO,* is measured by the percentage of outstanding shares held by a CEO. We initially ignore stock options because they do not give voting rights until exercised. However, stock options, especially in-the-money options, have important incentive effects. Thus, we use *OWN_CEO_SO*, the ratio of the combined value of a CEO's stocks and in-the-money stock options (as reported by ExecuComp) to the market value of all outstanding shares as an alternative measure of CEO ownership.

The share ownership by executives ranked up to five, *OWN_Top*, is the sum of the fractions of shares held by the CEO and up to top four non-CEO executives covered by ExecuComp; as such, this variable may represent the ownership of the top three, four, or five top executives. When we restrict the sample to only those cases where ExecuComp covers five or more top executives, the ownership of top four non-CEO executives, *OWN_Top4,* is measured by the percentage of the combined outstanding shares held by the four executives. The ownership of top five executives including CEO, *OWN_Top5,* is simply the sum of *OWN_CEO* and *OWN_Top4.* When any of these ownership values are equal to or greater than one, they are dropped from the sample.

Because we begin by replicating Himmelberg et al.'s (1999) baseline model, the majority of our model specifications include the same control variables used by them. To address reverse causality, we follow Cho's (1998) simultaneous equations approach and rely on a similar set of control variables. Table II describes all variables used in our study.

D. Summary Statistics

Table III contains summary statistics of all variables used in this study. The variable of main interest, CEO share ownership, has a mean of 2.8 %, more than double the average combined share holdings by top four non-CEO executives (1.3%), demonstrating the importance of CEO ownership relative to that of her team of executives. Because of our use of firm and CEO-firm fixed effects, the table also reports the average within firm and within CEO-firm pair standard deviations in the last two columns. As expected, the within firm variation is much smaller than the cross-sectional variation. Furthermore, the time series standard deviation within firms is greater than that within CEO-firm pairs. The time series variation is also greater for CEO ownership than for that of the top four non-CEO executives. The time series variations of HHI and IOC within firm or within CEO-firm pair are also non-trivial; suggesting that some firms may cross over between strong and weak external governance regimes. Such crossovers will further reduce the time series variation when we separate the observations into strong and weak external governance regimes

III. Impact of Managerial Ownership on Firm Valuation

A. Re-examination of the Relation between Tobin's Q and Share Ownership

We begin by replicating Himmelberg et al.'s (1999) baseline model with year and firm fixed effects. The specification is as follows.

$$Tobin's\ Q_{it} = \eta_t + \vartheta_i + \alpha_0 + \alpha_1 OWN_{it} + \alpha_2 (OWN)_{it}^2 + \alpha_3 LNS_{it} + \alpha_4 (LNS)_{it}^2 + \alpha_5 K/S_{it} + \alpha_6 (K/S)_{it}^2 + \alpha_7 SIGMA_{it} + \alpha_8 SIGDUM_{it} + \alpha_9 Y/S_{it} + \alpha_{10} R\&D/K_{it} + \alpha_{11} RDUM_{it} + \alpha_{12} A/K_{it} + \alpha_{13} ADUM_{it} + \alpha_{14} I/K_{it} + \mu_{it} \quad (1)$$

Subscripts *i* and *t* indicate firm i and time t, and η_t *and* ϑ_i are year- and firm-fixed effects. *OWN*, the fraction of shares owned, and OWN^2 are variables of main interest. The rest are control variables borrowed from Himmelberg et al. and are described in Table II. LNS stands for firm size as measured by log of sales; K/S, the ratio of property, plant and equipment (PPE) to sales; SIGMA, a measure of firm idiosyncratic risk; Y/S, operating income normalized by sales; R&D/K, the ratio of R&D expenditures to PPE; A/K, the ratio of advertising expenditures to PPE; and I/K, capital expenditures divided by PPE.

SIGMA captures possible effects of firm idiosyncratic risk on managerial share holdings. K/S measures the tangibility of assets, or "hard capital," whereas R&D/K and A/K measure the intangibility of assets or "soft capital." Presumably, softer capital is more discretionary and less easily monitored, increasing the desired level of managerial ownership. SIGDUM, RDUM, and ADUM are indicator variables for the availability of relevant data for the computation of SIGMA, R&D/K, and A/K. When they are equal to zero, indicating that their corresponding variables are missing, SIGMA, R&D/K, or A/K are set to zero to maintain sample size and reduce the risk of sample selection bias. I/K is the investment rate to proxy for the link between growth rate and opportunities for discretionary investments. Himmelberg et al. argue that these control variables, along with firm fixed effects, represent relevant contracting environment factors, and find the majority of the variables are significantly related to managerial share ownership.

In Column 1 of Table IV we use all firm-year observations in the full sample.[6] OWN_Top is the sum of fractions of shares owned by executives ranked up to top five. The number of executives represented in this variable varies over time because ExecuComp sometimes covers less than five executives. This is in the spirit of Himmelberg et al., who include all shares held by managers and directors reported in proxy statements in their computation of insider share ownership, with the number of the insiders ranging from less than five to over 60. Unsurprisingly, the result reported in Column (1) is consistent with those reported

[6] Three observations are dropped because the sum of fractions of share holdings exceeds one.

by Himmelberg et al. Both coefficients of OWN and OWN^2 are insignificant, and most coefficients of the control variables have the same signs and statistical significance as those in Himmelberg et al.'s regression results with firm fixed effects (i.e., 6^{th} column in their Table 5 (A) on p. 374.) These results establish the robustness of their results to using different samples over different time periods.

The result in Column (1) is affected by the noise in OWN_Top arising from the variation in the number of executives covered by ExecuComp over time. Of 2,872 firms ever covered by ExecuComp, it consistently covers five or more executives for only 132 firms. Of our sample of 2,482 firms, only 99 report the same number of executives over the sample period even when we treat the number of executives more than five as five. This mean that for 96% of the firms, OWN_Top in Column (1) represents ownership held by different number of executives over time for the same firm, which implies that a substantial portion of the within firm variation in OWN_Top over time arises from changes in the number of executives included in its calculation, rather than from real changes in top managerial share holdings.

To reduce this noise, in Column (2) we restrict the sample to only those firm-year observations in which ExecuComp covers at least five top executives. This restriction prevents equal treatment of ownership representing top five executives' combined share holdings with cases where, say, top five or top four executives' share holdings are missing for the same firm. The impact of this sample restriction is rather dramatic. The coefficient on OWN is positive and significant at the one percent level, and OWN^2 shows a negative coefficient significant also at the one percent level. The inverted U-shaped relation between Tobin's Q and managerial share holdings is resurrected with this sample restriction. The coefficients of OWN_TOP5 indicate the peak occurs when the ownership reaches about 26%.

The inverted U-shaped relation may not apply to all top five executives, because for the ownership to have a significant observable impact on firm valuation, it should deviate from the equilibrium conditions. The deviation is more likely to occur when the executives under consideration capture the contracting

process. Since CEOs are in a better position to capture the contracting process than non-CEO top executives, we separate the top five executives into CEOs and four top non-CEO executives and re-estimate the regression in Columns 3 and 4 for each group.

The estimation results reveal that the inverted U-shaped relation is driven by CEO ownership. For non-CEO top executive's share holdings, the relation is weak, with only OWN^2 showing a significant negative coefficient. The significant relation for CEOs suggests that there are enough CEOs capturing the incentive contracting process such that, on average, their shareholdings do not reflect the equilibrium contracts. Had most of their share ownership been determined according to the contracting view, the observed ownership should exhibit no significant relation to firm valuation. The coefficients of OWN_CEO indicate the peak occurs when the ownership reaches about 29%, while those of OWN_TOP4 indicate a peak at about 15%. As shown in Table III, CEOs shareholdings are greater than those of the top four non-CEO executives combined; thus, the peak occurs at a higher percentage point for CEOs than for non-CEO executives.

B. Interaction with External Governance Mechanisms

If the inverted U-shaped relation between firm valuation and CEO ownership is indeed due to CEOs capturing the contracting process, the effects of CEO ownership on valuation should depend on factors affecting CEOs' ability to capture the contracting process. We argue that one such factor is external governance mechanisms constraining CEOs' ability to alter the contracting process to their advantage. Thus, we examine the interactive effects with the strength of external governance by re-estimating the Tobin's Q and share ownership relation while separating the sample into strong and weak external governance. We consider a firm year is subject to strong (weak) external governance if it belongs to an industry with below (above) the median HHI or if its institutional ownership concentration (IOC) is above (below) the median IOC.

