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An Empirical Assessment of Empirical Corporate Finance

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An Empirical Assessment of Empirical Corporate Finance

Abstract

We empirically evaluate 20 prominent contributions to a broad range of areas in the empirical corporate finance literature. We assemble the necessary data and then apply a single, simple econometric method, the connected-groups approach of Abowd, Karmariz, and Margolis (1999), to appraise the extent to which prevailing empirical specifications explain variation of the dependent variable, differ in composition of fit arising from various classes of independent variables, and exhibit resistance to omitted variable bias and other endogeneity problems.

In particular, we identify and estimate the role of observed and unobserved firm- and manager-specific characteristics in determining primary features of corporate governance, financial policy, payout policy, investment policy, and performance. Observed firm characteristics do best in explaining market leverage and CEO pay level and worst for takeover defenses and outcomes. Observed manager characteristics have relatively high power to explain CEO contract design and low power for firm focus and investment policy. Estimated specifications without firm and manager fixed effects do poorly in explaining variation in CEO duality, corporate control variables, and capital expenditures, and best in explaining executive pay level, board size, market leverage, corporate cash holdings, and firm risk. Including manager and firm fixed effects, along with firm and manager observables, delivers the best fit for dividend payout, the propensity to adopt antitakeover defenses, firm risk, board size, and firm focus. In terms of source, *unobserved manager attributes* deliver a high proportion of explained variation in the dependent variable for executive wealth-performance sensitivity, board independence, board size, and sensitivity of expected executive compensation to firm risk. In contrast, *unobserved firm attributes* provide a high proportion of variation explained for dividend payout, antitakeover defenses, book and market leverage, and corporate cash holdings. In part, these results suggest where empiricists could look for better proxies for what current theory identifies as important and where theorists could focus in building new models that encompass economic forces not contained in existing models.

Finally, we assess the relevance of omitted variables and endogeneity for conventional empirical designs in the various subfields. Including manager and firm fixed effects significantly alters inference on primary explanatory variables in 17 of the 20 representative subfield specifications.

An Empirical Assessment of Empirical Corporate Finance

1. Introduction, Framework for Analysis, and Overview

We empirically evaluate recent, prominent contributions to a broad spectrum of areas in the empirical corporate finance literature. We assemble the necessary data and then apply to each representative regression model the method of Abowd, Karmariz, and Margolis (1999, AKM).¹ This approach allows the empiricist, through construction of “connected-groups,” to separately identify manager and firm fixed effects in a way that was not previously possible. Using the AKM approach, we appraise and quantify the extent to which prevailing empirical specifications explain variation of the dependent variable, differ in composition of fit arising from various classes of independent variables, and exhibit resistance to omitted variable bias and other endogeneity problems.

In one sense, our project is quite modest. We apply a single econometric approach across various empirical studies. This allows a relatively even-handed comparison of progress in the various subfields. In other dimensions, our research thrust is ambitious. It requires data collection and analysis for a large number of regression specifications. It assesses empirical performance across a wide spectrum of subfields in corporate finance and, in a broad sense, indicates varying research opportunities for empiricists and theorists across those subfields.

To be more specific, we select recent papers, each containing one or more regression specifications that are approximately representative of the current state of progress in a subfield of empirical corporate finance. To assess current progress and set a benchmark for comparison, we re-estimate that representative specification using our

¹ To our knowledge, Graham, Li, and Qiu (2011) were the first to apply the connected groups method to corporate finance.

sample period with time fixed effects. We then build on each benchmark specification by adding firm fixed effects alone, manager fixed effects alone, and finally, by using AKM, both firm and manager fixed effects. Based on the version with all five classes of explanatory variables, we decompose variation in the dependent variable into the unexplained portion and the portions explained by each of observed firm characteristics, observed manager attributes, and time, firm, and manager fixed effects.

Variation explained by observed firm and manager characteristics represents how successful empiricists are in explaining the dependent variable and provides evidence on the economic content and explanatory power of theory. Moreover, to the extent that variation in the dependent variable is “explained” by the various fixed effects, and insofar as those fixed effects represent unobserved manager and firm characteristics, we will know more about the nature of our gaps in knowledge about the determinants of the dependent variable. The attribution of that explained variation to unobserved manager or firm characteristics or to time fixed effects indicates to empiricists where to look for better observable proxies for factors that theory suggests are important and suggests to theorists where to focus new attention so as to identify additional economic determinants of organization structure, policy, or performance.

The subfields and specific empirical questions in corporate governance we consider include: executive compensation (pay level, wealth-performance sensitivity, and risk incentives), board structure (independence, size, and leadership structure), and corporate control (usage of antitakeover provisions and propensity to be a merger target or bidder). For payout policy we examine the propensity to pay dividends. For financial policy, we examine book and market leverage and cash balances. Specific aspects of investment policy we analyze are R&D intensity, capital expenditure, firm focus, and

firm risk. Measures of firm performance we consider are ROA and Tobin's Q . Table 1 stipulates the 20 experiments we perform and the published studies that provide the specific underlying benchmark specifications. Table 1 also provides information on the dependent variable, other aspects of our analysis, and results. Figures 1-6 comprise graphical representation, for all 20 empirical experiments, of benchmark goodness of fit and the composition of variation in the dependent variable attributable to each of the five classes of variables and to the residual. Figure 7, in aggregating Figures 2-6, captures all of these results in one location. Inspection of Figures 1-7 will give the reader an immediate sense for our approach and results. For additional detail, see Table 1.

By way of illustration and motivation, consider two sub-fields that have attracted substantial attention – managerial compensation contract design and capital structure. For the former, there have been numerous empirical attempts to explain compensation level, the sensitivity of managerial wealth to shareholder value (delta), and the sensitivity of expected managerial wealth to stock price volatility (vega). The standard agency model (e.g., Mirrlees, 1976, and Holmstrom, 1979) is a conventional way to understand contract design and frame empirical work, particularly for delta. While the essential characteristics of firms and managers identified in the agency model are not directly observable, prior studies employ a logical set of proxies for variables that should determine delta.² Despite the power of the logic and the appeal of the proxies, the accumulated evidence is disappointing. There is substantial variation in results across studies and explanatory power is poor, with adjusted R^2 often less than 10% in early specifications for delta without firm fixed effects (Gaver and Gaver, 1993; Bizjak,

² For the marginal value of effective managerial input or human capital on firm performance, measures include firm size, the ratio of market value to book value of assets, and R&D. Proxies for managerial ability include tenure, age, and board seats. Proxies for managerial risk aversion include age, gender, and tenure.

Brickley, and Coles, 1993). Perhaps incentive alignment through contract design is particularly impervious to application of standard regression specifications and explanatory proxies. Consider, instead, financial policy, specifically firm leverage. In assessing the prior literature, Lemmon, Roberts, and Zender (2008) note that the adjusted R^2 from traditional leverage regressions using previously identified determinants ranges from 18% to 29%, depending on sample period and the specification. After 60 years of work on the topic, these fit figures do not seem to reflect great progress.

Similarly, the results are mixed using recent specifications and our data. As Figure 1 indicates, using observable firm and manager characteristics and time fixed effects, the Lemmon, Roberts, and Zender (2008) specification for book leverage yields adjusted R^2 of 0.23 and the Coles, Daniel, and Naveen (2006) specification for delta delivers adjusted R^2 of 0.25. In terms of comparative fit, Figure 1 shows that these two regression models and the subfields they represent fall in the middle, ranking ninth and eleventh among the 20 cases we consider. At the top end, adjusted R^2 is highest for firm risk as the dependent variable (0.48) and lowest when the specification attempts to explain the propensity to put in place a poison pill (0.07).

To simultaneously assess sources of fit and suggest how researchers might do better, we re-estimate the benchmark specifications with firm and manager fixed effects included and identified by the approach of AKM (1999). When we include all five classes of explanatory variables and the residual, firm and manager observables provide proportions 0.088 (Figure 2) and 0.006 (Figure 3), respectively, of total variation in book leverage. Observed firm characteristics perform far better than observed manager characteristics. This makes some sense, as capital markets, product markets, production technologies, and corresponding industry norms, along with tax policy and bankruptcy

law, are likely to be more important determinants of capital structure than manager characteristics. Nonetheless, variation explained by observed proxies is low and including manager and firm fixed effects boosts adjusted R^2 for book leverage to 0.74. The proportion of total variation in book leverage explained is 0.715 arising from unobserved (to the econometrician) firm and manager attributes in total, with firm fixed effects providing 0.511, second among 20 subfields (Figure 4), and manager fixed effects providing 0.209, eighteenth among 20 subfields (Figure 5).

For executive wealth-performance sensitivity (Δ), firm and manager observables explain proportions 0.125 and 0.052, respectively, of variation in Δ . Including manager and firm fixed effects boosts adjusted R^2 to 0.75. For explained variation in managerial wealth-performance sensitivity, 0.629 arises from unobserved firm and manager attributes, with 0.598 contributed by manager fixed effects, first among 20 subfields, and 0.031 from firm fixed effects, which is last among subfields. Time fixed effects explain a small proportion, 0.010, of variation in Δ (see Figure 6).

These results help us understand what we do not know. In the above two examples, either we utilize poor proxies for firm and manager attributes motivated by our models or we need new models. For capital structure, researchers reasonably would concentrate on better proxies and new theories related to characteristics of the firm and the markets in which it operates, a conclusion that is reminiscent of Lemmon, Roberts, and Zender (2008). The prescription is very different for contract design. Researchers reasonably would work to develop better proxies for managerial attributes isolated in existing models and on new theories that identify other characteristics of executives relevant for contract design. See the columns designated “C1: Delta” and “F1: Book Leverage” in Figure 7.

Our analysis makes possible the same style of discussion for all of the areas in empirical corporate finance that we assess. In broad terms, estimated specifications without firm and manager fixed effects do poorly in explaining variation in CEO duality, corporate control variables, and capital expenditure, and best in explaining executive pay level, board size, market leverage, corporate cash holdings, and firm risk. Including manager and firm fixed effects, along with firm and manager observables, delivers the best fit for dividend payout, the propensity to adopt antitakeover defenses, firm risk, board size, and firm focus. In terms of source, unobserved *manager* attributes deliver a relatively high proportion of total variation in the dependent variable for executive wealth-performance sensitivity, board independence, board size, and sensitivity of expected executive compensation to firm risk. In contrast, unobserved *firm* attributes explain a high proportion of variation in dividend payout, antitakeover defenses, book and market leverage, and corporate cash holdings. Again, these results suggest where empiricists would look for better proxies for what current theory identifies as important and where theorists could focus in building new models that encompass economic forces not contained in existing models.

Finally, we assess the relevance of omitted variables and endogeneity for conventional empirical designs in the various subfields. It is widely known that when unobservable manager or firm heterogeneity is correlated with observable characteristics, regression specifications that do not explicitly account for such heterogeneity can produce biased coefficient estimates (e.g., see Kennedy, 2003, on omitted variables). Our analysis indicates that this is a concern for at least 17 of the 20 areas of empirical inquiry in corporate finance that we assess.

Our results contribute to the literature in several dimensions. First, the paper enlarges the empirical corporate finance literature by providing a relatively comprehensive empirical examination and comparison of overall empirical fit and sources of fit from observed independent variables across subfields. In doing so, we also gauge the role of unobserved firm and managerial heterogeneities in determining important aspects of organization design, policy, and behavior. Second, our empirical exploration of the economic content of the estimated manager fixed effects contributes to the growing literature on how unobservable versus observable managerial attributes affect corporate policy and performance. For example, in the case of executive contract design, beyond managerial skill and risk aversion our analysis accommodates the notion that managerial attributes heretofore unmeasured or inaccurately measured, such as social capital, psychological traits, personality, genetics, and functional background, influence firm structure, policy, and performance. Third, our analysis suggests where it is likely to be most productive for empiricists and theorists in corporate finance to allocate their time and effort. Fourth, our approach allows us to assess the relevance of omitted variables and endogeneity for conventional empirical designs in the various subfields. Including manager and firm fixed effects significantly alters inference in a number of instances.

Please note that our primary intent is not to be critical of the current state of empirical corporate finance, in general, or of specific contributions to the literature. Rather, our analysis identifies substantial progress in some areas of inquiry but less in others and, in some instances, ascertains potential research opportunities and plausible ways forward for both theorists and empiricists. Moreover, we are apologetic about not including many well-done and influential papers. Based on time and data limitations, we

are constrained to evaluate a manageable number of subfields and a limited number of specifications.

Section 2 describes the empirical methodology. Section 3 discusses how we select the prior contributions to the literature upon which we build our analysis. Section 4 describes the data, variables, and summary statistics. Section 5 frames the approach and suggests what one can expect from the analysis. Sections 6-13 present the results for the areas of empirical corporate finance we examine. Section 6 treats executive contract design, including delta, vega, and pay level. Section 7 considers board structure, including independence, size, and leadership structure. Section 8 analyzes corporate control, specifically the propensities to make a bid, receive a bid, or adopt a poison pill. Section 9 addresses financial policy, specifically book leverage, market leverage, and corporate cash holdings, while Section 10 examines payout policy. Sections 11 and 12 examine the role of firm and manager attributes not observed by the econometrician in determining aspects of investment policy, including capital expenditures, R&D intensity, firm risk, and firm focus. Section 13 examines the “determinants” of firm performance, as measured by Tobin’s Q and ROA. Section 14 provides discussion of last tests. Section 15 provides concluding remarks. Again, for a preview of the results, please refer to Figure 7 and Table 1.

