Teaming up and quiet intervention: The impact of institutional investors on executive compensation policies

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Abstract

This paper investigates whether institutional investors intervene in firms to impact their incentive systems. We use metrics based on geographic distance between institutional investors as proxies for the intensity of their strategic interactions and plausible interventions. We find that when investors are geographically proximate to one another, firms tend to adopt executive compensation contracts that exhibit more performance-based mechanisms, higher incentives to expend managerial effort, and higher incentives to make risky and positive-NPV policy choices. We also find that geographic distance between institutions is a significant determinant of the executive pay differentials. We show that firms with geographically dispersed investors have larger compensation gaps. This latter evidence appears to be consistent with the tournament theory, where CEO compensation is high relative to performance. Throughout the analysis we apply the dynamic panel generalized method of moments (GMM) methodology that accounts for unobservable heterogeneity, simultaneity, and other important endogeneity issues.

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1. Introduction

This paper examines whether geographically proximate institutional investors get involved in strategic interactions to affect firms' compensation policies. Our approach to addressing this question brings together two strands of literature. The first strand suggests that geographic proximity facilitates communication. For example, Coval and Moskowitz (1999) indicate that fund managers tend to invest in equity of local firms because they have easy access to superior information associated with such firms. In a related work, Baik, Kang, and Kim (2010) assert that geographic proximity is a major source of special information for local investment advisors that allows them to obtain higher excess returns. Further, as argued by John, Knyazeva and Knyazeva (2011), geographic distance creates an information disadvantage for corporate managers when communicating with outside investors.

The second strand of research highlights the role that institutional investors play in influencing firms' behavior. For instance, Edmans and Manso (2011) model interactions between multiple large investors and their incentives for the intervention in the firms' affairs in order to prevent or correct managerial failure. On the empirical side, Chen, Harford, and Li (2007) show that institutional shareholders exert pressure on firms' managements to undertake high quality acquisitions, and Cronqvist and Fahlenbrach (2008) report that large shareholders have a significant impact on firm investment and financing policies including the level of R&D expenditures, cash holdings, and financial leverage. What is particularly noteworthy, though, is that institutional shareholders tend to intervene in firms through the channel of private negotiations with top management, a fact that is undisclosed to existing shareholders and unobserved by other investors (see e.g., Carleton, Nelson, and Weisbach, 1998). In a recent paper, McCahery, Sautner, and Starks (2013) report that a quiet dialogue with the top management is used as an effective disciplinary tool by all types of institutional investors and in different corporate governance regimes.

Our study builds on the intersection of these two strands of literature. We use information on geographic location of institutional investors to construct unique metrics that proxy for informal communication between investors. We argue that institutions engage in an informal reciprocal dialogue to coordinate potential interventions in firms. Moreover, we argue that the intensity and effectiveness of this dialogue is a function of geographic proximity between institutions. Following arguments presented by Carleton et al. (1998) and McCahery et al. (2013), we posit that institutional investors intervene quietly, without disclosing this information to the public. We focus on the question of whether geographic proximity between key investors has an impact on firms' incentive systems. We consider several different compensation mechanisms that reflect the design of incentive compensation contracts for CEO and lower-level executives. Furthermore, we examine how executive pay differentials between CEO and lower-level executives in the top management team relate to the effect of mutual geographic positioning of investors. To the best of our knowledge, this is the first study to investigate the impact of physical proximity between institutional shareholders on executive compensation policies and compensation disparity.

To explore our main conjecture, we construct metrics that capture geographic proximity between key institutional shareholders of the firm. We relate these metrics to our set of compensation variables that reflect various important aspects of compensation contracts, and establish a causal relationship between investor proximity and executive compensation. We show that when institutions are located geographically closer to one another, firms tend to adopt incentives that better align the interests of managers with those of outside shareholders. Specifically, we show that due to the geographic proximity of the key investors, senior executives receive a significantly higher proportion of their annual compensation in the form of executive stock options and/or other instruments of equity-based pay. This result is consistent across all categories of senior executives in the top management team including CEO. Interestingly, however, we also find that the effect of geographic proximity between the key investors has virtually no impact on the aggregate size of the compensation package, including the remuneration awarded to CEO. All else being equal, senior executive officers are paid approximately the same amount of total compensation irrespective of geographic distance between the key investors. Collectively, these results highlight the importance of the effect of geography on the power of managerial incentives.

We next investigate whether geographic proximity between investors has an impact on other important aspects of executive compensation contracts. Specifically, we consider managers' incentives to expend effort in searching out new profitable investment opportunities, as well as managers' incentives to take risks. It is well established in the literature that incentives to induce effort are measured by *delta*, whereas incentives to make managers more willing to take risks are captured by *vega* (see, e.g., Coles, Daniel, and Naveen, 2006; Armstrong and Vashishtha, 2012). We compute *delta* as the sensitivity of the manager's wealth to the firm's stock price, and *vega* as the sensitivity of the manager's wealth to the volatility of the firm's stock returns. Both *delta* and *vega* are estimated at the portfolio level for each senior executive in the top management team using the high accuracy method developed by Core and Guay (2002). Existing literature demonstrates economic significance of the executive compensation vehicles provided by *delta* and *vega*. For example, Low (2009) and O'Connor and Rafferty (2010) find that risk- and effort-inducing incentives have positive and significant effect on firm valuation. Furthermore, Coles, Daniel, and Naveen (2006) show that *delta* and *vega* affect capital expenditures, spending on R&D, leverage, and the degree of business diversification. Recent work by Liu and Mauer (2011) demonstrates that when CEO is more willing to take risks, the firm's cash holdings are significantly higher, implying that greater risk-taking incentives lead to greater liquidity. Our empirical results are consistent with the existing studies. We find evidence of a significant positive relationship between our metrics of geographic proximity and managerial incentives provided by *delta* and *vega*. In the context of existing research on executive remuneration, our results highlight the importance of strategic interactions among institutional investors and their material impact on the system of effort and risk incentives that, in turn, shape firms' investment and financing policies. Furthermore, our evidence supports the implication that investors act in concert via informal channels.

In a subsequent analysis, we study executive pay differentials between CEO and lower-level executives in the top team. Specifically, we consider divergence in the level of aggregate compensation, difference in the equity-based component of the executive pay package, and the disparity in *delta* and *vega*. We relate these measures to our proxies for investor coordination, constructed based on the mutual geographic positioning of the key investors. We find a significantly positive relation between executive pay disparity and the effect of geography. Our analysis suggests that when investors are located farther away from one another and thus interact less, firms exhibit significantly larger compensation gaps. This association remains true for the size of the aggregate compensation as well as for various incentive instruments that capture the key features of executive compensation contracts. As such, the results obtained are suggestive of rank-order promotion tournaments with the winner's prize (i.e., CEO compensation) being larger when investors are geographically dispersed and when their joint monitoring activities are weaker (see, i.e., Lazear and Rosen, 1981; Bognanno, 2001). Furthermore, an interesting and generally overlooked implication of the tournament theory is that high levels of CEO pay may indicate that CEO is overpaid relative to performance. This paper is the first attempt in the literature to draw a link between the executive pay disparity and the effect of geographic location of investors.

Finally, we investigate the question of whether geographic proximity between the firm's headquarters and institutional investors has an effect on the design of executive compensation. A single large institutional shareholder may have strong incentives to intervene in the firms' affairs for two main reasons. First, because of its concentrated equity holdings, a large investor can overcome a free-rider problem associated with the initiation of value-enhancing policy changes in firms (see e.g., Grossman and Hart, 1980; Shleifer and Vishny, 1986). Second, a large shareholder located geographically closer to the firms' head office, may have easier access to management and firm-specific information via e.g., personal and business ties, and therefore may informally influence firms' decisions by exerting external pressure on companies. Extant research indicates that geographic proximity facilitates contacts and transfer of special information (see, e.g., Coval and Moskovitz, 1999; Baik et al., 2010). To test this conjecture, we use the metric developed by Chhaochharia et al. (2012) that captures geographic proximity between the firm's headquarters and its large institutional shareholders. We repeat all our tests with this alternate metric. We find some evidence for the existence of the geographic proximity effect between the firms' headquarters and investors for certain components of executive remuneration and for certain categories of senior executives, however, the results are only weakly significant. Despite using a fundamentally different approach, our findings seem to coincide with those of Kedia and Rajgopal (2009), who find no significant evidence that local labor markets and social interactions between neighboring firms have an impact on option-granting policies for senior executive officers. Furthermore, in light of the existing corporate governance studies (see, e.g., Chhaochharia et al., 2012), our findings suggest that local large investors may serve an important disciplinary and monitoring role preventing from e.g., the extreme governance failures, rather than being systematically involved in shaping corporate incentive policies.

We use a comprehensive data set of executive remuneration from Standard and Poor's Executive Compensation (ExecuComp) database. We begin the sample in 1992 because in that year companies began to adhere to the new Securities and Exchange Commission (SEC) disclosure rule on executive pay. We end the sample in 2006, when the SEC introduced new, more stringent disclosure requirements regarding executive remuneration. Due to these new requirements, the most recent remuneration data are not fully compatible with the previous disclosure regime. Consequently, our sample period runs from 1992 to 2006.

Throughout our empirical analysis we use the dynamic panel general methods of moments (GMM) methodology following the approach introduced in Wintoki, Linck, and Netter (2012). We argue that investment decisions on the part of financial institutions and thus their geographic location relative to one another can be determined endogenously. The GMM estimator mitigates these endogeneity concerns by controlling for unobservable heterogeneity, simultaneity, and the dynamic relation between current values of regressors and past values of the regressand. The model also accounts for time invariant (fixed) effects. In addition, in all test specifications, we address the instrument proliferation problem as identified by Roodman (2009).

This paper makes several contributions to the literature. First, it provides empirical evidence implying that institutional investors coordinate their actions and intervene in firms in order to affect corporate incentive policies. These findings complement and extend previous studies exploring the linkage between financial investors and executive pay (see, e.g., Hartzell and Starks, 2003; Almazan et al., 2005). Specifically, our analysis sheds more direct light on the process through which institutions affect executive compensation. Also, our study examines different aspects of the executive compensation contract for different categories of senior executives in the top team. Second, our paper adds to the strand of the literature on the role of large shareholders and their impact on managerial decision making (see e.g., Parrino, Sias, and Starks, 2003; Cronqvist and Fahlenbrach, 2008). We also provide some empirical evidence supportive of the theories developed in Admati and Pfleiderer (2009), and in Edmans and Manso (2011) which argue that institutional investors may act in groups in order to intervene in corporate affairs. These theories advance arguments for private negotiation processes between firms and institutions as an effective means of collecting information and influencing corporate behavior. Our findings seem to be consistent with these arguments. Third, this paper extends the literature on the effect of geography on finance (see e.g., Coval and Moskowitz, 1999; Gaspar and Massa, 2007; Bae, Stulz, and Tan, 2008; Baik, Kang, and Kim, 2010; Seasholes and Zhu, 2010; Garcia and Norli, 2012; Chhaochharia, 2012). We document that geographic proximity between institutional investors has a significant effect on how corporations design their compensation policies. Finally, this paper extends the discussion on executive pay gaps (see e.g., Kale, Reis, and Venkateswaran, 2009; Masulis and Zhang, 2013). To the best of our knowledge, for the first time in the literature, we establish that geographic proximity among the key investors is a significant determinant of the executive pay differentials between CEO and lower-level executives in the firm.