The results for CEO ownership are presented in Table V. In Panel A, all regressions include firm- and year fixed effects. The inverted U-shaped relation is significant only when external governance is weak,

regardless whether the strength of external governance is measured by product market competition or institutional ownership concentration. Interestingly, Column (2) indicates a peak at 26%, very close to the peak at 29% for the undivided sample in Table V. Most of coefficients on the control variables are largely consistent with those in Table IV.

The results also show no evidence of CEO ownership affecting firm valuation when external governance is strong. When external pressure is strong, CEO shareholdings are likely to reflect the equilibrium level determined by the contracting environment.

When external governance is weak and ineffective to restrain CEOs from capturing the contracting process, the share ownership affects firm valuation in an inverted U-shaped form. Weak external governance allows for greater agency problems, leaving more room for ownership to mitigate agency costs and improve firm valuation. However, when CEO share ownership is already large, additional shares help them pursue private benefits with less fear of reprisal from within their firms or from the market for corporate control. Such negative effects of incremental CEO share ownership may be mitigated by strong external governance and, hence, is more pronounced when external governance is weak.

B.1. CEO-firm Fixed Effects

The contracting environment includes not only firm characteristics but also agent characteristics, such as agents' abilities, risk preference, and so on. Many of these characteristics are not observable yet have important effects on contracting, which are aptly demonstrated in a recent paper by Graham et al. (2009). They document that time invariant manager fixed effects explain a majority of the variation in executive pay. Thus, we include CEO-firm fixed effects to account for both unobservable CEO and firm characteristics. Because of CEO turnovers during the sample period, our sample of 2,482 unique firms yields 5,262 CEO-firm pairs.

The results with CEO-firm fixed effects are reported in Panel B of Table V. The estimated relations between firm valuation and CEO ownership are remarkably consistent with those reported in Panel A. The inverted U-shaped relation for observations under weak external governance is robust to controlling for CEO effects. [7]

B.2. Non-CEO Top Executives

The sharply contrasting evidence between strong and weak external governance also raise the possibility that the weak valuation-ownership relation observed for non-CEO executives in Table IV is due to the pooling effect of the two external governance regimes. Thus, we repeat the same set of regressions on the non-CEO sample while separating it into strong and weak external governance regimes. The results are reported in Table VI. The weak external governance sample exhibits an inverted U-shaped relation, whereas there is no hint of such relation for the strong external governance subsample. Interestingly, Column (2) indicates a peak at 17%, very close to the peak at 15% for the undivided sample in Table IV. With CEO-firm fixed effects in the regression, the inverted U-shaped relation for the weak external governance sample is significant regardless of which proxy is used for the strength of external governance. With only firm fixed effects, the inverted U-shaped relation is significant only when the product market competition is weak.

These results suggest that, on average, non-CEO executives' share ownership also does not reflect the equilibrium managerial incentive contracts when external governance is weak. Taken together with the results on CEOs' share ownership, it appears that a CEO's capture of the incentive contracting process not only influences her ownership but also those of her top management team. When external governance is strong, by contrast, non-CEO top executives' share holdings also are unrelated to firm valuation. This is consistent with Demsetz and Lehn (1985) and Himmelberg et al. (1999) who argue that managerial share ownership is determined by the contracting environment.

[7] We also re-estimate the regressions only with CEO fixed effects, not CEO-firm fixed effects. The results (unreported) are consistent with those with firm or CEO-firm fixed effects.

B.3. Alternative Measures of Key Variables

The results in Tables V and VI may be specific to the ways in which the key variables are defined and the sample is constructed. To check robustness, we re-estimate the regressions in Table V with the following modifications: (1) OWN is defined as the ratio of the combined value of a CEO's stocks and in-the-money stock options (as reported by ExecuComp) to the market value of all outstanding shares, (2) IOC is defined as the percentage of share ownership held by top five institutions, (3) HHI is calculated based on the first two-digit SIC code, (4) strong and weak external governance is defined as the top third and the bottom third instead of above and below the median, and (5) utility and financial firms are excluded from the sample.

The re-estimation results with these alternative definitions of variables and sample construction are reported in Table VII without reporting coefficients on control variables. All the results are remarkably consistent with those reported in Table V. The inverted U-shaped relation between Tobin's Q and CEO ownership under weak external governance is robust to all the alternative variable definitions and sample construction.

B.4. Difference in Statistical Properties between Firms Subject to Strong and Weak External Governance

An alternative explanation for the different valuation-ownership relation between firms under strong and weak external governance (EG) is that the two samples have different statistical properties in ownership. Indeed, both the mean and within firm variation in CEO share ownership among firms subject to strong EG are smaller than those of firms under weak EG. The mean CEO ownership is 0.023 and 0.034 for the high and low IOC sample, and 0.027 and 0.029 for the low and high HHI sample. The corresponding within firm standard deviation of CEO ownership is 0.012 and 0.017 for the high and low IOC sample, and 0.012 and 0.015 for the low and high HHI sample. The smaller mean and within firm variation in share ownership may make it more difficult to identify the effect of ownership for firms subject to stronger EG, even when the ownership does not reflect the equilibrium contracts.

To check this possibility, we re-estimate the regressions for strong EG firms with two subsamples that have the mean and within firm variation of CEO ownership comparable to the weak EG sample. The first includes only firm-year observations with CEO ownership greater than 0.03. The second includes only observations with within firm standard deviation of CEO ownership greater than 0.017. Table VIII reports the estimation results, with Columns (1) and (2) reporting the results for the high ownership subsample; and Columns (3) and (4), for the high within firm variation subsample. The results are robust: Signs of many coefficients are inconsistent with the inverted U-shape, and none of the regressions shows significant coefficients for either *OWN_CEO* or $(OWN\_CEO)^2$, regardless whether EG is defined by product market competition or institutional ownership concentration. Apparently, the insignificant relation between Tobin's Q and CEO ownership for firms subject to strong external pressure for good governance are not driven by lower levels of CEO ownership or the lower within-firm variation.

IV. Endogeneity Issues

In this section, we address endogeneity issues concerning CEO share ownership due to reverse causality and time-varying omitted variables. The reverse causality in the ownership-firm value relation is first raised by Kole (1996), who suggests that corporate value could be a determinant of the ownership structure because managers may prefer equity compensation when they expect their firm to perform well. Cho (1998) extends this line of inquiry by estimating simultaneous regressions, and finds that investment affects firm value which, in turn, affects ownership structure.

To address the reverse-causality issues, we begin by simply repeating the regressions with one-period lagged value of CEO ownership. All regressions include year fixed effects and firm or CEO-firm fixed effects. To eliminate the effect of CEO turnovers, the year of- and the year after CEO turnover are excluded. Table IX presents the results with lagged CEO ownership variables. As with the

contemporaneous ownership variables, we observe an inverted U-shaped relation for the full and the weak external governance sample, but not for the strong external governance sample.

We also reexamine Cho's simultaneous equation system of ownership, firm value, and investment using the three-stage least squares (3SLS) method. There are three differences from Cho (1998): First, we use the 1992-2006 panel data with firm or CEO-firm fixed effects instead of Cho's 1991 cross-sectional data with industry fixed effects. Second, we measure risk with *SIGMA* and *SIGDUM* instead of standard deviation in changes in profit rate, which cannot be used with firm fixed effects. Third, our OWN is a continuous variable measuring CEO ownership, whereas his insider ownership measure is based on indicator variables for different levels of the combined fraction of shares held by officers and directors of the board. The CEO ownership equation, Equation (2), is also similar to the one estimated by Demsetz and Lehn (1985).

$$OWN\_CEO_{it} = \alpha_0 + \alpha_1 Mktval_{it} + \alpha_2 Tobin'sQ_{it} + \alpha_3 Liquidity_{it} + \alpha_4 SIGMA_{it-1} + \alpha_5 SIGDUM_{it-1} + \alpha_6 Investment_{it} + \eta_t + \vartheta_i + \varepsilon_{it} \quad (2)$$

$$Tobin'sQ_{it} = \beta_0 + \beta_1 OWN\_CEO_{it} + \beta_2 (OWN\_CEO)^2_{it} + \beta_3 Investment_{it} + \beta_4 Leverage_{it-1} + \beta_5 Assets_{it} + \eta_t + \vartheta_i + v_{it} \quad (3)$$

$$Investment_{it} = \gamma_0 + \gamma_1 Tobin's\ Q_{it} + \gamma_2 OWN\_CEO_{it} + \gamma_{32} (OWN\_CEO)^2_{it} + \gamma_3 Liquidity_{it} + \gamma_4\ SIGMA_{it-1} + \gamma_5 SIGDUM_{it-1} + \eta_t + \vartheta_i + \mu_{it} \quad (4)$$

The variables are defined in Table II.

