Knowledge, Compensation, and Firm Value: An Empirical Analysis of Firm Communication*

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November 2012

The conference call data and supplementary appendix to this paper can be downloaded at:
http://webuser.bus.umich.edu/feng/

*We thank an anonymous referee, Philippe Aghion, Emmanuel DeGeorge, Ben Ee, John Graham, Milton Harris, S.P. Kothari (editor), Greg Miller, Canice Prendergast, Jeffrey Sanchez-Burks, Jerry Zimmerman, and seminar participants at London Business School, University of Michigan, University of North Carolina, University of Rochester, University of Southern California, Tilburg University, the Third Interdisciplinary Accounting Conference in Copenhagen, and the Utah Winter Accounting Conference for many valuable comments. This paper was previously titled "Formal and Real Authority in Organizations: An Empirical Assessment."
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Abstract

Modern theories of the firm suggest that identifying the location of knowledge within an organization is the key to understanding the organization's decision-making processes. We hypothesize that external communication patterns reveal the underlying knowledge dispersion within the management team. Using a large database of firm conference call transcripts, we find evidence to support our hypothesis. CEOs speak less in settings where they are unlikely to be fully informed and these CEOs also receive a smaller proportion of total management team compensation. Firms that do not adhere to the above communication-pay pattern have a lower industry-adjusted Tobin's Q. These findings are consistent with modern theories of the firm.

JEL Codes: D22, D70, D80, L23, M12
Keywords: knowledge, communication, firm value, compensation, authority, organization

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1. Introduction

Organizational decisions require knowledge that is typically spread throughout the organization. Theory argues that in situations where this knowledge is costly to transfer, decision rights should be co-located with the person possessing the knowledge (e.g., Baiman et al. 1995; Brickley et al. 2009, Ch. 12; Horngren et al. 2012, Ch. 22).[1] Empirical research has established this co-location by showing that the allocation of formal decision rights (as measured by job titles and formal job descriptions) is strongly correlated with proxies of dispersion of knowledge in an organization.[2] However, modern theories of the firm suggest that patterns of formal decision rights only incompletely reflect knowledge dispersion in a firm; in these theoretical models, individuals with formal decision rights often find it optimal not to acquire and interpret the necessary knowledge, but simply acquiesce to a subordinate who has the knowledge.[3] Patterns of formal decision rights thus may not reflect patterns of knowledge dispersion in the organization. In light of these recent theories, this study attempts to measure knowledge dispersion with an entirely new approach and examine its economic consequences in terms of management compensation and firm valuation.

To identify the location of knowledge in a firm, we examine management communication patterns. Following theoretical constructs, we argue that communication is revealed knowledge –

[1] In this context, knowledge transfer costs are not the costs of inducing truth telling as in a standard adverse selection game, but instead result from the specific nature of information which is generally hard to both communicate and interpret. See Section 3.3 of Baiman et al. (1995) for an example and Section 2 of this study for details.

[2] See, for example, Baker, Gibbs, and Holmstrom (1994), Baiman, Larcker, and Rajan (1995), Baker and Holmstrom (1995), Nagar (2002), Aggarwal and Samwick (2003), Christie et al. (2003), Moers (2006), and Ortega (2009).

[3] See, for example, Bolton and Dewatripont (1994), Jensen and Meckling (1995), Aghion and Tirole (1997), Bolton and Scharfstein (1998), Baker, Gibbons and Murphy (1999), Garicano (2000), Dessein (2002), Dewatripont and Tirole (2005), Harris and Raviv (2005, 2008, 2010), Mookherjee (2006), Van den Steen (2010), and Ferreira and Sah (2010).

i.e., the person communicating is the person with the information. We are not the first to recognize the value in this approach: case studies have relied on communication patterns to reveal firms' underlying decision-making processes. For example, Simons (2000) documents in great detail how the managers of Johnson & Johnson (J&J), a conglomerate with about 250 operating companies, rely on an elaborate scheme of written documents and face-to-face communication to ensure that decision making is coupled with knowledge. This subtle nature of J&J's decision making is invisible in official org-charts and statements of job responsibilities. Simons, however, had unparalleled access to internal communication patterns of J&J management. Such outsider access to internal communication is inconceivable for a large sample of firms.

Our study's key innovation is to recognize that there is a publicly available management communication setting, namely earnings conference calls, that can illuminate patterns of knowledge among the management team. Conference calls carry great importance because they provide a visible forum for stakeholders to understand the firm and evaluate management decisions. Most publicly traded firms host earnings conference calls each quarter during which managers describe the performance and strategy of the firm and field a question-and-answer session with analysts (Kimbrough 2005). These meetings offer critical windows for analysts and investors to observe and update their views of the management teams and evaluate their investment decisions, or, in the vernacular of the theoretical models, project selection. The nature of these meetings illustrates the complex nature of value-relevant knowledge, the myriad forms it assumes, and the difficulties in *both* transmitting and interpreting it. Knowledge appears in forms ranging from tangible information (Bushee et al. 2003) to word choice (Larcker and Zakolyukina 2012) to the vocal inflections and tone affected reflexively by executives when talking (Mayew and Venkatachalam

2012). These meetings also carry high financial stakes.[4] As a result, conference calls present a setting in which significant information is communicated, project performance is evaluated, and costly consequences result if the task is performed poorly. Therefore, management is under significant pressure to communicate effectively, and firms approach this event with great care (see Figure 1).[5]

We hypothesize that one way for management to increase its effectiveness at communicating and explaining decisions to stakeholders is to permit the most informed management team member to speak – i.e., we argue that communication patterns reflect knowledge dispersion in the management team, over and above formal titles. As a prelude to archival data analysis, we first conduct a small-scale survey of Investor Relations professionals to gain a high-level sense of our hypothesis. The results, described in Section 3, are consistent with our hypothesis.

We next conduct large-scale empirical tests. We proceed in three interrelated steps. We begin by obtaining machine readable texts of 17,419 earnings conference calls from 2003–2007 and measure the cross-sectional variation in communication patterns of the management team. We find that the CEO speaks less in firms with a high level of R&D expenditures or a large employee base, situations where theory predicts that information is too specialized or too voluminous for one person to absorb (and, therefore, more costly to transfer to the CEO). The CEO also speaks less when he or she is new to the position and is likely less informed. By contrast, the CEO speaks more when he or she has more ability to acquire knowledge faster or has technical skills specifically related to the earnings conference call task, i.e., when the CEO is highly educated or has an accounting background. Moreover, we find that this relation is not exclusive to the CEO:

[4] An AIMR (Association for Investment Management & Research) survey found that 95 % of analysts and investors view the conference call as the most important form of technology-aided communication between management of public companies and the investment community (Stewart 2002). For archival empirical evidence on the price impact of conference calls, see Matsumoto et al. (2011) and Bushee et al. (2003).

[5] Attempts to shortcut this interaction can lead to clear analyst dissatisfaction as evidenced by the case of Cisco Systems, which was recently criticized for hosting a conference call with an overly "scripted feel" (Vance 2009).

the extent to which *other executives* speak is reflective of their own specialized information set, reinforcing our hypothesis that communication indeed reveals knowledge.

The above associations between conference call communication and firm and management attributes provide strong evidence that variation in communication patterns reflects variation in knowledge among members of the management team. However, a further test of the theory would be to demonstrate its economic implications for individuals and firms. We conduct two tests of economic consequences.

Our first economic consequence test shows that communication patterns are related to relative pay patterns: executives who communicate more are paid more relative to their peers. Modern theories of the firm indicate that knowledge influences decision making (e.g., Aghion and Tirole 1997). Therefore, management team members with more knowledge have a bigger impact on actual decisions, for which they receive more pay. A one standard deviation increase in the CEO's communication is associated with an increase in the relative portion of compensation paid to the CEO of 1.5 percentage points (or about a 4% increase relative to the mean value of 39%), which is of similar economic magnitude as other factors such as firm size and measures of the CEO's formal authority. The result also obtains robustly after an extensive set of controls, including measures of formal authority, providing additional confidence in our inferences that conference call communication patterns reflect dispersion of knowledge and authority among top management.

Second, the most important economic consequence of any organizational choice is firm value. Modern theories of the firm establish this link by showing that the process of maximizing firm value is what generates the association between knowledge and pay. Therefore, a particularly strong economic consequence predicted by these models is that firms who violate this arrangement

(for whatever reason – see Kreps 1990, Ch. 19) likely vest decision rights sub-optimally, leading to poor decisions and lower firm value. This is indeed the case. We first double sort the firms based on how much the CEO speaks and how much the CEO is paid, both relative to other management team members. We then tabulate industry-adjusted Tobin's Q for each firm partition. Off–diagonal firms, which represent mismatched communication and pay patterns, have a significantly lower industry-adjusted Tobin's Q compared to well-matched firms on the diagonal. The difference in industry-adjusted Tobin's Q across the two subsamples represents more than a 5% premium based on the sample median Tobin's Q, an economically significant difference. Furthermore, we also find that the negative effect of high relative CEO pay on industry-adjusted Tobin's Q documented by Bebchuk et al. (2011) is mitigated with higher levels of CEO knowledge.

To reprise, the main message of this study's analyses is that communication patterns reflect knowledge dispersion in the firm over and above previously established proxies based on formal authority allocation. Our findings offer insights into some continuing puzzles in the association between formal titles and pay.

First, a widely studied method of assigning tasks and paying employees is tournament theory. A key prediction of this theory is discrete jumps in pay as an employee wins the current job "tournament" and is promoted to the next level. While the empirical literature on tournaments finds wage differences across successive job-levels, it turns out that promotions are *not* the main cause. For example, Baker and Holmstrom (1995, p. 257) report that the wage differential between adjacent levels ranges from 18% to 47%, but promotions themselves only yield a wage premium of 7%. Gibbons and Waldman (1999) explain this pattern with an adverse selection model where the employer continuously learns more about the employee's knowledge base and adjusts her responsibilities and wages accordingly even within the same job title. This argument is consistent with

our finding that communication (which is presumed to reflect knowledge) is associated with pay, over and above the formal job title.

Second, recent studies such as Bebchuk et al. (2011) show that firm valuations decrease in the proportion of compensation that the CEO receives relative to other top management, a finding the authors use to argue that the CEO pay slice reflects agency problems in the firm. We find that this relation between pay and firm value is mitigated as the proportion that the CEO communicates increases. That is, our results suggest that a higher CEO pay slice is not suboptimal when the CEO has more knowledge. More important, the robustness of our results to a rich set of controls suggest that this knowledge factor cannot be uncovered from traditional CEO or firm factors, but may be inferred from communication settings such as the one used in this study.

Finally, the study also speaks to the research setting of the conference calls. Most studies in this research area view conference calls as a source of fundamental *financial* information about firm profits and future prospects.[6] Our point is that these conference calls reveal something about the *managerial* accounting context as well: they are windows into the operational style of the management teams that is not evident from the formal descriptions of organizational structures. Moreover, we show that these operational arrangements have significant implications for firm value, thus bridging managerial concepts with financial implications.

Section 2 describes the theory and motivates our hypotheses. Section 3 describes our survey, data and variable measurement, and provides a discussion of the descriptive statistics. Section 4 discusses the results, and Section 5 concludes.

[6] A partial list of such studies includes Tasker (1998), Frankel et al. (1999), Bowen et al. (2002), Bushee et al. (2003), Kimbrough (2005), Mayew (2008), Hollander et al. (2010), Hobson et al. (2011), and Mayew and Venkatachalam (2012).

2. Theory and Hypotheses

Modern analytical studies of the firm revolve around three key concepts: 1) subjective knowledge that is distributed differentially across individuals in an organization, where each individual's knowledge is costly for others to understand; 2) formal lines of authority; and 3) communication processes through which individuals attempt to influence or inform the decision of those with formal authority. The three concepts are interlinked. For example, if every individual's knowledge can be interpreted by others costlessly – i.e., if the only organizational challenge is to provide incentives that induce that individual to reveal her knowledge truthfully (as in a traditional adverse selection game) – patterns of authority are vacuous (Mookherjee 2006, p. 369). Therefore, knowledge must be of a nature that is not only difficult to communicate but also difficult to interpret without expending extensive resources (Baiman et al. 1995, Section 3.3).