2. Estimation Methodology

We employ the group connection method of AKM (1999). We provide here a brief description. For illustration and more detail see Graham, Li, and Qiu (GLQ, 2011), who apply AKM to executive pay level, and Coles and Li (2016), who apply it to other

aspects of executive compensation structure. See GLQ (2011) and Coles and Li (2016) for a discussion of method similar to that below.

The simplest way to include fixed effects is to create a dummy variable for each unique combination of manager and firm (i.e. for each employment spell). The “spell method” enlarges the feasible sample and addresses possible omitted variable bias, but it can only estimate the joint firm and manager effects and does not disentangle the two. Note that simply using firm dummies and manager dummies is insufficient for separating the effects. If a firm has no managerial turnover, the two effects are perfectly collinear.

This does suggest one way forward, which is to restrict the sample to cases in which the firm has at least one manager who has moved from one company to another. Potential difficulties with the mover dummy variables (MDV) approach include: selection bias from restricting the sample to movers only; small sample size arising from infrequent managerial turnover; and, computational difficulties from inverting a covariate matrix with many dummy variables. Bertrand and Schoar (2003), for example, use this approach, their purpose being to examine whether unobserved managerial heterogeneity has power to explain return on assets, investment, leverage, and cash holdings.

Relative to the MDV and spell approaches, the method of Abowd, Karmariz, and Margolis (1999) achieves separate “identification” of the firm and manager fixed effects but still retains a substantial portion of the sample. The intuition is fairly simple. Consider a manager who switches firms once during the sample period. The fixed effect for this manager can be estimated, as can be the fixed effects for the two firms that employed the manager. Based on the firm fixed effects, the fixed effects for all other managers at those two firms can also be estimated, even if they did not move. Removing all firms that never had a manager depart or arrive leaves groups of firms connected by

managerial transitions. AKM (1999) prove that such connectedness is necessary and sufficient to separately identify firm and individual fixed effects. Again, this approach restricts sample *attrition* to executive-years arising from firms that employ the same group of executives for the entire sample period. Some manager mobility is the key ingredient that allows identification of both manager and firm fixed effects. We report results using the AKM method.

Firm and manager fixed effects represent characteristics that are unobservable to the econometrician. Note that, for any unobserved factor to affect the dependent variable, at least one decision-maker must have at least some information on that attribute. Write the dependent variable for firm i and manager j at time t , y_{ijt} , as:

$$y_{ijt} = F_{it}\hat{\beta} + M_{jt}\hat{\alpha} + \hat{\mu}_i + \hat{\theta}_j + \hat{\lambda}_t + \varepsilon_{jt} \quad (1)$$

where the right-hand side is comprised of observable time-variant firm characteristics ($F_{it}\hat{\beta}$), observable time-variant manager characteristics ($M_{jt}\hat{\alpha}$), firm fixed effects ($\hat{\mu}_i$), manager fixed effects ($\hat{\theta}_j$), year fixed effects ($\hat{\lambda}_t$), and residuals (ε_{jt}). Hat denotes an estimate of a parameter or a vector of parameters i indexes firms, j indexes managers, and t indexes time..

To provide a quantitative comparison of the relative economic significance of the classes of variables, we follow GLQ (2011) to decompose variation of the dependent variable (delta or vega) into five estimated components and the unexplained remainder. Based on equation (1), *model R*² can be decomposed as:

$$\begin{aligned}
R^2 &= \frac{\text{cov}(\hat{y}_{ijt}, y_{ijt})}{\text{var}(y_{ijt})} = \frac{\text{cov}(F_{it}\hat{\beta} + M_{jt}\hat{\alpha} + \hat{\mu}_i + \hat{\theta}_j + \hat{\lambda}_t, y_{ijt})}{\text{var}(y_{ijt})} \\
&= \frac{\text{cov}(F_{it}\hat{\beta}, y_{ijt})}{\text{var}(y_{ijt})} + \frac{\text{cov}(M_{jt}\hat{\alpha}, y_{ijt})}{\text{var}(y_{ijt})} + \frac{\text{cov}(\hat{\mu}_i, y_{ijt})}{\text{var}(y_{ijt})} + \frac{\text{cov}(\hat{\theta}_j, y_{ijt})}{\text{var}(y_{ijt})} + \frac{\text{cov}(\hat{\lambda}_t, y_{ijt})}{\text{var}(y_{ijt})}
\end{aligned} \tag{2}$$

Of course, $1 - \text{model } R^2$ is the proportion of variation attributable to the residual. Figures 2 – 7 report on the components of total variation attributable to the five classes of variables, per (2), with Figure 7 also including residual variation.

Another comparison is based on the proportion of R^2 , explained variation, provided by each class of variable. Normalizing the components in (2) gives:

$$\frac{\text{cov}(F_{it}\hat{\beta}, y_{ijt})}{R^2 \text{var}(y_{ijt})}, \frac{\text{cov}(M_{jt}\hat{\alpha}, y_{ijt})}{R^2 \text{var}(y_{ijt})}, \frac{\text{cov}(\hat{\mu}_i, y_{ijt})}{R^2 \text{var}(y_{ijt})}, \frac{\text{cov}(\hat{\theta}_j, y_{ijt})}{R^2 \text{var}(y_{ijt})}, \text{ and } \frac{\text{cov}(\hat{\lambda}_t, y_{ijt})}{R^2 \text{var}(y_{ijt})}. \tag{3}$$

Table 1 provides a comprehensive summary but with fit comparisons based on attribution of explained variation in the dependent variable, as in (3), rather than attribution of total variation (including the residual) of the dependent variable.

3. Representative Specifications

To reduce the data requirements for our analysis and for brevity, we choose one published contribution to the literature in each area and, further, one or a small number of regression specifications from that paper, which we then re-estimate using the approach of AKM. All else equal, we choose papers that are recent and also are as representative as possible of the prevailing, mainstream empirical designs in that subfield. In addition, given the scale of our empirical undertaking, we favor specifications for which the required data are not too costly to obtain. In most areas, multiple papers meet some of these criteria, though generally no prior paper dominates on all dimensions. Accordingly,

we make some arbitrary choices in selecting benchmark papers and specifications. It should be clear that this reflects pragmatism and the desire to manage data collection costs and other costs rather than a conclusion that one prior paper necessarily is a better product than another.

The headings in Table 1 specify the full set of 20 sub-fields in empirical corporate finance that we examine and the corresponding contributions to those sub-fields that we select to build on and enlarge. The table identifies the papers we emphasize, the particular specification we use as the benchmark, and the dependent variable. We select 20 different specifications (arising from 9 different papers) to duplicate and re-examine using AKM. Again, the broad topic areas we consider are compensation policy, board structure, corporate control, financial policy, payout policy, investment policy, firm diversification/focus, and firm performance.

4. Assembling the Samples

We begin with all executive-year observations from Execucomp for firms with fiscal years ending from 1993 to 2013. For a firm-year this includes up to five named executive officers (NEOs). Firm-executive-year observations carry the subscript ijt . We include the CEO, who is likely to have the most discretion, span of control, and effect on structure, policy and performance, but also include the other NEOs for the reason that top management team attributes tend to predict organizational attributes better than CEO attributes alone (Hambrick, 1994). Including NEOs, to the extent they switch firms, also allows in more cases identification of the firm and manager fixed effects. We exclude any observations without matching CRSP and Compustat North America data and, consistent with prior literature, we eliminate financial services and utility firms from the

sample. The full sample to which the spell approach could apply consists of 14,137 executive-year observations. Restricting the sample to include movers only would reduce considerably the number of observations to 12,360. The approach of AKM, which allows identification of both firm and manager fixed effects, generates connected subsamples that aggregate to 83,670 executive-firm-year observations arising from 1,517 firms and 19,835 managers. Otherwise, for some experiments, data limitations reduce sample size.

We obtain corporate governance data from RiskMetrics Governance, director data from RiskMetrics Directors, daily stock returns and prices from CRSP, executive compensation data from ExecuComp, company diversification information from the Compustat Segment data, corporate bond information from Compustat Ratings data, information on institutional holdings from Thomson Reuters data, and all other financial items from Compustat Fundamentals. For data on corporate control and mergers and acquisitions, we rely on SDC Platinum. We follow Coles, Daniel and Naveen (2011, Appendix) in adjusting Execucomp data for reporting changes based on the 2006 implementation of FAS123R. For brevity, we provide variable definitions in the Appendix and defer any detailed discussion of specific variables until the relevant subsection. Table 2 reports summary statistics. Inspection of those statistics indicates that our dependent and independent variables are characterized by sample moments similar to those reported in the representative prior studies.

The representative papers across the various subfields differ depending on variables employed, variable definitions, sample period, and thus sample size. In our analysis, towards the objective of a cleaner comparison across empirical questions, we use the same core sample of firms and managers over a common period. Some secondary variables, such as manager age and tenure, are often missing. To maximize sample size

we define variables that indicate whether the variable is missing (= 1, otherwise = 0), and set the variable itself equal to zero when the indicator equals 1. This procedure follows a number of recent papers, including Himmelberg et al. (1999) and Byoun (2008).

5. Remarks on What to Expect

Recall that our analysis employs five classes of explanatory variables: observable attributes of firms; observable attributes of executives; year fixed effects; time-invariant firm fixed effects; and time-invariant manager fixed effects. Observable attributes of managers and firms can vary through time. The firm and manager fixed effects account for unobserved attributes of firms and managers that are stable through time. These attributes can be those that are imperfectly represented by included observables, but also could be characteristics that would be important in models not yet tested or understood or in theories not yet identified or articulated. Year fixed effects likely capture broad trends in the economic environment, such as macro conditions, and in unobserved firm and manager characteristics. The residual accommodates what is left, such as time-variation in the idiosyncratic unobserved firm and manager attributes, nonstationarity in the cross-sectional effect of observed attributes, as well as noise.

The relative explanatory power of these variables should vary across research questions. For example, one would expect managerial attributes, such as risk aversion, cost of effort, talent, general human capital, and firm-specific human capital to be important for the structure of managerial compensation and perhaps board structure and, firm performance. To the extent that observables are good proxies for these underlying attributes, then time-varying manager characteristics should have high explanatory power. If observed attributes are poor proxies (for risk aversion or talent, for example), then

manager fixed effects are likely to have power. This also is true for other attributes newly identified by theory but not yet tested and traits not identified or isolated by theory. For example, managerial fixed effects accommodate the literature that asserts that psychological traits (Chatterjee and Hambrick, 2007; Malmendier and Tate, 2005, 2008; Hackbarth, 2008; Graham, Harvey, and Puri, 2009; Grable, 2000), personalities (Kaplan, Klebanov, and Sorensen, 2008), and functional background (e.g. Hambrick, 2007) influence firm policies and performance. Along the same lines, executive fixed effects can capture social capital, interpersonal networks, charisma, ability to self-regulate, religious beliefs, and genetic makeup.³

On the other hand, perhaps firm attributes, such as characteristics of the product market, cost structure, regulatory environment, asset base, and growth opportunities, are relatively more important for financial policy, such as aspects of the capital structure decision, investment policy, and perhaps firm performance as well. Then observable firm attributes and firm fixed effects will have explanatory power, with the mix being determined by the quality of the proxies, the insight and predictive power of existing theory, and the elements of theory not yet tested or developed. Of course, this is not a certain conclusion. Managerial characteristics, such as risk aversion, also are likely to shape decisions on leverage (e.g., Cronqvist, Makhija, and Yonker, 2010) and cash holdings.⁴

³ In this last respect, recent evidence suggests that genetic makeup has high explanatory power for job choice, satisfaction, and (poor) performance (Shane, 2010). Other evidence shows that genes affect behavior through bloodstream levels of neurotransmitters, such as serotonin and dopamine, and hormones, such as oxytocin and cortisol (see *Homo admistrans: the biology of business*, The Economist, September 25, 2010, pp. 99-101).

⁴ *A priori*, managerial characteristics will not matter much in determining corporate policies if managerial discretion is lacking (Hambrick, 2007). For example, manager fixed effects are likely to matter more for investment policy as compared to financial policy, supposing that investment policy is more centrally located within the span of managerial discretion and control and managers have flexibility to determine investment policy.

Overall fit, or the ability of all classes of variables combined to explain the dependent variable, also is likely to vary across subfields. Some aspects of empirical corporate finance are more mature and better developed empirically and/or theoretically. In contrast, the residual error will be larger in subfields that are less developed and in which the unobserved attributes and dependent variable are highly variable through time. The study of capital structure was initiated some 60 years ago (Modigliani and Miller, 1958), while the examination of the structure of managerial compensation is more recent (Holmstrom, 1979; Murphy, 1999). Thus, one would expect less residual variation for leverage as opposed to compensation level. Along these lines, Graham, Li, and Qiu (2011) note that “...(I)t is well known that labor market outcomes are extremely heterogeneous and that observationally equivalent individuals sometimes earn markedly different compensation.”