Table X reports the results of 3SLS simultaneous regressions. To be as close to Cho's specifications as possible, regressions are estimated for the full sample with only firm fixed effects in Panel A1. We then divide the sample into strong and weak external governance in Panel A2. Panel B repeats the same set of regressions with CEO-firm fixed effects. The estimation results in both panels do not rule out the

possibility that Tobin's Q affects CEO ownership and investments; however, the inverted U-shaped relation between Tobin's Q and CEO ownership remains highly significant for both the full and weak external governance samples. This is true regardless whether we control for only firm fixed effects or CEO-firm fixed effects. As before, for the strong external governance sample, none of the ownership variables is significantly related to Tobin's Q.

Time invariant unobservable firm and CEO characteristics are controlled for by firm and CEO-firm fixed effects. To address the time variant omitted variables problem, we follow the instrumental variables approach used in Himmelberg et al. (1999). As they point out, a good instrumental variable for managerial ownership is difficult to find because any variable that plausibly determines the equilibrium level of managerial ownership may also affect firm value. Himmelberg et al. nevertheless use the firm size and stock price volatility as instrumental variables of managerial ownership in two-stage least squares regressions. We conduct the same exercise with our sample using *LNS*, $(LNS)^2$, *SIGMA*, and *SIGDUM* as instruments, while controlling for year and firm or CEO-firm fixed effects. The variance of the predicted *OWN_CEO* and $(OWN\_CEO)^2$ in the second stage are adjusted with robust standard errors. The results (not reported) do not show any significant relation between Tobin's Q and CEO ownership for either the full or the weak external governance sample.

This finding could be misleading because using instrumental variables while controlling for fixed effects reduces the precision of estimates so much that the test has little power to detect a relation. To counter this problem, we require more stringent conditions for weak external governance. We define a firm-year observation is under weak external governance if it is in the top third, top quintile, or top decile in terms of product market competition, or in the bottom third, bottom quintile, or bottom decile in institutional ownership concentration. If the lack of a significant relation between Tobin's Q and CEO share holdings for the weak external governance subsample is indeed due to time varying omitted variables,

even these very weak external governance subsamples should not exhibit any systematic relation between Tobin's Q and CEO share ownership.

The results are reported in Table XI. They show a significant inverted U-shaped relation between Tobin's Q and CEO share ownership for subsamples with the weakest external governance (HHI > 90% and IOC < 10%), even though the sample sizes are much smaller than any other subsamples we have examined so far. For the second weakest subsamples (HHI > 80% and IOC < 20%), the signs indicate an inverted U-shape, which is significant when product market competition is used to identify weak external governance with firm fixed effects.

V. Summary and Conclusions

In this paper we reexamine a rather contentious issue concerning the effects of managerial shareholdings on firm valuation: Is managerial share ownership purely an endogenous variable as predicted by the contracting view of Demsetz and Lehn (1985) and Himmelberg et al. (1999), or does it affect firm valuation as posited by Stulz (1988), Morck et al. (1988), and McConnell and Servaes (1990). To this end, we first identify an important factor that may cause heterogeneity in the effect of ownership on firm valuation; the strength of external governance. The strength of external governance is important in today's modern corporate form, which is often characterized by diffuse share ownership with imperfect oversight by the board of directors. Such firms' incentive contracts are susceptible to capturing by CEOs, unless deterred by strong external governance. Once captured, the predictions of contracting theory as applied to managerial incentive contracts may not hold.

To measure the strength of the external governance, we rely on product market competition and concentration of institutional share holdings. The contracting view seems to prevail for firms subject to strong external governance; shareholdings by CEOs and top management teams are unrelated to firm valuation. For firms subject to weak external governance, the capturing view seems more appropriate;

the CEO and top management share ownership not only affects firm valuation but in the inverted U-shaped fashion.

These results survive various robustness tests concerning unobservable time invariant CEO-firm characteristics, variable definitions, statistical properties of CEO ownership under different external governance regimes, reverse causality, and time varying omitted variables. Therefore, we conclude that the relation between CEO share ownership and firm valuation depends on the strength of external pressure for good governance. When external governance is sufficiently weak to allow CEOs to capture incentive contracts, CEO shareholdings deviate from the equilibrium conditions predicted by the contracting view. Thus, we interpret the inverted U-shaped relation as a manifestation of some CEOs usurping the role of principals from shareholders. The lack of relation between CEO share ownership and firm valuation, by contrast, implies the prevalence of the contracting view under strong external governance. The threat of elimination in highly competitive product markets and close monitoring through concentrated institutional ownership seem to help preserve shareholders' inherent rights as principal owners of capital.

These results have important implications for research on how managerial attributes and contractual arrangements affect firm behavior and valuation, because the strength of external pressure for good governance may cause heterogeneity in how the attributes and arrangements under investigation affect managerial behavior. For example, how an attribute such as CEO power and a contractual arrangement like stock option grants affect managerial decisions may depend on the strength of external governance. A research design failing to account for this important difference may yield only an average effect, masking an important distinction that can lead to more appropriate prescriptions for corporate financial policies and public policy on corporate governance.

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Table I: Firm-year Observations with Relevant Share Ownership

This table lists the number of firms with ownership for CEO and four top non-CEO executives in each year of the sample period. Data is drawn from ExecuComp for the period 1992-2006. Firm-year observation is included if accounting and stock return data to construct Tobin's Q control variables and are available from Compustat and CRSP.

Year	Firms with CEO Ownership	Firms with 4 Top non-CEO Executives' Ownership
	(1)	(2)
1992	309	280
1993	965	902
1994	1,296	1,192
1995	1,358	1,252
1996	1,405	1,296
1997	1,435	1,325
1998	1,413	1,291
1999	1,494	1,378
2000	1,452	1,340
2001	1,397	1,270
2002	1,422	1,318
2003	1,454	1,337
2004	1,453	1,342
2005	1,453	1,350
2006	1,423	1,327
Total Firm-year Observations	**19,729**	**18,200**
Total Firms	**2,482**	**2,428**

Table II: Variable Descriptions

Panel A: Performance and Ownership Variables	
Tobin's Q	The market value of common equity plus the book value of total liabilities divided by the book value of total assets.
OWN_CEO	The total common equity holdings of the CEO as a fraction of common equity outstanding.
OWN_CEO_SO	The ratio of the combined value of a CEO's stocks and in-the-money stock options (as reported by ExecuComp) to the market value of all outstanding shares.
OWN_Top	The sum of the fractions of shares held by executives ranked up to top five.
OWN_Top4	The sum of the fractions of shares held by four top non-CEO executives.
OWN_Top5	The sum of the fractions of shares owned by top five executives, including CEO.
Panel B: External Governance Variables	
HHI	Herfindahl-Hirschman Index calculated as the sum of the squares of sales by the four biggest firms in each industry during each year. Industries are defined by the Fama-French (1997) industry groupings.
HHI_Sic2	Herfindahl-Hirschman Index calculated as the sum of the squares of sales by the four biggest firms in each industry during each year. Industries are defined by the first two-digit SIC codes.
IOC	Institutional investor ownership concentration measured as the sum of the squares of top five institutional investor ownerships.
IOC_Top5	The sum of top five institutional investor ownerships.
Panel C: Control Variables	
LNS	The natural log of sales in 2000 US dollars.
K/S	The ratio of tangible, long-term assets (property, plant, and equipment) to sales.
Y/S	The ratio of EBITDA (earnings before interest, tax, depreciation, and amortization) to sales.
SIGMA	The standard error of the residuals from a CAPM model estimated using daily data for the period covered by the annual sample.
SIGDUM	A dummy variable equal to unity if the data required to estimated RISK is available, and otherwise equal to zero (if SIGMA is missing). To maintain sample size and reduce the risk of sample selection bias, we set missing observations of SIGMA equal to zero, and then include this dummy variable to allow the intercept term to capture the mean of SIGMA for missing values.
R&D/K	The ratio of research and development expenditures to property, plant, and equipment.
RDUM	A dummy variable equal to unity if R&D data are available, and otherwise equal to zero.
A/K	The ratio of advertising expenditures to property, plant, and equipment.
ADUM	A dummy variable equal to unity if R&D data are available, and otherwise equal to zero.
I/K	The ratio of capital expenditures to property, plant, and equipment.
Mktval	The market value of common equity in 2000 US dollars (Unit: billion dollars).
Liquidity	Cash flow divided by the book value of total assets.
Investment	Capital expenditures divided by the book value of total assets.
Leverage	Total value of long term debt divided by the book value of total assets.
Assets	The natural log of the book value of total assets in 2000 US dollars.