The standard setup in these models is a manager with formal authority who acts as the principal, and a subordinate with specific knowledge who acts as the agent. The agent proposes projects which the principal must accept or reject. The principal cannot interact with all the company's stakeholders personally; as a result much subjective knowledge about the projects resides with her subordinates. The uninformed principal must then decide whether to invest resources to process and interpret the subjective knowledge of the subordinate and then undertake the decision herself. This information acquisition and interpretation process is costly in time and expense. Moreover, the potential for an informed principal to overrule the subordinate may reduce the subordinate's initiative to search for projects ex ante. Considering these knowledge transfer and interpretation costs, it is at times optimal for the principal to choose to remain uninformed and acquiesce to the agent's decision expertise. In this case, the knowledge and effective decision-making power reside with agent. The location of knowledge and the costs of transferring and in-

terpreting it are thus the critical factors driving the decision-making process.

A person's knowledge, unlike her wages, cannot be directly measured. Our observation, motivated in the previous section, is that conference calls provide a crucial window into the true location of knowledge within the firm. We hypothesize that the relative amount that CEOs speak on conference calls is related to the extent of knowledge dispersion between the CEO and subordinates. Our reasoning is straightforward. If the CEO defers to someone, we hypothesize that this deferment reveals, on average, that the other individual is relatively better informed on that particular topic. In the language of the models, the CEO found it optimal not to incur the costs of transferring this individual's knowledge to herself, but instead delegate to a subordinate.[7]

Of course, it is always possible that the CEO possessed the knowledge, but chose to let the subordinate speak, or that the relevant knowledge could be transferred and interpreted costlessly (i.e., the only costs would be to induce truth-telling as in a standard communication game). In such cases the choice of the speaker has no bearing on knowledge dispersion in the firm. To reject these alternative arguments, we develop a series of hypotheses that we discuss next.

We first posit that the CEO's communication patterns relative to the rest of the management team vary with both individual characteristics and firm characteristics. We discuss these characteristics here and provide specific variable definitions in the next section. The education level of the CEO is one such individual measure. Formal education likely reflects both the CEO's knowledge and her ability to absorb new knowledge communicated to her by her subordinates. This ability reduces the costs associated with knowledge transfer and, as a result, reduces the in-

[7] In online appendix to this paper, we present two pieces of high level evidence to support our hypothesis. First, Section 3 of the online appendix tabulates the results from a survey of Investor Relations professionals. The IR professionals in our survey indicate that CEOs delegate responses to better informed subordinates, on average. Second, in Section 4 of the online appendix, we provide a multitude of anecdotes from conference calls that highlight settings in which the CEO variously responds directly to an analyst question or allows a subordinate to respond, often indicating that the subordinate is better informed.

formation asymmetry between the CEO and subordinates. Absorbing knowledge also takes time, so individuals newly placed in the CEO position likely have less specific knowledge. Finally, a CEO's formal job description could be a meaningful indicator of the CEO's knowledge of the firm. We measure the CEO's formal authority through job title concentration, including the CEO's position on the board, and founder status.

If CEOs are perfectly matched to firms, CEO characteristics are a sufficient statistic of knowledge dispersion in the management team. However, it is difficult to exhaustively measure CEO characteristics, and furthermore, firm-CEO matching may not be perfect (Bertrand and Schoar 2003). We therefore look to firm-specific measures as well. We employ two measures: the technical complexity of the firm, and the number of people that the CEO is directly or indirectly responsible for (span of control). Both of these factors increase organizational complexity and make it difficult for the CEO to be fully informed about the firm.

Finally, modern theories of the firm suggest that the CEO is more likely to defer to subordinates if the task is not important, or if the subordinate is aligned with the CEO's incentives – i.e., if the CEO can trust the subordinate to execute the task as the CEO herself would have done (e.g., Jensen and Meckling 1995; Aghion and Tirole 1997).

Collectively, therefore, the above considerations lead to our first hypothesis:

H1: CEOs communicate relatively less than other management team members on earnings conference calls when they are less educated, have fewer formal responsibilities, are new to the position, manage a technically complex firm, or have a high span of control. These findings hold after controlling for the importance of the task and relative incentive alignment of the subordinates.

H1 is based on the assumption that the conference call setting is such an important venue for shareholders to evaluate management decisions that management team members will put forth

the best candidates to answer shareholder questions. However, as noted before, it is possible that speaking patterns could deviate from this hypothesis for a number of reasons. A CEO may be overconfident or power-seeking or simply enjoy publicity (e.g., Finkelstein 1992, p. 510; Malmendier and Tate 2005), and these CEOs could somehow systematically get matched to the firms where we predict CEOs speak the most. While we attempt to control for such characteristics, a prediction of the variation in speaking patterns by itself is not an authoritative statement on the location of knowledge and the corresponding power to influence decisions. To strengthen our case, we therefore look to economic consequences of the variation in speaking patterns.

The first economic consequence is pay. In an efficient labor market, a manager with more power to influence decisions will receive more pay (Rosen 1982). If communication credibly indicates that the speaker has the deep knowledge to substantially influence decisions, communication patterns should reflect pay patterns. Formally stated:

H2: Team members who speak less relative to other management team members should receive a smaller slice of the total management team pay.

While pay is an important economic consequence, the most important economic consequence of any organizational choice is firm value. It is in the process of maximizing firm value that modern theories of the firm generate an equilibrium association between communication and pay. Our next test directly measures the impact of organizational choice on firm value.

An important concept to consider when linking organizational choice to firm value is the traditional efficient choice view, which argues that all firms make optimal choices at all times, so any unexplained variation in these choices is due to unobserved exogenous heterogeneity. However, this view faces some resistance from economic theorists such as Kreps (1990, Ch. 19), who ar-

gues that at any given time, some firms could deviate from the optimal choice, for several reasons: the management could be maximizing something other than profit (see Kreps, Section 19.2), or the management may not know the optimal arrangement and could be searching for it (see Kreps, Section 19.3). These firms could not exist in the efficient market view because disciplinary forces of the market would have eliminated them. Kreps's counterpoint (Section 19.1) is that there are strong theoretical reasons why these disciplinary forces may have weaknesses. Consequently, suboptimal firms can be present in the economy (Bloom and Van Reenen 2010).[8] While the specific causes and the mechanisms by which some firms become suboptimal are heterogeneous, an important measurable outcome shared by all suboptimal firms should be lower valuations. Stated formally:

H3: Firms whose management communication-pay patterns deviate from Hypotheses H1 and H2 have lower firm value.

3. Data and Univariate Results

3.1 Survey of Investor Relations Professionals

We first conduct a small-scale survey of Investor Relations professionals to gain a high level sense of our hypothesis. We inquire both about whether CEOs delegate communication on these calls based on the location of knowledge and about the spontenaity (versus "scriptedness") of the conference calls. On a scale of 1 to 7, we found a median response of 6.0 (with 1 being that the CEO never delegates and 7 being that the CEO frequently delegates to a better informed subordinate) and 5.5 (with 1 being "scripted" and 7 being "spontaneous") for degree of delegation and the

[8] Bloom and Van Reenen (2010) investigate productivity differences across firms and find that differing management practices are a significant causal factor, consistent with our hypothesis.

level of spontenaity, respectively. A complete description of the survey and results can be found in Section 3 of the online appendix. This survey provides confirmatory evidence of our hypothesis. Section 4 of the online appendix additionally displays a compendium of excerpts from randomly selected conference calls to give the reader a sense of the nature of conversations in these calls. We turn to large scale empirical analyses next.

3.2 Data Sources

Our study uses data from multiple sources. We obtain conference call data from transcripts compiled by ThomsonReuters, firm financial data from Compustat's Xpressfeed, compensation data from ExecuComp , stock return data from CRSP, board of directors and governance data from RiskMetrics, audit fee data from Audit Analytics, and executive education data from BoardEx.[9] Appendix A provides descriptions and definitions for all variables used in our analysis. We discuss the variables, with a particular focus on the conference call data, in Section 3.3 below. We also provide an extensive set of univariate results to give the reader a sense of how conference call speaking patterns vary across different types of firms.

3.3 Communication Measure

Our measure of revealed information asymmetry between a CEO and her subordinates is the extent to which the CEO communicates during earnings conference calls relative to her subordinates. Table 1 reports our conference call selection process.[10] From the full sample of confer-

[9] We also use company founding year data from Boyan Jovanovic's website: http://www.nyu.edu/econ/user/jovanovi/.

[10] Additional detailed description of how we selected and parsed the conference calls can be found in Section 1 of the online appendix.

ence calls that we obtained from ThomsonReuters, 17,419 calls are ultimately eligible. For each conference call, we identify the date of the call, the name and ticker symbol of the firm, and the names and titles of all speakers. We then determine the amount of speech (both the number of times that a person spoke as well as the number of characters spoken) for each individual on the conference call. Our primary measure of CEO knowledge is the amount of text spoken by the CEO as a percentage of text spoken by all company personnel on the conference call.

The conference calls are typically quarterly events, however, most other variables that we use in this study are measured on an annual basis. We therefore convert the conference call data to annual observations by averaging across all conference calls for a firm within a fiscal year. After this procedure, there are 6,862 firm-year conference call observations. We further eliminate firm-year observations with insufficient data from all other data sources resulting in a total of 3,881 firm-year observations, which is further reduced to 3,331 observations for analyses requiring CEO education data.

Table 2 reports the descriptive statistics for the 17,419 conference calls that we successfully parsed. We present the data for all conference calls in Panel A, by year in Panel B, by Fama-French 12-industry grouping in Panel C, and by quarterly earnings performance in Panel D. Several statistics are worth noting. First, the variables appear to be well-centered — the mean and median are similar in magnitude across the variables. Figure 2a presents the distribution of the amount of text spoken by all company personnel during the conference calls. The distribution is similar to a normal distribution, with the exception of a few outliers to the extreme right. Figure 2b presents the distribution of the amount of speaking by the CEO as a percent of total company personnel speech. This distribution (which by definition is distributed between 0 and 1, inclusive) has fatter tails than the normal distribution and also has a mass point at zero. Calls in which the CEOs are

not present (i.e., do not speak) account for approximately 9% of the conference calls in our sample.[11] A second item worth noting is the significant role that the CFO plays on the conference calls, as expected.

In Panel B we present the conference call statistics by year. The first item to note is the distribution of our sample across years. Our sample is skewed toward more recent years reflecting the increasing number of conference calls held by firms and transcripts collected by ThomsonReuters. A second observation is that the length of the conference call has increased monotonically over the time period. A final item to note in Panel B is that the role of the CEO has also increased over the years. The percentage of CEO text rose from 45% in 2003 to 50% in 2007, where much of this increase is a result of the higher rate of presence by CEOs on the conference calls. (In untabulated results, we find that the percentage of conference calls attended by the CEO increased from 86% in 2003 to 93% in 2007.) Thus, as more information is provided by conference calls (as proxied for by their length), CEOs have become more involved. This reinforces the previously documented evidence that conference calls are important information events.

Panel C reports the conference call statistics by industry. Two items are worth noting from this table. First, the distribution of conference calls in our sample is concentrated in five industry classes, consistent with the distribution of firms in the ExecuComp dataset. Second, there is significant variation across industry type not only for the length of the conference call, but also for the extent to which the CEO delegates speaking on average. For example, Utilities industries have both the least amount of total text spoken by all company personnel and the least amount of par-

[11] Recall that this measure is a *relative* measure of knowledge, not absolute. Therefore, for a CEO who has little or no participation on a conference call, the implication is that the CEO has less knowledge vis-à-vis their subordinates, on average, compared to other CEOs who participate more on conference calls (after controlling for the other participation factors discussed, such as the importance of the conference call), not that they have little or no knowledge in an absolute sense. We thank an anonymous referee for highlighting this point for us.

ticipation by the CEOs. In contrast, the Health industries have the longest conference calls on average while CEOs play the most dominant role in the Manufacturing industries. Finally, Panel D reports the conference call statistics by quarterly earnings performance. We note that, at the univariate level, the CEO participates relatively more in earnings conference calls that just miss or just beat expectations; however, this difference is not significant in multivariate regression analysis (untabulated). Given that our goal is to explain firm-level organizational characteristics and not quarter-to-quarter differences in earnings performance, we simply report the descriptive statistics here and leave further analysis of this data to future studies.