A final aspect of the analysis relates to how the inclusion of fixed effects can mitigate bias arising from omitted variables. Accordingly, we examine whether the inclusion of firm and manager fixed effects changes coefficient estimates and statistical inference for primary explanatory variables identified by leading theoretical models.

6. Compensation Policy: Executive Contract Design

We first consider compensation policy. We present our analysis and also use this particular aspect of empirical corporate finance to illustrate our approach. Accordingly, we present the results in more detail and with more discussion than will be typical in what follows. Given the span of the empirical analysis, brevity requires a more parsimonious approach in subsequent sections of the paper.

Returning to compensation policy, the dependent variables we examine are pay level, the sensitivity of executive wealth to shareholder value (delta), and the sensitivity of expected executive wealth to volatility of shareholder value (vega). Our point of departure for delta and vega is Coles, Daniel, and Naveen (2006). We build on Graham, Li, and Qiu (2011) for pay level.

Unlike all of the other subfields of empirical corporate finance we assess below, compensation policy is the only area to have been examined using the method of AKM (1999). See Graham, Li, and Qiu (2011) on compensation level and Coles and Li (2016) for delta and vega. Though we use different data and sample period and our specifications herein differ slightly from theirs, our results are similar to those in the two prior papers.

Total compensation is TDC1 from Execucomp. We follow Coles, Daniel, and Naveen (2006), who follow Guay (1999) and Core and Guay (2002), to calculate accumulated delta and vega for each executive on an annual basis. Delta is defined as the change in the dollar value of the executive's wealth for a one percentage point change in stock price. Vega is the change in the dollar value of the executive's wealth for a 0.01 change in the annualized standard deviation of stock returns. Because option vega is many times higher than stock vega (Guay, 1999), Coles, Daniel and Naveen (2006) use vega of the option portfolio to measure the total vega of the stock and option portfolio. We winsorize delta and vega at the 1st and 99th percentiles. Please refer to the Appendix (Variable Definitions) for detailed definitions and Table 2 for summary statistics for these and other variables.

6.1 Executive wealth-performance sensitivity (delta)

Our benchmark specification for delta, meaning the specification that we adopt as roughly representative of the prior literature, is a pooled OLS regression, including time fixed effects but without firm or manager fixed effects (FE), which is based on the explanatory variables in the specification in Coles, Daniel, and Naveen (2006, Table 3, Panel A, Column 3), which resembles Core and Guay (1999, Table 2, Model 1), plus other selected observable managerial attributes. The estimates using our data and controls are reported under Model (1) in Panel A of Table 3. The adjusted R^2 is 0.25. Adding firm fixed effects increases adjusted R^2 to 0.37 (Model (2)), while manager fixed effects alone boost adjusted R^2 to 0.73 (Model (3)). Model (4) includes both firm and manager fixed effects to yield adjusted $R^2 = 0.75$.

Panel B of Table 3 reports the relative explanatory power of the classes of variables. Per equation (2), we calculate the covariances between dependent variables (delta and vega, respectively) and each of the components, normalized by the variance of dependent variable. These percentages are the fractions of the model sum of squares attributable to particular components. Applying the AKM method to delta with both manager and firm fixed effects (Model (4) of Panel A), observed firm attributes, observed manager attributes, firm fixed effects, manager fixed effects, and year fixed effects account for proportions 0.12 (ranked 4 among 20), 0.05 (3), 0.03 (20), 0.60 (1), and 0.01 (12) of total variation of delta, with proportional residual unexplained variation of 0.186. Thus, unadjusted model R^2 is 0.814 (Table 3, Panel B). Normalized by variation of delta explained by the model ($0.814 = 1.00 - 0.186$), the five classes of variables contribute 15.32% ($= 0.124/(1-0.186)$), 6.37% ($= 0.052/(1-0.186)$), 3.8%, 73.28%, and 1.23% of model R^2 , explained variation in delta, respectively.

Column C1 in Figure 7 represents graphically the components of total variation. For delta, and for all other dependent variables, orange represents the share of the residual in variation of the dependent variable, light blue is observed managerial characteristics, purple is observed firm characteristics, green is year fixed effects, red is firm fixed effects, and blue is manager fixed effects. See Table 1 for sources of explained variation in delta.

While the percentage of total variation in delta arising from observed manager characteristics (0.052) seems low in absolute terms, Figure 3 indicates it is the third highest among the 20 experiments. Nonetheless, given the high explanatory value of time-invariant fixed effects (0.598, Figure 5), researchers would reasonably work to obtain better proxies for managerial attributes and to develop new theories that identify new managerial characteristics relevant for delta. Along these lines, perhaps Coles, Daniel and Naveen (2006) and predecessors employ poor proxies for managerial ability and risk aversion. Furthermore, perhaps they and other researchers would consider models that contain, as well as proxies that measure, for example, managerial reputation (Milbourn, 2003). Such forces, or social capital, genetics, or personality, for example, may be sources of the “explanatory power” of manager fixed effects for delta.

Table 1 includes information on whether including manager and firm fixed effects alters inference on other explanatory variables. In the case of delta, the most important change is that including the fixed effects changes the coefficient on firm risk to negative and significant from positive and significant. While a positive coefficient is consistent with numerous previous findings (e.g., Core and Guay, 1999, and Coles et al., 2006), the result is inconsistent with the predictions of the standard agency problem, *ceteris paribus*. In contrast, including firm and manager fixed effects yields a result that is quite different

from the pooled OLS result without fixed effects but is consistent with Aggarwal and Samwick (1999, 2003) and Himmelberg et al. (1999) and the prediction of the leading model.

It is plausible that including the fixed effects successfully addresses omitted variable bias. For example, suppose firm risk has two opposing effects on delta. The direct effect is suggested by standard agency theory where, all else equal, delta will be lower the higher is firm risk because delta exposes managers to risk. The indirect effect is through employee-employer matching. Risk-tolerant managers are sorted to high risk firms and those managers are willing to accept higher delta than more risk-averse managers. The former effect predicts a negative relationship between firm risk and delta, while the latter suggests a positive one. If manager fixed effects and/or firm fixed effects absorb the matching effect, the specification isolates the direct effect of firm risk on delta.

6.2 Compensation Vega

The benchmark specification we select for vega is a pooled OLS regression, without firm or manager fixed effects, that is based on Coles, Daniel, and Naveen (2006, Table 3, Panel A, Column 2), which resembles Core and Guay (1999, Table 4, Model 4), plus other selected observable managerial attributes. Benchmark adjusted R^2 is 0.28 (Model (1), Panel A, Table 4). Adding firm fixed effects increases adjusted R^2 to 0.40 (Model (2)), while manager fixed effects boosts adjusted R^2 to 0.47 (Model (3)). Model (4) includes both firm and manager fixed effects to yield adjusted $R^2 = 0.49$.

As Panel B of Table 4 indicates, when normalized by variation of vega explained by the model ($0.626 = 1 - 0.374$), the five classes of variables (observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects) contribute 19.3% ($0.121/(1-0.74)$), 9.3%, 7.7%, 59.1%, and 4.6% of model R^2 .

See Table 1. Column C2 in Figure 1 represents graphically the unnormalized (by model R^2) components of variation.

Risk aversion may be the most important determinant absorbed in managerial fixed effects. Effort focused on finding better proxies continues. For example, risk aversion can be proxied by cultural and political environment (Guiso, Sapienza, and Zingales, 2004, 2008). Malmendier and Nagel (2011) find individual experiences matter: in particular, “depression babies” exhibit lower willingness to take financial risk. In addition, Bergman and Jenter (2007) link stock option compensation to employee optimism.

Note that including manager and firm fixed effects yields a negative and significant coefficient on each of firm risk and market-to-book. Again, it is plausible that fixed effects mitigate a common endogeneity problem by controlling for important but unobservable underlying drivers of both firm characteristics and executive compensation.

6.3 Compensation level

The representative specification (Model (1), Panel A, Table 5) we select for compensation level is a pooled OLS regression, without firm or manager fixed effects, which is based on the explanatory variables in Graham, Li, and Qiu (2011, Table 4, Panel A, Column 1), plus selected observable managerial attributes and year fixed effects. Adding both firm and manager fixed effects improves adjusted R^2 from the benchmark value of 0.35 to 0.67. As Table 1 and Panel B of Table 5 indicate, normalized variation of total compensation explained is 20.2%, 10.9%, 8.3%, 47.1%, and 13.8% of model R^2 for observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects, respectively. These results are quite similar to those

in Graham, Li, and Qiu (2011). See column C3 in Figure 7 for unnormalized attribution of variation in pay level.

In determining executive pay level, firm fixed effects are likely to represent, for example, complexity of the tasks that the executive faces in the firm and firm- (or industry-, region-, etc.) specific compensation practice. Manager fixed effects plausibly reflect managerial ability and other manager-specific factors, such as reputation (Malmendier and Tate, 2009). In terms of possible bias from omitted variables, including manager and firm fixed effects alters inference for manager age and changes the significance of several other coefficients.

7. Board Structure

The conventional wisdom is that independent boards, smaller boards, and boards that separate the CEO and chairman positions are better boards (see Coles, Daniel, and Naveen, 2008, for discussion). On the first of these, a greater level of board independence is thought to lead to effective monitoring and better firm performance. Indeed, some stock exchanges (e.g., NYSE) require that at least half the board be non-employee directors. Several studies show how outside (non-management) directors on the board affect discrete tasks, including hiring and firing of the Chief Executive Officer (CEO) (Weisbach, 1988), adoption of antitakeover devices (Brickley, Coles, and Terry, 1994), and negotiating takeover premiums (Byrd and Hickman, 1992). In terms of board size, Jensen (1993) suggests that larger boards could be less effective than smaller boards because of coordination problems and director free-riding. Yermack (1996) provides evidence that smaller boards are associated with higher firm value, as measured by Tobin's Q. On the other hand, Coles, Daniel, and Naveen (2008) suggest that advising

requirements and firm complexity can alter the balance of costs and benefits, so that bigger boards with more inside directors would be appropriate for some companies.

Brickley, Coles and Jarrell (1997) found that nearly 81% of large US companies in 1988 combined the CEO and chairman positions in one individual. Furthermore, they found no relation between firm performance and corporate leadership structure. Nonetheless, the conventional wisdom (e.g., the Conference Board) is that separating the positions is good governance and the recent trend has been towards separating the position, with nearly 40% of large US companies doing so more recently (Spencer Stuart, 2009: respondents from the 2009 (as of May 15) S&P 500). Brickley, Coles and Jarrell (1997) and Baliga, Moyer, and Rao (1996) set forth the potential costs and benefits of combining and separating the positions.

7.1 Board independence

The benchmark specification (Model (1), Panel A, Table 6) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Linck, Netter, and Yang (2008, Table 4, Column 2), plus selected observable managerial attributes and year fixed effects. The dependent variable is the proportion of board members who are not executives of the company. Benchmark adjusted R^2 is 0.25 (Model (1), Panel A, Table 6). Adding firm fixed effects increases adjusted R^2 to 0.74 (Model (2)), while manager fixed effects boosts adjusted R^2 to 0.73 (Model (3)). Model (4) includes both firm and manager fixed effects to yield adjusted $R^2 = 0.76$.

As Panel B of Table 6 indicates, when normalized by variation of board independence explained by the model, the five classes of variables, observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects, contribute 2.6%, 0.8%, 27.4%, 59.7%, and 7.2% of model R^2 (Table 1).

Column B1 in Figure 7 represents graphically the components of total variation in board independence.

Pertaining to the large explanatory share of manager fixed effects, there are several potential sources of managerial influence over board structure. For example, the selection of directors is largely influenced by the CEO (Shivdasani and Yermack, 1999). Consistent with the negotiation hypothesis in Hermalin and Weisbach (1998) and Baker and Gompers (2003), Boone, Field, Karpoff, and Raheja (2007) find board independence is negatively related to managerial influence. Furthermore, if a manager is highly capable or influential, she will be elected into the board, potentially decreasing board independence, increasing board size, and increasing the likelihood of CEO duality if she is a CEO. Manager fixed effects could capture the time-invariant portions of these factors.

Firm fixed effects are also important in determining board independence. This may reflect the likelihood that board structure is determined by scope and complexity of the firms operations (Coles, Daniel, and Naveen, 2008; Lehn, Patro, and Zhao, 2009) and is influenced by the specific business and information environment (e.g., Raheja, 2005; Harris and Raviv, 2008). Furthermore, although board governance often is an important control system, it clearly is not the only one. Firm fixed effects may capture some unobserved characteristics of other governance features that can supplement direct board monitoring. Examples are shareholder activism (Gillan and Starks, 2000), mutual monitoring among executives (Acharya, Myers, and Rajan, 2011; Li, 2011), analyst coverage (Yu, 2008), regulatory environment (La Porta et al., 2000), accounting transparency, and auditing effectiveness, etc. The regression residual may reflect the findings of Boone et al. (2007) that board size and independence increase as firms grow

and diversify over time, effects which cannot be captured in time-invariant fixed effects. Finally, we observe that including manager and firm fixed effects changes the sign on leverage from positive to negative, suggesting that leverage and board monitoring are substitutes rather than complements in production.