The remainder of the paper proceeds as follows. Section 2 presents our data sources, sample selection criteria, main variables of interest, control measures, and methodology. Section 3 explores the relation between geographic proximity and various remuneration devices as well as the connection between the effect of geography and executive pay differentials. Section 4 summarizes the results and concludes the paper.

2. Sample selection, variables and methodology

2.1. Data

We construct our sample by obtaining data from multiple sources. First, we consider all firms included in Standard and Poor's ExecuComp database, which provides detailed information on executive compensation for the five most highly compensated senior executives in the firm. Then, we match these data with Thomson Reuters Institutional (13f) Holdings database that covers common stock holdings of institutional investors, who file 13(f) reports with the SEC. We relate these data to the information on geographic location of institutions and firms[3] identified based on ZIP codes which are retrieved from Nelson's Directory of Investment Managers, Compustat, Compact Disclosure, SEC filings, and money managers websites. Geographic location of firms is defined by the location of their headquarters, as opposed to the place of incorporation, and is updated every time the firm relocates. Next, both institutional and firm ZIP codes are translated to latitude and longitude coordinates of geographic positioning. For the details on the data collection process, see Chhaochharia et al.

[3] We thank Vidhi Chhaochharia, Alok Kumar, Alexandra Niessen-Ruenzi, and Jeremy Page for generously sharing the data with us.

(2012). In the last step, we match these data with year-end accounting information available on Standard and Poor's Compustat, and stock market data as provided by Center for Research in Security Prices (CRSP).

Our sample begins in 1992 because this is the year in which the SEC adopted new disclosure rule regarding the structure of the annual compensation for each of the five most highly compensated executives in the firm. Consequently, 1992 is also the first year for which ExecuComp provides executive compensation data. Our sample ends in 2006, when the SEC implemented additional disclosure requirements, making some of the compensation data items incompatible with the pre-2006 format. Accordingly, our sample period runs from 1992 to 2006.

The sample size varies depending on data availability between 5,018 (minimum) and 15,757 (maximum) observations. For each individual empirical test, we use all available data points.

2.2. Variables

2.2.1. Key proxies

We use two main measures of geographic proximity. Both measures are based on geographic distance calculated following the approach used in Coval and Moskowitz (1999). We first define the proximity between institutional investors, which is the average distance between the largest financial shareholders of the firm. More specifically, we calculate it as the weighted average distance between each pair of investors out of the pool of the largest investors owning firm's equity, and assign weights based on the fraction of wealth that each investor allocates to that particular equity, as well as the percentage ownership of the firm's equity held by that particular investor. We argue that the more the institutional shareholder invests in the firm's equity as a fraction of its total wealth, holding everything else equal, the more it cares about the performance of the investment. Moreover, keeping everything else constant, we posit that the coordination role of the institutional shareholder vis-à-vis other institutions of the firm is greater, the larger the fraction of the firm's equity owned by that particular shareholder. Altogether, the most influential institutional shareholder in the coordination process will be the one with the largest share of its invested wealth in a given stock and, at the same time, the one with the largest fraction of holdings of this specific stock as compared to all other investors. Formally, the proximity between institutional investors can be specified as follows:

$$\frac{\sum_{j=1}^{J} dist_j \times (v_{i,k} \times own_{i,k} + v_{i,l} \times own_{i,l})_j}{\sum_{j=1}^{J} (v_{i,k} \times own_{i,k} + v_{i,l} \times own_{i,l})_j}, \quad (1)$$

where *dist* is the geographic distance, estimated based on the approach first introduced in Coval and Moskowitz (1999), *v* is the fraction of wealth the investor allocates to the firm's stock, *own* is the fraction of the total shares outstanding held by the investor, *J* is the number of all possible connections between any of the two of largest institutional investors, subscripts *k*, *l*, *j* denote investors, subscript *i* denotes the firm.

Following the approach described above, we construct *INVESTOR_DISTANCE_5* and *INVESTOR_DISTANCE_10* which measure the proximity between the five and the ten largest institutional investors, respectively. Our primary measure considers the five largest investors because in aggregate they hold a large percentage of a typical publicly traded firm's outstanding shares. Accordingly, the top five has the greatest incentives to get involved in interactions with each other in order to coordinate potential interventions. In addition, we construct the alternative measure denoted by *INVESTOR_DISTANCE_10* that considers the first ten largest institutions. The reason for that is twofold. First, we examine the robustness of our results with this alternate proxy. Second, this variable is more compatible with the metrics used in previous research that considers links between the effect of geography and corporate governance. For example, Chhaochharia et al., 2012 use a measure capturing geographic proximity between the firm's headquarters and ten largest institutional shareholders. For completeness of our analysis, we repeat all our tests using an identical measure and denote it by *FIRM_DISTANCE*. We compute this measure as the simple average distance between the firm's headquarters and its ten largest institutional investors. We use *FIRM_DISTANCE* in a baseline set of specifications to assess the impact of firm-investor proximity on executive compensation schemes.

2.2.2. Compensation measures

We use several different compensation measures as our dependent variables. We first define *TOTAL_COMP*, which is calculated as the sum of base salary, annual bonus, Black-Scholes-Merton value of executive stock options, restricted stocks, long-term incentive payouts and all other compensation (perquisites). Next, we compute *EQUITY_TOTAL* which is the sum of Black-Scholes-Merton value of executive stock options plus restricted stocks and long-term incentive payouts scaled by *TOTAL_COMP*. For a set of robustness checks, we also define *OPTIONS_TOTAL* which is a ratio of Black-Scholes-Merton value of executive stock options to *TOTAL_COMP*. The inputs for the value estimation of executive stock options are as follows. Exercise price is the stock price on the date of the option grant. Volatility is the annualized stock return volatility calculated over a 60-month period using monthly stock return data. Dividend yield is the average dividend yield over the previous three years. The risk-free rate is proxied by a daily treasury yield curve rate on a Treasury note with the same maturity as the maturity of the executive stock option. In regression analysis, we use the natural logarithm of *TOTAL_COMP* because the variable is significantly skewed.

We use two distinct measures of managerial incentives. The first is the proxy for effort incentives denoted by *DELTA*, which we define as the change in the value of the portfolio of executive stock options per 1% change in the price of the firm's common stock. The second proxies for risk incentives, denoted *VEGA*, and defined as the change in the value of the portfolio of executive stock options per 1% change in the firm's stock return volatility. We calculate both variables using one-year high-accuracy approximation method, as developed by Core and Guay (2002), which allows us to estimate the value of all outstanding stock options accumulated by an executive over his or her tenure. We exclude from our calculation vested stock options and stocks, as their holdings vary over time depending on the consumption needs of an executive. Because we do not obtain information on personal consumption needs, and because these are endogenously heterogeneous, we omit the information on vested stock options and stocks when constructing the variables. Consequently, *DELTA* and *VEGA* include the information on the unvested and current stock option grants, both determined by the firm- and industry-specific factors controlled for in our empirical specifications. To adjust for skewness, we use the natural logarithm of these variables.

Similar to Kale, Reis, and Venkateswaran (2009), we construct a set of variables that captures compensation disparity between CEO and lower level senior executives. Each variable is computed as the first difference between CEO pay and the median pay for board executives using the information on total pay (*TOTAL_COMP_DIFF*), equity-based pay (*EQUITY_COMP_DIFF*), option portfolio *delta* (*DELTA_DIFF*), and option portfolio *vega*

(*VEGA_DIFF*), respectively. Because these variables are highly skewed and may introduce bias into our tests, we transform them logarithmically as well.

2.2.3. Control variables

We use a set of control variables motivated by prior literature. As in, for example, Core, Guay, and Larcker (2008) we use the following controls as the baseline economic determinants of executive compensation. *SIZE* proxies for firm size and is measured as the natural logarithm of the book value of total assets; *RETURN* measures stock market performance and is calculated as the rate of return on equity over a 12-month period using daily stock returns; *ROA* is the ratio of operating income before depreciation and amortization to the book value of total assets, and *GROWTH* proxies for investment opportunities and is measured as the annual growth in net sales. We follow Custodio, Ferreira, and Matos (2013) and Liu and Mauer (2011) and include *AGE* in our econometric specifications, which we define as the number of years the firm is reported in CRSP. As in Coles, Daniel, and Naveen (2006) we use the following set of investment and financial variables that are known to explain significant variation in *DELTA* and *VEGA*. *RD* is the ratio of expenditures on research and development to the book value of total assets; *CAPEX* is equal to capital expenditures scaled by the book value of total assets; *LEVERAGE* is the sum of the book value of the short- and long-term debt divided by the book value of total assets, and *SEGMENTS* is the number of reported business segments. Finally, we define *COMPLEX* as an indicator variable equal to one if a firm operates multiple business segments, and zero otherwise. This variable aims to capture the complexity of a signal about manager's ability reflected in firm's output (see, e.g., Zabojnik and Bernhardt, 2001).

2.3. Descriptive statistics

Table 1 reports descriptive statistics of the variables used in our empirical analysis. To diminish the impact of extreme outliers on our results, we winsorize all variables at the 1st and 99th percentile levels. Panel A indicates the mean and standard deviation values of the main compensation variables for CEO, board executives, four other most highly compensated executives excluding CEO, and the least paid senior executive as reported by the firm. The typical sample firm comprises on average 1.5 executives serving on the board of directors and holding executive titles other than CEO. On average, 43% of the total CEO compensation is paid in equity-based instruments, which is approximately five percentage points higher than the proportion of the equity-based component in board executives' pay package, and about two percentage points higher than equity-based pay awarded to other senior executives. The proportion of equity-based compensation in the sample CEO pay package is similar to that reported by Cornett, Marcus, and Tehranian (2007). The mean CEO total pay is $4,566 thousand with a standard deviation of $5,784 thousand, while the mean total pay for the lowest paid senior executive is about four times lower with the mean of $1,288 thousand and a standard deviation of $1,656 thousand. A similar mean CEO total pay has been reported previously in e.g., Bizjack, Lemmon, and Naveen (2008), and Maug, Niessen-Ruenzi, and Zhivotova (2012). The mean CEO option portfolio *delta* and the mean CEO option portfolio *vega* are $87,285 and $71,159, respectively, meaning that CEO's wealth increases by about $87 thousand for a 1% increase in the firm's stock price, and by about $71 thousand for a 1% increase in the firm's stock return volatility. These statistics are somewhat lower when compared to, for example, those found in Coles, Daniel, and Naveen (2006), because in our setup they include solely the unvested and current portion of stock option grants as held in executive porfolio. Clearly, the levels of option portfolios *delta* and *vega* are significantly lower for board executives and for the four other senior executive officers as compared with those for CEO, as other senior executives are typically compensated markedly lower than CEO.