Table III: Summary Statistics

This table presents summary statistics for all variables. S.D. indicates sample standard deviation of the variable; WFS.D. indicates the average within firm standard deviation of the variable; and WCFS.D. indicates the average within CEO-firm pair standard deviation of the variable. The definitions of all variables are given in Table II.

Variable	Obs.	Mean	Median	Min	Max	S.D.	W F S.D	W CF S.D.
Panel A: Performance and Ownership Variables								
Tobin's Q	20668	2.119	1.561	0.279	105.119	2.402	0.801	0.675
OWN_CEO	19729	0.028	0.003	0.000	0.761	0.067	0.016	0.008
OWN_CEO_WOPT	19559	0.029	0.003	0.000	0.762	0.068	0.016	0.008
OWN_Top	19726	0.042	0.008	0.000	0.866	0.084	0.021	0.014
OWN_Top5	18200	0.039	0.007	0.000	0.866	0.081	0.020	0.013
OWN_Top4	18200	0.013	0.002	0.000	0.636	0.040	0.011	0.007
Panel B: External Governance Variables								
HHI	20668	0.047	0.032	0.002	0.805	0.065	0.011	0.008
HHI_Sic2	20668	0.054	0.034	0.002	0.816	0.064	0.014	0.010
IOC	15740	0.020	0.015	0.000	0.872	0.032	0.010	0.009
IOC_Top5	15740	0.254	0.248	0.000	0.972	0.102	0.062	0.052
Panel C: Control Variables								
LNS	20668	7.086	7.033	-3.534	12.606	1.629	0.363	0.275
K/S	20668	0.900	0.447	0.003	303.596	3.851	0.349	0.262
Y/S	20668	-0.022	0.144	-424.447	1.330	5.640	0.389	0.286
SIGMA	20668	0.024	0.021	0.000	0.196	0.015	0.008	0.007
SIGDUM	20668	0.952	1.000	0.000	1.000	0.215	0.029	0.018
R&D/K	20668	0.137	0.000	0.000	28.184	0.557	0.058	0.048
RDUM	20668	0.563	1.000	0.000	1.000	0.496	0.039	0.027
A/K	20668	0.045	0.000	0.000	6.549	0.200	0.025	0.020
ADUM	20668	0.297	0.000	0.000	1.000	0.457	0.134	0.095
I/K	20668	0.131	0.102	0.000	4.302	0.109	0.059	0.050
Mktval	21272	6.084	1.282	0.000	475.894	20.050	3.019	2.389
Liquidity	21272	0.085	0.041	0.000	0.977	0.111	0.050	0.042
Investment	21272	0.060	0.045	0.000	1.205	0.059	0.026	0.022
Leverage	21272	0.188	0.170	0.000	0.999	0.166	0.072	0.059
Asset	21272	7.303	7.146	0.587	14.301	1.697	0.382	0.286

Table IV: Re-examination of the Relation between Tobin's Q and Managerial Share Ownership

This table reports estimates of the relation between Tobin's Q and managerial ownership. The definitions of all variables are given in Table II. Share ownership in Column (1) includes all executives ranked up to top five; Column (2) restricts the sample to firm-year observations in which all top five executives' ownerships are available; Column (3) includes only CEO ownership; Column (4) includes the sum of share ownership by four top non-CEO executives only when all four are available. All specifications include year and firm fixed effects. Standard errors are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5% and 1%, respectively.

	Dependent Variable: Tobin's Q			
Variable	**(1)**	**(2)**	**(3)**	**(4)**
OWN_Top	1.836			
	(1.812)			
(OWN_Top)^2	1.129			
	(7.189)			
OWN_Top5		3.610***		
		(0.869)		
(OWN_Top5)^2		-6.967***		
		(1.761)		
OWN_CEO			3.995***	
			(1.238)	
(OWN_CEO)^2			-6.861***	
			(2.466)	
OWN_Top4				1.970
				(1.219)
(OWN_Top4)^2				-6.451**
				(3.145)
LNS	-1.509***	-2.147***	-1.524***	-2.163***
	(0.463)	(0.644)	(0.467)	(0.643)
(LNS)^2	0.069**	0.115***	0.070**	0.115***
	(0.028)	(0.040)	(0.029)	(0.040)
K/S	-0.147***	-0.168***	-0.146***	-0.171***
	(0.035)	(0.052)	(0.036)	(0.052)
(K/S)^2	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Y/S	-0.019	0.002	-0.018	0.001
	(0.016)	(0.035)	(0.017)	(0.035)
SIGMA	-16.614***	-16.407***	-16.486***	-16.359***
	(5.025)	(5.956)	(5.003)	(5.966)
SIGDUM	-1.572***	-1.431***	-1.586***	-1.424***
	(0.463)	(0.413)	(0.476)	(0.413)
R&D/K	0.080	0.260**	0.079	0.263**
	(0.096)	(0.125)	(0.096)	(0.126)
RDUM	0.132*	0.117	0.122*	0.125
	(0.075)	(0.076)	(0.073)	(0.077)
A/K	1.867***	1.543***	1.871***	1.553***
	(0.626)	(0.484)	(0.629)	(0.484)
ADUM	-0.380***	-0.319***	-0.379***	-0.321***
	(0.094)	(0.092)	(0.094)	(0.092)
I/K	4.457***	4.038***	4.482***	4.077***
	(0.917)	(0.913)	(0.922)	(0.915)
Constant	10.401***	12.304***	10.501***	12.477***
	(2.193)	(2.813)	(2.221)	(2.811)
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Observations	19726	18200	19729	18200
# of Firms	2482	2428	2482	2428
Adj R-squared	0.39	0.40	0.39	0.40

Table V: Tobin's Q and CEO Share Ownership under Strong and Weak External Governance

This table reports estimates of the relation between CEO ownership and Tobin's Q under strong and weak external governance. External governance is measured by Herfindahl-Hirschman Index (HHI) in Columns (1), (2), (5) and (6) and by institutional ownership concentration (IOC) in Columns (3), (4), (7) and (8). LHHI and HHHI indicate below and above the median HHI, corresponding to strong and weak external governance. HIOC and LIOC indicate above and below the median IOC, corresponding to strong and weak external governance. All specifications include firm and year fixed effects in Panel A; and CEO-firm and year fixed effects in Panel B. The definitions of all variables are given in Table II. Standard errors are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5% and 1%, respectively.

	Dependent Variable: Tobin's Q							
Variable	**Panel A: Firm FE**				**Panel B: CEO-Firm FE**			
	LHHI	**HHHI**	**HIOC**	**LIOC**	**LHHI**	**HHHI**	**HIOC**	**LIOC**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
OWN_CEO	0.258	5.976***	0.840	6.309***	-1.636	10.007***	-2.412	19.740***
	(0.855)	(1.144)	(1.254)	(1.790)	(1.455)	(1.774)	(1.821)	(3.265)
$(OWN\_CEO)^2$	-0.308	-10.513***	-1.951	-13.142***	1.735	-14.423***	2.482	-33.669***
	(1.948)	(2.653)	(2.839)	(4.136)	(2.660)	(3.291)	(3.384)	(6.176)
LNS	-0.696***	-0.748***	-2.690***	-4.244***	-0.797***	-0.987***	-2.097***	-5.283***
	(0.137)	(0.141)	(0.260)	(0.281)	(0.164)	(0.169)	(0.269)	(0.344)
$(LNS)^2$	0.029***	0.032***	0.154***	0.221***	0.043***	0.053***	0.120***	0.303***
	(0.010)	(0.011)	(0.019)	(0.020)	(0.012)	(0.013)	(0.019)	(0.025)
K/S	-0.155***	-0.076***	-0.647***	-0.215***	-0.220***	-0.092**	-0.751***	-0.274***
	(0.032)	(0.022)	(0.099)	(0.032)	(0.040)	(0.039)	(0.125)	(0.043)
$(K/S)^2$	0.001***	0.000*	0.040***	0.001***	0.002***	0.000	0.060***	0.001***
	(0.000)	(0.000)	(0.007)	(0.000)	(0.000)	(0.000)	(0.013)	(0.000)
Y/S	0.013	-0.025***	0.581***	0.106***	-0.012	-0.025***	0.342***	0.151***
	(0.015)	(0.007)	(0.095)	(0.020)	(0.018)	(0.007)	(0.103)	(0.027)
SIGMA	-0.003	-13.109***	-13.835***	-26.327***	-3.695*	-14.255***	-13.776***	-31.794***
	(1.851)	(2.641)	(2.945)	(4.348)	(2.125)	(2.720)	(2.861)	(4.784)
SIGDUM	0.136	-0.815***	-2.250***	-3.329***	0.169	-1.040***	-1.990***	-5.226***
	(0.177)	(0.175)	(0.261)	(0.339)	(0.236)	(0.197)	(0.286)	(0.413)
R&D/K	-0.260***	0.082*	0.251***	-0.029	-0.395***	0.024	0.175**	-0.035
	(0.085)	(0.048)	(0.089)	(0.075)	(0.093)	(0.050)	(0.077)	(0.089)
RDUM	-0.004	0.037	0.342**	0.095	0.036	0.033	0.239	0.190
	(0.145)	(0.126)	(0.154)	(0.255)	(0.171)	(0.134)	(0.166)	(0.293)
A/K	0.417**	0.979***	0.049	4.879***	0.608***	1.198***	0.331	3.946***
	(0.194)	(0.199)	(0.282)	(0.382)	(0.206)	(0.200)	(0.244)	(0.438)
ADUM	-0.211***	-0.134*	0.018	-0.595***	-0.087	-0.219**	0.003	-0.480***
	(0.068)	(0.081)	(0.091)	(0.137)	(0.079)	(0.087)	(0.092)	(0.162)
I/K	2.891***	2.792***	3.736***	4.714***	2.504***	2.322***	2.588***	4.167***
	(0.179)	(0.227)	(0.284)	(0.337)	(0.197)	(0.237)	(0.266)	(0.375)
Constant	5.043***	6.257***	14.868***	24.118***	5.070***	7.113***	12.688***	28.747***
	(0.567)	(0.543)	(1.001)	(1.091)	(0.677)	(0.640)	(1.034)	(1.347)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	N	N	N	N
CEO-Firm FE	N	N	N	N	Y	Y	Y	Y
Observations	9186	10543	7889	7250	9186	10543	7889	7250
# of Firms	1537	1752	1557	1465				
# of CEO-firm Pairs					2448	2913	2472	2293
Adj R-squared	0.56	0.64	0.43	0.41	0.57	0.71	0.61	0.44