3.4 Knowledge Asymmetry Measures

Our primary assertion is that communication patterns reflect knowledge asymmetry between the CEO and her subordinates. To examine this assertion, we identify several proxies for the knowledge of the CEO relative to the remaining management team. We begin by measuring education levels. The BoardEx database reports each of the educational degrees obtained by the executive and we code them on a scale of 0 to 3, with 3 representing a doctorate level (e.g., Ph.D., M.D., or J.D.), 2 representing a masters level, 1 representing a bachelors level, and 0 representing everything else (such as an associates or technical degree). Table 3 reports that the mean CEO Education Level is 1.75, while the median CEO has a Masters degree.[12] BoardEx also reports certifications received by the executive. We use this data to create an indicator variable equal to 1 if the CEO has an accounting certification (Certified Public Accountant or Chartered Accountant). Ap-

[12] To measure relative differences across the management team, we also collect education data for the non-CEO executives to create a second variable for the difference in education level between the CEO and subordinates. The education level for the non-CEO executives is less populated in BoardEx, so we calculate the education level of the non-CEOs by averaging over the education level for those reported in the database. As Table 3 reports, we find no difference in education levels between the CEO and subordinates, on average.

proximately 6% of CEOs have an accounting certification.[13] We argued before that new CEOs are less knowledgeable about the firm relative to their subordinates compared to more seasoned CEOs. To identify new CEOs, we use ExecuComp and find the first year that a particular individual is designated as the CEO within the database. Approximately 11% of the firm-years in our sample contain a new CEO.

We also identify firm-level measures as proxies of information dispersion between the CEO and subordinates. To measure the technical complexity of the firm, we use R&D (scaled by sales). Table 3 reports that our sample firms spend 4% of sales on R&D activities on average. Measuring span of control is more difficult without access to a firm's org-chart, but we use two proxies. First, we use the log transformed number of employees. Abdel-Khalik (1988) finds that the number of employees can be used as approximation for the organizational structure of the firm. Moreover, more employees create more demands on a CEO's time – as the CEO's breadth over production labor increases, she has less knowledge and authority as a result of overload, which is precisely the construct that we aim to proxy. A second proxy is the number of corporate participants listed on the conference call. This variable is appropriate if, ceteris paribus, CEOs with more direct reports invite more executives to participate.[14] In Section 2 of the supplemental appendix we tabulate the Percentage CEO Text by each of these CEO knowledge variables and find that they are significantly related at the univariate level.

[13] We also considered whether the CEO has had a finance or accounting related position in the past. We find that this variable is signed similarly to the accounting certification variable but is not statistically significant. However, we note that the lack of statistical significance may be the result of variable noise. Specifically, the financial background variable may be coded with numerous false negatives as BoardEx does not always contain the full professional background of the CEOs.

[14] Because the number of participants may be 'mechanically' related to how much the CEO talks, in untabulated results we remove this variable and all inferences remain.

3.5 Conference Call Task Importance Measures

Our prediction is that the principal considers the importance of the task and the incentive alignment of the subordinates when deciding who speaks in the conference calls. We measure the importance of the conference call to the CEO using three variables: audit fees, an indicator variable for regulated industries, and an indicator variable for the CEO's last year in office. The auditing literature suggests that abnormal audit fees are a proxy for two constructs: the importance that management places on financial statement quality and the unexplained risk or firm complexity for the audit (see Ball et al. 2012 and references therein). Both constructs predict that communication with investors and analysts may take a relatively more prominent role with higher audit fees, indicating that the importance of conference calls is increasing with audit fees. As with prior literature, we use the natural log of audit fees.[15] Regarding regulated industries, Bushman et al. (1996) highlight that these firms have two important characteristics useful for our setting: 1) managers' authority for making decisions is lower because of the presence of regulatory approval boards and, 2) the importance of the interaction between regulated firms and the capital markets is lower because their returns are more predictable and essentially set by the regulators. Thus conference calls are less important for regulated firms. We use an indicator variable equal to one if the firm operates in a Telecom or Utilities industry, and zero otherwise. Finally, CEOs who are leaving office may care less about the outcome of the conference call or may be 'stepping aside' for other managers. Therefore, we code an indicator variable for the CEO's last year in office.

The extent to which the subordinates' incentives are aligned with the CEO's for a given task must also be considered. Incentives between individuals may be aligned for a variety of rea-

[15] Because we include variables which explain 'expected' audit fees – such as firm size and volatility – in our analyses of interest, a first stage regression to derive unexplained audit fees is unnecessary.

sons, including non-monetary reasons. However, non-monetary incentive alignment is more difficult to measure, so we measure the relative extent to which the executives' firm-based wealth is sensitive to firm stock price performance. Specifically, we follow the Core and Guay (2002) procedures and calculate the dollar value change in the executives' wealth for a 1% change in the firm's stock price. Because this measure has significant outliers, we create deciles of this measure for both CEOs and non-CEOs. Moreover, because the *relative* degree of incentive alignment between the CEO and subordinates is the construct we want to model, we subtract the CEO's wealth sensitivity decile from the non-CEO's decile to create the Incentive Alignment variable.[16] Table 3 reports that, on average, the CEO and her subordinates are in the same wealth sensitivity decile (i.e., the mean difference between the subordinate's decile and the CEO's decile is nearly zero).

3.6 CEO's Formal Authority Measures

Formal authority resides with the individual who has the *express right* to make a decision. While our focus is on the formal position of CEO, we note that formal authority varies among CEOs and it is important to control for this variation. The ideal measure would be constructed from the details of the compensation contract wherein the CEO's rights are expressly delineated. However, outside researchers are typically not privy to contract details beyond financial report disclosures. As a result, we use prior studies on the CEO's formal authority (e.g., Adams et al. 2005) which have developed alternative proxies.. Our first measure of formal authority is an indicator variable for a company founder CEO. We find that 11% of the firm-years in our sample have

[16] Our results are robust to a variety of specifications of the Incentive Alignment variable: we use the raw wealth sensitivity measure of the non-CEOs (i.e., simply use the Core-Guay measure of the subordinate's wealth sensitivity as a measure of their incentive alignment rather than using deciles); we place the wealth sensitivity measure into quintiles rather than deciles; and, finally, we use an indicator variable for whether the non-CEOs have a larger wealth sensitivity decile than the CEO (rather than the difference in deciles). Our inferences are consistent for each of these specifications.

CEO-founders (see Table 3). The second measure is an indicator variable for title concentration. This indicator takes the value of one for a CEO who is the Chair of the Board of Directors as well as the President of the company.[17] Just over 50% of the CEOs in our sample have concentrated titles. Our third measure is an indicator variable for the CEO as the only insider on the Board of Directors. If a CEO is the only executive with formal ties to the Board, she likely has higher levels of formal authority. Approximately 60% of the CEOs in the sample are the only insiders on the Board.

3.7 Other Measures and Control Variables

As we discussed in Section 2, CEOs may derive power from various sources other than formal channels. These include ownership of the firm, tenure, prestige and overconfidence. We calculate CEO ownership as the total number of shares owned by the CEO divided by the total number of shares outstanding for the firm. CEOs in our sample own approximately 1.4% of their firms on average, while the median is only 0.2% (see Table 3). Tenure is measured as the number of years the CEO has been in office. We find that the average (median) CEO tenure is approximately 8 (6) years. Prestige is more difficult to quantify. We follow Cao et al. (2011) and proxy for this construct using *Fortune* magazine's annual survey of the America's Most Admired Companies. *Fortune* conducts this survey on an annual basis by surveying management of Fortune 1000 companies to rank their peer firms on eight dimensions, including quality of management.[18] While the

[17] In addition, we count a CEO who is not President as having title concentration if there is no other person with the title President or Chief Operating Officer reporting to her (see Adams et al. 2005).

[18] The other dimensions include innovation, people management, use of corporate assets, social responsibility, financial soundness, long-term investment, and quality of products or services. See Cao et al. (2011) for a paper that uses this measure. One potential issue with this measure is that Fortune only considers the largest 1,000 companies by sales and, within this group of firms, only considers firms that are among the ten largest within their industry. While our sample includes these firms, it also includes other firms that were not eligible for the survey. Therefore, this measure is biased towards larger firms.

ranking is particular to a *firm*, we suggest that the CEOs of the highly ranked companies have more prestige. We implement this measure by creating a dummy variable indicating that a firm is one of the top 5 firms in its industry in the survey. Finally, we consider CEO overconfidence. Malmendier and Tate (2005) designate CEOs whose wealth is overexposed to the idiosyncratic risk of their firms as overconfident. They create measures of overconfidence based on the extent to which CEOs wait to exercise their options or excessively accumulate stock. Because these measures require data to be accumulated potentially over many years, recent studies proxy for this measure by using only end-of-year data (e.g., Hribar and Yang 2011; Schrand and Zechman 2011). We use the extent to which CEOs wait to exercise their options using end-of-year holdings of exercisable options which remain unexercised, scaled by the sum of the value of unexercised exercisable options, unexercisable options, and shares of stock. This results in a percentage of the value of the CEO's holdings that is held in unexercised exercisable options. On average, 29.5% of the total value of the CEO's holdings are held in unexercised exercisable options.

We include a full battery of control variables that prior literature has associated with CEO authority, compensation, and firm performance (e.g., Chhaochharia and Grinstein 2009; Bebchuk et al. 2011). We use board size (number of directors) and percentage of inside directors (employees, former employees or relatives of employees) as Board structure variables. The average board in our sample has 9.5 directors. We also include the G-Index developed by Gompers, Ishii, and Metrick (2003) as a measure of corporate governance. Finally, we include control variables for firm size, growth, profitability, and volatility.

3.8 Compensation Measures

Our hypotheses – and the theoretical models – are based on the relative differences be-

tween CEOs and their subordinates. Therefore, our measure of CEO compensation is also relative. We use the CEO pay slice (Bebchuk et al. 2011), defined as the total compensation of the CEO divided by the total compensation of the CEO and the four highest paid executives other than the CEO. We find that the CEO receives 39% of the compensation that is paid to the top five executives, similar to the amount reported in Bebchuk et al. (2011).

4. Results

4.1 Communication and Knowledge Dispersion

We now supplement Section 3's survey, anecdotal, and univariate evidence on conference call patterns with multivariate analyses. Table 4 provides the Pearson correlations for the main variables of interest, and suggests that multicollineary does not appear to be a concern.

Table 5, Panel A provides multivariate tests of H1. We provide a few model specifications depending on which variables are included.[19] Model 1 excludes CEO Education and CEO Accountant Certification variables because these are missing for a portion of the sample; whereas Models 2 - 4 include these variables. Model 3 considers the relative difference in education levels between the CEO and average subordinate (rather than the CEO's education only) and Model 4 includes the CEO Last Year variable which results in a slight reduction in observations.

Across all specifications, we find strong support for our hypothesis that the CEO's relative amount of communication on conference calls is related to determinants of knowledge dispersion within the management team.[20] Specifically, for each education level rank that the CEO has, she

[19] Note that because many of the proxies are features of particular industries (e.g., high research and development intensive industries or highly regulated industries), we do not include industry fixed effects in these regressions. We are not interested solely in *within industry* variation, which would be the result if industry fixed effects were included.
[20] Table A1 in Section 2 of the online appendix tabulates univarate relations between the Percentage CEO Text variable and each of the knowledge proxies. We find significant differences in CEO speaking based on these proxies at this univariate level.

speaks about 3 percentage points more, on average, and if she has an accounting certification, her percentage of speaking increases by nearly 5 percentage points. On the other hand, if the CEO is new, if she leads a relatively technically complex firm, or she has a large number of employees that report to her, she speaks relatively less and the subordinates speak relatively more.[21] Likewise, the control variables for the importance of the conference call and the incentive alignment of the subordinates are consistent with expectations, as the CEO speaks increasingly more relative to the subordinates when the firm pays higher audit fees, and speaks less when operating in regulated industries, during the last year in office, or when the subordinates' financial incentives are better aligned.[22]

With respect to a CEO's formal authority measures, Title Concentration and Only Insider are positively related to the relative extent of CEO communication; the CEO's founder status appears to be unrelated. The CEO's Title Concentration may be particularly strongly related to the CEO's communication because the Board recognizes the CEO's knowledge of the firm, and thus endows her with additional formal authority. Also note that CEO Title Concentration is a *relative* formal authority measure – if the CEO has the President title, for example, a subordinate does not, and therefore formal authority predicts knowledge as reflected in communication patterns.