Panels B through C provide the mean, median, and standard deviation, as well as the tenth and the ninetieth percentile values for other variables used in the study. The distribution of our distance measures is roughly symmetric. The mean (median) distance between the five largest institutional investors is about 937 (931) miles, and the mean (median) distance between the ten largest institutions is approximately 900 (876) miles. The distance between the firm's headquarters and its ten largest institutional investors is on average 883 miles, with a median of 797 miles. These numbers are slightly lower than those reported in Chaochharia et al. (2012) for a much larger sample size. Panel C reports compensation differentials between CEO and board executives across several pay dimensions. For example, the mean (median) difference in total pay between CEO and senior executives serving on board is $2,309 thousand ($779 thousand), and the mean (median) difference in option portfolio *delta* is $57 thousand ($9 thousand). Interestingly, in our sample, the value of different pay components is always higher for board executives than for CEO in the lower tail of the distribution. Panel D provides an overview of firm characteristics. The average firm has $6.5 billion worth of assets, return on assets of 12.6%, and annual sales growth of 13.5%. It invests in R&D and capital approximately 3% and 6% of its book value of total assets per year, respectively, and it has a total debt to total assets ratio of 0.4. The typical sample firm has a complex asset structure, reports 2.4 business segments, and has been in operation for roughly 25 years.

2.4. Methodology

In their paper, Wintoki, Linck, and Netter (2012) present the economic rationale for using the dynamic panel generalized method of moments (GMM) methodology in corporate finance. Accordingly, we use the GMM estimator to investigate the effect of strategic interactions among institutional investors on the compensation policies of firms. The GMM was introduced and developed in a series of studies beginning with Holtz-Eakin, Newey, and Rosen (1988), and has since been used in many other areas of finance research (see, e.g., Kang, Liu, and Qi, 2010; Coles, Lemmon, and Meschke, 2012; Hoechle, Schmidt, Walter, and Yermack, 2012). In our GMM estimation procedure we control for the instrument proliferation problem, which can potentially lead to overfitting of the instrumented variables and consequently to biased parameter estimates (Roodman, 2009).

Generally, endogeneity problem may lead to a spurious relation between observable characteristics in the empirical model, and thus to incorrect inference. The dynamic panel GMM estimator accounts for the major causes of endogeneity which are simultaneity, unobservable heterogeneity, and the dynamic relationship between current values of the explanatory variables and past values of the dependent variable. In our setting, we control for the dynamic relationship between executive compensation (our dependent variable) and equity-holdings of the key institutional investors, which determine their geographic positioning versus each other and thus the intensity of their mutual interaction. We recognize that current geographic proximity among investors can affect current executive compensation that in turn may have an impact on future firm characteristics, e.g., stock market performance, and through stock market performance on future executive compensation. Likewise, we argue that past compensation may affect past stock market performance of firms and consequently financial investors' investment decisions that determine their geographic location and, through that channel, current executive compensation. The bottom line is that investor proximity may influence current and future pay setting process in firms. In our setting, all central variables of interest as well as the vast majority of controls can altogether be considered dynamically endogenous.

To control for simultaneity and reverse causality, GMM uses historical values of the dependent and explanatory variables as a set of instruments for the current realizations of the explanatory variables. Moreover, the instruments chosen from the pool of the lagged values of the dependent and explanatory variables can be deemed exogenous with regard to the current value of the dependent variable. In our empirical model, we posit that all explanatory variables except for firm age and year indicators are endogenous. Therefore, we use lagged values of executive pay, geographic proximity among institutional investors, and other economic determinants of executive pay (excluding firm age and year indicators) as instruments for the current values of these variables. More specifically, we include in our GMM estimation lags of our dependent variable (executive compensation) ranging from two to three years, contingent on the specification of the estimated empirical model. These lags capture the impact of firm's history on firm's present, i.e., they capture all information from firm's past that could have an impact on current executive compensation. Moreover, we include in our model lags of the explanatory variables that are older than two or three years, depending on the number of lags used for our dependent variable. Conversely, these lagged variables should have no direct effect on the current values of executive compensation (dependent variable) and therefore could be considered exogenous with regard to the current or future changes in executive compensation. Overall, our instrument set includes the variables that are in lagged levels as well as in lagged differences. We test the validity of these instruments using the Hansen test of over-identifying restrictions and a difference-in-Hansen test of exogeneity. We also correct for the instrument proliferation bias as identified in Roodman (2009). Finally, in the estimation procedure we control for the time-invariant component of unobservable heterogeneity by including "fixed effects" in all our regressions.

3. Empirical results

In this section we first examine the relation between various remuneration arrangements and our metrics of geographic proximity among the key institutional investors. We subsequently consider the relation between the effect of geography and executive pay differentials. Finally, we investigate how geographic proximity between the firm's headquarters and investors influence the firms' remuneration policies. We estimate the above links using the dynamic panel GMM methodology. We provide the empirical results in the following subsections.

3.1. Impact of institutional strategic interactions on equity-based and total compensation

Table 2 presents GMM parameter estimates of the model in which the dependent variable is the equity-based component of the executive pay package comprising Black-Scholes-Merton value of executive stock options, restricted stocks, and long-term incentive payouts (LTIP), scaled by total compensation. We estimate the value of this variable for the different categories of senior executives, including CEO (Models 1-2), executive officers serving on the board of directors excluding CEO (Models 3-4), lower level senior executives (Models 5-6), and the least highly compensated senior executive as reported by the firm (Models 7-8). We introduce the above classification to investigate whether the predicted effect of institutional investor proximity on compensation policies of firms has a similar impact and magnitude across different categories of senior executives in the top management.

Our main variables of interest are *INVESTOR_DISTANCE_5* and *INVESTOR_DISTANCE_10*, which capture geographic proximity between the five and the ten largest institutional investors, respectively. Each of the above explanatory variables serves as a proxy for informal strategic interactions among the key institutional investors, undertaken by these institutions with the aim of monitoring and influencing the firm's compensation policies. Our choice of the number of institutional shareholders considered in the estimation of *INVESTOR_DISTANCE_5* is motivated by the fact that only a few largest institutions hold a bulk of the firm's equity as owned by all institutional investors (see, e.g., Chen, Harford, and Lie, 2007). Hence, everything else constant, the largest institutions will be more incentivized to influence firms as compared with institutions with relatively negligible equity holdings. A second important motivation is that the coordination costs rise with the number of entities involved in the coordination process. Therefore, holding all else constant, the coordination will be more effective among a relatively small number of institutional shareholders. In addition to *INVESTOR_DISTANCE_5*, we introduce *INVESTOR_DISTANCE_10*, which is our alternative proxy for informal interactions among shareholders. We construct this variable for two main reasons. First, we include it in the econometric model to test the robustness of our empirical specifications. Second, we want to ensure compatibility with other measures of geographic distance used in the prior research. For example, Chhaochharia et al., (2012) construct their central variable of interest based on the information on geographic distance between the ten largest institutional shareholders.

All the specifications (Table 2, Model 1-8), include firm-specific controls that have been previously shown to be important factors in explaining cross-sectional variation in executive compensation (see, e.g., Core et al., 2008; Custodio et al., 2013). *SIZE* is measured by the book value of total assets, *RETURN* is the return on equity over the past 12 months, *ROA* is the return on assets, *GROWTH* is annual growth in net sales, and *AGE* is the age of the firm. Detailed definitions of the explanatory variables are provided in Appendix A. All the regressions include time fixed-effects (fiscal year indicators). *P*-values are shown in parentheses below each parameter estimate. In addition, at the bottom of the table, we report *p*-values for a test of the first- and second-order serial correlation, Hansen test for over-identifying restrictions, and the test of difference-in-Hansen.

The consistent result in Table 2 is a statistically significant and negative relation between equity-based compensation and each of the two different proxies for institutional shareholder coordination. For example, in Model 1, the estimated coefficient on *INVESTOR_DISTANCE_5* is -0.486 with a *p*-value of 0.055. The same conclusion emerges from Model 2, which uses *INVESTOR_DISTANCE_10* as an alternate proxy. The parameter estimate is -0.565 with a *p*-value of 0.085. These results indicate that all else constant, the closer the institutional investors are located to one another in space, the more they interact and coordinate, and as a consequence impose greater pressure on the management to adopt compensation schemes with the higher proportion of equity-based component in the CEO pay package. These actions are in line with the interests of institutional investors. An equity-based compensation mechanism is designed in such a way as to incentivize managers to earn higher stock returns, which is precisely the investment objective of financial institutions. Thus, to boost returns, institutional investors, will undertake actions to pressure boards of directors to adopt equity-based bonus schemes with payouts based on the realized stock market performance. The effectiveness of such activity will be greater, if the key financial shareholders are geographically closer to each other and can thus coordinate better.

The results for the other three categories of executives in the management team are statistically stronger. For example, for senior executives serving on the board of directors (Models 3-4), the estimated coefficient on *INVESTOR_DISTANCE_5* (*INVESTOR_DISTANCE_10*) is -2.325 (-2.051) with a *p*-value of 0.000 (0.000), and for the least highly compensated senior executive in the management team (Models 7-8), the parameter estimates are -0.494 (-0.841) with a *p*-value of 0.046 (0.009). Similar results are found for the entire group of all senior executives excluding CEO (Models 5-6).

In Table 2, Models 1-3 and Models 7-8 are estimated with two lags of the relevant executive compensation variable as an explanatory variable, and Models 4-6 are estimated with three lags. The estimated results imply that the number of included lags is sufficient. The *p*-values of the different specification tests are reported in parentheses at the bottom of the table. The test of *AR*(2) second-order serial correlation has a *p*-value of at least 0.167, meaning that the null hypothesis of no second-order serial correlation cannot be rejected. We also test the strength of our instruments (lagged and differenced). The Hansen test of over-identifying restrictions indicates that our instruments are valid in all specifications. A difference-in-Hansen test of exogeneity implies that the additional subset of our instruments can be considered exogenous in most of our empirical specifications.

In Table 3 we reestimate our GMM regressions with the dependent variable equal to the Black-Scholes-Merton value of executive stock options scaled by total compensation. All explanatory variables, including the main variables of interest, remain the same as in Table 2.

We narrow down our dependent variable to executive stock options as they constitute *bona fide* shareholder wealth-increasing mechanism adopted by virtually every single public corporation. Conversely, restricted stocks plans, for example, that are included in the construction of the dependent variable in Table 2, serve mainly as a retention instrument for senior executive officers and are used only by the largest firms. Thus, in Table 3 we re-define our dependent variable and use executive stock options as our measure of equity-based compensation, since they constitute a less noisy measure of value-increasing pay incentives. Overall, the results from the GMM estimations of the specifications presented in Table 3 can be considered as a check on the robustness of the results reported in Table 2.