Table VI: Tobin's Q and Non-CEO Top Four Executives' Share Ownership under Strong and Weak External Governance

This table reports estimates othe relation between the sum of four top non-CEO executives' ownership and Tobin's Q under strong and weak external governance. External governance is measured by Herfindahl-Hirschman Index (HHI) in Columns (1), (2), (5) and (6) and by institutional ownership concentration (IOC) in Columns (3), (4), (7) and (8). LHHI and HHHI indicate below and above the median HHI, corresponding to strong and weak external governance. HIOC and LIOC indicate above and below the median IOC, corresponding to strong and weak external governance. All specifications include firm- and year fixed effects in Panel A; and CEO-firm pair and year fixed effects in Panel B. The definitions of all variables are given in Table II. Standard errors are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5% and 1%, respectively.

	Dependent Variable: Tobin's Q							
Variable	**Panel A: Firm FE**				**Panel B: CEO-Firm FE**			
	LHHI	**HHHI**	**HIOC**	**LIOC**	**LHHI**	**HHHI**	**HIOC**	**LIOC**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
OWN_Top4	-1.739	3.884***	0.144	2.716	-0.884	4.872***	-1.594	5.555**
	(1.285)	(1.474)	(2.045)	(2.102)	(1.620)	(1.625)	(2.213)	(2.625)
(OWN_Top4)^2	3.172	-11.589***	-1.843	-9.984*	-0.011	-14.514***	2.151	-18.882**
	(3.586)	(4.224)	(5.569)	(5.901)	(4.578)	(4.530)	(5.914)	(7.397)
LNS	-0.698***	-1.364***	-2.733***	-3.870***	-0.753***	-1.886***	-2.024***	-5.320***
	(0.151)	(0.198)	(0.282)	(0.284)	(0.180)	(0.207)	(0.291)	(0.357)
(LNS)^2	0.030***	0.075***	0.155***	0.207***	0.041***	0.103***	0.114***	0.319***
	(0.010)	(0.014)	(0.020)	(0.019)	(0.013)	(0.015)	(0.021)	(0.025)
K/S	-0.156***	-0.087***	-0.737***	-0.238***	-0.197***	-0.846***	-0.871***	-0.389***
	(0.034)	(0.029)	(0.110)	(0.034)	(0.042)	(0.094)	(0.137)	(0.045)
(K/S)^2	0.001***	0.000***	0.042***	0.001***	0.002***	0.036***	0.064***	0.001***
	(0.000)	(0.000)	(0.007)	(0.000)	(0.000)	(0.007)	(0.014)	(0.000)
Y/S	0.011	0.021	0.561***	0.040	-0.006	0.103***	0.265**	0.038
	(0.016)	(0.020)	(0.102)	(0.025)	(0.019)	(0.025)	(0.110)	(0.037)
SIGMA	0.579	-8.300***	-15.050***	-21.584***	-3.903*	-7.610***	-15.725***	-31.238***
	(2.000)	(2.774)	(3.189)	(4.213)	(2.329)	(2.755)	(3.108)	(4.612)
SIGDUM	0.127	-0.848***	-2.539***	-2.036***	0.213	-0.990***	-2.311***	-3.295***
	(0.191)	(0.171)	(0.281)	(0.316)	(0.267)	(0.184)	(0.311)	(0.382)
R&D/K	0.011	0.208***	0.286***	0.219*	-0.104	0.112**	0.199**	-0.003
	(0.098)	(0.062)	(0.097)	(0.132)	(0.108)	(0.056)	(0.082)	(0.160)
RDUM	-0.016	0.036	0.353**	-0.030	0.014	0.040	0.243	-0.008
	(0.156)	(0.123)	(0.168)	(0.234)	(0.182)	(0.125)	(0.181)	(0.261)
A/K	0.489**	0.489**	0.070	3.923***	0.711***	0.468**	0.394	1.984***
	(0.211)	(0.204)	(0.319)	(0.390)	(0.226)	(0.201)	(0.277)	(0.429)
ADUM	-0.251***	-0.054	0.028	-0.492***	-0.116	-0.121	0.016	-0.328**
	(0.072)	(0.080)	(0.098)	(0.130)	(0.084)	(0.082)	(0.099)	(0.151)
I/K	2.785***	2.563***	3.554***	3.911***	2.400***	1.899***	2.247***	3.248***
	(0.191)	(0.229)	(0.312)	(0.315)	(0.210)	(0.232)	(0.292)	(0.345)
Constant	5.073***	8.473***	15.452***	21.103***	4.998***	10.708***	12.972***	26.742***
	(0.629)	(0.735)	(1.065)	(1.111)	(0.741)	(0.783)	(1.129)	(1.368)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	N	N	N	N
CEO-Firm FE	N	N	N	N	Y	Y	Y	Y
Observations	8450	9750	7280	6717	8450	9750	7280	6717
# of Firms	1487	1702	1502	1406				
# of CEO-firm Pairs					2360	2812	2377	2203
Adj R-squared	0.55	0.65	0.42	0.43	0.56	0.74	0.60	0.48

Table VII: Robustness to Alternative Definitions of Key Variables and Sample Construction

This table reports the robustness of the results in Table V to various measures of key variables and to an alternative sample construction. External governance is measured by Herfindahl-Hirschman Index (HHI) in Columns (1), (2), (5) and (6) and by institutional ownership concentration (IOC) in Columns (3), (4), (7) and (8). LHHI and HHHI indicate below and above the median HHI, corresponding to strong and weak external governance. HIOC and LIOC indicate above and below the median IOC, corresponding to strong and weak external governance. All specifications include firm- and year fixed effects in Panel A; and CEO-firm pair and year fixed effects in Panel B. The same control variables used in Table V are included in all regressions, but not reported. The definitions of all variables are given in Table II. Standard errors are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5% and 1%, respectively.