The results in Panel A of Table 5 investigate the variation between the CEO and *all* subor-

[21] We also examined the number of industries that the firm operates in by counting the number of SIC codes from the Compustat Segments file. At a univariate level, we find that the amount of CEO talking decreases monotonically in the number of industries the firm has, but that the statistical significance of this result is not robust to the inclusion of firm controls (such as firm size, number of employees, and board size) which are significantly correlated with the number of segments. These results are tabulated in Tables A2 and A3 of the online appendix.

[22] In a recent study, Graham et al. (2011) survey CEOs regarding their choice to delegate decisions. We find that our results with respect to firm size are consistent with their findings; while the negative relation between CEO tenure and communication is the opposite finding. The latter result may be a consequence of highly tenured CEOs "grooming" the next CEO on conference calls in our setting. Moreover, when we include the square of CEO Tenure, we find that the linear effect is positive while the second order term is negative, suggesting a nonlinear relation between CEO Tenure and communication.

dinates. However, understanding *which* subordinate is speaking when the CEO is not speaking is critical to identification of the relation between communication and knowledge – i.e., it ensures that CEO communication variation is consistent with knowledge variation within the management team. If our results are merely reflective of the communication variation between the CEO and CFO, for example, then it may be unclear as to why the CFO is speaking on certain topics in which the CEO (or other executives) would likely be better informed. To investigate the variation between the CEO and specific subordinates, in Panel B of Table 5 we allocate the portion of the conference call that the CEO is not speaking into two mutually exclusive categories: the CFO, and all other executives (i.e., the Percentage CEO Text, Percentage CFO Text, and Percentage Other Executive Text sum to 100%). If our CEO communication measure is truly identifying variation in the CEO's relative knowledge, then the variation across the non-CEO executives should reflect their relative knowledge advantages based on their positions within the firm. Specifically, we expect financial-type explanatory variables, such as CEO Accountant Certification and Audit Fees, to be related to the portion of the CFO's communication (and not related to the other executive's communication) and the technical-type explanatory variables, such as R&D expenditures, to be related to the portion of the other executives' communication (and not related to the CFO's communication).

In Panel B of Table 5 we find this to be the case. Column 2 shows that the variation in CFO communication is related to the CEO's accountant certification and the firm's audit fees, but is not related to the technical complexity of the firm (as measured by R&D). However, the variation in the extent of communication by other executives is related to the technical complexity of the firm. To the extent that these other executives have more specialized roles in the company, they are likely to be more informed about the details of the company's scientific projects than the

CEO, who more likely takes an overall management role. The more visible role of these other executives in more technically complex companies reinforces the hypothesis that the portion the CEO speaks is not random, nor is it simply a comparison to the CFO; rather, the portion that the CEO speaks on conference calls appears to be related to the knowledge dispersion within the management team.

We also conduct two robustness tests. First, we consider an alternative measure of the CEO's communication – the percentage of the *number* of times the CEO speaks relative to other executives. Conference calls start with initial prepared remarks by management which, though scripted, creates an initial impression on the audience and sets the stage for the rest of the call. Nonetheless, we downplay the initial preamble by using the number of times that the CEO speaks during the conference call rather than the amount of text. All of our results (untabulated) are robust to the use of this measure.

Second, we conduct a cross sectional test of the Table 5, Panel A results. Our overarching hypothesis is that conference call communication reflects the location of knowledge within the firm. If this hypothesis is correct, then conference calls which reveal more information should reveal the location of knowledge within the executive team more meaningfully. Therefore, motivated by findings of Matsumoto et al. (2011) (which suggest that the information content of conference calls is increasing in the level of analyst participation), we partition our sample into "High Analyst Involvement" and "Low Analyst Involvement" based on the median number of analyst questions during the conference call. We find that, with the exception of the number of conference call participants and audit fees, the coefficients on the knowledge asymmetry and task control variables of Table 5, Panel A are more significant in the "High Analyst Involvment" partition (these results are reported in Table A4 of the supplemental appendix), which supports our hypothesis. In sum, we

find strong evidence to support the hypothesis that communication on earnings conference calls reflects relative knowledge dispersion within a firm's management team.

4.2 Communication and Compensation

Hypothesis H2 predicts a positive relation between relative CEO pay and communication. We regress the portion of compensation for the top executives that is paid to the CEO on the relative amount they speak during conference calls and various controls for the wage function.[23] Table 6 presents the results of our analysis. As an initial assessment, in the first regression we only include our CEO communication measure and firm characteristic controls and find that the coefficient on CEO communication is strongly significantly positive; that is, compensation is an increasing function of communication. In model (2), we include variables for the CEO's formal authority and characteristics and find that the magnitude and significance of the coefficient on the CEO communication measure changes little. Communication is thus related to wages as predicted by hypothesis H2.[24]

Table 6 also allows us to compare the economic magnitude of the impact of knowledge dispersion versus formal authority and other firm characteristics on the CEO's relative compensation. Using model (2) we calculate the impact on the portion of compensation paid to the CEO of a one standard deviation change in various independent variables. A standard deviation increase in the CEO's communication is associated with an increase in the relative portion of compensation paid to the CEO of 1.5 percentage points (or about a 4% increase relative to the mean value

[23] Our inferences hold in the natural log of CEO compensation as well, however, this measure of compensation does not relate to the theoretical constructs as cleanly because it is not a relative measure.

[24] The association between CEO compensation and CEO formal authority measures in Table 6 is similar to that found in prior studies (e.g., Bebchuk et al. 2011). Our findings are also robust to the inclusion of squared ownership and tenure terms, as done in prior studies.

of 39%). This is similar in magnitude to a one standard deviation increase in firm size, which has an approximate impact of 1.3 percentage points. By comparison, an increase in CEO's formal authority (which is measured using indicator variables, so the increase here is simply the value of the coefficient) is associated with an increase in the CEO's compensation portion of 1.8 and 2.5 percentage points for CEO Title Concentration and CEO Only Insider, respectively. Thus, the wage implications of our proxy for knowledge appear be as economically significant as the wage implications of formal authority.

Table 6, models (3) and (4) examine the CFO.[25] Model (3) specifically speaks to the agent's relationship with the principal as we measure the compensation and text spoken for the CEO and CFO only.[26] As predicted, we find that the CFO's compensation is positively associated with the CFO's portion of communication relative to the CEO. As an additional check, the compensation and percentage CFO text variables in column (4) are measured consistently with the CEO compensation model in columns (1) and (2) by including all executives in the calculation of the measure. The results continue to hold. Hence our evidence suggests that modern theories of the firm are applicable to multiple members of the management team.

4.3 Tests of Firm Value

The ultimate measure of importance of any organizational choice is its impact on firm value, which we now document. In Table 7, Panel A, we sort observations into quintiles of CEO Pay

[25] Note that we include variables for the CFO's ownership and presence on the Board of Directors, but do not include other variables that are included for the CEO either because of a substantial reduction of data (e.g., date of employment is frequently missing resulting in a substantial reduction in the Tenure observations) or because the variable is not relevant for the CFO (e.g., Title Concentration and Only Insider).

[26] Specifically, the compensation measure (CFO to CEO Compensation) is calculated as the CFO's compensation divided by the sum of the CFO's and CEO's compensation. The Percentage CFO-CEO Text variable is calculated similarly as the amount of text spoken by the CFO divided by the sum of the text spoken by the CFO and CEO.

Slice' (CEO compensation as a proportion of total executive compensation) and quintiles of communication and tabulate the industry-adjusted Tobin's Q for these firms. Our hypothesis (H3) predicts that those observations on the diagonal should receive a higher industry-adjusted Tobin's Q by the market than those off the diagonal. This is precisely what we find. In fact, those observations on the diagonal have a Tobin's Q which is over 5% (.09/1.58) larger than the sample average Tobin's Q.

Bebchuk et al. (2011) find that industry-adjusted Tobin's Q is decreasing in CEO Pay Slice. The results in Table 7, Panel A suggest that this negative effect of CEO Pay Slice may be mitigated in circumstances in which the CEO is highly knowledgeable. We test this hypothesis using a model similar to Bebchuk et al. (2011, Table 3). We regress industry-adjusted Tobin's Q (both contemporaneous and one-year-ahead) on the portion of CEO communication, portion of CEO compensation, an interaction term between communication and compensation, and similar control variables to Bebchuk et al. (2011). We find that the main effect of CEO communication is significantly negative and, consistent with Bebchuk et al. (2011), we find a significantly negative coefficient on CEO Pay Slice. Moreover, the interaction term is significantly positive indicating that higher levels of compensation are only suboptimal when the CEO is uninformed. Indeed, at the mean level of Percentage CEO Text, the main effect of a one standard deviation increase in CEO Pay Slice is almost completely offset by the interaction effect.

One potential concern with this result is endogeneity related to reverse causality – i.e., that firm performance affects CEO participation on conference calls.[27] This may be of particular concern if analysts and shareholders demand to hear from the CEO in times of extreme performance,

[27] We do not consider the potential endogeneity of the CEO pay slice variable because Bebchuk et al. (2011) investigate this issue at great length and find that endogeneity does not appear to be causing their main result.

particularly in times of extreme negative performance. In these extreme cases, formal authority may be the dominating force driving management communication patterns, rather than knowledge of the CEO per se. While this is a difficult concern to address because the underlying concept of knowledge dispersion within the firm is latent (thus making instrument identification difficult), we highlight two cross-sectional results which mitigate these concerns. First, revisiting the results of Table 2, Panel D, we find little relation between contemporaneous firm performance and CEO participation. Firm performance does not appear to have a first order effect on the extent of CEO participation. Second, in untabulated tests, we find that the results of Table 7, Panel B are robust to eliminating the extreme negative 5% of firm-year performance observations (defined as change in ROA from year *t-1* to *t*).[28] We recognize that it is difficult to rule out all causes of endogeneity, but the evidence above provides reason to believe that the results are not entirely due to reverse causality.

Collectively, our results show that communication on conference calls is reflective of knowledge dispersion within the management team, that knowledge predicts compensation, and that alignment of these fundamental organizational constructs has significant implications for firm performance as predicted by modern theories of the firm.

5. Conclusion

There is a large gap between traditional empirical constructs of organizational design and their deeper theoretical foundations. While empiricists demonstrate associations between measureables such as pay and job titles, the true theoretical associations emerge from deeper or-

[28] This result is robust to eliminating the top 5% of *absolute* performance as well, thus considering extreme performance firms, either positive or negative.

ganizational fundamentals, such as subjective knowledge, that are dispersed throughout the organization and are costly to transfer. One reason why theory is presently ahead of empirics in the analysis of these organizational fundamentals is because of measurement difficulties. Concepts such as knowledge manifest themselves empirically in ways that elude traditional large-sample archival numerical data. This study's position, however, is that management communication patterns reveal knowledge. Specifically, this study shows that earnings conference calls are not simply sources of information on firm fundamentals, but are also windows into management factors such as knowledge dispersion within the management team. These factors, posited by modern theories of the firm as critical to management execution, also contribute to firm value. Our results not only highlight the empirical relevance of modern theories of the firm, but also demonstrate the value of incorporating these theories into empirical analyses of financial reporting activities such as conference calls.

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Appendix A: Variable Definitions

This appendix describes the data source and measurement of each variable used in our study. All data are for the years 2003 – 2007. We collect conference call data from earnings conference call transcripts compiled by ThomsonReuters. The data for all remaining variables is sourced from Compustat, ExecuComp, CRSP, RiskMetrics (formerly IRRC), Audit Analytics, and BoardEx datasets.