Taken together, the results documented in Table 3 conform to our expectations and are somewhat stronger than those displayed in Table 2. The coefficient estimate on the variable *INVESTOR_DISTANCE_5* is highly statistically significant for all four of our categories of senior executives including CEO with a *p*-value of 0.01 or better in all cases. Moreover, the coefficient estimate associated with *INVESTOR_DISTANCE_10* is also highly statistically significant in all specifications except for CEO (Model 2), where it remains significant at conventional level with a *p*-value of 0.018. The regression results imply that when institutional investors are geographically closer to one another, they interact more and better coordinate their actions with the aim of exerting pressure on companies to adopt incentive systems that are more in line with the shareholders' interests. This implication is in agreement with the conjecture suggested in an earlier work by, for example, Hartzell and Starks (2003).

The dynamic GMM estimates as presented in Table 3 are obtained with up to three lags of the dependent variable in the empirical model. We carry out a number of specification tests and report the results at the bottom of Table 3. The results are slightly stronger than, but are qualitatively similar to those reported in Table 2. The *AR*(2) second-order serial correlation test does not allow rejection of the null hypothesis of no second-order serial correlation. Furthermore, the Hansen test of over-identifying restrictions fails to reject the null hypothesis of validity of our instrument set, and the difference-in-Hansen test of exogeneity provides evidence of the exogeneity of our subset of instruments.

We obtain notably different results when we use GMM regressions to estimate the effect of the proximity of the key institutional investors on the absolute level of total compensation. We define total compensation as the sum of base salary, annual cash bonus, Black-Scholes-Merton value of executive stock options, restricted stocks, and long-term incentive payouts (LTIP). Estimates are reported in columns (1)-(8) of Table 4. The coefficients on *INVESTOR_DISTANCE_5* and *INVESTOR_DISTANCE_10* are negative albeit mostly statistically insignificant. For example, in Models 1 and 2, the estimates for *INVESTOR_DISTANCE_5* (*INVESTOR_DISTANCE_10*) are -0.0173 (-0.0347) with a *p*-value of 0.977 (0.967), implying that geographic proximity of institutional investors has no effect on the absolute level of total CEO compensation. Similar results are obtained for the other senior executive officers (Models 5-6), and for the least highly paid senior executive in the top management team (Models 7-8). Conversely, we find a negative and statistically significant effect of geographic proximity among the key institutional shareholders on the level of total compensation for senior executives serving on the board of directors and holding titles other than CEO (Models 3-4).

Overall, the regression results are supportive of the view that geographically proximate institutional investors team up to influence firms' compensation policies. Specifically, financial institutions appear to significantly impact the structure of senior executive pay packages by imposing compensation contracts with higher proportion of equity-based instruments. Moreover, we do not find evidence that geographically proximate institutions affect the absolute level of total compensation. The results presented above are consistent across different categories of senior executives including CEO. Collectively, our findings are similar in spirit to those obtained by Knyazeva, Knyazeva, and Masulis (2013) in a somewhat different context. Their study indicates that firms with higher proportion of local directors provide their CEO with more incentives from equity-based pay, nonetheless, the level of total compensation is not affected by the proportion of local directors appointed to the board.

3.2. Managerial incentives to increase effort

In this section, we perform a series of tests to evaluate the relation between the geographic closeness of the key institutional investors and stock price sensitivity (*delta*) inherent in the design of executive compensation contracts. *Delta* measures the change in the value of executive stock options, restricted stocks, and stocks, as held in the wealth portfolio of a senior executive, per 1% change in the stock price. Therefore *delta* helps aligning the interests of senior executives with those of outside shareholders, as the payout to senior executives is based on the stock price performance. More specifically, *delta* can encourage senior executives to work harder in searching out new profitable investment opportunities (see, e.g., Coles, Daniel, and Naveen, 2006). Therefore, the selection and implementation of the positive-NPV projects by managers will improve shareholder wealth and simultaneously the value of manager's wealth portfolio.

We compute *delta* following the methodology introduced in Core and Guay (2002). We exclude from the calculation the components that are endogenously determined by the managers actively trading their wealth portfolios, because we do not obtain the information of the consumption needs on the part of managers. For example, we omit vested executive stock options, as they can be exercised by managers at any point in time and at their sole discretion, and in effect change the power and effectiveness of the remaining wealth-increasing incentives. Appendix A provides additional details on the construction of *delta*.

In Table 5 we regress *delta* on our two alternative coordination proxies *INVESTOR_DISTANCE_5* and *INVESTOR_DISTANCE_10*, which capture geographic closeness between the five and ten key institutional shareholders, respectively, and a set of controlling variables. Our choice of the additional controlling variables is motivated by the prior literature. As in other studies (e.g., Coles, Daniel, and Naveen, 2006), *RD* is the total expenditures on research and development; *CAPEX* is the total expenditures on capital; *LEVERGE* is the total indebtedness, and *SEGMENTS* is the number of reported business segments. For more detailed variable definitions and sources of data, refer to Appendix A.

The results presented in Table 5 are in line with the findings displayed in Tables 2-3 and continue to provide support for the argument that large institutional investors engage in informal strategic interactions with one another to collectively exert pressure on the management to implement wealth-increasing compensation policies. For example, the coefficient estimates on *INVESTOR_DISTANCE_5* (*INVESTOR_DISTANCE_10*) for board senior executives (Models 3-4) are negative and highly statistically significant with a *p*-value of 0.001 (0.000). Furthermore, the coefficients associated with *INVESTOR_DISTANCE_5* (*INVESTOR_DISTANCE_10*) for other senior executive officers excluding CEO (Models 5-6), as well as for the least highly paid senior executive as reported by the firm (Models 7-8), are also negative and statistically significant at the 1% or 5% levels, with the highest *p*-value of 0.015. The estimated coefficients on both variables of interest for the CEO subsample are negative, however, not significantly different from zero (Models 1-2). The specification tests presented at the bottom of Table 5 reveal that all models perform equally well. The *AR*(2) second-order serial correlation test, Hansen test of over-identifying restrictions, and the difference-in-Hansen test of exogeneity fail to reject the model.

Overall, the findings presented above corroborate our earlier results and imply that institutional shareholders act in unison to influence firms to adopt compensation policies that lead to the improvement in shareholder wealth. Specifically, if the geographic distance between the key institutional investors is shorter, they can more effectively coordinate their actions and thus exert greater pressure on boards to adopt compensation contracts with higher *delta*. Managers with compensation schemes characterized by high *delta* are more likely to put more effort in pursuing positive NPV projects that in consequence should result in shareholder wealth creation.

3.3. Managers' attitudes towards risk-taking

Because managers' human capital is closely tied to firms and thus remains largely undiversifiable, managers may be reluctant to increase the firm's risk by investing in high risk, positive NPV projects (see e.g., Amihud and Lev, 1981). The use of executive stock options in a compensation policy can potentially diminish this agency problem, as the value of the stock option is an increasing function of a firm's riskiness. Therefore, compensating senior executives with options induce managers to increase risk by pursuing high risk high return projects. This inherent feature of option-based compensation is captured by *vega*, which measures the change in the value of executive stock options in the manager's personal wealth portfolio for 1% change in the annualized volatility of stock returns. Higher *vega* incentivizes senior executives to undertake profitable and risk-increasing projects that result in higher valuation of manager's portfolio of wealth and higher capitalization of the firm's equity (see e.g., Low, 2009).

Table 6 shows GMM regression results with *vega* as the dependent variable. We estimate *vega* following the methodology introduced in Core and Guay (2002). Similarly to *delta*, the construction of *vega* does not include vested stock options. Following Tchistyi, Yermack and Yun (2011), we approximate *vega* of managerial equity holdings to be zero. Consistent with previous literature (see, e.g., Coles et al., 2006), we include in Models 1-8 two additional control variables that have been shown to correlate with the level of *vega*. *VOLATILITY* captures the firm's overall riskiness and *SALARY* is a fixed cash component of executive compensation package. Details concerning variable construction and data sources are presented in Appendix A. The results presented in Table 6 provide further support that geographic proximity between the key institutional shareholders influences compensation policies of firms. In all eight regressions, the estimated coefficients on our central variables of interests are negative and mostly statistically significant. For example, the coefficients on *INVESTOR_DISTANCE_5* and *INVESTOR_DISTANCE_10* for the subsample of board executives (Models 3-4) are both negative and significant at the 5% and 1% levels, respectively, implying that a proximate location of key institutional shareholders has a positive impact on managerial risk-taking incentives, which potentially lead to improvement in the value of the firm's equity. Models 7 and 8 report statistically analogous results for the least highly paid senior executives as reported by the firm. In Models 2 and 6, *INVESTOR_DISTANCE_10* exhibits slightly more modest statistical relationship with *vega* at the 10% and 5% levels, respectively.

Evidence from a set of specification tests is presented at the bottom of Table 6. Collectively, they fail to reject the estimated models. Test statistics indicate insignificant *AR*(2) second-order autocorrelation in the residuals in all specifications except for Model 2, where the results show a *p*-value of 0.078. The overidentification test indicates that the set of selected instruments is valid and significant. Finally, all models pass the difference-in-Hansen test of exogeneity of the additional instrument subset.

3.4. Executive pay differentials

We now consider whether the geographic proximity among key institutional shareholders impacts compensation disparity between CEO and lower-level managers. Existing empirical research (see, e.g., Kale et al., 2009) suggests that compensation gap can be attributed to tournament incentives within the firm, such as the amount of compensation in the case of a promotion to CEO and the probability of promotion. On the other hand, Masulis and Zhang (2013) contend that productivity theory is more relevant in explaining executive pay gap. They find a strong positive connection between varying productivity levels of senior managers and pay disparity. Our next tests attempt to supplement the extant literature by examining whether investor proximity affects the difference in compensation between CEO and lower-level managers within the same firm.

Table 7 estimates GMM regressions to investigate the impact of investor proximity on pay gap along several different dimensions of the executive compensation structure. We study four different dependent variables that capture the differential between CEO and lower-level executives in the aggregate amount of compensation (*TOTAL_COMP_DIFF*), equity-based compensation (*EQUITY_COMP_DIFF*), *delta* (*DELTA_DIFF*), and *vega* (*VEGA_DIFF*). We follow previous literature (see, e.g., Kale et al., 2009; Masulis and Zhang, 2013) and include as our control variables firm size (*SIZE*), return on assets (*ROA*), investment opportunities (*GROWTH*), research and development expenditures (*RD*), volatility of stock returns (*VOLATILITY*), dummy variable equal to one if the firm operates in multiple business segments (*COMPLEX*), and firm age (*AGE*). As in our previous regressions, we consider *AGE* and year dummy variables as the only exogenous variables in the specification. Detailed variable definitions and data sources are provided in Appendix A.

We find that firms whose key institutional shareholders are geographically proximate to one another have significantly lower pay gaps. The estimated coefficients pertaining to *INVESTOR_DISTANCE_5* and *INVESTOR_DISTANCE_10* are statistically significant at at least conventional levels in most specifications. For instance, the coefficient estimate on *INVESTOR_DISTANCE_5 (INVESTOR_DISTANCE_10)* in the *TOTAL_COMP_DIFF* equations (Models 1-2) are 1.881 (3.511) with a *p*-value of 0.079 (0.019), and in the *VEGA_DIFF* equations (Models 7-8) are 3.481 (6.840) with a *p*-value of 0.059 (0.004). The effects associated with the differential in equity-based compensation and in *delta* are weaker (Models 3 and 5) or insignificant (Models 4 and 5). A number of regression diagnostics reported at the bottom of Table 7 imply that the model performs very well.