7.2 Board size

The base specification (Model (1), Panel A, Table 7) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Linck, Netter, and Young (2008, Table 4, Column 1), plus selected observable managerial attributes and year fixed effects. The dependent variable is the number of directors on the board. Benchmark adjusted R^2 is 0.39 (Model (1), Panel A, Table 6). Adding firm fixed effects increases adjusted R^2 to 0.79 (Model (2)), while manager fixed effects boosts adjusted R^2 to 0.78 (Model (3)). Model (4) includes both firm and manager fixed effects to yield adjusted $R^2 = 0.80$.

Column B2 of Figure 7 and Panel B of Table 7 indicate that, when normalized by variation of board size explained by the model, the five classes of variables (observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects) contribute 9.8%, 5.0%, 30.8%, 52.5%, and 1.8% of model R^2 . Including manager and firm fixed effects reduces the magnitude and significance of the coefficients on CEO age and R&D intensity.

7.3 Leadership structure: CEO duality

The representative specification (Model (1), Panel A, Table 8) is a pooled logistic regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Linck, Netter, and Young (2008, Table 4, Column 3), plus selected observable managerial attributes. The dependent variable is the logit-transformed

indicator variable that takes the value of 1 if the CEO and chairman positions are combined in one individual, and the value 0 otherwise. Benchmark adjusted R^2 is 0.08. Relative to the results reported to this point, fixed effects yield a larger improvement in fit (adjusted for degrees of freedom). Adding firm fixed effects increases adjusted R^2 to 0.62 (Model (2)), while manager fixed effects boosts adjusted R^2 to 0.65 (Model (3)). Model (4) includes both firm and manager fixed effects to yield adjusted $R^2 = 0.68$.

Because of the nonlinearity in the logistic function, it is unclear how to generate the analysis of composition of fit. Thus, we re-estimate a simple linear version of Model (4). [Of course, while Model (5) includes both firm and manager fixed effects, it suffers from the defects that motivate the use of logit in the first place.] Column B3 of Figure 1 and Panel B of Table 8 indicate that, when normalized by variation of CEO duality explained by the model, the five classes of variables (observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects) contribute 9.2%, 0.8%, 31.1%, 55.9%, and 3.1% of model R-squared.

A CEO who consistently performs well will be rewarded with the chairman position. Other determinants may be manager's reputation, credibility, charisma, and vision, all of which are typically hard to quantify. On the firm side, board leadership may depend on organizational structure and firm-specific restrictions and policies.

8. Corporate Control

We consider the correlates of the likelihood of a company making a control bid, receiving a control bid, and putting in place an antitakeover device. The primary specifications are probit. Like the logit model for leadership structure, however, decomposition of fit requires that we also estimate a simple linear probability model.

8.1 Propensity to bid

The dependent variable is one if the firm announces a bid in year t and zero otherwise. The benchmark specification is a probit regression, without firm or manager fixed effects, which is based on the explanatory variables in Harford (1999, Table III, Column 3), plus selected observable managerial attributes. Benchmark adjusted R^2 is quite low at 0.12 (Model (1), Panel A, Table 9). Adding firm fixed effects increases adjusted R^2 to 0.55, while manager fixed effects boosts adjusted R^2 to 0.56. Model (4) includes both firm and manager fixed effects to yield adjusted $R^2 = 0.59$.

The linear probability model (LPM) is Model (5). Column MA1 of Figure 1 and Panel B of Table 9 indicate that, when normalized by variation of propensity to bid explained by the model, the five classes of variables (observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects) contribute 4.6%, 0.6%, 36.1%, 57.9%, and 0.8% of model R-squared.⁵ Firm level attributes such as cross-firm social connections (Ishii and Xuan, 2010) and organizational form (e.g., conglomerate or single-segment firms, per Maksimovic and Phillips, 2008) can affect acquisition propensity. As for managers, Malmendier and Tate (2008) show that the odds of making an acquisition are 65% higher under overconfident CEOs. Note that both “empire-building” and “overconfidence” may lead to excessive acquisitiveness. The difference is that the former is a firm-level agency problem while the latter is manager specific personality. Overconfident managers believe that they are acting in the interest of shareholders. If so, the standard incentive contracts, as controlled for in the regression, are unlikely to correct their sub-optimal decisions.

⁵ Manager fixed effects are prominent in this specification. This is consistent with Malmendier and Tate (2005), who suggest that (in bidder regressions) the manager fixed effect could represent CEO overconfidence.

The large residual portion may reflect industry life-cycle (Maksimovic and Phillips, 2008) or industry shocks that Mitchell and Mulherin (1996) and Mulherin and Boone (2000) show to be significantly related to M&A activity.

Comparing Model (4) with Model (1), the primary change due to the addition of firm and manager fixed effects is that the coefficient on the price-to-earnings ratio changes from significantly positive to significantly negative.

8.2 Propensity to be a target

The dependent variable is 1 if the firm is announced to be a target of a successful tender offer, merger proposal, or merger agreement in year t and 0 otherwise. The benchmark specification is a probit regression, without firm or manager fixed effects, which is based on the explanatory variables in Comment and Schwert (1995, Table 3, Column 1), plus selected observable managerial attributes. Again, benchmark adjusted R^2 is quite low at 0.07 (Model (1), Panel A, Table 10). Adding firm fixed effects increases adjusted R^2 to 0.56, while manager fixed effects boosts adjusted R^2 to 0.63. Including both firm and manager fixed effects yields adjusted $R^2 = 0.63$ (Model (4)).

The linear probability model is Model (5). Column MA2 of Figure 1 and Panel B of Table 10 indicate that observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects contribute 0.8%, 0.6%, 32.7%, 62.3%, and 0.6% of model R-squared, respectively. Adding both fixed effects makes insignificant the coefficients on firm size and prior abnormal return.

8.3 Poison pill adoption

The representative specification is a probit regression, without firm or manager fixed effects, which is based on the explanatory variables in Comment and Schwert (1995, Table 3, Column 4), plus selected observable managerial attributes. The dependent

variable is one if the firm adopts poison pill in year t and zero otherwise. Fixed effects are important. Benchmark adjusted R^2 is quite low at 0.07 (Model (1), Panel A, Table 11). Adding firm fixed effects increases adjusted R^2 to 0.88 (Model (2)), while manager fixed effects boosts adjusted R^2 to 0.89 (Model (3)). Including both firm and manager fixed effects yields adjusted $R^2 = 0.91$.

The linear probability model is Model (5). Column MA3 of Figure 1 and Panel B of Table 11 indicate that observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects contribute 1.7%, 0.2%, 57.2%, 40.6%, and 0.2% of model R-squared, respectively.

Comparing probit Models (1) and (4), adding both fixed effects changes the coefficients on a number of important variables. The coefficient on each of the control-shares-law dummy, price-to-earnings ratio, firm size, and CEO indicator all change from significantly positive to significantly negative. The coefficient on market-to-book changes from significantly positive to insignificant and close to zero. These results suggest that the omitted variables problem is likely to be present in models examining the use of antitakeover devices.

9. Financial Policy

Capital structure has been a topic of significant interest since the beginnings of academic finance. Numerous recent empirical contributions would be appropriate as for us to set forward as the benchmark model. We base the leverage results below on specifications from Lemmon, Roberts, and Zender (2008), the reason being in part that they also suggest that firm fixed effects are important, particularly insofar as the fixed

effects capture unobserved time-invariant factors that generate surprisingly stable capital structures.

9.1 Book leverage

The benchmark specification is a pooled OLS regression, without firm or manager fixed effects, which is based on the explanatory variables in Lemmon, Roberts, and Zender (2008, Table II, Panel A, Column 3), plus selected observable managerial attributes. The dependent variable is total debt scaled by firm assets. Benchmark adjusted R^2 is 0.23 (Model (1), Panel A, Table 12). Adding firm fixed effects increases adjusted R^2 to 0.67 (Model (2)), while manager fixed effects boosts adjusted R^2 to 0.71 (Model (3)). Model (4) includes both firm and manager fixed effects to yield adjusted $R^2 = 0.74$.

As Panel B of Table 12 indicates, when normalized by variation of book leverage explained by the model, observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects, contribute 10.8%, 0.7%, 62.5%, 25.6%, and 0.5% of model R-squared. Column F1 in Figure 1 represents graphically these components of variation.

These results are consistent with the results and conclusions of Lemmon, Roberts, and Zender (2008). They find that corporate capital structures are stable over long periods of time and that this feature of the leverage data-generating process is present after controlling for firm entry and exit and for previously identified determinants of capital structure. Overall, they show that much of the variation in capital structure is time-invariant and that much of that variation is not explained by existing empirical specifications. This is consistent with Parsons and Titman (2008) and Graham and Leary

(2011) who suggest more work is needed to identify what is captured in firm fixed effects but are missing from our models.

Compare Models (1) and (4) to discern the primary changes in empirical results from including manager and firm fixed effects. The coefficients on log (sales) and the dividend payer dummy (and manager tenure) change from positive (negative) and significant to negligible and insignificant.

9.2 Market leverage

The dependent variable is total debt scaled by the sum of total debt and market equity. The baseline specification is a pooled OLS regression, without firm or manager fixed effects, which is based on the explanatory variables in Lemmon, Roberts, and Zender (2008, Table II, Panel A, Column 6), plus selected observable managerial attributes. Benchmark adjusted R^2 is 0.39 (Model (1), Panel A, Table 13). Adding firm fixed effects increases adjusted R^2 to 0.77, while manager fixed effects boosts adjusted R^2 to 0.76. Model (4) includes both firm and manager fixed effects to yield adjusted $R^2 = 0.79$.

Panel B of Table 13 indicates that, when normalized by variation of market leverage explained by the model, observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects, contribute 22.5%, 0.1%, 51.6%, 24.6%, and 1.2% of model R-squared. Column F2 in Figure 1 represents graphically these components of variation.

These results and those for book leverage are consistent with the strong explanatory power for firm fixed effects reported in Lemmon, Roberts, and Zender (2008). Nonetheless, managerial fixed effects also represent a significant component of variation in both book and market leverage explained, which is consistent with the notion

that managerial characteristics, such as risk aversion, affect corporate financial policy (see Cronqvist, Makhija, and Yonker, 2010). Moreover, overconfident managers exhibit strong debt conservatism and pecking-order preferences (Malmendier, Tate, and Yan, 2011). Furthermore, Berger, Ofek, and Yermack (1997) show managers who have more control would keep leverage ratio low. Other important factors are likely to be cost of borrowing as determined by credit risk, relationships with lenders, and the implicit interest rate. In addition, firm culture will keep leverage and cash holding persistent over time (Cronqvist, Low, and Nilsson, 2007).

Comparing Models (1) and (4), the primary changes in empirical results from including manager and firm fixed effects are that the dividend payer dummy changes from small and insignificant to positive and insignificant, while significant coefficients on manager tenure, the CEO indicator, and the board seat indicator become small and insignificant.

9.3 Cash holdings

The baseline specification is a pooled OLS regression, without firm or manager fixed effects, which is based on the explanatory variables in Harford, Mansi, and Maxwell (2008, Table 3, Column 1), plus selected observable managerial attributes. The natural logarithm of the cash to sales ratio is the dependent variable. Benchmark adjusted R^2 is fairly large at 0.41 (Model (1), Panel A, Table 14). Adding firm fixed effects yields adjusted R^2 of 0.80, manager fixed effects alone delivers adjusted R^2 of 0.80, and using both gives adjusted $R^2 = 0.82$.

Panel B of Table 14 indicates that observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects, contribute

17.0%, 0.80%, 51.0%, 28.8%, and 2.4% of model R-squared.⁶ Column F3 in Figure 1 represents graphically these components of normalized variation. Like book and market leverage, firm observables and fixed effects dominate manager observable and fixed effects.

Frank and Goyal (2009) show industry median leverage is an important correlate, acting as a proxy for company specific intangibility, regulation, stock variance, and uniqueness. Obviously, this proxy is so noisy that the firm fixed effects may capture a large portion of these factors.

Comparing Models (1) and (4), including manager and firm fixed effects alters parameter estimates and inference in numerous cases. Significant coefficients in Model (1) that are insignificant in Model (4) with both fixed effects are the director indicator, G index, cash flow volatility, and market-to-book. Variables that become significant are firm size (-), R&D intensity (-), and manager age (-). Omitted variables and other endogeneity problems may be a significant difficulty in the analysis of cash holdings.

10. Payout Policy

Like capital structure, the characteristics, determinants, and implications of dividend policy comprise one of the original areas of inquiry in finance. Again, there are numerous candidates for the benchmark specification. We select DeAngelo, DeAngelo, and Stulz (2006) as the source of our baseline specification.

10.1 Dividend Payout Ratio

⁶ According to Bates, Kahle, and Stulz (2009), cash holdings are determined by cash flow risk rather than agency conflicts. This would explain why firm fixed effects dominate manager fixed effects.

The dependent variable is an indicator variable that takes the value of 1 if the firm pays out one or more dividends in the fiscal year, and 0 otherwise. The benchmark specification is a pooled logistic regression, without firm or manager fixed effects, which is based on the explanatory variables in DeAngelo, DeAngelo, Stulz (2006, Table 3, Column 1), plus selected observable managerial attributes. Benchmark adjusted R^2 is 0.34 (Model (1), Panel A, Table 15). Adding firm fixed effects increases adjusted R^2 to 0.93, while manager fixed effects boosts adjusted R^2 to 0.92. Model (4) includes both firm and manager fixed effects to yield adjusted $R^2 = 0.94$.