(i = firm; m = month; t, t', t'' = year counters; $M_{i,t}$ = last month in fiscal year t for firm i; j = executive; $J_{k,i,t}$ = total number of company executives on conference call k for firm i in year t; k = conference call; $K_{i,t}$ = total number of conference calls for firm i in year t)

Variable	Description	Formula
Percentage CEO (CFO) Text	The ratio of the number of characters spoken by the CEO (CFO) during the conference call to the number of characters spoken by all company executives during the conference call. This variable was created by parsing the text of earnings conference call transcripts acquired from ThomsonReuters. See Table 1 for a description of the conference call selection process. We create an annualized version of this variable by averaging the data across all conference calls within a fiscal year (we assume that conference calls that occur up to 3 months after the fiscal year-end are associated with earnings for that year). This variable is multiplied by 100. *Percentage CEO Number* uses the same formula as *Percentage CEO Text* except the number of times that the CEO and all executives speak is substituted for the number of characters spoken.	$=100*\frac{\sum_{k=1}^{K_{i,t}}\left(\frac{Characters\_Spoken_{CEO(CFO),k,i,t}}{\sum_{j=1}^{J_{k,i,t}} Characters\_Spoken_{j,k,i,t}}\right)}{K_{i,t}}$
CEO Education Level	A discrete variable coded 0, 1, 2, or 3, with 3 representing a doctorate level (e.g., Ph.D., M.D., or J.D.); 2 representing a masters level; 1 representing a bachelors level; and 0 representing everything else (such as an associates or technical degree) as reported in the BoardEx database.	$=CEO\_Education\_Level_{i,t}$
Education Difference	The difference between the CEO's education level (as defined above) and the average subordinate education level. The education level of each of the subordinates is calculated the same way as the CEO Education Level variable. We ignore missing education level data for subordinates and calculate the subordinate average for those that are available. The subordinates that we consider in this calculation are the four highest paid executives other than the CEO.	$=CEO\_Education\_Level_{i,t}-\frac{\sum_{j=1}^{4} Subordinate\_Education\_Level_{j,i,t}}{4}$
CEO Accountant Certification	This is a dummy variable = 1 if the CEO has a Certified Public Accountant or Chartered Accountant certification as reported by BoardEx; and 0 otherwise.	$=CEO\_Accountant\_Certification_{i,t}$
New CEO	This is a dummy variable = 1 for the CEO's first year in office; 0	$=New\_CEO_{i,t}$

	otherwise. The CEO's first year in office is determined by identifying the first year that ExecuComp reports the executive as the CEO.	
R&D/Sales	Research and development expenses (Compustat data item *xrd*) divided by sales (Compustat data item *sale*). We re-code missing values of R&D to zero to avoid significant observation losses.	$= \frac{R\&D_{i,t}}{Sales_{i,t}}$
LN(Employees)	The natural log of (1 + the total number of employees of the firm); the number of employees is taken from Compustat data item *emp* and is reported in thousands.	$= LN(1 + Total\_Employees_{i,t})$
Participants	This is the number of firm employees who participate on the conference call.	$= \frac{\sum_{k=1}^{K_{i,t}} J_{k,i,t}}{K_{i,t}}$
LN(Audit Fees)	This is the natural log of the fees paid by the firm to its auditor for its annual financial statement audit as reported by the Audit Analytics database.	$= LN(Audit\_Fees_{i,t})$
Regulated Industry	This is a dummy variable = 1 if the firm is in a Utilities or Telecom industry (as defined by the Fama-French 12 industry segmentation).	$= Max\left(Utilities\_Ind\_Dummy_{i,t}, Telecom\_Ind\_Dummy_{i,t}\right)$
CEO Last Year	This is a dummy variable = 1 for the CEO's last year in office; 0 otherwise. The CEO's last year in office is determined by identifying the last year that ExecuComp reports the executive as the CEO. This procedure requires a firm observation in *t+1*, slightly reducing the sample size with this variable.	$= CEO\_Last\_Year_{i,t}$
Incentive Alignment	This variable measures the difference for top 4 non-CEO executives and the CEO in the sensitivity of their wealth to a 1% change in stock price of the firm. We measure the wealth sensitivity for each executive following Core and Guay (2002) as the sum of total shares held (*shrown_excl_opts*), total unexercised unexercisable options (*opt_unex_unexer_num*) and total unexercised exercisable options (*opt_unex_exer_num*) times the fiscal year-end stock price divided by 100. Before summing the number of shares and options, we multiply the options holdings by the estimated delta of the options because option portfolio values are less sensitive to changes in stock price than stock portfolio values. We calculate the delta using the Black-Scholes model. This model requires the following inputs (our assumptions in parentheses): dividend yield (3-year average yield prior to year of observation), expected volatility (see *Return Volatility* variable definition), number of years until option maturity (assumed 5 years for all options), current stock price	$= Decile(Average\_Non\text{-}CEO\_Wealth\_Sensitivity_{i,t}) - Decile(Average\_CEO\_Wealth\_Sensitivity_{i,t})$

	(*prcc_f* from Compustat), strike price (assumed to be the price needed to derive the intrinsic value reported in ExecuComp), and risk-free rate (assumed the risk-free rate reported in ExecuComp). Note that some prior studies have calculated separate deltas for newly granted options and all other options; however, starting with fiscal year 2006, ExecuComp no longer reports the expiration date of the newly granted options, requiring us to make a similar set of assumptions for new and old options so we aggregated all options. We recoded any missing ExecuComp variables to zero if missing. Shares are reported in $M, so we divide by 1,000 to report the sensitivity in $MM. After calculating the Core-Guay measure for each executive, we average over the highest paid non-CEO executives. We then create deciles of this value for both CEOs and non-CEOs for all firms to account for the significant skewness and differences between CEOs and non-CEOs in this variable. Finally, we take the difference in deciles between the non-CEOs and CEOs for each firm year.	
CEO Founder	This is a dummy variable = 1 if the CEO was a company founder; and 0 otherwise. To determine if the CEO was a company founder, we first established the date in which the CEO joined the company by using the earlier of the *becameceo* and *joined_co* variables from ExecuComp. We then established the year in which the company was founded by using the firm age data from Jovanovic's website: http://www.nyu.edu/econ/user/jovanovi/. This data provides the founding year, incorporation year and exchange listing year for approximately 7,700 firms. Because the founding year data is frequently missing, to establish the first year for the firm, we first use the founding year, then the incorporation year and finally the listing year. We then compare this founding year to the year that the CEO joined the company. If the difference between these years is less than 2, we then set the *CEO Founder* variable = 1. As the founding year (instead the incorporation or listing year) is not used for all firms, the *CEO Founder* variable may be overstated. On the other hand, if a founding year was missing, then we assumed that the CEO was not a founder to avoid dropping observations. This may potentially understate this variable.	$= CEO\_Founder_{i,t}$
CEO Title Concentration	This is a dummy variable = 1 if the CEO is the Chair of the Board and the President (or the CEO is the Chair of the Board and no other executive is the President or COO); and 0 otherwise. To determine the titles of the executives, we use the RiskMetrics database. This database contains all company directors and identifies	$= CEO\_Title\_Concentration_{i,t}$

	their position within the company if the director is also an employee. Specifically, RiskMetrics has dummy variables identifying the *chairman*, *president*, and *coo*. If the CEO is also identified as the Chairman and President, or is identified as the Chairman and no other director is identified as the President, then *CEO Title Concentration* = 1; and is 0 otherwise. Using RiskMetrics may overstate this variable somewhat in the case in which a company has a President, but the President is not also a director.	
CEO Only Insider	This is a dummy variable = 1 if the CEO is the only company employee on the Board of Directors; 0 otherwise. The RiskMetrics database classifies all directors as employee (E), linked (L) or independent (I). This variable is coded as 1 if the CEO is the only employee (E) listed on the Board according to RiskMetrics.	$= CEO\_Only\_Insider_{i,t}$
CEO (CFO) Ownership	This is the percentage of outstanding company shares owned by the CEO (CFO). We use the *shrown_excl_opts* variable in ExecuComp to identify the number of shares held by the CEO (CFO) and the variable *shrsout* to identify the total number of shares outstanding for the firm. This variable may contain noise because the measurement of *shrsout* is at the end of the fiscal year, whereas *shrown_excl_opts* may be measured at a date after the fiscal year and before the proxy statement date.	$=100*\left(\frac{shrown\_excl\_opts_{CEO(CFO),i,t}}{shrsout_{i,t}}\right)$
CEO Tenure	This is the number of years the CEO has been in office. We subtract the *becameceo* variable in ExecuComp from the *year* variable and add 1 (to count the first year in office as 1).	$= year_{i,t} - becameceo_{i,t} + 1$
Prestige	This is a dummy variable = 1 if the firm is listed as one of the top 5 companies in its industry of Fortune Magazine's annual America's Most Admired Companies survey.	$= Top\_5\_Company\_Dummy_{i,t}$
Overconfidence	This measures the extent to which the CEO holds unexercised exercisable options. It is measured as the intrinsic value of the unexercised exercisable options (*opt_unex_exer_est_val* in ExecuComp) divided by the value of the total holdings of the CEO, which is the sum of the value of unexercised exercisable options, unexercisable options (*opt_unex_unex_est_val*), and shares of stock (*shrown_excl_opts*prcc_f*). All values of options and the amount of stock holdings are from the ExecuComp database and the share price is from Compustat.	$=100*\left(\frac{opt\_unex\_exer\_est\_val_{CEO,i,t}}{value\_of\_holdings_{CEO,i,t}}\right)$
Board Size	This is the number of directors on the Board of Directors. We count the number of directors listed in the RiskMetrics database for the measurement of this variable.	$= Number\_of\_Directors_{i,t}$

Percentage Insiders	This is the percentage of insiders on the Board of Directors. The RiskMetrics database classifies all directors as employee (E), linked (L) and independent (I). The linked directors include former employees and family members. We count any director that is an employee (E) or linked (L) as an insider.	$=100*\left(\frac{Number\_of\_Insiders_{i,t}}{Number\_of\_Directors_{i,t}}\right)$
LN(Assets)	The natural log of total company assets (Compustat Fundamentals Annual dataset item *at* reported in $MM).	$=LN(Total\_Assets_{i,t})$
Growth	The year-over-year percentage sales growth using the firm's net sales (Compustat data item *sale*).	$=100*\left(\frac{Sales_{i,t}-Sales_{i,t-1}}{Sales_{i,t-1}}\right)$
ROA	Return on Assets as measured by Income Before Extraordinary Items (Compustat data item *ib*) divided by year-end assets (Compustat data item *at*).	$=100*\left(\frac{Inc\_Before\_Extraordinary\_Items_{i,t}}{Total\_Assets_{i,t}}\right)$
Returns	Annual returns for the fiscal year calculated by compounding the monthly returns from the CRSP monthly data file (variable *ret* in the CRSP file).	$=100*\left[\left(\prod_{m=1}^{12}(ret_{i,m,t}+1)\right)-1\right]$
ROA Volatility	The standard deviation of annual *ROA* (as defined above) for the 5 year window from *t-4* to *t*.	$=\frac{100}{\sqrt{5}}*\left[\sqrt{\sum_{t'=t-4}^{t}\left(ROA_{i,t'}-\frac{\sum_{t''=t-4}^{t}ROA_{i,t''}}{5}\right)^2}\right]$
Return Volatility	The standard deviation of log monthly returns for the 60 month window starting 59 months before the last month (M_i) of the fiscal year. We only require a minimum of at least 12 months starting 11 months before window from *m-11* to *m* to be included.	$=\frac{100\sqrt{12}}{\sqrt{5}}*\left[\sqrt{\sum_{m=M_{i,t}-59}^{M_{i,t}}\left(LN(ret_{i,m}+1)-\frac{\sum_{m'=M_{i,t}-59}^{M_{i,t}}LN(ret_{i,m'}+1)}{60}\right)^2}\right]$
G-Index	The Gompers, Ishii and Metrick (2003) Governance Index provided by the RiskMetrics database. This is a composite measure of 24 charter provisions. Because this measure is not updated annually, for any year of missing data, we use the previous year's value.	$=G\_Index_{i,t}$
CEO (CFO) to Top 5 Compensation	The ratio of total CEO (CFO) compensation to the top 4 highest paid executives plus the CEO (CFO). Total compensation is defined as the *tdc1* variable from ExecuComp.	$=100*\left(\frac{tdc1_{CEO(CFO),i,t}}{\sum_{j=1}^{5}tdc1_{j,i,t}}\right)$