Our results provide evidence of the effect of geography on executive pay differentials. We show that firms with more geographically dispersed institutional investors have larger compensation gaps between CEO and lower-level executives. This evidence appears to be consistent with the tournament theory, where CEO may be overpaid relative to his/her performance (see, e.g., Lazear and Rose, 1981). In other words, due to geographic remoteness among the investors and, therefore, a less coordinated oversight, boards may want to set higher prizes (compensation) upon promotion to the position of CEO. Higher winning prize means greater incentives for potential CEO successors within the firm. Alternatively, higher pay gaps may indicate increased CEO's power over setting his/her compensation when the intensity of monitoring on the part of the distant institutional investors is weaker.

3.5. Investor proximity to firm headquarters and executive compensation

The results presented thus far, support the idea that institutional investors team up to coordinate their actions with the aim of inducing pressure on boards to adopt compensation policies that better align the interests between managers and shareholders. These actions are more effective if institutional investors are located closer in geographic proximity. In this section we proceed with a related analysis and investigate whether geographic distance between the firm's headquarters and its key institutional shareholders affects the characteristics of the executive compensation contracts. To address this issue, we construct a variable *FIRM_DISTANCE* that measures average distance between the firm and its ten largest institutional investors. This variable, however, does not capture geographic proximity among the institutional shareholders themselves. Chhaochharia et al. (2012) use this explanatory variable in a slightly different setting. Their study shows that local institutional shareholders effectively monitor corporate behavior. Consequently, we use *FIRM_DISTANCE* to investigate whether geographic proximity between institutional investors and the firm's headquarters has any impact on the compensation policies adopted by firms. More specifically, we aim to determine whether monitoring activities of local institutions impacts the structure of executive compensation, managerial incentives to induce effort, and managerial risk-seeking behavior.

Table 8 presents coefficient estimates on the *FIRM_DISTANCE* variable obtained from a dynamic panel GMM estimator. We re-estimate all model specifications identical to those reported in Tables 2-6, using the same dependent variables and *FIRM_DISTANCE* as our key explanatory variable. As in our prior analyses, all explanatory variables except AGE and year dummies are assumed to be endogenous. In Panel A we examine the relation between *FIRM_DISTANCE* and the equity-based component of total compensation. The coefficient estimate on *FIRM_DISTANCE* in the board executive equation (Model 2) is negative and statistically significant with a *p*-value of 0.014. The coefficients on *FIRM_DISTANCE* in both the CEO and the four other executives equation (Models 1 and 3) are negative but exhibit no statistical relationship with the equity-based compensation. In Panel B, the dependent variable is an option-based component of the total compensation, and the results are qualitatively analogous to those reported in Panel A. Further tests, presented in Panel C, reveal a negative and marginally statistically significant association between *FIRM_DISTANCE* and the absolute level of total compensation for the CEO equation (Model 1), while the other three specifications (Models 2-4) yield qualitatively similar but statistically insignificant results. Finally, we relate *FIRM_DISTANCE* to *delta* and *vega* (Panels D and E, respectively). The results do not exhibit statistical significance except for the coefficient estimate on *FIRM_DISTANCE* for the CEO subsample, which is only weakly significant (Panel D, Model 1).

Overall, the reported regression analyses provide weak evidence that geographic proximity between the firms' headquarters and investors has an impact on compensation policies of firms. Nevertheless, we find that CEO is compensated with a higher level of total compensation and higher stock option *delta* when the concentration of institutional shareholders located in proximity to firm's headquarters is high. This result agrees with Chhoachharia et al. (2012) who find that firms with a high local institutional ownership are more profitable and have stronger boards. Clearly, CEO of more profitable firm should receive higher compensation as compared to CEO of a less profitable industry peer. Moreover, as pointed out by Hermalin (2005), stronger boards should make CEO increase effort, which consequently should lead to higher CEO pay.

4. Conclusion

To the best of our knowledge this is the first study to establish a link between literatures on geographic distance, institutional investors, and executive compensation. In this paper we investigate whether institutional investors act in unison to intervene in firms' affairs. Specifically, we study whether geographically proximate institutional investors engage in strategic interactions to affect firms' compensation contracting process. We argue that institutions engage in informal interactions among themselves, and that the intensity of these interactions and their effectiveness is commensurate with geographic distance between the institutions. Consequently, we conjecture that institutional investors located geographically closer to each other have greater impact on firms' boards of directors and thus on executive pay policies.

Using a large sample of US firms from 1992 to 2006, and the dynamic panel generalized method of moments (GMM) methodology, we show that when institutional shareholders are in geographic proximity and thus coordinate more, firms adopt executive compensation contracts with better incentives to maximize shareholder wealth. Specifically, we show that these contracts include more value-enhancing mechanisms, greater incentives to encourage managers to work harder, and greater incentives that lead to increased risk-taking. Notably, the aggregate level of executive pay is not affected by the effect of geography. The results are consistent across different categories of senior executives in the top management team, including CEO. Furthermore, we provide evidence that geographic proximity between institutional investors has a significantly negative effect on the executive pay disparity. Arguably, this latter result provides an evidence for overpaying for CEO performance when institutional investors are geographically distant, coordinate less, and thus have negligible influence on firms.

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Appendix A: Variable definitions

Variable	Definition	Source
INVESTOR_DISTANCE_5 (INVESTOR_DISTANCE_10)	Average distance between the five (ten) largest institutional investors of the firm defined by the following: $$\frac{\sum_{j=1}^{J} dist_j \times (v_{i,k} \times own_{i,k} + v_{i,l} \times own_{i,l})_j}{\sum_{j=1}^{J} (v_{i,k} \times own_{i,k} + v_{i,l} \times own_{i,l})_j},$$ where *dist* is the geographic distance in miles, estimated based on the approach first introduced in Coval and Moskowitz (1999), *v* is the fraction of wealth that the investor allocates to the firm's stock, *own* is the fraction of the total shares outstanding held by the investor, *J* is the number of all possible connections between any of the two out of the five (ten) largest investors, subscripts *k*, *l*, *j* denote investors, subscript *i* denotes the firm.	Thomson Reuters
FIRM_DISTANCE	Average distance between the firm and its ten largest institutional investors. The variable is computed as described in Chhaochharia, Kumar and Niessen-Ruenzi (2012) and in Coval and Moskovitz (1999). It is based on the precise geographic coordinates of each sample firm and its ten largest financial shareholders. The coordinates are derived from the postal (ZIP) codes. More formally, a single distance between the investor and the firm can be defined as: $d_{f,i} = r \times arc\ cos\{sin(lat_f) \times sin(lat_i) + cos(lat_f) \times cos(lat_i) \times cos(lon_i - lon_f)\}$, where subscripts *f* and *i* denote the firm and the investor, respectively, *lat (lon)* is the latitude (longitude) measured in radians, and *r* is earth radius measured in miles.	Thomson Reuters
EQUITY_TOTAL	Equity-based compensation scaled by total compensation, where equity-based compensation is equal to the sum of Black-Scholes-Merton value of executive stock options, restricted stocks and long-term incentive payouts (LTIP).	ExecuComp
OPTIONS_TOTAL	Black-Scholes-Merton value of executive stock options scaled by total compensation.	ExecuComp
TOTAL_COMP	Sum of base salary, annual bonus, Black-Scholes-Merton value of executive stock options, restricted stocks, long-term incentive payouts (LTIP) and all other compensation.	ExecuComp
DELTA	Change in the portfolio value of executive stock options per 1% change in the price of firm's common stock. Estimation of portfolio *delta* is based on the procedure described in Core and Guay (2002) and uses the data on the unvested and current stock option grants.	ExecuComp
VEGA	Change in the portfolio value of executive stock options per 1% change in the firm's stock return volatility. Estimation of portfolio *vega* is based on the procedure described in Core and Guay (2002) and uses the data on the unvested and current stock option grants.	ExecuComp

TOTAL_COMP_DIFF	First difference between CEO total compensation and the median total compensation for board executives.	ExecuComp
EQUITY_COMP_DIFF	First difference between CEO equity-based compensation and the median equity-based compensation for board executives.	ExecuComp
DELTA_DIFF	First difference between CEO *delta* and the median delta for board executives.	ExecuComp
VEGA_DIFF	First difference between CEO *vega* and the median vega for board executives.	ExecuComp
SIZE	Book value of total assets.	Compustat
RETURN	Stock return calculated over a 12-month period.	CRSP
ROA	Operating income before depreciation and amortization, scaled by the book value of total assets.	Compustat
GROWTH	Annual growth in net sales.	Compustat
VOLATILITY	Annualized standard deviation of monthly stock returns measured over a 60-month period.	CRSP
RD	Expenditures on research and development scaled by the book value of total assets.	Compustat
CAPEX	Capital expenditures scaled by the book value of total assets.	Compustat
LEVERAGE	Sum of the book value of the short- and long-term debt, scaled by the book value of total assets.	Compustat
SEGMENTS	Number of reported business segments.	Compustat Segments
COMPLEX	Indicator variable equal to one if a firm operates multiple business segments, and to zero otherwise.	Compustat Segments
AGE	Number of years the firm is reported on CRSP.	CRSP
BOARD EXECUTIVES	Executive officers serving on the firm’s board of directors, excluding CEO.	ExecuComp
FOUR OTHER EXECUTIVES	Other most highly compensated executives, as reported by the firm, excluding CEO.	ExecuComp

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Table 1. Descriptive statistics

VARIABLES	CEO		BOARD EXECUTIVES		FOUR OTHER EXECUTIVES		LOWEST PAID EXECUTIVE	
	MEAN (OBS.)	ST.DEV.	MEAN (OBS.)	ST.DEV.	MEAN (OBS.)	ST.DEV.	MEAN (OBS.)	ST.DEV.
PANEL A: COMPENSATION VARIABLES								
EQUITY_TOTAL	0.4313 (15,383)	0.2858	0.3756 (6,491)	0.2749	0.4129 (13,307)	0.2367	0.3809 (15,689)	0.2663
OPTIONS_TOTAL	0.3119 (13,089)	0.2772	0.2786 (5,018)	0.2583	0.2973 (13,307)	0.2383	0.2791 (13,466)	0.2557
TOTAL_COMP ($000)	4,566.8 (15,414)	5,784.5	4,140.5 (5,022)	5,886.7	7,204.7 (15,534)	8,655.0	1,288.7 (15,757)	1,656.1
SALARY ($000)	666.66 (9,984)	312.77	690.55 (5,101)	515.35	1,371.4 (12,026)	675.09	264.79 (12,205)	133.29
DELTA ($000)	87.285 (13,265)	155.26	71.566 (5,510)	135.23	118.12 (13,371)	201.12	20.864 (13,557)	38.923
VEGA ($000)	71.159 (9,984)	121.68	73.755 (5,101)	137.19	86.416 (12,026)	143.27	15.298 (12,205)	27.623