Variable		**Panel A: Firm FE**				**Panel B: CEO-Firm FE**			
		LHHI	**HHHI**	**HIOC**	**LIOC**	**LHHI**	**HHHI**	**HIOC**	**LIOC**
		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
CEO_OWN including in-the-money stock options (*OWN_CEO_SO*)	*(OWN_CEO)*	0.540	5.705***	1.244	5.143***	-1.369	9.818***	-1.563	15.402***
		(0.821)	(1.065)	(1.196)	(1.584)	(1.382)	(1.656)	(1.731)	(2.821)
	(OWN_CEO)^2	-1.497	-9.412***	-2.920	-9.504***	0.456	-13.206***	0.510	-22.066***
		(1.743)	(2.274)	(2.587)	(3.192)	(2.258)	(2.735)	(2.950)	(4.392)
	Adj R-squared	0.56	0.65	0.44	0.41	0.57	0.72	0.62	0.44
	Obs.	9102	10455	7837	7205	9102	10455	7837	7205
HHI measured by the first two-digit SIC Code (*HHI_Sic2*)	*(OWN_CEO)*	1.397	4.166***			0.259	8.426***		
		(1.086)	(1.239)			(1.874)	(1.891)		
	(OWN_CEO)^2	-1.626	-7.080**			-0.288	-11.457***		
		(2.583)	(2.831)			(3.524)	(3.527)		
	Adj R-squared	0.53	0.39			0.53	0.58		
	Obs.	9184	10545			9184	10545		
IOC measured by the sum of top five institutional investor ownership (*IOC_Top5*)	*(OWN_CEO)*			0.512	6.854***			-2.381	21.527***
				(1.117)	(1.843)			(1.565)	(3.430)
	(OWN_CEO)^2			-0.696	-14.327***			2.613	-35.991***
				(2.596)	(4.170)			(3.230)	(6.236)
	Adj R-squared			0.46	0.42			0.68	0.46
	Obs.			7911	7228			7911	7228
Different cutoff points in HHI and IOC (Top/Bottom 1/3)	*(OWN_CEO)*	0.396	5.523***	0.075	10.124***	-2.898	6.375***	-3.469	34.383***
		(1.219)	(1.404)	(1.740)	(2.611)	(2.220)	(2.003)	(2.535)	(4.943)
	(OWN_CEO)^2	-3.493	-10.144***	-2.094	-21.260***	2.395	-10.326***	4.332	-59.193***
		(3.236)	(3.192)	(3.702)	(6.038)	(4.353)	(3.593)	(4.779)	(9.328)
	Adj R-squared	0.54	0.35	0.38	0.42	0.55	0.57	0.63	0.43
	Obs.	5567	7149	5394	4627	5567	7149	5394	4627
Sample without utility and financial firms	*(OWN_CEO)*	0.232	5.705***	1.033	6.374***	-1.560	8.783***	-2.528	20.425***
		(1.043)	(1.146)	(1.322)	(1.972)	(1.778)	(1.758)	(1.930)	(3.574)
	(OWN_CEO)^2	-0.255	-10.184***	-2.276	-13.165***	1.668	-12.796***	2.485	-34.157***
		(2.291)	(2.644)	(2.952)	(4.522)	(3.140)	(3.246)	(3.510)	(6.722)
	Adj R-squared	0.53	0.65	0.43	0.39	0.54	0.72	0.61	0.43
	Obs.	7026	10217	7306	6051	7026	10217	7306	6051

Table VIII: Difference in Statistical Properties between Firms Subject to Strong and Weak External Governance

This table reports the results of testing whether the results in Table V are driven by differences in statistical properties between firms subject to strong and weak external governance. All regressions are estimated with strong external governance subsamples. In Columns (1), (2), (5), and (6), the samples include only firm-year observations with CEO ownership greater than 0.03, and are subject to strong external governance. In Columns (3), (4), (7), and (8), the samples include only firm-year observations with within firm standard deviation of CEO ownership greater than 0.017. External governance is measured by Herfindahl-Hirschman Index (HHI) in Columns (1), (2), (5) and (6) and by institutional ownership concentration (IOC) in Columns (3), (4), (7) and (8). LHHI and HHHI indicate below and above the median HHI, corresponding to strong and weak external governance. HIOC and LIOC indicate above and below the median IOC, corresponding to strong and weak external governance. All specifications include firm- and year fixed effects in Panel A; and CEO-firm pair and year fixed effects in Panel B. The same control variables used in Table V are included in all specifications, but not reported. The definitions of all variables are given in Table II. Standard errors are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5% and 1%, respectively.

	Dependent Variable: Tobin's Q							
Variable	**Panel A: Firm FE**				**Panel B: CEO-Firm FE**			
	OWN_CEO>0.03		**WFSD(OWN_CEO)>0.017**		**OWN_CEO>0.03**		**WFSD(OWN_CEO)>0.017**	
	LHHI	**HIOC**	**LHHI**	**HIOC**	**LHHI**	**HIOC**	**LHHI**	**HIOC**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
OWN_CEO	-1.534	-1.421	0.571	-0.666	-0.993	1.018	-1.814	-3.126
	(2.069)	(2.802)	(0.859)	(1.412)	(2.199)	(3.219)	(1.471)	(2.011)
$(OWN\_CEO)^2$	1.394	1.978	-0.896	-3.678	-0.225	-2.193	2.009	3.030
	(3.249)	(4.210)	(1.879)	(3.038)	(3.418)	(4.789)	(2.605)	(3.682)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm-FE	Y	Y	Y	Y	N	N	N	N
CEO-Firm FE	N	N	N	N	Y	Y	Y	Y
Observations	1660	1313	1592	1488	1660	1313	1592	1488
Adj-Rsquare	0.63	0.73	0.64	0.55	0.63	0.73	0.65	0.70

Table IX: Tobin's Q and Lagged CEO Share Ownership

This table reports the robustness of the results to reverse-causality between CEO ownership and Tobin's Q using one-period lagged value of CEO ownership. For all regressions, the observations in the year of and the year after CEO turnover are excluded. The full sample is used in Columns (1) and (6). Subsamples divided by the strength of external governance are used in Columns (2)-(5) and (7)-(10). External governance is measured by Herfindahl-Hirschman Index (HHI) in Columns (2), (3), (7) and (8) and by institutional ownership concentration (IOC) in Columns (4), (5), (9) and (10). LHHI and HHHI indicate below and above the median HHI, corresponding to strong and weak external governance. HIOC and LIOC indicate above and below the median IOC, corresponding to strong and weak external governance. All specifications include firm- and year fixed effects in Panel A; and CEO-firm pair and year fixed effects in Panel B. The definitions of all variables are given in Table II. Standard errors are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5% and 1%, respectively.

	Dependent Variable: Tobin's Q									
Variable	**Panel A: Firm FE**					**Panel B: CEO-Firm FE**				
	Full	**LHHI**	**HHHI**	**HIOC**	**LIOC**	**Full**	**LHHI**	**HHHI**	**HIOC**	**LIOC**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
OWN_CEO_lag1	3.003***	0.593	3.115***	2.657**	2.577	4.084***	0.633	4.848***	1.928	6.675**
	(0.739)	(0.926)	(1.094)	(1.102)	(1.683)	(1.126)	(1.386)	(1.688)	(1.800)	(2.658)
(OWN_CEO_lag1)^2	-3.593**	0.598	-5.502**	-2.615	-4.832	-5.774***	0.245	-8.079***	-4.157	-11.274**
	(1.611)	(1.947)	(2.401)	(2.326)	(3.670)	(2.062)	(2.503)	(3.076)	(3.651)	(4.812)
LNS	-0.340***	-0.453***	-0.578***	-1.191***	-1.969***	-0.540***	-0.497***	-0.668***	-0.664**	-2.177***
	(0.095)	(0.156)	(0.134)	(0.231)	(0.285)	(0.109)	(0.183)	(0.152)	(0.280)	(0.307)
(LNS)^2	0.002	0.013	0.033***	0.060***	0.080***	0.028***	0.024*	0.048***	0.028	0.122***
	(0.007)	(0.011)	(0.010)	(0.016)	(0.019)	(0.008)	(0.013)	(0.011)	(0.020)	(0.021)
K/S	-0.125***	-0.132***	-0.108***	-0.539***	-0.408***	-0.103***	-0.167***	0.078**	-0.748***	-0.213***
	(0.015)	(0.036)	(0.024)	(0.096)	(0.047)	(0.025)	(0.047)	(0.039)	(0.155)	(0.054)
(K/S)^2	0.000***	0.001***	0.000**	0.036***	0.003***	0.000*	0.001***	-0.000***	0.074***	0.003***
	(0.000)	(0.000)	(0.000)	(0.007)	(0.001)	(0.000)	(0.000)	(0.000)	(0.020)	(0.001)
Y/S	-0.037***	0.025	-0.034***	0.485***	0.037*	-0.034***	-0.021	-0.012*	0.280***	0.084***
	(0.005)	(0.020)	(0.005)	(0.082)	(0.021)	(0.005)	(0.031)	(0.006)	(0.098)	(0.025)
SIGMA	0.475	0.861	-1.102	-3.148	-0.342	-1.310	-1.414	-1.778	-2.711	-2.124
	(1.727)	(2.055)	(2.344)	(2.557)	(3.987)	(1.784)	(2.224)	(2.554)	(2.823)	(3.949)
SIGDUM	-0.118	0.074	-0.224	-0.182	-0.279	-0.074	0.292	-0.240	0.050	-1.210**
	(0.141)	(0.248)	(0.171)	(0.260)	(0.380)	(0.188)	(0.416)	(0.223)	(0.364)	(0.484)
R&D/K	0.122***	-0.291***	0.109**	0.202***	0.130*	0.044	-0.221**	0.071	0.161**	0.012
	(0.040)	(0.090)	(0.044)	(0.066)	(0.079)	(0.041)	(0.097)	(0.048)	(0.068)	(0.079)
RDUM	-0.002	0.033	-0.094	0.216*	-0.176	-0.071	0.034	-0.145	0.191	-0.304
	(0.092)	(0.159)	(0.110)	(0.129)	(0.233)	(0.106)	(0.181)	(0.130)	(0.171)	(0.236)
A/K	0.968***	0.435**	0.008	0.331	3.093***	0.437***	0.632***	0.001	0.354*	0.474
	(0.147)	(0.202)	(0.183)	(0.207)	(0.382)	(0.149)	(0.208)	(0.199)	(0.213)	(0.387)
ADUM	-0.184***	-0.175**	0.009	0.043	-0.443***	-0.092	-0.085	0.019	0.063	-0.138
	(0.054)	(0.073)	(0.073)	(0.075)	(0.130)	(0.061)	(0.082)	(0.086)	(0.091)	(0.140)
I/K	2.482***	2.808***	1.670***	2.672***	2.258***	2.040***	2.436***	1.605***	2.294***	1.488***
	(0.156)	(0.214)	(0.192)	(0.256)	(0.308)	(0.165)	(0.229)	(0.220)	(0.284)	(0.320)
Constant	4.033***	4.172***	4.983***	6.802***	12.580***	4.199***	3.652***	4.112***	5.082***	12.533***
	(0.383)	(0.669)	(0.513)	(0.891)	(1.173)	(0.442)	(0.817)	(0.601)	(1.124)	(1.305)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	N	N	N	N	N
CEO-Firm FE	N	N	N	N	N	Y	Y	Y	Y	Y
Observations	14302	6802	7500	5940	5307	14302	6802	7500	5940	5307
# of Firms	2268	1413	1524	1398	1300					
# of CEO-firm Pairs						3508	1924	2147	1912	1781
Adj R-squared	0.50	0.62	0.63	0.53	0.48	0.57	0.63	0.64	0.53	0.58