CFO to CEO Compensation	The ratio of total CFO compensation to the sum of CFO and CEO total compensation. Total compensation is defined as the *tdc1* variable from ExecuComp.	$=100*\left(\frac{tdc1_{CFO,i,t}}{tdc1_{CFO,i,t}+tdc1_{CEO,i,t}}\right)$
CFO on Board of Directors	This is a dummy variable = 1 if the CFO is on the Board of Directors; 0 otherwise according to the RiskMetrics dataset.	$=CFO\_on\_Board\_Dummy_{i,t}$
Industry-adjusted Tobin's Q	Tobin's Q is calculated as the market value of assets divided by the book value of assets. The market value of assets is calculated using data from Compustat: price per share (*prcc_f*) x number of shares outstanding (*csho*) + book value of assets (*at*) – book value of equity (*ceq*). The book value of assets is the variable *at* from Compustat. We calculate the median Tobin's Q for each of the 48 Fama-French industries for each year and subtract this value from each firm-year Tobin's Q.	$=\frac{prcc\_f\times csho+at-ceq}{at}-median\left(Tobin'sQ^{Industry}\right)$

Figure 1: Sample Timeline for Management's Preparation for Earnings Conference Calls
(Source: Corporate Executive Board IRO Survey, July 2009)

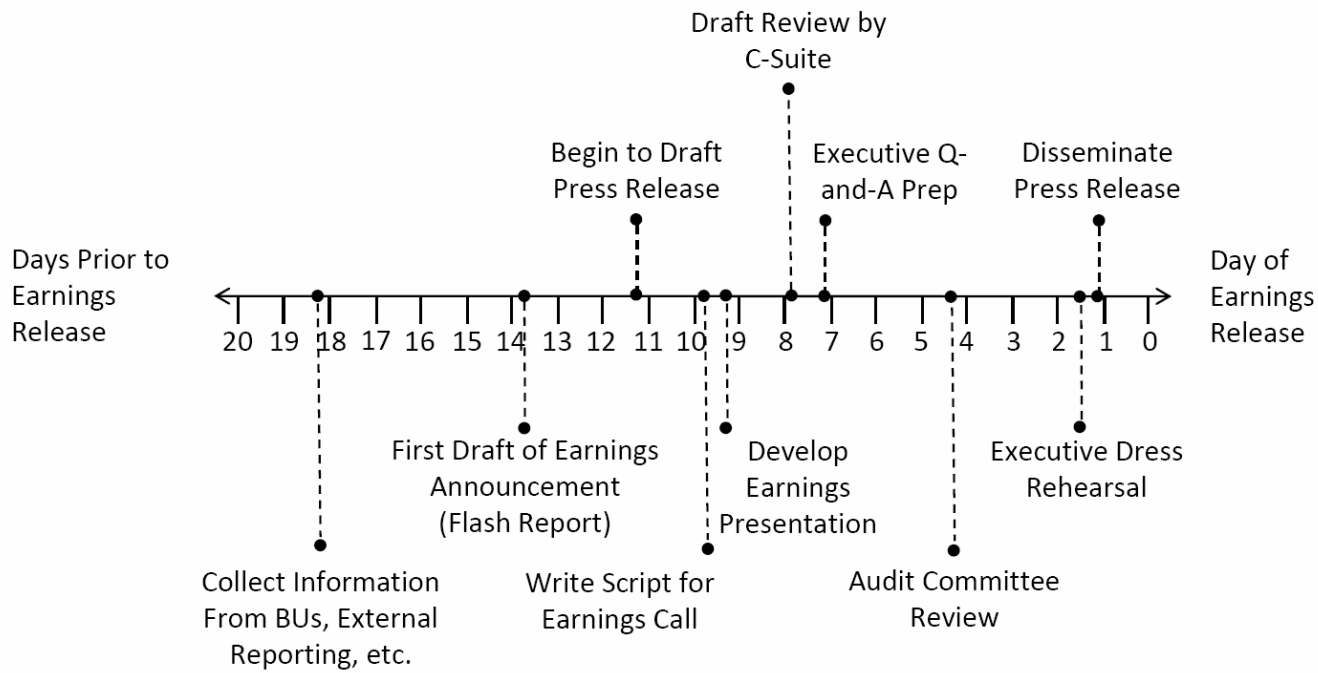
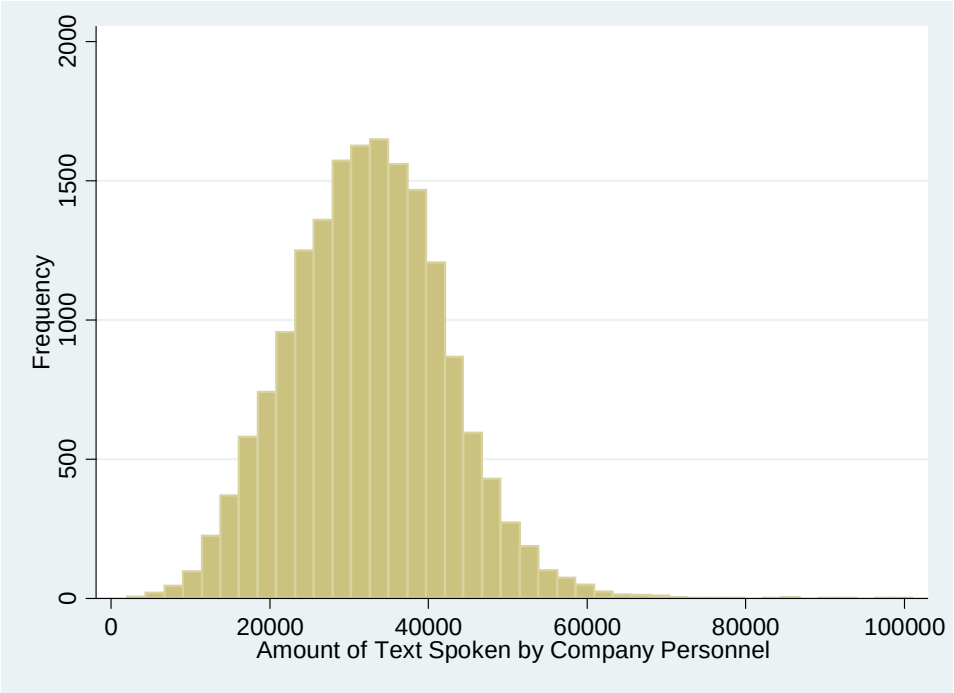
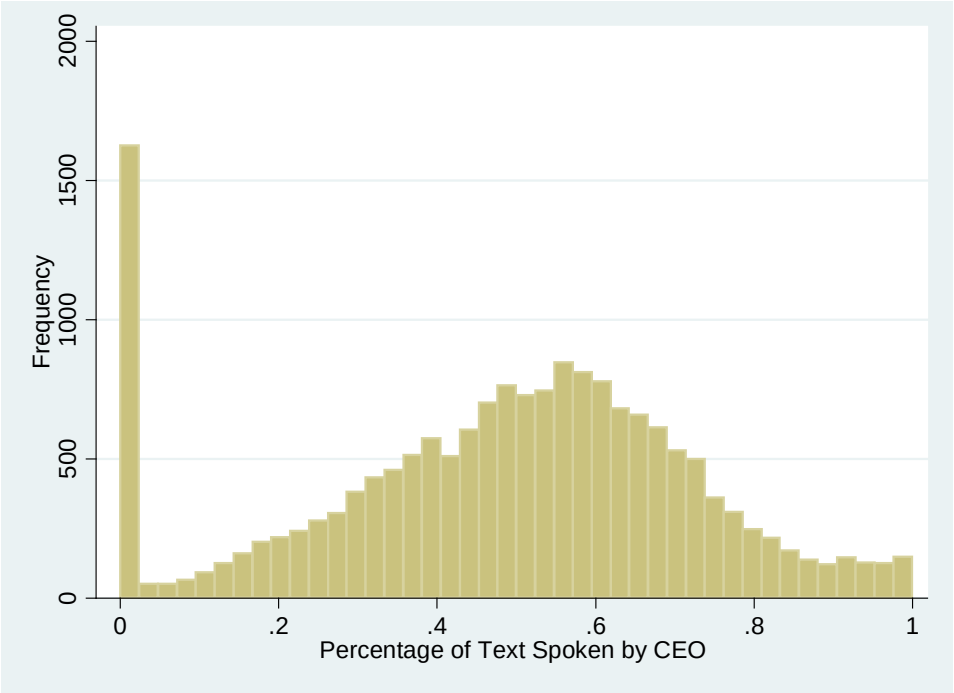


Figure 2a: Distribution of Conference Call Length



This figure shows the distribution of the number of characters spoken by company personnel during the 17,419 earnings conference calls in our sample. Table 2 reports the descriptive statistics.

Figure 2b: Distribution of the Percentage of CEO Text



This figure shows the distribution of the amount of text spoken by the CEO as a percent of total company personnel speech during the 17,419 earnings conference calls in our sample. During approximately 9% of the conference calls the CEO was not present (or at least did not make any comments). Table 2 reports the descriptive statistics.

TABLE 1: Sample Selection

Number of transcripts received from ThomsonReuters (January 2001 - September 2008)	129,924
Transcripts which contain foreign characters	-23,981
Not "Earnings" related	-24,840
Do not have both a presentation section and a Q&A section	-4,185
Not an ExecuComp firm	-44,235
Unable to identify at least one speaker on the conference call	-10,705
More than 1 CEO or CFO in the conference call identified	-642
More than 1 conference call in a month	-493
Keep only years 2003 - 2007	-3,424
Eligible conference calls	17,419
Data for conference calls occurring the same fiscal year are averaged within the year resulting in the following number of firm-years	6,862
Insufficient data in Compustat, CRSP, ExecuComp, AuditAnalytics, or RiskMetrics	-2,981
Eligible firm-years	3,881
Insufficient CEO education data from BoardEx	-550
Eligible firm-years with CEO education data	3,331

We received 129,924 individual conference call transcript files from ThomsonReuters. We then parsed these text files to determine the amount of text spoken by each individual. We only kept conference calls which indicated that they were related to earnings (as indicated in the header of the text file). Additional conference calls were eliminated because of formatting issues with the text file or lack of data availability as described in this table. The conference calls are generally held on a quarterly basis; however, because all other data used in our study is on an annual basis, we average the conference call data within a year for a given firm.

TABLE 2: Conference Call Descriptive Statistics - Summary statistics for the 17,419 earnings conference calls that were selected as decribed in Table 1.