VARIABLES	OBS.	MEAN	ST.DEV.	10TH PERC.	MEDIAN	90TH PERC.
PANEL B: DISTANCE MEASURES						
INVESTOR_DISTANCE_5 (miles)	15,757	937.19	534.50	181.95	930.50	1,646.9
INVESTOR_DISTANCE_10 (miles)	15,757	899.53	410.50	367.41	876.46	1,461.7
FIRM_DISTANCE (miles)	15,757	882.55	446.77	382.49	796.99	1,569.4
PANEL C: COMPENSATION GAP VARIABLES						
TOTAL_COMP_DIFF ($000)	5,887	2,308.9	9,135.9	-97.239	779.19	5,820.4
EQUITY_COMP_DIFF ($000)	5,887	1,584.4	8,601.8	-168.76	289.97	4,228.1
DELTA_DIFF ($000)	5,887	57.247	282.46	-5.4890	9.2489	135.64
VEGA_DIFF ($000)	5,887	41.554	159.83	-4.1480	7.6085	109.66
PANEL D: FIRM CHARACTERISTICS						
SIZE ($000)	15,757	6,528.6	11,242	248.11	1,622.1	21,488
RETURN	15,757	0.1559	0.4845	-0.3427	0.1022	0.6602
ROA	15,757	0.1260	0.1189	0.0265	0.1271	0.2413
GROWTH	15,757	0.1349	0.3169	-0.0917	0.0895	0.3810
VOLATILITY	14,077	0.4137	0.2055	0.2070	0.3590	0.6980
RD	15,757	0.0289	0.0607	0.0000	0.0000	0.1002
CAPEX	15,003	0.0562	0.0533	0.0097	0.0418	0.1164
LEVERAGE	15,757	0.3951	0.2210	0.1087	0.4051	0.6319
SEGMENTS	13,689	2.4380	1.5486	1.0000	2.0000	5.0000
COMPLEX	5,887	0.6020	0.4895	0.0000	1.0000	1.0000
AGE	15,757	24.826	17.917	6.6739	20.348	53.121
BOARD EXECUTIVES	6,491	1.5631	0.7932	1.0000	1.0000	3.0000
FOUR OTHER EXECUTIVES	13,307	4.1491	0.8161	4.0000	4.0000	5.0000

Note: The table reports summary statistics that describe the sample. The data are obtained from ExecuComp, Compustat, Thomson Reuters, and CRSP. The number of observations for the relevant subsamples differs depending on data availability. Variable definitions and sources of data are given in Appendix A. All variables are winsorized at the 1% and 99% levels. The sample period is from 1992 to 2006.

Table 2. The effect of institutional strategic interactions on equity-based compensation package

	CEO		BOARD EXECUTIVES		FOUR OTHER EXECUTIVES		LOWEST PAID EXECUTIVE	
VARIABLES	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
INVESTOR_DISTANCE_5 (x 10^4)	-0.4860*		-2.3250***		-0.4990**		-0.4940**	
	(0.055)		(0.000)		(0.015)		(0.046)	
INVESOTR_DISTANCE_10 (x 10^4)		-0.5650*		-2.0510***		-0.4460*		-0.8410***
		(0.085)		(0.000)		(0.055)		(0.009)
SIZE	0.0198	0.0164	-0.0549	-0.0799	0.0262	0.0221	0.0079	0.0068
	(0.424)	(0.498)	(0.257)	(0.220)	(0.198)	(0.272)	(0.750)	(0.781)
RETURN	-0.0464	-0.0372	0.0468	0.0429	-0.0681	-0.0656	-0.0418	-0.0381
	(0.459)	(0.552)	(0.812)	(0.788)	(0.210)	(0.227)	(0.466)	(0.516)
ROA	0.2448*	0.2574*	0.2377	0.6992*	0.1758	0.2191	0.3018*	0.2973*
	(0.098)	(0.074)	(0.553)	(0.058)	(0.246)	(0.140)	(0.065)	(0.064)
GROWTH	0.0904**	0.0963**	0.1263	0.1479	0.0859*	0.0929**	0.1143**	0.1188***
	(0.043)	(0.031)	(0.176)	(0.203)	(0.057)	(0.034)	(0.012)	(0.009)
AGE	-0.0136	-0.0113	0.0652	0.0959	-0.0283	-0.0253	-0.0094	-0.0095
	(0.537)	(0.604)	(0.168)	(0.180)	(0.155)	(0.202)	(0.676)	(0.672)
EQUITY_TOTAL_LAG1	0.3659**	0.3645**	0.6806**	0.5254*	0.2809*	0.2714*	0.3227**	0.3107**
	(0.015)	(0.014)	(0.016)	(0.070)	(0.074)	(0.079)	(0.017)	(0.020)
EQUITY_TOTAL_LAG2	0.0348*	0.0373*	0.0957**	0.1238**	0.0715***	0.0782***	0.0698***	0.0702***
	(0.096)	(0.069)	(0.036)	(0.011)	(0.004)	(0.002)	(0.000)	(0.000)
EQUITY_TOTAL_LAG3				0.0096	0.0264	0.0294		
				(0.823)	(0.245)	(0.194)		
AR(1)	(0.000)	(0.000)	(0.001)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
AR(2)	(0.186)	(0.193)	(0.167)	(0.378)	(0.262)	(0.294)	(0.188)	(0.218)
HANSEN	(0.379)	(0.374)	(0.164)	(0.534)	(0.190)	(0.163)	(0.399)	(0.411)
DIFF-IN-HANSEN	(0.398)	(0.433)	(0.121)	(0.290)	(0.063)	(0.065)	(0.292)	(0.358)
FIRMS	2,180	2,180	1,377	1,102	1,995	1,995	2,200	2,200
OBSERVATIONS	15,383	15,383	6,491	5,018	13,307	13,307	15,689	15,689

Note: Regressions are estimated using the dynamic panel general method of moments (GMM) methodology, as introduced in Holtz-Eakin, Newey, and Rosen (1988) and in Arellano and Bond (1991), and developed thereafter in Arellano and Bover (1995), and in Blundell and Bond (1998). *SIZE* and *AGE* have been transformed logarithmically. All explanatory variables except for *AGE* and year indicators are deemed endogenous. *AR(1)* and *AR(2)* test for first- and second-order serial correlation (respectively) in the first differenced residuals under the H_0 of no serial correlation. *HANSEN* tests for over-identifying restrictions under the H_0 that all instruments are valid. *DIFF-IN-HANSEN* tests for exogeneity of instruments under the H_0 that all instruments used for the equations in levels are exogenous. Variable definitions and sources of data are given in Appendix A. All variables are winsorized at the 1% and 99% levels**.** The sample period is from 1992 to 2006. *p-values* are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 3. The effect of institutional strategic interactions on executive stock option awards

	CEO		BOARD EXECUTIVES		FOUR OTHER EXECUTIVES		LOWEST PAID EXECUTIVE	
VARIABLES	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
INVESTOR_DISTANCE_5 (x 10^4)	-0.6390***		-1.3340***		-0.6720***		-0.6750***	
	(0.006)		(0.002)		(0.000)		(0.004)	
INVESOTR_DISTANCE_10 (x 10^4)		-0.6370**		-1.6730***		-0.6650***		-0.9850***
		(0.018)		(0.003)		(0.004)		(0.000)
SIZE	0.0413	0.0432*	-0.0567	-0.0769*	0.0274	0.0248	0.0056	0.0059
	(0.123)	(0.098)	(0.292)	(0.088)	(0.169)	(0.200)	(0.813)	(0.801)
RETURN	-0.0791	-0.0823	0.0361	0.0231	-0.0308	-0.0375	-0.0710	-0.0710
	(0.267)	(0.234)	(0.803)	(0.899)	(0.586)	(0.508)	(0.238)	(0.232)
ROA	-0.0809	-0.0631	0.3170	0.2566	-0.0520	-0.0174	0.0891	0.0927
	(0.650)	(0.721)	(0.400)	(0.503)	(0.691)	(0.894)	(0.628)	(0.619)
GROWTH	0.0695	0.0756	0.1049	0.0769	0.0710	0.0774*	0.0853	0.0891
	(0.270)	(0.229)	(0.336)	(0.378)	(0.133)	(0.093)	(0.159)	(0.140)
AGE	-0.0482*	-0.0528*	0.0664	0.0785*	-0.0333	-0.0331	-0.0161	-0.0192
	(0.095)	(0.063)	(0.301)	(0.091)	(0.124)	(0.125)	(0.518)	(0.441)
OPTIONS_TOTAL_LAG1	0.3864*	0.3269	0.6352*	0.8141***	0.4724***	0.4432***	0.4309**	0.3927**
	(0.066)	(0.126)	(0.065)	(0.003)	(0.002)	(0.004)	(0.016)	(0.028)
OPTIONS_TOTAL_LAG2	0.0833**	0.0950***	0.1359**	0.1083**	0.0998***	0.1081***	0.1005***	0.1085***
	(0.016)	(0.007)	(0.021)	(0.026)	(0.001)	(0.000)	(0.000)	(0.000)
OPTIONS_TOTAL_LAG3	0.0438*	0.0489*	0.0444		0.0497*	0.0542**	0.0379	0.0417*
	(0.093)	(0.057)	(0.429)		(0.056)	(0.035)	(0.125)	(0.084)
AR(1)	(0.002)	(0.005)	(0.018)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AR(2)	(0.430)	(0.610)	(0.423)	(0.102)	(0.118)	(0.174)	(0.201)	(0.287)
HANSEN	(0.832)	(0.773)	(0.522)	(0.141)	(0.343)	(0.236)	(0.354)	(0.265)
DIFF-IN-HANSEN	(0.710)	(0.616)	(0.653)	(0.154)	(0.189)	(0.123)	(0.380)	(0.305)
FIRMS	1,970	1,970	1,102	1,377	1,995	1,995	2,000	2,000
OBSERVATIONS	13,089	13,089	5,018	6,491	13,307	13,307	13,466	13,466

Note: Regressions are estimated using the dynamic panel general method of moments (GMM) methodology, as introduced in Holtz-Eakin, Newey, and Rosen (1988) and in Arellano and Bond (1991), and developed thereafter in Arellano and Bover (1995), and in Blundell and Bond (1998). *SIZE* and *AGE* have been transformed logarithmically. All explanatory variables except for *AGE* and year indicators are deemed endogenous. *AR(1)* and *AR(2)* test for first- and second-order serial correlation (respectively) in the first differenced residuals under the H_0 of no serial correlation. *HANSEN* tests for over-identifying restrictions under the H_0 that all instruments are valid. *DIFF-IN-HANSEN* tests for exogeneity of instruments under the H_0 that all instruments used for the equations in levels are exogenous. Variable definitions and sources of data are given in Appendix A. All variables are winsorized at the 1% and 99% levels**.** The sample period is from 1992 to 2006. *p-values* are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4. The effect of institutional strategic interactions on total compensation