Our dividend payout variable is dichotomous, so we estimate the linear probability model using the explanatory variables from the logit specifications (see Model (5), Panel A). Panel B of Table 15 indicates that, when normalized by variation of dividend payout explained by the model, observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects, contribute 3.4%, 0.2%, 68.6%, 27.1%, and 0.7% of model R-squared. Column D1 in Figure 1 represents graphically these components of variation. Like financial policy, firm characteristics and firm fixed effects dominate those for managers.

Firm fixed effects may reflect market imperfections such as agency problems, asymmetric information, and taxes (e.g., Myers and Majluf, 1984). Firm culture can give rise to stable dividend policy through time (Cronqvist, Low, and Nilsson, 2007). The empirical evidence, however, is inconclusive and much of the variation across firms remains unexplained (see Allen and Michaely, 2003). At the manager level, overconfidence (Deshmukh, Goel, and Howe, 2010) and political ideology (Hutton, Jiang, and Kumar, 2010) potentially are related to the propensity to pay dividends and, thus, would be captured by manager fixed effects. Comparing Models (1) and (4), the primary

changes in empirical results from including manager and firm fixed effects are that the coefficients on both the ratio of retained earnings to total common equity and manager age change from significantly positive to insignificant and the coefficients on the ratio of total common equity to total assets and market-to-book change from significantly negative to significantly positive.

11. Investment Policy

Investment policy can focus on relatively tangible versus intangible assets, with the former perceived as less risky than the latter. Thus, we examine capital expenditures versus expenditures on R&D and, ultimately, the determinants of firm risk.

11.1 Capital expenditures

The dependent variable is capital expenditure, net of sales of property, plant, and equipment, scaled by total assets. The representative specification is a pooled OLS regression, without firm or manager fixed effects, which is based on the explanatory variables in Coles, Daniel, and Naveen (2006, Table 3, Panel B, Column 1) plus selected observable managerial attributes. Benchmark adjusted R^2 is quite small, with value equal to 0.08 (Model (1), Panel A, Table 16). Adding firm fixed effects increases adjusted R^2 to 0.62, while manager fixed effects boosts adjusted R^2 to 0.61. Model (4) includes both firm and manager fixed effects to yield adjusted $R^2 = 0.63$.

As Panel B of Table 16 indicates, when normalized by variation of capital expenditure explained by the model, observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects, contribute 10.7%, 0.1%, 47.3%, 41.6%, and 0.4% of model R-squared. Column II in Figure 1 represents graphically these components of variation. The relative power of manager

fixed effects versus manager observables is striking. This suggests that developing models that isolate relevant manager characteristics and developing good proxies for those attributes would be good strategies.

Theories define firm culture as well-established shared beliefs and organizational preferences (e.g., Kreps, 1990; Lazear, 1995; Hermalin, 2001). Cronqvist, Low, and Nilsson (2007) find that firm culture matters for investment policy, such as capital expenditure and R&D investment, and that firm culture is not necessarily dependent on the particular CEO in place. Interestingly, literature shows that managerial bias (Ben-David, Graham, Harvey, 2010), overconfidence, personal education, employment history (scientific vs. financial) (Malmendier and Tate, 2005), and political ideology (Hutton, Jiang, and Kumar, 2010) also have explanatory power for investment policies

Compare Models (1) and (4) to discern the primary changes in empirical results from including manager and firm fixed effects. Inference changes for three variables that come immediately to mind as likely to be important for capital expenditures, specifically compensation vega, surplus cash, and log(sales).

11.2 R&D intensity

The dependent variable is research and development expenditure scaled by assets, with missing values for R&D set to zero. The benchmark specification is a pooled OLS regression, without firm or manager fixed effects, which is based on the explanatory variables in Coles, Daniel, and Naveen (2006, Table 3, Panel A, Column 1), plus selected observable managerial attributes.

Note that benchmark adjusted R^2 is substantially higher than for capital expenditures, with value equal to 0.28 (Model (1), Panel A, Table 17). Adding firm fixed effects increases adjusted R^2 to 0.77, manager fixed effects boosts adjusted R^2 to 0.78,

and including both firm and manager fixed effects yields adjusted $R^2 = 0.80$ (Model (4)). As Panel B of Table 17 indicates, when normalized by variation of R&D explained by the model, observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects contribute 12.9%, 0.1%, 51.8%, 35.2%, and 0.1% of model R-squared. Column I2 in Figure 1 represents graphically these components of variation. Relative to the results for capital expenditures, firm attributes, those observed and unobserved, are more important for R&D intensity than managerial attributes.

Giroud and Mueller (2011) show product market competition should be considered in determining the relation between governance and R&D, CAPEX, etc. This may be absorbed in firm fixed effects. Nonetheless, their R-squared doesn't improve much when including proxies for product market competition. Other factors absorbed in firm fixed effects may include industry- or firm-specific technology, productivity, and human capital.

Compare Models (1) and (4) to discern the primary changes in empirical results from including manager and firm fixed effects. The three significant compensation variables, vega, delta, and cash compensation, all become insignificant after firm and manager fixed effects are included. Inference also is altered for book leverage, manager age, and the director indicator.

11.3 Firm risk

The dependent variable is the one-year standard deviation of daily stock returns. The representative specification is a pooled OLS regression, without firm or manager fixed effects, which is based on the explanatory variables in Coles, Daniel, and Naveen (2006, Table 9, Column 1), plus selected observable managerial attributes. Benchmark

adjusted R^2 is among the highest among all subfields examined in this paper, with value equal to 0.48 (Model (1), Panel A, Table 18). Adding firm or manager fixed effects increases adjusted R^2 to 0.81, while including both firm and manager fixed effects yields adjusted $R^2 = 0.83$.

As Panel B of Table 18 indicates, when normalized by variation of firm risk explained by the model, observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects, respectively, contribute 8.0%, 1.9%, 45.2%, 17.6%, and 27.7% of model R-squared. Column I3 in Figure 1 represents graphically these components of variation. These results are noteworthy insofar that year fixed effects exhibit far and away the most power here as compared to all other models we estimate.

It is intuitive that stock return volatility is largely determined by firm specific fundamentals, such as line of business. Nonetheless, research also shows that managerial narcissism (Chatterjee and Hambrick, 2007), ego, bias, experience (Finkelstein and Hambrick, 1996), and power (Adams, Almeida, and Ferreira, 2005) also affect risk-taking and volatility.

Comparing Models (1) and (4), including manager and firm fixed effects changes the coefficient on cash compensation from insignificant to negative and significant, and vice versa for manager age and the director indicator. The coefficient on book leverage is significant in both models but switches from negative to positive.

12. Diversification

While the extent of product market diversification can be viewed as an element of investment policy, we consider it separately because of the large volume of literature on

the topic. We employ two standard measures. The Herfindahl index is the sum of the squares of segment sales divided by the square of firm sales. The Herfindahl index increases in firm focus. We also use the natural log of the number of operating segments as reported in Compustat segment database. This measure decreases in firm focus.

12.1 Herfindahl index

The representative specification is a pooled OLS regression, without firm or manager fixed effects, which is based on the explanatory variables in Coles, Daniel, and Naveen (2006, Table 4, Panel A, Column 1), plus selected observable managerial attributes. Benchmark adjusted R^2 is 0.16 (Model (1), Panel A, Table 19). Adding firm or manager fixed effects increases adjusted R^2 to 0.73 and 0.75, respectively, while including both firm and manager fixed effects yields adjusted R^2 of 0.79.

Panel B of Table 19 indicates that, when normalized by the variation of the Herfindahl index explained by the model, observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects, respectively, contribute 13.1%, 0.1%, 45.7%, 37.5%, and 3.5% of model R-squared. Column I4 in Figure 1 represents graphically these components of variation.

A firm may enter a new industry if the firm's existing expertise and technology are easy to apply in this industry. Other possible determinants are the company's organizational structure and market position. Furthermore, Malmendier and Tate (2008) find overconfident CEOs make more diversifying acquisitions. Industry experience and diversity of the management team are other candidates for the explanatory power of manager fixed effects.

Comparing Models (1) and (4), including manager and firm fixed effects changes inference on a number of variables. The dividend cut dummy, prior stock return,

compensation vega, and manager age all change from significantly negative to insignificant. Sign changes occur on cash compensation and sales growth.

12.2 Ln(Number of segments)

The baseline specification is a pooled OLS regression, without firm or manager fixed effects, which is based on the explanatory variables in Coles, Daniel, and Naveen (2006, Table 4, Panel B, Column 1), plus selected observable managerial attributes. Benchmark adjusted R^2 is a modest 0.21 (Model (1), Panel A, Table 20). Adding firm fixed effects increases adjusted R^2 to 0.73, manager fixed effects boosts adjusted R^2 to 0.75, and including both firm and manager fixed effects yields adjusted $R^2 = 0.79$ (Model (4)). As Panel B of Table 20 indicates, when normalized by variation of $\ln(\text{segments})$ explained by the model, observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects contribute 11.7%, 0.5%, 44.6%, 34.9%, and 8.3% of model R-squared.⁷ Column I5 in Figure 1 represents graphically these components of variation.

Comparing Models (1) and (4) reveals a nontrivial number of changes in inference arising from including manager and firm fixed effects. Fixed effects alter inference for manager tenure, the CEO turnover indicator, the dividend cut indicator, sales growth, stock return, and the executive compensation variables.

13. Firm Performance

⁷ Denis, Denis, and Sarin (1997) note that diversification is associated with external corporate control threats, financial distress, and management turnover. These factors are likely to affect the relative importance of firm and manager fixed effects.

The study of the determinants of firm value and performance has been a persistent and significant segment of the literature.⁸ The performance measures we use as dependent variables are: Tobin's Q, the ratio of the market value of the firm's securities to the replacement cost of its tangible assets; and ROA, the ratio of net income to the book value of the firm's total assets.

13.1 Tobin's Q

The representative specification is a pooled OLS regression, without firm or manager fixed effects, which is based on the explanatory variables in Mehran (1995, Table 4, Panel A, Column 4), plus selected observable managerial attributes. Benchmark adjusted R^2 is 0.24 (Model (1), Panel A, Table 21). Adding firm fixed effects increases adjusted R^2 to 0.70, manager fixed effects boost adjusted R^2 to 0.71, and including both firm and manager fixed effects yields adjusted $R^2 = 0.75$ (Model (4)). As Panel B of Table 21 indicates, when normalized by variation of Tobin's Q explained by the model, observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects contribute 5.5%, 0.4%, 43.6%, 48.1%, and 2.4% of model R-squared. Column P1 in Figure 1 represents graphically these components of variation. These figures are most notable in that unobserved manager attributes represent such a large proportion of explained variation.

Managerial ability and risk aversion are obvious potential sources of the explanatory power of manager fixed effects. Other possibilities are "integrity" (Erhard, Jensen, and Zaffron, 2008), reputation (Chemmanur and Paeglis, 2005), leadership qualities, vision, and professional network. Manager's extra-curricular activities, though

⁸ Influential examples include Morck, Shleifer, and Vishny (1988) and McConnell and Servaes (1990) for Tobin's Q. See Coles, Lemmon, and Meschke (2011) for a discussion of performance-on-structure regressions.

seemingly irrelevant, may have connection with performance, such as home purchase (Liu and Yermack, 2007), public awards (Malmendier and Tate, 2005; 2009), marriage, children, family illness (Bennedsen et al., 2007). Comparing Models (1) and (4) reveals a nontrivial number of sign changes in important coefficients. From significantly positive to significantly negative are the coefficients on manager wealth-performance sensitivity, prior relative operating performance, and firm size (as measured by $\log(\text{assets})$). Board independence changes from significantly negative to significantly positive.

13.2 Return on assets

The baseline specification is a pooled OLS regression, without firm or manager fixed effects, which is based on the explanatory variables in Mehran (1995, Table 4, Panel B, Column 4), plus selected observable managerial attributes. Benchmark adjusted R^2 is 0.17 (Model (1), Panel A, Table 22). Adding firm fixed effects increases adjusted R^2 to 0.72, manager fixed effects boosts adjusted R^2 to 0.73, and including both firm and manager fixed effects yields adjusted $R^2 = 0.76$ (Model (4)).

As Panel B of Table 22 indicates, when normalized by variation of ROA explained by the model, observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects contribute 14.4%, 1.5%, 52.0%, 29.6%, and 2.5% of model R-squared. Column P2 in Figure 1 represents graphically these components of variation. These figures are notable in comparison to the results above on Tobin's Q, because relative explanatory power shifts towards unobserved and observed firm attributes instead of manager characteristics.

Comparing Models (1) and (4) reveals a few important alterations in inference. The coefficients on board independence and scaled inventory plus PPE are no longer positive and significant but become insignificant.

14. Additional Discussion

One obvious possibility is that the low explanatory share of explained variation for observed firm and manager characteristics and the poor overall fit (large residual variation) arise from nonstationarity through time of the estimated cross-sectional coefficients on observed manager and firm characteristics. To test this notion, we re-estimate each of the 20 empirical specifications including a sixth class of variable, namely the interaction of three or four of the primary observed manager and firm characteristics predicted by theory to be important with time indicators for each year (except one). This allows the cross-sectional parameters for each of these primary observables to vary through time.