Table X: Simultaneous Equation Estimation of the Relation between CEO Share Ownership, Tobin's Q, and Investment

This table reports the robustness to reverse-causality between CEO ownership and Tobin's Q by estimating simultaneous equations with the three-stage least squares method. The specifications are similar to the one used in Cho (1998), but not identical. Each simultaneous equation system includes three equations; CEO ownership equation, Tobin's Q equation, and Investment equation. All specifications include firm- and year fixed effects in Panel A; and CEO-firm pair and year fixed effects in Panel B. Panels A1 and B1 report the results estimated with the full sample and Panels A2 and B2 report the results estimated with the subsamples separated by strength in external governance. LHHI and HHHI indicate below and above the median HHI, corresponding to strong and weak external governance. HIOC and LIOC indicate above and below the median IOC, corresponding to strong and weak external governance. The definitions of all variables are given in Table II. Standard errors are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5% and 1%, respectively.

Panel A1: Full Sample with Firm FE			
Variable	**(1)**	**(2)**	**(3)**
	OWN_CEO	**Tobin'Q**	**Investment**
Mktval	-0.001***		
	(0.000)		
Tobin'Q	0.020***		0.005***
	(0.001)		(0.001)
Liquidity	-0.095***		-0.057***
	(0.010)		(0.006)
SIGMA	0.248***		-0.027
	(0.045)		(0.042)
SIGDUM	0.014***		0.006***
	(0.003)		(0.002)
Investment	-0.631***	-106.551***	
	(0.101)	(30.869)	
OWN_CEO		869.077***	0.835**
		(191.357)	(0.325)
$(OWN\_CEO)^2$		-1,547.951***	-2.160***
		(388.506)	(0.660)
Leverage		-3.178**	
		(1.586)	
Assets		2.882***	
		(0.628)	
Constant	0.000	-0.034	0.000
	(0.000)	(0.084)	(0.000)
Year FE	Y	Y	Y
Firm FE	Y	Y	Y
Observations	20297	20297	20297
Chi2	650.14	1593.88	2918.78

Panel A2: Sub-samples with Firm FE												
	LHHI			**HHHI**			**HIOC**			**LIOC**		
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
	OWN_CEO	**Tobin'Q**	**Investment**	**OWN_CEO**	**Tobin'Q**	**Investment**	**OWN_CEO**	**Tobin'Q**	**Investment**	**OWN_CEO**	**Tobin'Q**	**Investment**
Mktval	0.000			-0.001***			-0.000			0.000		
	(0.000)			(0.000)			(0.000)			(0.000)		
Tobin'Q	-0.003		0.005***	0.028***		0.001	0.002*		0.001	-0.003*		0.002
	(0.002)		(0.001)	(0.002)		(0.002)	(0.001)		(0.001)	(0.002)		(0.001)
Liquidity	0.050***		-0.048***	-0.114***		-0.041***	0.020***		-0.045***	0.114***		-0.053***
	(0.009)		(0.006)	(0.013)		(0.007)	(0.007)		(0.008)	(0.021)		(0.010)
SIGMA	0.057		-0.041	0.051		-0.106**	0.175***		-0.249***	0.243**		-0.128*
	(0.044)		(0.048)	(0.077)		(0.053)	(0.046)		(0.068)	(0.104)		(0.069)
SIGDUM	-0.004		0.004	0.010**		0.003	-0.012***		0.015***	-0.022***		0.010***
	(0.003)		(0.003)	(0.004)		(0.003)	(0.003)		(0.004)	(0.007)		(0.004)
Investment	1.016***	-10.945		-1.141***	-102.834***		0.411***	63.586		2.155***	-138.069***	
	(0.102)	(36.339)		(0.140)	(30.160)		(0.081)	(59.442)		(0.181)	(49.500)	
OWN_CEO		382.409	0.744		791.977***	1.987***		227.001	1.620***		829.930***	0.464
		(336.813)	(0.693)		(158.668)	(0.472)		(532.042)	(0.622)		(261.492)	(0.458)
$(OWN\_CEO)^2$		-515.740	-0.350		-1,522.818***	-4.546***		118.936	-1.951		-1,547.565***	-0.100
		(655.574)	(1.350)		(325.045)	(0.968)		(1,015.560)	(1.188)		(544.405)	(0.956)
Leverage		2.594			-0.991			12.261***			-2.718	
		(2.149)			(1.554)			(2.741)			(3.340)	
Assets		0.559			2.136***			0.592			2.162**	
		(0.533)			(0.508)			(1.586)			(1.023)	
Constant	-0.000	-0.007	0.000	0.000	-0.000	0.000	0.000	-0.009	-0.000	-0.000	-0.116	0.000
	(0.000)	(0.080)	(0.000)	(0.000)	(0.081)	(0.000)	(0.000)	(0.162)	(0.000)	(0.001)	(0.140)	(0.000)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	9692	9692	9692	10605	10605	10605	8094	8094	8094	7546	7546	7546
Chi2	301.59	1503.44	3328.29	292.11	364.75	1463.64	372.88	2209.5	1724.6	407.52	518.49	4824.35

Panel B1: Full Sample with CEO-Firm FE			
Variable	**(1)**	**(2)**	**(3)**
	OWN_CEO	**Tobin'Q**	**Investment**
Mktval	-0.001***		
	(0.000)		
Tobin'Q	0.018***		0.003***
	(0.001)		(0.001)
Liquidity	-0.098***		-0.051***
	(0.007)		(0.005)
SIGMA	0.157***		-0.057
	(0.038)		(0.036)
SIGDUM	0.017***		0.006***
	(0.003)		(0.002)
Investment	-0.856***	-152.541**	
	(0.070)	(66.390)	
OWN_CEO		2,056.707**	1.046***
		(921.919)	(0.182)
$(OWN\_CEO)^2$		-3,192.458**	-2.418***
		(1,530.748)	(0.304)
Leverage		-5.328	
		(4.433)	
Assets		9.919**	
		(4.457)	
Constant	-0.000	-0.036	0.000
	(0.000)	(0.125)	(0.000)
Year FE	Y	Y	Y
CEO-Firm FE	Y	Y	Y
Observations	20297	20297	20297
Chi2	420.88	378.77	2788.18