	CEO		BOARD EXECUTIVES		FOUR OTHER EXECUTIVES		LOWEST PAID EXECUTIVE	
VARIABLES	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
INVESTOR_DISTANCE_5 (x 10^4)	-0.0173 (0.977)		-3.7500*** (0.005)		-0.5310 (0.302)		-0.2290 (0.729)	
INVESOTR_DISTANCE_10 (x 10^4)		-0.0347 (0.967)		-4.9680*** (0.002)		-0.7450 (0.245)		-0.7360 (0.385)
SIZE	0.1509** (0.034)	0.1430** (0.045)	-0.0924 (0.598)	-0.1388 (0.430)	0.0587 (0.371)	0.0554 (0.395)	0.1628** (0.020)	0.1637** (0.016)
RETURN	-0.1383 (0.439)	-0.1454 (0.432)	-0.2499 (0.496)	-0.1536 (0.658)	0.0065 (0.962)	-0.0205 (0.880)	-0.0832 (0.608)	-0.0588 (0.717)
ROA	1.1596** (0.039)	1.2297** (0.036)	1.7412 (0.241)	1.9327 (0.163)	0.9375** (0.041)	1.1963*** (0.009)	0.6861 (0.196)	0.6486 (0.203)
GROWTH	0.1394 (0.309)	0.1603 (0.255)	-0.1977 (0.522)	-0.1614 (0.590)	0.2868** (0.028)	0.3620*** (0.002)	0.2060 (0.167)	0.2079 (0.164)
AGE	0.0273 (0.661)	0.0379 (0.546)	0.1467 (0.389)	0.1904 (0.267)	0.0495 (0.388)	0.0689 (0.214)	-0.0221 (0.696)	-0.0242 (0.665)
TOTAL_COMP_LAG1	0.3342* (0.083)	0.3218 (0.117)	0.6824*** (0.004)	0.6860*** (0.002)	0.4836** (0.012)	0.3686** (0.047)	0.3681* (0.063)	0.3785** (0.048)
TOTAL_COMP_LAG2	0.0536 (0.183)	0.0547 (0.186)	0.1363* (0.089)	0.1409* (0.068)	0.0607 (0.190)	0.0842* (0.054)	0.0679** (0.033)	0.0653** (0.036)
TOTAL_COMP_LAG3			-0.0036 (0.942)	0.0003 (0.994)				
AR(1)	(0.001)	(0.003)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
AR(2)	(0.670)	(0.725)	(0.415)	(0.310)	(0.378)	(0.747)	(0.415)	(0.373)
HANSEN	(0.238)	(0.210)	(0.528)	(0.688)	(0.038)	(0.027)	(0.210)	(0.257)
DIFF-IN-HANSEN	(0.571)	(0.380)	(0.339)	(0.477)	(0.061)	(0.046)	(0.233)	(0.279)
FIRMS	2,186	2,186	1,103	1,103	2,196	2,196	2,206	2,206
OBSERVATIONS	15,414	15,414	5,022	5,022	15,534	15,534	15,757	15,757

Note: Regressions are estimated using the dynamic panel general method of moments (GMM) methodology, as introduced in Holtz-Eakin, Newey, and Rosen (1988) and in Arellano and Bond (1991), and developed thereafter in Arellano and Bover (1995), and in Blundell and Bond (1998). The dependent variable including its lags, as well as *SIZE* and *AGE* have been transformed logarithmically. All explanatory variables except for *AGE* and year indicators are deemed endogenous. *AR(1)* and *AR(2)* test for first- and second-order serial correlation (respectively) in the first differenced residuals under the H_0 of no serial correlation. *HANSEN* tests for over-identifying restrictions under the H_0 that all instruments are valid. *DIFF-IN-HANSEN* tests for exogeneity of instruments under the H_0 that all instruments used for the equations in levels are exogenous. Variable definitions and sources of data are given in Appendix A. All variables are winsorized at the 1% and 99% levels**.** The sample period is from 1992 to 2006. *p-values* are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5. The effect of institutional strategic interactions on incentives to expend effort (*delta*)

	CEO		BOARD EXECUTIVES		FOUR OTHER EXECUTIVES		LOWEST PAID EXECUTIVE	
VARIABLES	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
INVESTOR_DISTANCE_5 (x 10^4)	-1.0610		-8.3850***		-2.2154**		-2.7900**	
	(0.391)		(0.001)		(0.015)		(0.011)	
INVESOTR_DISTANCE_10 (x 10^4)		-2.1400		-8.8410***		-3.0600***		-3.4000***
		(0.145)		(0.000)		(0.006)		(0.004)
SIZE	0.3372***	0.3329***	-0.2354	-0.1842	0.2845***	0.2713***	0.2784**	0.2298**
	(0.002)	(0.002)	(0.254)	(0.372)	(0.004)	(0.005)	(0.024)	(0.028)
RETURN	0.1969	0.1942	0.4107	0.3359	0.2792	0.3157*	0.0214	0.0830
	(0.339)	(0.352)	(0.345)	(0.418)	(0.114)	(0.069)	(0.918)	(0.692)
ROA	1.5684	1.7795*	-1.5053	-1.4176	-0.1493	-0.3201	-0.3783	0.3834
	(0.128)	(0.091)	(0.547)	(0.541)	(0.848)	(0.669)	(0.664)	(0.658)
GROWTH	0.2094	0.2197	0.0478	-0.0413	-0.1357	-0.1315	-0.2338	0.1587
	(0.185)	(0.155)	(0.895)	(0.906)	(0.351)	(0.362)	(0.259)	(0.473)
RD	4.6876	5.2717	-2.7869	-2.2144	0.8681	0.0451	4.2222	2.5279
	(0.151)	(0.113)	(0.618)	(0.672)	(0.757)	(0.987)	(0.251)	(0.390)
CAPEX	-3.3537	-3.4345	-2.4817	-1.1678	0.6393	0.5959	1.1918	-0.4008
	(0.131)	(0.123)	(0.551)	(0.768)	(0.711)	(0.728)	(0.570)	(0.868)
LEVERAGE	-0.2941	-0.3394	-0.4548	-0.3699	0.0844	0.1075	-0.1385	-0.2939
	(0.335)	(0.273)	(0.541)	(0.599)	(0.660)	(0.578)	(0.526)	(0.237)
SEGMENTS	-0.0217	-0.0167	-0.0050	0.0011	-0.0323	-0.0284	-0.0059	0.0249
	(0.537)	(0.640)	(0.942)	(0.986)	(0.220)	(0.274)	(0.844)	(0.398)
AGE	-0.1757**	-0.1714**	0.2433	0.1827	-0.1838**	-0.1878**	-0.1533*	-0.1505*
	(0.041)	(0.048)	(0.181)	(0.310)	(0.029)	(0.027)	(0.094)	(0.078)
DELTA_LAG1	0.3841**	0.3482**	1.2692***	1.2949***	0.7263***	0.7548***	0.6792***	0.3841*
	(0.017)	(0.027)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.052)
DELTA_LAG2	0.1788**	0.1979**	-0.1499	-0.1869	0.0578	0.0433	0.0741	0.1854***
	(0.027)	(0.013)	(0.331)	(0.227)	(0.514)	(0.625)	(0.183)	(0.009)
DELTA_LAG3								0.0478
								(0.108)
AR(1)	(0.015)	(0.019)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.013)
AR(2)	(0.206)	(0.123)	(0.187)	(0.105)	(0.484)	(0.357)	(0.170)	(0.843)
HANSEN	(0.616)	(0.656)	(0.868)	(0.723)	(0.197)	(0.262)	(0.646)	(0.684)
DIFF-IN-HANSEN	(0.749)	(0.768)	(0.849)	(0.826)	(0.272)	(0.300)	(0.601)	(0.874)
FIRMS	1,984	1,984	1,227	1,227	1,991	1,991	2,001	1,828
OBSERVATIONS	13,265	13,265	5,510	5,510	13,371	13,371	13,557	11,580

Note: Regressions are estimated using the dynamic panel general method of moments (GMM) methodology as introduced in Holtz-Eakin, Newey, and Rosen (1988) and in Arellano and Bond (1991), and developed thereafter in Arellano and Bover (1995), and in Blundell and Bond (1998). The dependent variable including its lags, as well as *SIZE, RD* and *AGE* have been transformed logarithmically. All explanatory variables except for *AGE* and year indicators are deemed endogenous. *AR(1)* and *AR(2)* test for first- and second-order serial correlation (respectively) in the first differenced residuals under the H_0 of no serial correlation. *HANSEN* tests for over-identifying restrictions under the H_0 that all instruments are valid. *DIFF-IN-HANSEN* tests for exogeneity of instruments under the H_0 that all instruments used for the equations in levels are exogenous. Variable definitions and sources of data are given in Appendix A. All variables are winsorized at the 1% and 99% levels**.** The sample period is from 1992 to 2006. *p-values* are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6. The effect of institutional strategic interactions on incentives to take risks (*vega*)

	CEO		BOARD EXECUTIVES		FOUR OTHER EXECUTIVES		LOWEST PAID EXECUTIVE	
VARIABLES	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
INVESTOR_DISTANCE_5 (x 10^4)	-0.5040		-4.9580**		-1.1100		-1.9350*	
	(0.679)		(0.014)		(0.284)		(0.052)	
INVESOTR_DISTANCE_10 (x 10^4)		-2.3790*		-7.5410***		-2.4300**		-3.4720***
		(0.093)		(0.001)		(0.045)		(0.004)
SIZE	0.3143***	0.3076***	-0.2051	-0.1784	0.3290*	0.3218*	0.1583	0.1646
	(0.005)	(0.006)	(0.289)	(0.376)	(0.062)	(0.062)	(0.157)	(0.145)
VOLATILITY	-1.3477**	-1.2881**	-1.2386	-1.0549	-0.8046*	-0.8089*	-0.9098**	-0.8796**
	(0.014)	(0.020)	(0.162)	(0.232)	(0.087)	(0.090)	(0.027)	(0.032)
ROA	1.2282	1.3927	1.1480	1.0396	0.9774	1.0038	0.2767	0.1986
	(0.236)	(0.209)	(0.459)	(0.511)	(0.165)	(0.161)	(0.685)	(0.770)
GROWTH	0.5048**	0.5412***	0.6209**	0.5459*	0.0929	0.0699	0.0882	0.0801
	(0.012)	(0.008)	(0.042)	(0.071)	(0.549)	(0.653)	(0.544)	(0.583)
SALARY	-0.0399	-0.0478	0.6454***	0.6898***	-0.7032*	-0.7322*	0.0156	0.0085
	(0.699)	(0.657)	(0.004)	(0.002)	(0.082)	(0.075)	(0.921)	(0.955)
RD	-0.2390	-0.5447	3.2489	3.3535	3.8743	4.5121	3.2453	3.1353
	(0.950)	(0.890)	(0.520)	(0.542)	(0.198)	(0.161)	(0.215)	(0.238)
CAPEX	-0.7608	-0.8167	-1.1188	-0.3196	2.4056	2.8035	1.6947	1.8140
	(0.791)	(0.778)	(0.804)	(0.943)	(0.252)	(0.193)	(0.464)	(0.423)
LEVERAGE	-0.0545	-0.0829	-0.2656	-0.1719	-0.0236	-0.0142	-0.1779	-0.1654
	(0.854)	(0.785)	(0.698)	(0.807)	(0.914)	(0.949)	(0.372)	(0.413)
SEGMENTS	0.0031	0.0122	-0.0216	-0.0071	-0.0163	-0.0106	0.0048	0.0099
	(0.935)	(0.756)	(0.737)	(0.909)	(0.601)	(0.727)	(0.867)	(0.726)
AGE	-0.1823**	-0.1781**	0.0869	0.0468	-0.0545	-0.0450	-0.0824	-0.0933
	(0.034)	(0.042)	(0.578)	(0.767)	(0.531)	(0.598)	(0.303)	(0.258)
VEGA_LAG1	0.3304**	0.2815*	0.6889***	0.7016***	0.6525***	0.6590***	0.6145***	0.6192***
	(0.034)	(0.077)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
VEGA_LAG2	0.1845**	0.2143**	0.0378	0.0241	0.0537	0.0518	0.0634	0.0597
	(0.037)	(0.018)	(0.712)	(0.818)	(0.456)	(0.478)	(0.110)	(0.140)
VEGA_LAG3	0.0037	0.0081						
	(0.902)	(0.786)						
AR(1)	(0.015)	(0.029)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
AR(2)	(0.148)	(0.078)	(0.781)	(0.909)	(0.954)	(0.972)	(0.159)	(0.148)
HANSEN	(0.812)	(0.696)	(0.162)	(0.124)	(0.274)	(0.279)	(0.762)	(0.858)
DIFF-IN-HANSEN	(0.621)	(0.795)	(0.245)	(0.161)	(0.054)	(0.076)	(0.747)	(0.829)
FIRMS	1,764	1,764	1,204	1,204	1,949	1,949	1,960	1,960
OBSERVATIONS	9,984	9,984	5,101	5,101	12,026	12,026	12,205	12,205