In all 20 cases the class of interactive variables typically provides less than 2% of explained variation of the dependent variable. This class of variables subsumes very little of the explained variation of the other five classes of independent variables. Nonstationarity of the cross-sectional coefficients on observed manager and firm characteristics is not an explanation for poor overall fit and is not an explanation for the low explanatory power of observed manager and firm characteristics.

15. Conclusion

To empirically gauge the state of progress in empirical corporate finance, we apply the connected-groups approach of Abowd, Karmariz, and Margolis (1999) to identify and estimate the role of observed and unobserved firm- and manager-specific characteristics in determining primary features of corporate governance, financial policy, payout policy, investment policy, and performance. The results allow us to assess the

extent of empirical progress in the various subfields in empirical corporate finance. We consider a broad range of subfields. They are: executive compensation (level, wealth-performance sensitivity, and risk incentives); board structure (composition, size, and leadership structure); corporate control (usage of antitakeover provisions, propensity to be a merger target or bidder); payout policy (dividend payout propensity); financial policy (book and market leverage, cash balances); investment policy (R&D intensity, capital expenditure, firm focus, and firm risk); and firm performance (ROA, Tobin's Q).

Table 1 and Figure 1 summarize our results. Measured by fit, some subfields are more successful than others. Estimated specifications without firm and manager fixed effects do poorly in explaining variation in CEO duality, corporate control variables, and capital expenditures, and best in explaining executive pay level, board size, market leverage, corporate cash holdings, and firm risk.

When fit based on observable manager and firm characteristics is poor, our analysis suggests ways forward for theory and empirics. Including manager and firm fixed effects, along with firm and manager observables, delivers the best fit for dividend payout, the propensity to adopt antitakeover defenses, firm risk, board size, and firm focus. In terms of source of fit, unobserved *manager* attributes deliver a high proportion of explained variation in the dependent variable for executive wealth-performance sensitivity, board independence, board size, and sensitivity of expected executive compensation to firm risk. A significant portion of what we know we do not know is related to time-invariant attributes of managers. In contrast, unobserved *firm* attributes provide a high proportion of variation explained for dividend payout, antitakeover defenses, book and market leverage, and corporate cash holdings. For these aspects of organization structure and policy, a significant portion of what we know we do not know

is related to time-invariant attributes of firms. That is, our results suggest where empiricists would look for better proxies for what current theory identifies as important and where theorists could focus in building new models that encompass economic forces not contained in existing models.

Finally, we assess the relevance of omitted variables and endogeneity for conventional empirical designs in the various subfields. These problems appear to be severe in some areas.

Figure 2 represents our attempt to place this paper in the literature. The figure classifies research into four categories, using the topic of executive compensation as an example. From left to right, the papers become less theoretical and more empirical. This paper is located on the far right of the figure. This is a purely empirical exercise, meant nonetheless to suggest to empiricists and theorists where there are likely to be productive research opportunities in empirical corporate finance.

Appendix (Variable Definitions)

Managerial Attributes:

Variable	Definition
Age	Manager's age in years
Tenure	Number of years of continuous employment with a firm
Female	A dummy variable with 1 for female and 0 for male
CEO	A dummy variable with 1 if the executive served as the CEO of the company for all or most of the indicated fiscal year and 0 otherwise
Director	A dummy variable with 1 if the executive served as a director of the company and 0 otherwise
Mover	A dummy variable with 1 for managers who switched firm in the sample period and 0 for those who did not

Variables from Coles, Daniel, and Naveen (2006):

Variable	Definition
Delta	The dollar change in the executive's wealth for a 1% change in stock price
Vega	The dollar change in the executive's wealth for a 0.01 change in standard deviation of returns
Market-to-book	The ratio of the market value of equity item minus the book value of equity plus the book value of assets to the book value of assets
Firm risk	The standard deviation of one-year daily stock returns
Log (Net Assets)	The natural log of Net Assets, where Net Assets is calculated as total assets less cash and short-term investments
R&D	Research and development expenditure scaled by assets
Surplus Cash	Amount of cash available to finance new projects, scaled by assets
Board Independence	The number of independent outside directors divided by board size
Institutional Holdings	The percentage of company's outstanding common shares held by institutions
ROA	Return on assets, calculated as net income before extraordinary items and discontinued operations divided by total assets
PPE	Investment in property, plant, and equipment scaled by assets
CAPEX	Capital expenditure net of sales of property, plant, and equipment, scaled by assets
Leverage	Book debt divided by book assets. (i.e., book leverage)
Sales growth	$\text{Log}(\text{Sales}_t/\text{Sales}_{t-1})$
Cash compensation	The sum of manager's salary and bonus.
Stock Return	The stock return over the fiscal year.
Herfindahl Index	The sum of the square of segment sales divided by the square of firm sales
Dividend Cut	A dummy variable with 1 if there is a reduction in annual dividend and 0 otherwise
CEO Turnover	A dummy variable with 1 if the CEO was replaced and 0 otherwise
Ln(Segments)	The natural log of the number of operating segments as reported in Compustat segment database

Variables from Linck, Netter, and Yang (2008):

Variable	Definition
Board size	The number of directors on the board
Board independence	The proportion of the board composed of non-executive directors
Board leadership	A dummy variable with 1 if the CEO is also the Chairman of the Board and 0 otherwise, which is also referred to as combined leadership or CEO duality
LogMVE	The logarithm of market value of equity
Debt	Total long-term debt over total assets
LogSegments	The logarithm of number of business segments
FirmAge	The number of years since the firm first appeared on CRSP
MTB	The market-to-book ratio of equity
R&D	R&D expenses over total assets
RETSTD	The standard deviation of the monthly stock return over the fiscal year immediately in the preceding fiscal year
CEO_Own	The percent of shares held by the CEO
Director_Own	The average percent of firm's shares held by non-executive directors
FCF	Free cash flow (operating income before depreciation minus total income taxes, change in deferred taxes, interest expense, preferred dividends, and dividends on common stock) scaled by total assets
Performance	The average annual industry-adjusted earnings before interest and taxes scaled by total assets over the two-year period preceding the proxy date
Lag(CEO_Chair)	A dummy variable with 1 if the CEO is also the Chairman of the Board in the previous period and 0 otherwise

Variables from Harford (1999):

Variable	Definition
Abnormal return	The daily market-model abnormal return averaged over years $t-4$ through $t-1$
Sales growth	The average sales growth over years $t-4$ through $t-1$
Noncash working capital	Net working capital (current assets - current liabilities) minus cash and cash equivalents, normalized by total assets and averaged over years $t-4$ through $t-1$
Leverage	The ratio of book value of debt to market value of equity, averaged over years $t-4$ to through $t-1$
Market-to-book	The ratio of market value of equity to book value of equity, averaged over years $t-4$ through $t-1$
Price-to-earnings	The stock price divided by earnings per share, averaged over years $t-4$ through $t-1$.
Size	The natural logarithm of total assets

Variables from Comment and Schwert (1995):

Variable	Definition
Abnormal return	The daily market-model abnormal return averaged over years $t-4$ through $t-1$
Sales growth	The average sales growth over years $t-4$ through $t-1$
Liquidity	The ratio of net liquid assets to total assets, averaged over years $t-4$ through $t-1$
Debt/equity	The ratio of debt to equity, averaged over years $t-4$ to through $t-1$
Control share law	A dummy variable with 1 if the control share law is effective for the state in which the company is incorporated and 0 otherwise
Business combination law	A dummy variable with 1 if the business combination law is effective for the state in which the company is incorporated and 0 otherwise
Poison pill	A dummy variable with 1 if the firm has a shareholder rights plan in effect and 0 otherwise

Variables from Lemmon, Roberts, and Zender (2008):

Variable	Definition
Book Leverage	Total debt scaled by book assets
Market Leverage	Total debt scaled by the sum of total debt and market equity.
Initial Leverage	The first non-missing value for leverage in the Compustat from 1980 to 2006
Profitability	Operating income before depreciation scaled by book assets
Cash Flow	The standard deviation of historical operating income, requiring at least 3 years of data
Volatility	
Tangibility	Investment in property, plant, and equipment (PPE) scaled by book assets
Dividend Payer	A dummy variable with 1 if the firm pays out dividend in the fiscal year and 0 otherwise

Variables from Harford, Mansi, and Maxwell (2008):

Variable	Definition
Cash Holdings	The natural log of the cash/sales ratio
Gindex	The Gompers, Ishii, and Metrick (2003) antitakeover index
Inside Ownership	The equity ownership of the top five officers
Pay Sensitivity	Managerial delta
Institutional ownership	The percentage of institutional equity holdings
Size	The natural log of total assets
Leverage	The ratio of total debt (short- and long-term debt) to assets
Cash flow	Earnings after interest, dividend, and taxes, but before depreciation, divided by assets
Working capital	The ratio of current assets net of cash minus current liabilities divided by assets
CF Volatility	The standard deviation of cash flows for the past five years
R&D	The ratio of research and development to sales
CapEx	The ratio of capital expenditures to net assets

Acquisition	The ratio of acquisition to sales
Dividend indicator	A dummy variable with 1 if the firm pays out dividend in the fiscal year and 0 otherwise
Bond indicator	A dummy variable with 1 if the firm has long-term S&P rating and 0 otherwise

Variables from DeAngelo, DeAngelo, and Stulz (2006):

Variable	Definition
Dividend payout	A dummy variable with 1 if the firm pays out dividend in the fiscal year and 0 otherwise
RE/TE	The ratio of earned equity (retained earnings) to total common equity
TE/TA	The ratio of total common equity to total assets
Sales growth	$\text{Log}(\text{Sales}_t/\text{Sales}_{t-1})$

Variables from Mehran (1995):

Variable	Definition
Tobin's Q	The ratio of the market value of the firm's securities to the replacement cost of its tangible assets
ROA	The ratio of net income to the book value of the firm's total assets
% of managers' equity compensation	The ratio of the sum of the value of awards from grants of new stock options, restricted stocks, phantom stocks, and performance shares to total compensation
% of shares held by all outside blockholders	The sum of the percentages of equity held by individual investors, institutional investors, and corporations who own at least 5% of the common stock of the company
% of outside directors	The percentage of outside board directors who are neither top executives, retired executives, or former executives of the company nor relatives of the CEO
Std of % change in operating income	Measured with annual data in the proceeding five years

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Figure 1

This figure reports the adjusted R² of each the regressions based on observed firm and manager characteristics with time fixed effects only versus regressions based on observed firm and manager characteristics and time fixed effects, firm fixed effects, and manager fixed effects.

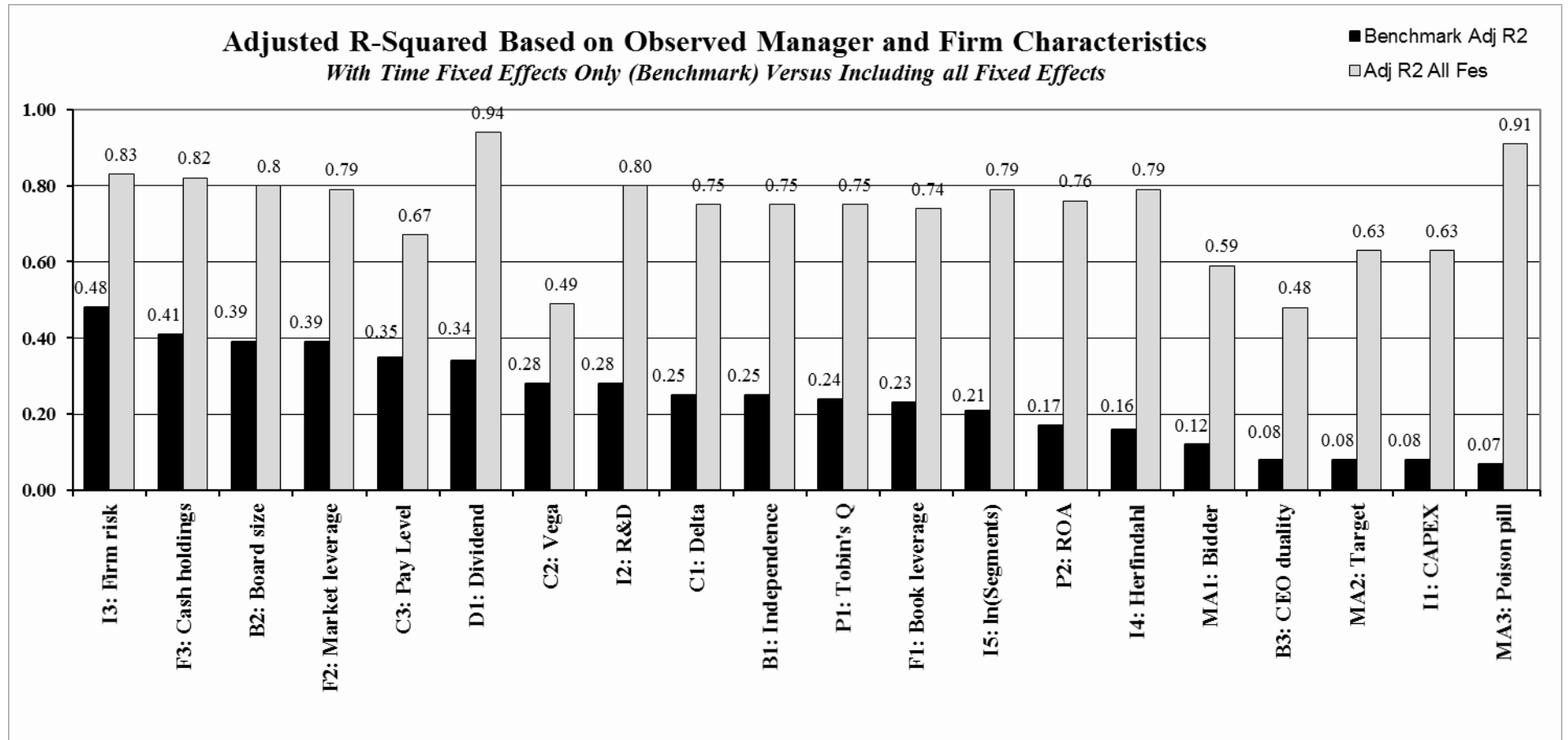


Figure 2

This figure reports the fractions of the model sum of squares attributable to observable firm characteristics in the regressions including all five classes of RHS variables: observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects.