Panel A: All conference calls

Variable	Mean	Median	Standard Deviation	Minimum	Maximum	N
Length of Text	32,484	32,409	9,866	1,998	100,986	17,419
Number of Comments	49	46	23	1	223	17,419
Analyst Questions	42	40	21	0	203	17,419
Percentage CEO Text	48%	51%	24%	0%	100%	17,419
Percentage CFO Text	33%	32%	20%	0%	100%	17,419
Percentage CEO Comments	49%	52%	25%	0%	100%	17,419
Percentage CFO Comments	32%	30%	22%	0%	100%	17,419

Panel B: By year

Year	Length of Text	Number of Comments	Analyst Questions	Percentage Text		N	%
				CEO	CFO		
2003	30,529	47	42	45%	33%	1,835	10.5%
2004	31,570	49	42	47%	33%	3,097	17.8%
2005	32,744	50	43	47%	33%	3,718	21.3%
2006	32,967	49	41	49%	32%	4,105	23.6%
2007	33,229	49	42	50%	32%	4,664	26.8%

(Continued)

Panel C: By Fama-French 12 industry grouping

Industry	Length of Text	Number of Comments	Analyst Questions	Percentage Text CEO	Percentage Text CFO	N	%
Non Durable Consumer Goods	33,578	51	44	47%	32%	903	5.2%
Durable Consumer Goods	33,053	56	48	50%	33%	436	2.5%
Manufacturing	30,949	53	47	54%	32%	2,271	13.0%
Energy	30,970	52	47	50%	19%	683	3.9%
Chemicals	33,781	54	48	50%	31%	495	2.8%
Business Equipment	32,923	47	40	52%	33%	3,620	20.8%
Telecom	33,799	35	28	40%	35%	387	2.2%
Utilities	27,442	44	38	36%	42%	781	4.5%
Shops	33,411	50	42	46%	34%	2,106	12.1%
Health	34,326	48	40	44%	32%	1,203	6.9%
Money	31,898	47	40	43%	34%	2,420	13.9%
Other	33,306	51	43	50%	33%	2,114	12.1%

Panel D: By quarterly EPS performance relative to analyst expectations

EPS performance	Length of Text	Number of Comments	Analyst Questions	Percentage Text CEO	Percentage Text CFO	N	%
Miss > -$0.01	32,620	50	43	48%	32%	3,458	20%
Miss<= -$0.01	32,522	48	41	50%	32%	455	3%
Just meet	33,461	51	44	49%	33%	1,667	10%
Beat <= $0.01	32,598	48	42	51%	31%	732	4%
Beat > $0.01	33,025	50	43	47%	33%	8,550	49%
Missing IBES data	29,814	43	36	50%	33%	2,557	15%

Length of Text = the total number of characters (i.e., letters) spoken by a company employee during the conference call; *Number of Comments* = the total number of times that a company employee spoke during the conference call; *Analyst Questions* = the number of times that an analyst spoke; *Percentage CEO (CFO) Text* = the total number of characters spoken by the CEO (CFO) divided by the *Length of Text*; *Percentage CEO (CFO) Number* = the total number of times that the CEO (CFO) spoke divided by *Number of Comments*. *N* is the number of observations and % is the percentage of the sample by category. EPS data is collected from IBES. Analyst earnings expectations are based on the analyst median forecast in the most recent month before the earnings report.

TABLE 3: Descriptive Statistics - Summary statistics for variables used in all analyses. Lag correlation is the Pearson correlation between the variable and its one year lag value for the pooled sample.

Variable	Mean	Median	Standard Deviation	Minimum	Maximum	N	Lag Correlation
Percentage CEO Text	46.8%	48.8%	22.9%	0.0%	100.0%	3,881	0.77
CEO Education Level	1.75	2.00	0.68	0.00	3.00	3,331	0.89
Education Difference	(0.01)	0.00	0.77	(3.00)	3.00	3,331	0.81
CEO Accountant Certification	0.06	0.00	0.24	0.00	1.00	3,331	0.87
New CEO	0.11	0.00	0.31	0.00	1.00	3,881	(0.03)
R&D/Sales	0.04	0.00	0.08	0.00	0.41	3,881	0.93
LN(Employees)	2.27	2.08	1.27	0.03	7.31	3,881	0.99
Participants	3.31	3.00	1.14	1.00	11.00	3,881	0.80
LN(Audit Fees)	14.55	14.46	1.08	11.45	18.31	3,881	0.92
Regulated Industry	0.08	0.00	0.27	0.00	1.00	3,881	1.00
CEO Last Year	0.12	0.00	0.32	0.00	1.00	3,749	(0.05)
Incentive Alignment	0.02	0.00	2.19	(9.00)	9.00	3,881	0.61
CEO Founder	0.11	0.00	0.31	0.00	1.00	3,881	0.93
CEO Title Concentration	0.51	1.00	0.50	0.00	1.00	3,881	0.67
CEO Only Insider	0.61	1.00	0.49	0.00	1.00	3,881	0.72
CEO Ownership	1.4%	0.2%	4.1%	0.0%	57.0%	3,881	0.84
CEO Tenure	8.10	6.00	7.16	1.00	49.00	3,881	0.83
Prestige	0.20	0.00	0.40	0.00	1.00	3,881	0.74
Overconfidence	29.5%	24.2%	26.0%	0.0%	100.0%	3,881	0.69
Board Size	9.53	9.00	2.39	4.00	24.00	3,881	0.88
Percentage Insiders	26.8%	25.0%	13.9%	0.0%	100.0%	3,881	0.78
LN(Assets)	8.05	7.87	1.65	3.27	14.45	3,881	0.99
Growth	12.3%	9.7%	19.5%	-87.5%	249.3%	3,881	0.28
ROA	5.0%	4.9%	8.3%	-104.7%	60.1%	3,881	0.62
Returns	18.1%	14.3%	36.4%	-85.8%	423.8%	3,881	(0.01)
ROA Volatility	4.1%	2.2%	8.8%	0.0%	205.1%	3,881	0.88
Return Volatility	38.6%	33.9%	18.0%	10.4%	123.2%	3,881	0.96
G Index	9.51	9.00	2.50	2.00	17.00	3,881	0.98
CEO to Top 5 Compensation	39.0%	39.3%	11.9%	0.0%	99.3%	3,881	0.40
CFO to CEO Compensation	28.5%	27.1%	11.5%	0.1%	100.0%	3,427	0.34
CFO to Top 5 Compensation	14.8%	14.4%	5.6%	0.1%	75.1%	3,427	0.28

The number of observations varies based on data availability. See Appendix A for variable definitions.

TABLE 4: Pearson Correlations

N = 3,331	Percentage CEO Text	CEO Education Level	Education Difference	CEO Accounting Certification	New CEO	R&D/Sales	LN(Employees)	Participants	LN(Audit Fees)	Regulated Industry	Incentive Alignment	CEO Founder	CEO Title Concentration	CEO Only Insider	CEO Ownership	CEO Tenure	LN(Assets)
CEO Education Level	**0.05**																
Education Difference	**0.06**	**0.78**															
CEO Accounting Certification	0.03	**-0.09**	**-0.04**														
New CEO	-0.01	0.01	0.00	**0.05**													
R&D/Sales	0.01	**0.09**	0.01	**-0.09**	0.01												
LN(Employees)	**-0.21**	0.01	0.00	0.00	0.02	**-0.28**											
Participants	**-0.22**	**0.06**	**0.04**	0.02	-0.02	-0.03	**0.08**										
LN(Audit Fees)	**-0.14**	**0.09**	-0.01	-0.01	0.02	**-0.11**	**0.63**	**0.14**									
Regulated Industry	**-0.14**	**0.11**	0.01	0.03	-0.02	**-0.16**	**-0.09**	**0.14**	**0.05**								
Incentive Alignment	**-0.07**	-0.03	-0.02	**0.05**	**0.30**	-0.01	**0.07**	0.02	**0.05**	0.00							
CEO Founder	-0.03	**-0.07**	-0.01	-0.02	**-0.09**	**0.04**	**-0.09**	**0.05**	**-0.11**	**-0.07**	**-0.17**						
CEO Title Concentration	0.03	**0.06**	0.00	-0.01	**-0.18**	**-0.04**	**0.08**	0.02	**0.10**	**0.06**	**-0.20**	0.01					
CEO Only Insider	**0.10**	**0.08**	0.00	-0.02	**-0.04**	0.03	**-0.05**	-0.01	**0.05**	**0.11**	**-0.18**	**-0.11**	**0.33**				
CEO Ownership	0.00	**-0.05**	0.00	-0.02	**-0.09**	0.01	**-0.07**	-0.01	**-0.11**	**-0.07**	**-0.46**	**0.25**	**0.06**	**-0.09**			
CEO Tenure	**-0.08**	**-0.04**	-0.01	**-0.04**	**-0.32**	0.03	**-0.07**	**0.05**	**-0.12**	**-0.06**	**-0.41**	**0.46**	**0.16**	**-0.12**	**0.42**		
LN(Assets)	**-0.27**	**0.07**	0.01	**0.05**	-0.02	**-0.24**	**0.64**	**0.20**	**0.73**	**0.16**	**0.09**	**-0.11**	**0.10**	**-0.05**	**-0.14**	**-0.11**	
CEO to Top 5 Compensation	**0.10**	**0.07**	0.02	-0.02	**-0.08**	**-0.07**	**0.05**	-0.03	**0.07**	0.02	**-0.16**	**-0.10**	**0.15**	**0.15**	**-0.13**	**-0.04**	**0.06**

See Appendix A for variable definitions. **Bold** indicates significance at the two-tailed 5% level.

Table 5: Determinants of Conference Call Communication Patterns - This table presents the results of regressing the relative proportion of communication on earnings conference calls by the CEO (Panel A) and other executives (Panel B) on proxies for the relative amount of knowledge of the CEO, task importance and incentive alignment, formal authority, and other control variables.

Panel A: Analysis of the CEO

	Dependent variable: Percentage CEO Text			
	(1)	(2)	(3)	(4)
	Coef.	Coef.	Coef.	Coef.
Independent variables	[t-stat]	[t-stat]	[t-stat]	[t-stat]
Knowledge asymmetry variables				
CEO Education Level		2.869***		2.926***
		[3.21]		[3.22]
Education Difference			2.014**	
			[2.57]	
CEO Accountant Certification		4.709*	4.306	4.800*
		[1.75]	[1.59]	[1.80]
New CEO	-2.539**	-2.457**	-2.346*	-2.505**
	[-2.16]	[-2.03]	[-1.95]	[-2.04]
R&D/Sales	-28.033***	-31.057***	-27.655***	-31.811***
	[-3.48]	[-3.68]	[-3.29]	[-3.71]
LN(Employees)	-2.381***	-2.532***	-2.553***	-2.535***
	[-3.53]	[-3.63]	[-3.66]	[-3.62]
Participants	-2.763***	-3.075***	-3.055***	-2.986***
	[-4.86]	[-5.38]	[-5.33]	[-5.24]
Task control variables				
LN(Audit Fees)	2.710***	2.526***	2.749***	2.640***
	[3.11]	[2.72]	[2.96]	[2.85]
Regulated Industry	-10.917***	-11.526***	-10.958***	-11.633***
	[-4.68]	[-4.85]	[-4.61]	[-4.87]
CEO Last Year				-5.084***
				[-4.37]
Incentive Alignment	-0.734***	-0.829***	-0.850***	-0.794***
	[-2.68]	[-2.89]	[-2.98]	[-2.76]
Formal authority variables				
CEO Founder	0.733	0.543	0.311	0.459
	[0.33]	[0.25]	[0.15]	[0.21]
CEO Title Concentration	3.157***	2.768***	2.912***	2.620**
	[3.11]	[2.63]	[2.76]	[2.48]
CEO Only Insider	1.981*	1.733	1.885	1.885
	[1.67]	[1.36]	[1.48]	[1.46]

(Continued)

Table 5, Panel A (Continued)

Other control variables				
CEO Ownership	-0.281	-0.133	-0.153	-0.133
	[-1.61]	[-0.77]	[-0.87]	[-0.74]
CEO Tenure	-0.400***	-0.458***	-0.453***	-0.427***
	[-3.45]	[-3.72]	[-3.67]	[-3.42]
Prestige	-2.665*	-1.414	-1.504	-1.329
	[-1.90]	[-0.95]	[-1.01]	[-0.90]
Overconfidence	0.004	0.001	-0.001	0.004
	[0.20]	[0.03]	[-0.06]	[0.17]
Board Size	-0.323	-0.377	-0.321	-0.403
	[-1.00]	[-1.12]	[-0.95]	[-1.22]
Percentage Insiders	0.071*	0.088**	0.085**	0.090**
	[1.78]	[2.15]	[2.05]	[2.18]
LN(Assets)	-3.397***	-3.172***	-3.265***	-3.216***
	[-4.78]	[-4.36]	[-4.49]	[-4.45]
Growth	0.016	0.030	0.030	0.035*
	[0.87]	[1.47]	[1.43]	[1.73]
ROA	-0.049	-0.031	-0.038	-0.038
	[-0.93]	[-0.52]	[-0.64]	[-0.64]
Returns	-0.003	-0.008	-0.007	-0.009
	[-0.28]	[-0.77]	[-0.67]	[-0.80]
ROA Volatility	-0.014	-0.017	-0.020	-0.011
	[-0.37]	[-0.30]	[-0.36]	[-0.18]
Return Volatility	-0.022	-0.008	-0.015	-0.011
	[-0.54]	[-0.20]	[-0.37]	[-0.27]
G Index	0.350	0.393	0.393	0.416
	[1.41]	[1.49]	[1.49]	[1.56]
Industry FE?	N	N	N	N
Year FE?	Y	Y	Y	Y
Adj. R2	0.157	0.169	0.167	0.176
N	3881	3331	3331	3218

See Appendix A for variable definitions. Reported below the coefficients are heteroskedasticity consistent t-statistics, clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.