Note: Regressions are estimated using the dynamic panel general method of moments (GMM) methodology as introduced in Holtz-Eakin, Newey, and Rosen (1988) and in Arellano and Bond (1991), and developed thereafter in Arellano and Bover (1995), and in Blundell and Bond (1998). The dependent variable including its lags, as well as *SIZE*, *VOLATILITY*, *CASH_COMP*, *RD* and *AGE* have been transformed logarithmically. All explanatory variables except for *AGE* and year indicators are deemed endogenous. *AR(1)* and *AR(2)* test for first- and second-order serial correlation (respectively) in the first differenced residuals under the H_0 of no serial correlation. *HANSEN* tests for over-identifying restrictions under the H_0 that all instruments are valid. *DIFF-IN-HANSEN* tests for exogeneity of instruments under the H_0 that all instruments used for the equations in levels are exogenous. Variable definitions and sources of data are given in Appendix A. All variables are winsorized at the 1% and 99% levels**.** The sample period is from 1992 to 2006. *p-values* are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7. The effect of institutional strategic interactions on executive pay disparity

	TOTAL_COMP_DIFF		EQUITY_COMP_DIFF		DELTA_DIFF		VEGA_DIFF	
VARIABLES	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
INVESTOR_DISTANCE_5 (x 10^4)	1.8810*		8.3270*		1.8340		3.4810*	
	(0.079)		(0.063)		(0.302)		(0.059)	
INVESOTR_DISTANCE_10 (x 10^4)		3.5110**		9.3570		5.6910**		6.8400***
		(0.019)		(0.131)		(0.013)		(0.004)
SIZE	0.1683	0.1840	0.9369**	1.0073**	0.0112	0.0186	0.3138	0.3102
	(0.154)	(0.116)	(0.028)	(0.016)	(0.950)	(0.918)	(0.108)	(0.114)
ROA	0.3610	0.2871	0.3848	-0.4773	2.2339*	2.4468**	1.8608	1.8888
	(0.702)	(0.753)	(0.904)	(0.874)	(0.051)	(0.034)	(0.147)	(0.140)
GROWTH	-0.2279	-0.2412	-1.8115***	-1.8514***	-0.3937*	-0.4125*	-0.5411**	-0.5414**
	(0.201)	(0.168)	(0.005)	(0.005)	(0.076)	(0.068)	(0.024)	(0.026)
RD	-1.7892	-1.2543	2.4292	2.7475	2.5003	2.8001	9.1213*	9.3953*
	(0.538)	(0.645)	(0.794)	(0.761)	(0.552)	(0.526)	(0.063)	(0.071)
VOLATILITY	0.7514	0.7183	2.3740	1.9354	-0.4472	-0.3508	-0.2742	-0.3416
	(0.164)	(0.171)	(0.313)	(0.388)	(0.586)	(0.677)	(0.761)	(0.707)
COMPLEX	0.1693*	0.1856*	0.1613	0.1656	-0.0270	-0.0197	0.0641	0.0548
	(0.097)	(0.063)	(0.705)	(0.693)	(0.859)	(0.899)	(0.715)	(0.753)
AGE	-0.1333	-0.1531	-0.7035*	-0.7829*	-0.0764	-0.0734	-0.2139	-0.2063
	(0.254)	(0.185)	(0.097)	(0.061)	(0.664)	(0.682)	(0.258)	(0.276)
LAG1	0.1661	0.2196	-0.1159	-0.1028	0.5570***	0.5834***	0.4776***	0.5161***
	(0.472)	(0.356)	(0.533)	(0.597)	(0.001)	(0.001)	(0.006)	(0.010)
LAG2	0.1186**	0.1201**	0.0906**	0.0828**	0.1594	0.1454	0.1389	0.1072
	(0.018)	(0.020)	(0.012)	(0.020)	(0.125)	(0.177)	(0.186)	(0.372)
AR(1)	(0.033)	(0.026)	(0.045)	(0.050)	(0.005)	(0.004)	(0.004)	(0.008)
AR(2)	(0.652)	(0.781)	(0.169)	(0.230)	(0.316)	(0.399)	(0.653)	(0.856)
HANSEN	(0.172)	(0.450)	(0.175)	(0.244)	(0.876)	(0.886)	(0.949)	(0.949)
DIFF-IN-HANSEN	(0.256)	(0.603)	(0.295)	(0.468)	(0.689)	(0.695)	(0.965)	(0.950)
FIRMS	1,337	1,337	1,337	1,337	1,337	1,337	1.337	1,337
OBSERVATIONS	5,887	5,887	5,887	5,887	5,887	5,887	5,887	5,887

Note: Regressions are estimated using the dynamic panel general method of moments (GMM) methodology as introduced in Holtz-Eakin, Newey, and Rosen (1988) and in Arellano and Bond (1991), and developed thereafter in Arellano and Bover (1995), and in Blundell and Bond (1998). *LAG1* and *LAG2* are the first and the second lag of the dependent variable, respectively. The dependent variables and its lags as well as *SIZE*, *VOLATILITY*, *RD* and *AGE* have been transformed logarithmically. All explanatory variables except for *AGE* and year indicators are deemed endogenous. *AR(1)* and *AR(2)* test for first- and second-order serial correlation (respectively) in the first differenced residuals under the H_0 of no serial correlation. *HANSEN* tests for over-identifying restrictions under the H_0 that all instruments are valid. *DIFF-IN-HANSEN* tests for exogeneity of instruments under the H_0 that all instruments used for the equations in levels are exogenous. Variable definitions and sources of data are given in Appendix A. All variables are winsorized at the 1% and 99% levels**.** The sample period is from 1992 to 2006. *p-values* are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8. The effect of institutional proximity to firm's headquarters on various remuneration arrangements

DEPENDENT VARIABLE	CEO	BOARD EXECUTIVES	FOUR OTHER EXECUTIVES	LEAST PAID EXECUTIVE
	[1]	[2]	[3]	[4]
PANEL A				
EQUITY_TOTAL	-0.6810 (0.145)	-2.1110** (0.014)	-0.4120 (0.200)	0.0818 (0.845)
AR(1)	(0.000)	(0.006)	(0.000)	(0.001)
AR(2)	(0.226)	(0.295)	(0.107)	(0.854)
HANSEN	(0.159)	(0.645)	(0.322)	(0.687)
DIFF-IN-HANSEN	(0.552)	(0.468)	(0.118)	(0.616)
PANEL B				
OPTIONS_TOTAL	-0.4060 (0.279)	-0.8700 (0.224)	-0.0445 (0.904)	0.0458 (0.909)
AR(1)	(0.003)	(0.017)	(0.000)	(0.000)
AR(2)	(0.372)	(0.371)	(0.990)	(0.143)
HANSEN	(0.805)	(0.339)	(0.142)	(0.448)
DIFF-IN-HANSEN	(0.679)	(0.547)	(0.178)	(0.414)
PANEL C				
TOTAL_COMP	-2.5490* (0.058)	-3.3580 (0.116)	-0.5050 (0.597)	-0.5490 (0.642)
AR(1)	(0.000)	(0.002)	(0.000)	(0.001)
AR(2)	(0.579)	(0.599)	(0.510)	(0.264)
HANSEN	(0.169)	(0.648)	(0.070)	(0.216)
DIFF-IN-HANSEN	(0.543)	(0.495)	(0.127)	(0.535)
PANEL D				
DELTA	-3.2980* (0.102)	-4.0510 (0.188)	-2.0160 (0.196)	-0.0671 (0.965)
AR(1)	(0.004)	(0.001)	(0.000)	(0.018)
AR(2)	(0.295)	(0.164)	(0.343)	(0.670)
HANSEN	(0.385)	(0.557)	(0.183)	(0.434)
DIFF-IN-HANSEN	(0.381)	(0.672)	(0.180)	(0.922)
PANEL E				
VEGA	0.2600 (0.883)	-1.4900 (0.538)	1.3590 (0.381)	1.5700 (0.291)
AR(1)	(0.015)	(0.004)	(0.000)	(0.000)
AR(2)	(0.207)	(0.874)	(0.828)	(0.108)
HANSEN	(0.695)	(0.042)	(0.317)	(0.771)
DIFF-IN-HANSEN	(0.417)	(0.074)	(0.062)	(0.736)

Note: The table reports coefficient estimates on the *FIRM_DISTANCE* variable. Regressions include identical controls and logarithmic transformations of variables as in Tables 2-6, and are estimated using the dynamic panel general method of moments (GMM) methodology as introduced in Holtz-Eakin, Newey, and Rosen (1988) and in Arellano and Bond (1991), and developed thereafter in Arellano and Bover (1995), and in Blundell and Bond (1998). All explanatory variables except for *AGE* and year indicators are deemed endogenous. *AR(1)* and *AR(2)* test for first- and second-order serial correlation (respectively) in the first differenced residuals under the H_0 of no serial correlation. *HANSEN* tests for over-identifying restrictions under the H_0 that all instruments are valid. *DIFF-IN-HANSEN* tests for exogeneity of instruments under the H_0 that all instruments used for the equations in levels are exogenous. Variable definitions and sources of data are given in Appendix A. All variables are winsorized at the 1% and 99% levels**.** The sample period is from 1992 to 2006. *p-values* are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.