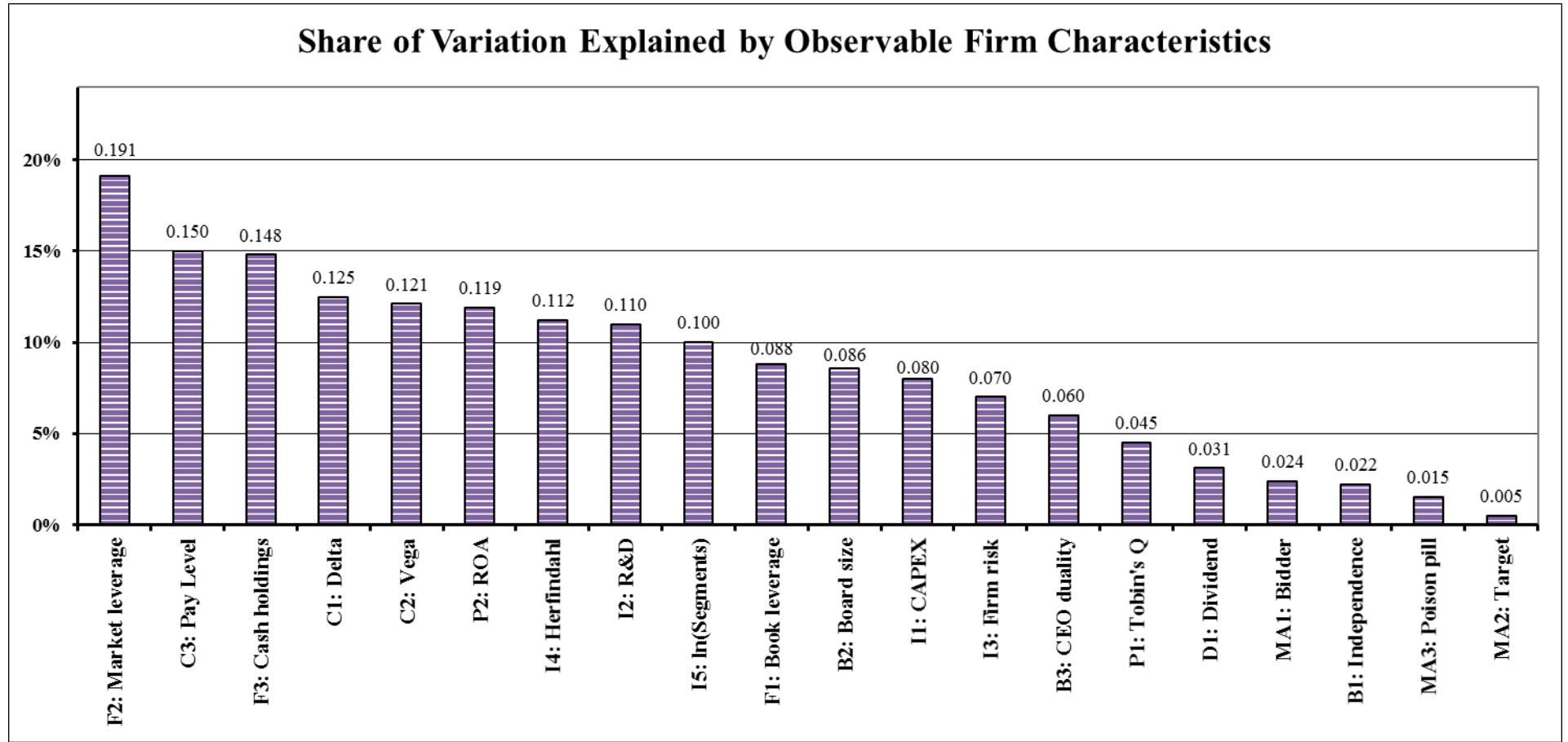


Figure 3

This figure reports the fractions of the model sum of squares attributable to observable manager characteristics in the regressions including all five classes of RHS variables: observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects.

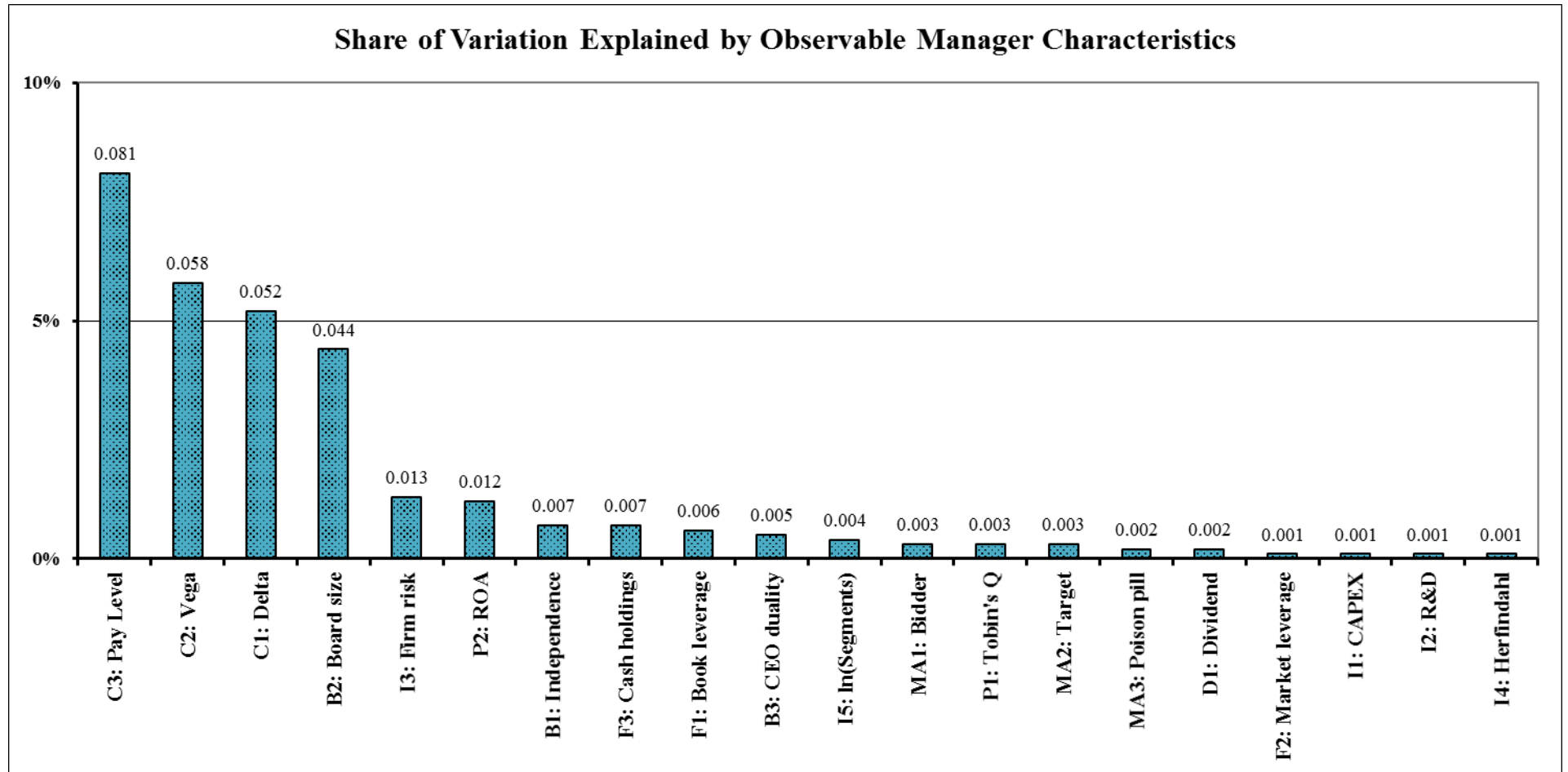


Figure 4

This figure reports the fractions of the model sum of squares attributable to unobserved firm characteristics in the regressions including all five classes of RHS variables: observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects.

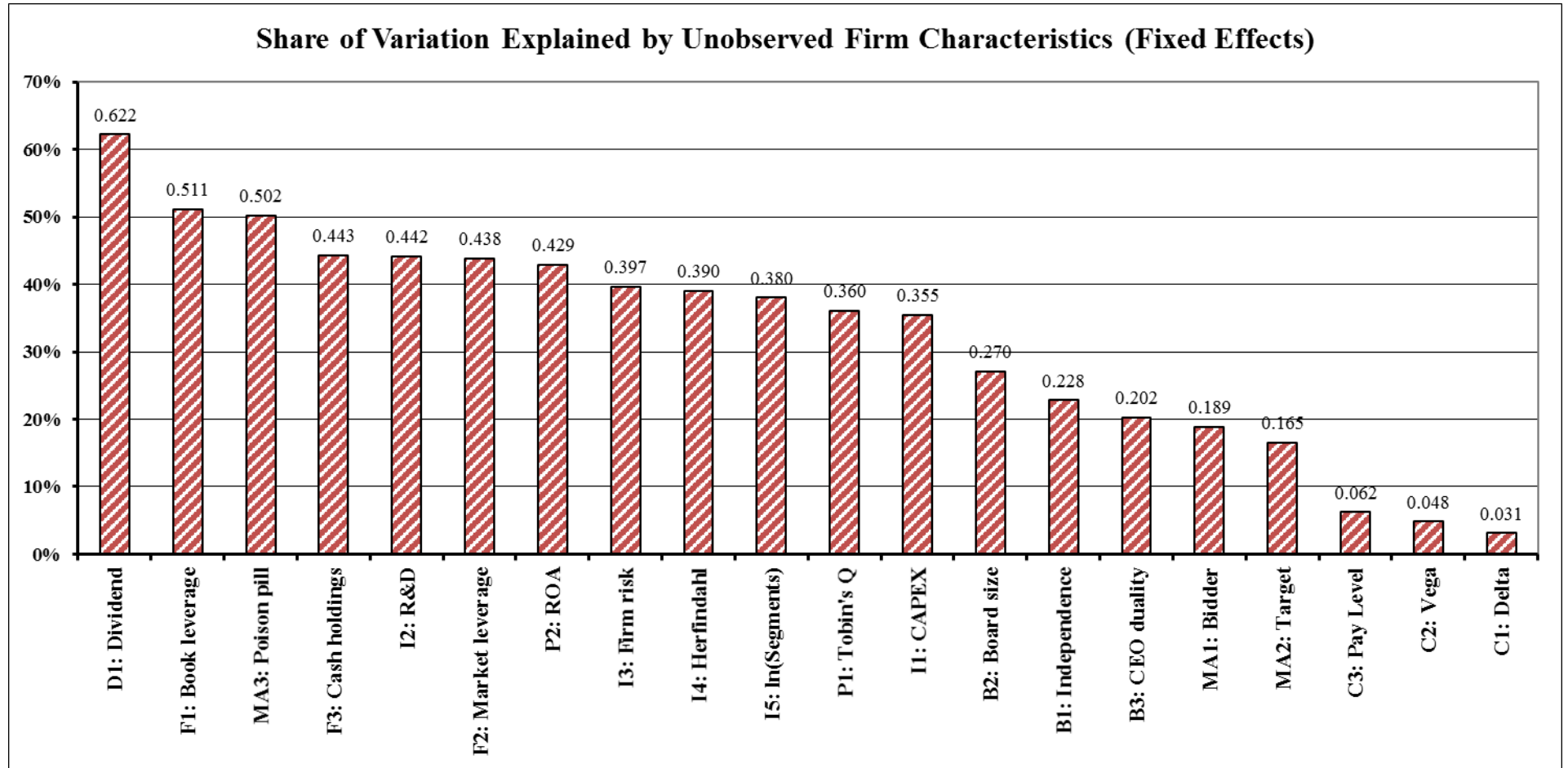


Figure 5

This figure reports the fractions of the model sum of squares attributable to unobserved manager characteristics in the regressions including all five classes of RHS variables: observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects.