Table 5: Determinants of Conference Call Communication Patterns - This table presents the results of regressing the relative proportion of communication on earnings conference calls by the CEO (Panel A) and other executives (Panel B) on proxies for the relative amount of knowledge of the CEO, task importance and incentive alignment, formal authority, and other control variables.

Panel B: Consideration of Other Executives

	Dependent variables:			
	Percentage CEO Text (From Panel A)	Percentage CFO Text	Percentage Other Exec. Text	
	(1)	(2)	(3)	(2) - (3)
	Coef.	Coef.	Coef.	Difference
Independent variables	[t-stat]	[t-stat]	[t-stat]	p-value
Knowledge asymmetry variables				
CEO Education Level	2.926***	-1.324	-1.602**	0.275
	[3.22]	[-1.64]	[-2.21]	0.381
CEO Accountant Certification	4.800*	-4.617**	-0.184	-4.442
	[1.80]	[-2.26]	[-0.10]	0.028
New CEO	-2.505**	0.923	1.583	-0.497
	[-2.04]	[0.88]	[1.40]	0.405
R&D/Sales	-31.811***	3.927	27.884***	-23.968
	[-3.71]	[0.61]	[3.12]	0.005
LN(Employees)	-2.535***	1.062*	1.473***	-0.414
	[-3.62]	[1.68]	[2.66]	0.296
Participants	-2.986***	-4.890***	7.876***	-12.766
	[-5.24]	[-9.31]	[14.29]	0.000
Task control variables				
LN(Audit Fees)	2.640***	-1.776**	-0.864	-0.915
	[2.85]	[-2.23]	[-1.14]	0.190
Regulated Industry	-11.633***	10.643***	0.989	9.657
	[-4.87]	[4.93]	[0.58]	0.000
CEO Last Year	-5.084***	1.766*	3.318***	-1.542
	[-4.37]	[1.71]	[3.05]	0.221
Incentive Alignment	-0.794***	0.473**	0.321	0.147
	[-2.76]	[2.03]	[1.37]	0.278
Formal authority variables				
CEO Founder	0.459	1.425	-1.883	3.300
	[0.21]	[0.86]	[-0.92]	0.092
CEO Title Concentration	2.620**	-0.247	-2.373***	2.137
	[2.48]	[-0.27]	[-2.80]	0.069
CEO Only Insider	1.885	2.485**	-4.369***	6.854
	[1.46]	[2.24]	[-3.73]	0.000

(Continued)

Table 5, Panel B (Continued)

Other control variables				
CEO Ownership	-0.133	0.248	-0.115	0.361
	[-0.74]	[1.64]	[-1.17]	0.047
CEO Tenure	-0.427***	-0.057	0.484***	-0.538
	[-3.42]	[-0.55]	[4.45]	0.000
Prestige	-1.329	0.164	1.166	-0.998
	[-0.90]	[0.14]	[0.88]	0.300
Overconfidence	0.004	-0.004	0.000	-0.004
	[0.17]	[-0.21]	[0.01]	0.447
Board Size	-0.403	0.117	0.286	-0.169
	[-1.22]	[0.41]	[1.11]	0.330
Percentage Insiders	0.090**	-0.022	-0.068*	0.046
	[2.18]	[-0.60]	[-1.80]	0.196
LN(Assets)	-3.216***	2.689***	0.528	2.165
	[-4.45]	[4.06]	[0.97]	0.004
Growth	0.035*	-0.030*	-0.005	-0.025
	[1.73]	[-1.70]	[-0.28]	0.230
ROA	-0.038	-0.093**	0.131**	-0.224
	[-0.64]	[-2.04]	[2.20]	0.003
Returns	-0.009	-0.003	0.012	-0.015
	[-0.80]	[-0.33]	[1.22]	0.221
ROA Volatility	-0.011	-0.022	0.033	-0.055
	[-0.18]	[-0.41]	[0.68]	0.306
Return Volatility	-0.011	0.096***	-0.084**	0.180
	[-0.27]	[2.99]	[-2.22]	0.000
G Index	0.416	-0.484**	0.067	-0.551
	[1.56]	[-2.21]	[0.30]	0.018
Industry FE?	N	N	N	
Year FE?	Y	Y	Y	
Adj. R^2	0.176	0.136	0.268	
N	3218	3218	3218	

See Appendix A for variable definitions. Reported below the coefficients are heteroskedasticity consistent t-statistics, clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively. The p-values for the differences in coefficients reported in column 4 are based on randomized bootstrap tests.

Table 6: Compensation Regressions - Measures of CEO (CFO) compensation regressed on the CEO's (CFO's) proportion of communication, characteristics, and firm controls.

	Dependent variables			
	CEO Compensation		CFO Compensation	
	CEO to Top 5 Compensation	CEO to Top 5 Compensation	CFO to CEO Compensation	CFO to Top 5 Compensation
	(1)	(2)	(3)	(4)
	Coef.	Coef.	Coef.	Coef.
Independent variables	[t-stat]	[t-stat]	[t-stat]	[t-stat]
Communication variables				
Percentage CEO Text/100	7.347***	6.438***		
	[6.12]	[5.34]		
Percentage CFO-CEO Text/100#			3.537***	
			[3.29]	
Percentage CFO Text/100#				1.500**
				[2.45]
CEO variables				
CEO Founder		-1.792*	1.894*	0.018
		[-1.75]	[1.65]	[0.04]
CEO Title Concentration		1.822***	-1.129**	-0.110
		[3.79]	[-2.26]	[-0.43]
CEO Only Insider		2.481***	-0.182	1.007***
		[4.50]	[-0.32]	[3.63]
CEO Ownership		-0.316***	0.185*	-0.020
		[-3.37]	[1.86]	[-0.64]
CEO Tenure		0.087*	-0.035	0.007
		[1.76]	[-0.58]	[0.32]
Prestige		-1.052	0.723	-0.023
		[-1.62]	[1.09]	[-0.07]
Overconfidence		-0.002	-0.001	0.004
		[-0.19]	[-0.15]	[0.92]
CFO variables				
CFO Ownership			1.505	1.688**
			[1.60]	[2.47]
CFO on Board of Directors			2.459***	2.779***
			[2.66]	[5.61]

(Continued)

Table 6 (Continued)

Control variables				
Board Size	-0.306**	-0.153	0.190	0.113
	[-2.20]	[-1.08]	[1.34]	[1.58]
Percentage Insiders	-0.079***	-0.014	0.027	0.018**
	[-4.24]	[-0.70]	[1.34]	[1.97]
LN(Assets)	0.833***	0.788***	-0.972***	-0.447***
	[3.45]	[2.99]	[-3.63]	[-3.87]
Growth	-0.000	-0.000	0.006	0.001
	[-0.00]	[-0.02]	[0.53]	[0.25]
ROA	0.089***	0.100***	-0.072**	0.004
	[2.98]	[3.28]	[-2.17]	[0.29]
Returns	0.002	0.002	0.002	-0.000
	[0.31]	[0.43]	[0.27]	[-0.10]
ROA Volatility	0.011	0.013	-0.042**	-0.019*
	[0.70]	[0.81]	[-2.04]	[-1.72]
Return Volatility	-0.034*	-0.031*	0.046**	0.017*
	[-1.90]	[-1.77]	[2.46]	[1.86]
G Index	0.289**	0.216**	-0.199**	-0.011
	[2.58]	[1.99]	[-1.99]	[-0.23]
Industry FE?	Y	Y	Y	Y
Year FE?	Y	Y	Y	Y
Adj. R^2	0.088	0.114	0.083	0.062
N	3881	3881	3407	3427

[#] *Percentage CFO-CEO Text* is the amount of text spoken by the CFO divided by the sum of the amount of text spoken by the CFO and CEO. *Percentage CFO Text* is computed analogously to *Percentage CEO Text* wherein the denominator includes all executives on the conference call. We have one fewer observation using *Percentage CFO-CEO Text* because neither executive was present for one firm.

The CEO and CFO measures of real authority are divided by 100 to ease readability of the coefficient estimates. See Appendix A for variable definitions. Reported below the coefficients are heteroskedasticity consistent t-statistics, clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.

Table 7: Tobin's Q Analysis - Examining the relation between industry adjusted Tobin's Q, the CEO's proportion of communication, and the CEO's proportion of compensation.

Panel A: Industry Adjusted Tobin's Q by quintiles of CEO Pay Slice and Percentage CEO Text

Percentage CEO Text	CEO Pay Slice 1	2	3	4	5	Total
1	0.60	0.35	0.36	0.36	0.23	0.39
	184	*158*	*151*	*155*	*130*	*778*
2	0.21	0.08	0.20	0.18	0.18	0.17
	173	*164*	*157*	*153*	*128*	*775*
3	0.16	0.11	0.31	0.20	0.24	0.21
	153	*154*	*180*	*145*	*143*	*775*
4	0.16	0.10	0.32	0.32	0.40	0.26
	146	*163*	*133*	*153*	*180*	*775*
5	0.25	0.22	0.15	0.24	0.29	0.23
	122	*136*	*154*	*169*	*197*	*778*
Total	0.29	0.17	0.27	0.26	0.28	0.25
	778	*775*	*775*	*775*	*778*	*3,881*

	Mean	Standard Deviation	N
Statistics for the diagonal cells:	0.32	1.03	878
Statistics for the off-diagonal cells:	0.23	0.85	817

Difference in means:	0.09**
Welch's t-stat	[1.98]

This table presents an analysis of the relation between industry adjusted Tobin's Q, proportion of CEO communication, and CEO Pay Slice. In Panel A, the sample was sorted based on quintiles of both Percentage CEO Text and CEO Pay Slice. Industry adjusted Tobin's Q and sample sizes are reported in each cell. Panel A reports a difference in means test for the five diagonal cells relative to the six off-diagonal cells. We test the difference in means of industry adjust Tobin's Q using the Welch's t-stat which accounts for different sample sizes and different standard deviations for the diagonal and off-diagonal sub-samples. See Appendix A for variable definitions. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.

(Continued)

Table 7: Tobin's Q Analysis - Examining the relation between industry adjusted Tobin's Q, the CEO's proportion of communication, and the CEO's proportion of compensation.

Panel B: Industry Adjusted Tobin's Q regressed on Percentage CEO Text, CEO Pay Slice, the interaction of both variables, and control variables.

Dependent variable:	Industry Adjusted Tobin's Q (t)	Industry Adjusted Tobin's Q (t+1)
	Coef.	Coef.
Independent variables:	[t-stat]	[t-stat]
Percentage CEO text	-0.867***	-0.260*
	[-3.06]	[-1.80]
CEO Pay Slice	-0.964***	-0.375**
	[-2.78]	[-2.18]
Percentage CEO text * CEO Pay Slice	1.742***	0.596*
	[2.69]	[1.87]
Industry Adj. Tobin's Q (t)		0.830***
		[38.93]
Control variables?	Y	Y
Year FE?	Y	Y
Adj. R^2	0.265	0.771
N	3881	2517

This table presents an analysis of the relation between industry adjusted Tobin's Q, proportion of CEO communication, and CEO Pay Slice. Panel B presents a regression similar to Bebchuk et al. (2011), Table 3, columns 1 and 2, in which industry adjusted Tobin's Q is regressed on CEO Pay Slice and control variables, but with CEO Percentage Text and the interaction between CEO Pay Slice and CEO Percentage Text included in the regression. The control variables included, but not tabulated, include: G Index, LN(Assets), CEO Ownership, ROA, Leverage [defined as (current portion of long-term debt + long-term debt)/total assets], R&D/Sales, CEO Founder, CEO Tenure, CEO Title Concentration, CEO Only Insider, Diversified [an indicator variable equal to 1 if the firm operates in more than one business segment]. See Appendix A for variable definitions not described here. Reported below the coefficients are heteroskedasticity consistent t-statistics, clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.