Panel B2: Sub-sample with CEO-Firm FE												
	LHHI			**HHHI**			**HIOC**			**LIOC**		
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
	OWN_CEO	**Tobin'Q**	**Investment**	**OWN_CEO**	**Tobin'Q**	**Investment**	**OWN_CEO**	**Tobin'Q**	**Investment**	**OWN_CEO**	**Tobin'Q**	**Investment**
Mktval	0.000			-0.001***			0.000			-0.001***		
	(0.000)			(0.000)			(0.000)			(0.000)		
Tobin'Q	-0.011***		0.012***	0.024***		0.003***	-0.004***		0.001	0.021***		0.002**
	(0.002)		(0.001)	(0.002)		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)
Liquidity	0.051***		-0.052***	-0.104***		-0.048***	0.049***		-0.042***	-0.236***		-0.051***
	(0.007)		(0.006)	(0.010)		(0.006)	(0.007)		(0.007)	(0.020)		(0.008)
SIGMA	0.056		-0.060	0.141**		-0.056	0.125**		-0.132**	0.185		-0.065
	(0.041)		(0.046)	(0.061)		(0.050)	(0.055)		(0.059)	(0.118)		(0.056)
SIGDUM	-0.006*		0.005	0.016***		0.007**	-0.012***		0.009**	0.047***		0.007*
	(0.003)		(0.004)	(0.004)		(0.003)	(0.004)		(0.004)	(0.009)		(0.004)
Investment	0.954***	5.619		-0.885***	-164.239**		0.999***	-11.093		-2.705***	-244.734***	
	(0.064)	(7.515)		(0.098)	(76.623)		(0.046)	(11.060)		(0.159)	(87.441)	
OWN_CEO		-101.021	1.007***		2,037.659**	0.750***		-75.246	1.582***		1,865.949***	1.259***
		(124.111)	(0.328)		(1,007.682)	(0.212)		(155.892)	(0.345)		(646.770)	(0.282)
$(OWN\_CEO)^2$		112.498	-0.125		-3,154.615*	-1.739***		116.753	-0.977*		-3,287.035***	-2.903***
		(200.993)	(0.534)		(1,628.204)	(0.346)		(242.296)	(0.540)		(1,124.449)	(0.489)
Leverage		-1.367***			-9.057			-0.442			-15.468**	
		(0.396)			(6.100)			(0.648)			(7.395)	
Assets		-0.780*			11.327**			-0.922			7.675**	
		(0.467)			(5.535)			(0.601)			(3.361)	
Constant	0.000	0.008	-0.000	-0.000	0.013	0.000	0.000	0.001	-0.000	0.000	-0.061	0.000
	(0.000)	(0.017)	(0.000)	(0.000)	(0.138)	(0.000)	(0.000)	(0.014)	(0.000)	(0.001)	(0.161)	(0.000)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CEO-Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	9692	9692	9692	10605	10605	10605	8094	8094	8094	7546	7546	7546
Chi2	356.72	1150.58	6804.68	234.07	109.09	1092.81	512.12	276.63	6916.2	356.39	29.73	2772.6

Table XI: Tobin's Q and CEO Share Ownership with Instrumental Variables Used in Himmelberg et al. (1999) for Observations under Weakest External Governance

This table reports the estimates of the two-stage least squares regressions. The instrumented variables are *OWN_CEO* and $(OWN\_CEO)^2$. The instrumental variables are *LNS,* $(LNS)^2$, *SIGMA*, and *SIGDUM,* used in Himmelberg et al., (1999). Weakest external governance is defined as HHI being in the top third in Columns (1) and (7); the top quintile in Columns (2) and (8); and the top decile in Columns (3) and (9). The corresponding IOCs are the bottom third in Columns (4) and (10); the bottom quintile in Columns (5) and (11); the bottom decile in Columns (6) and (12). All specifications include firm and year fixed effects in Panel A; and CEO-firm pair and year fixed effects in Panel B. The definitions of all variables are given in Table II. Robust standard errors are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5% and 1%, respectively.

Panel A: Firm FE						
	Dependent Variable: Tobin's Q					
	HHI>66.66%	**HHI>80%**	**HHI>90%**	**IOC<33.33%**	**IOC<20%**	**IOC<10%**
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
OWN_CEO	19.366	82.902***	135.612**	-1423.436	239.061	718.319**
	-49.899	-29.626	-55.014	-1371.034	-232.665	-313.135
$(OWN\_CEO)^2$	213.717	-138.274**	-270.641**	5242.966	-324.831	-1,474.379*
	-209.909	-68.725	-111.272	-4758.05	-663.887	-789.786
K/S	-0.653***	-1.488***	-1.534***	-0.827	-0.018	0.597
	-0.199	-0.499	-0.54	-0.982	-0.219	-0.421
$(K/S)^2$	0.019***	0.034***	0.037***	0.001	0.002	0.001
	-0.005	-0.01	-0.012	-0.007	-0.002	-0.003
Y/S	0.018	-0.118	0.186	-0.568	0.141	0.517**
	-0.052	-0.139	-0.497	-0.603	-0.141	-0.251
R&D/K	1.442*	0.404	6.733**	2.077	-0.327	-0.524
	-0.757	-0.559	-3.108	-2.161	-0.426	-0.795
RDUM	-0.528*	-0.262*	-0.405*	-2.107	2.446	12.066*
	-0.284	-0.156	-0.21	-8.749	-1.784	-6.984
A/K	0.967	-0.173	-1.237	2.958	4.962**	-0.623
	-1.247	-0.772	-3.782	-6.202	-2.502	-3.411
ADUM	-0.068	-0.012	0.051	-2.012	-0.048	0.63
	-0.249	-0.16	-0.406	-6.426	-1.391	-2.34
I/K	0.432*	1.235*	-0.604	6.651	3.572**	8.352*
	-0.259	-0.739	-1.705	-7.265	-1.759	-4.53
Constant	0.005	0.004	-0.013	0.02	0.025	0.082
	-0.046	-0.024	-0.051	-0.596	-0.092	-0.231
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Observations	7149	4180	2127	4628	2760	1381
Wald chi2	51.87	81.96	33.29	3.18	36.44	15.99

Panel B: CEO-Firm FE						
	Dependent Variable: Tobin's Q					
	HHI>66.66%	**HHI>80%**	**HHI>90%**	**IOC<33.33%**	**IOC<20%**	**IOC<10%**
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
OWN_CEO	-376.816	61.608	106.495**	389.505*	480.058	2,209.186**
	-382.548	-296.74	-46.721	-230.497	-520.433	-859.553
$(OWN\_CEO)^2$	1564.423	-177.584	-341.769*	-744.686	-763.744	-5,495.927**
	-1472.729	-1039.672	-192.823	-646.769	-1363.469	-2296.002
K/S	-0.955***	-1.088	-0.342	0.179	0.197	0.699
	-0.365	-0.666	-0.472	-0.276	-0.487	-0.513
$(K/S)^2$	0.039***	0.036**	0.028***	-0.002	-0.001	-0.004
	-0.011	-0.014	-0.009	-0.003	-0.005	-0.005
Y/S	0.76	0.288	1.384***	0.044	0.095	0.42
	-0.497	-0.38	-0.425	-0.079	-0.126	-0.333
R&D/K	3.485*	0.413	8.611**	-0.251	-0.247	-0.52
	-2.103	-0.801	-3.541	-0.221	-0.279	-0.757
RDUM	-1.026	-0.128	-0.271	0.731	-0.178	3.893
	-1.004	-0.516	-0.214	-1.537	-6.045	-4.707
A/K	2.981	-0.299	-2.523	6.056**	4.636	-12.976*
	-6.489	-4.181	-8.162	-2.542	-4.711	-7.272
ADUM	-0.52	-0.023	0.27	-0.199	0.052	1.997
	-0.859	-0.248	-0.669	-0.553	-2.076	-2.239
I/K	0.529	1.489	-0.741	6.272***	10.536**	33.009***
	-0.481	-6.028	-2.386	-2.419	-4.181	-12.714
Constant	0.008	0.002	0	0.006	0.015	-0.026
	-0.125	-0.021	-0.064	-0.053	-0.076	-0.33
Year FE	Y	Y	Y	Y	Y	Y
CEO-Firm FE	Y	Y	Y	Y	Y	Y
Observations	7149	4180	2127	4628	2760	1381
Wald chi2	58.87	107.26	65.81	45.54	47.34	22.2