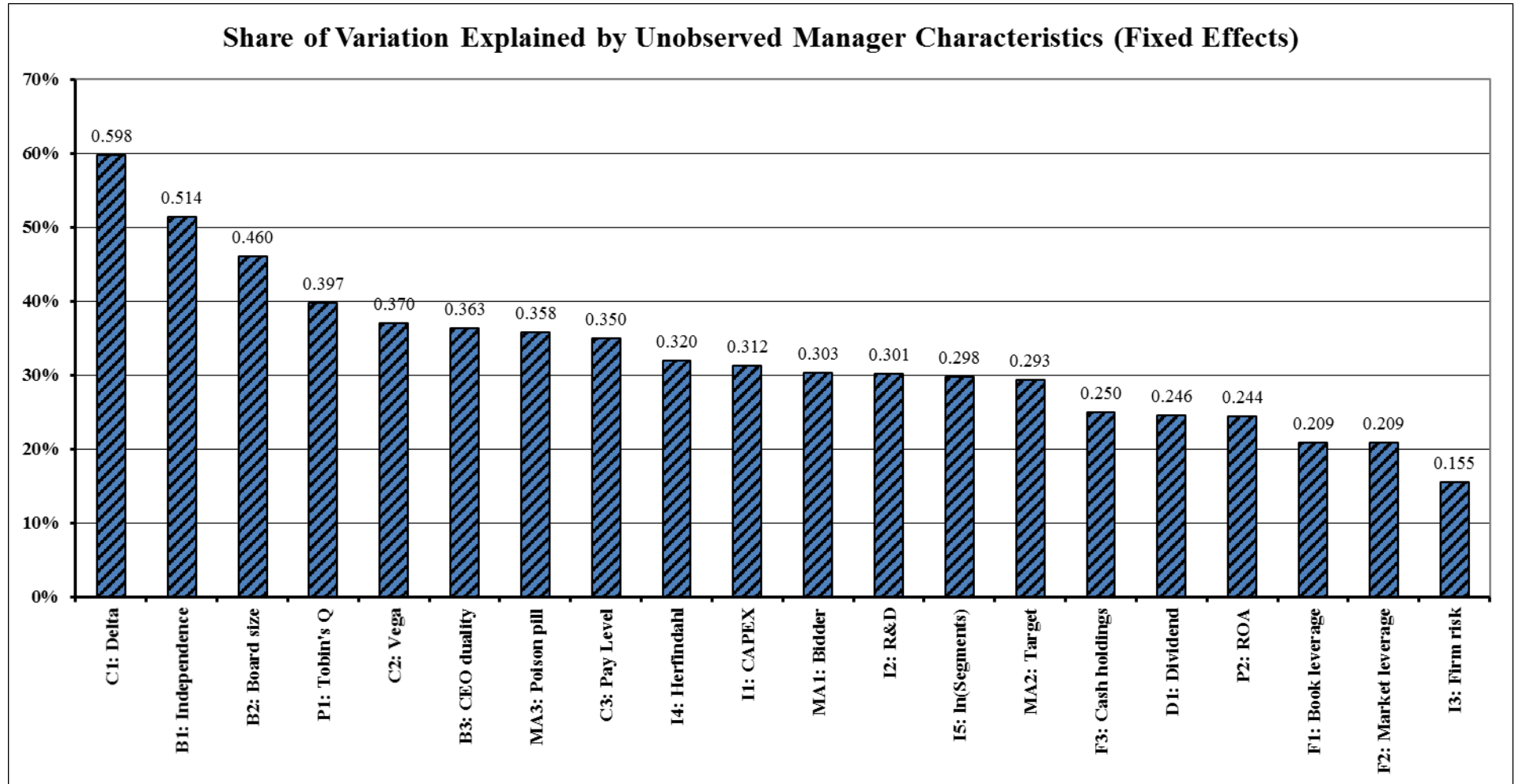


Figure 6

This figure reports the fractions of the model sum of squares attributable to year fixed effects in the regressions including all five classes of RHS variables: observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects.

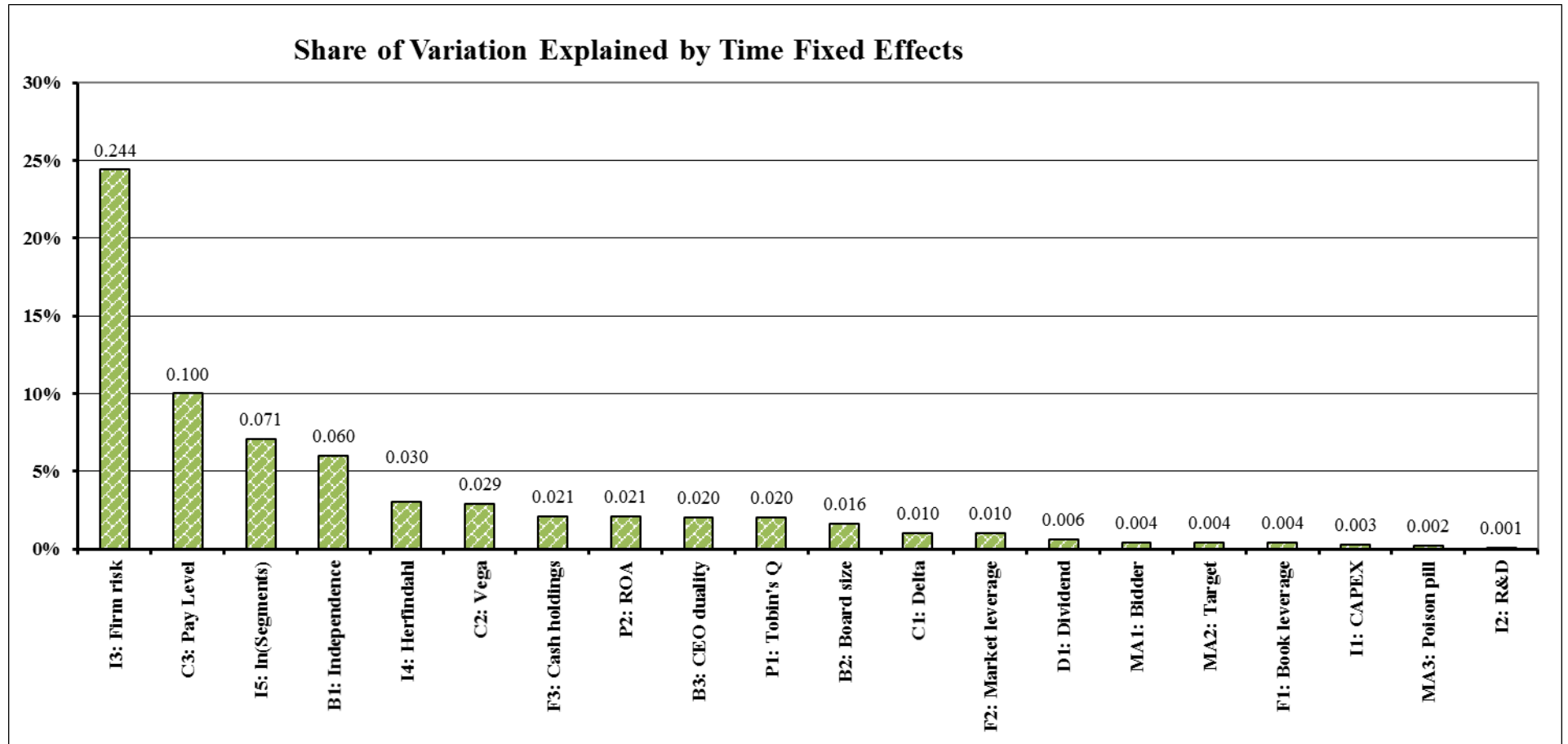


Figure 7

This figure reports the share in variation of the dependent variable of the five classes of variables and the residual. These components are the fractions of the model sum of squares attributable to particular components. Applying the connected groups method of Abowd, Karmariz, and Margolis (1999) allows separation of firm and manager fixed effects. In addition to the residual, the five remaining classes of variables are observable firm attributes, observable manager attributes, firm fixed effects, manager fixed effects, and year fixed effects.

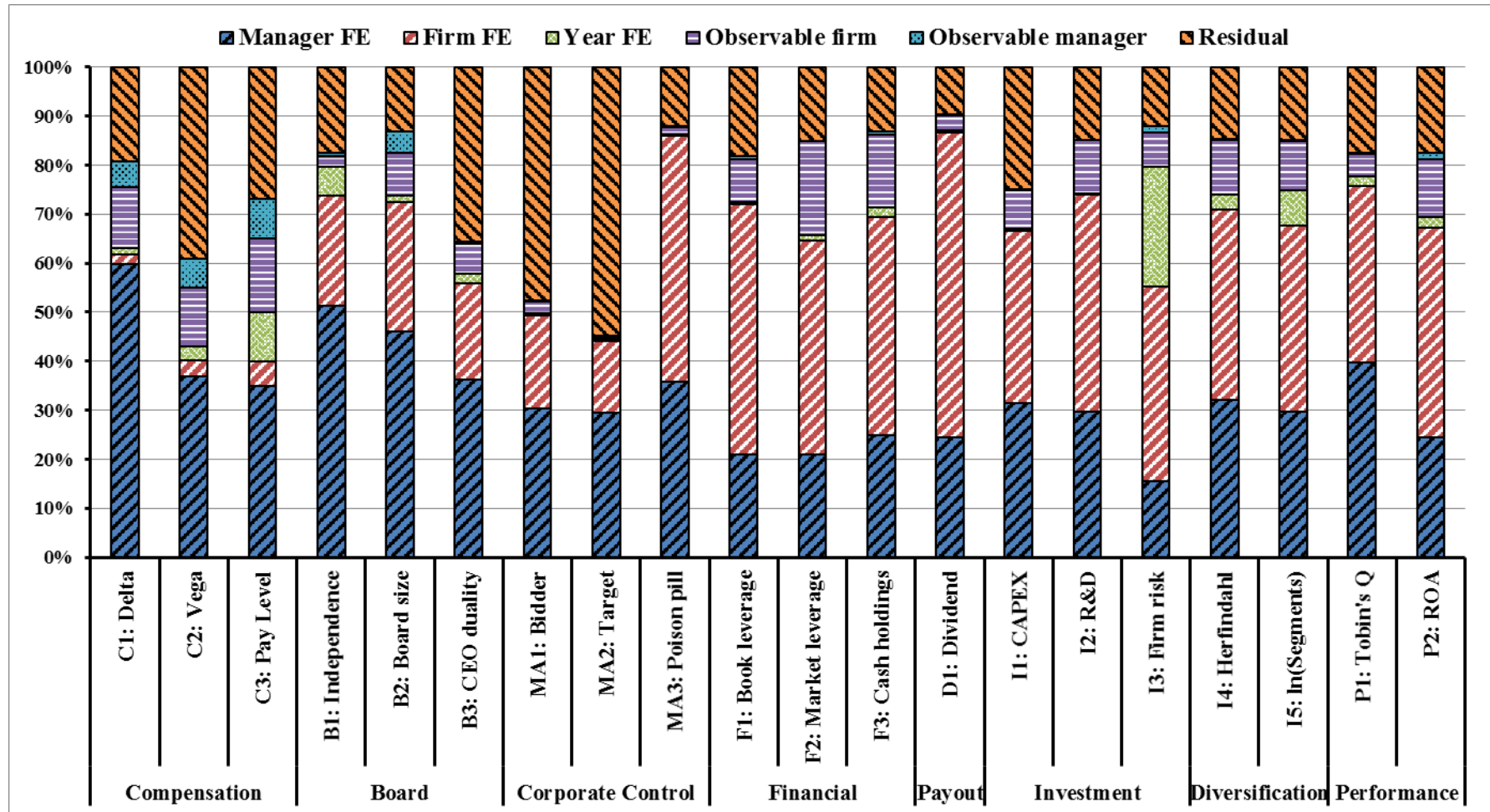


Figure 8

A taxonomy for placing this paper relative to others, using the example of research on executive compensation.

Theory →	Theory and Then → Empirics	← Empirics Supported by Theory	← Primarily Empirical
Modeling designed to describe/capture economic forces and associated outcomes/predictions	Modeling with direct empirical application to examine the efficacy of the model and whether the model identifies/captures relevant economic features of the problem	Empirical work supported with substantial/rigorous modeling in mathematical or other form.	Empirical experiments with the empirical design driven by conventional wisdom or guidance from prior literature or casual modeling.
Olmstrom (1979)	Coles/Lemmon/Wang (2010) Hennessy/Whited (2007)	Coles/ Daniel/Naveen (2006)	Jensen/Murphy (1990); Guay (1999)
←	←	←	This paper resides here. The intention is to provide useful guidance across the other three categories.

Table 1

Summary of results: an empirical examination of empirical corporate finance. NA = not applicable. Composition of total variation in the dependent variable attributable to (six) variable classes is reported as proportions. Composition of explained variation in the dependent variable attributable to (five) variable classes is reported as percentages.

	Contract Design			Other Corporate Governance		
Paper (Year/ T=Table/P=Panel/ C=Column/ M=Model)	Delta	Vega	Compensation Level	Board Independence	Board Size	Leadership Structure (Duality)
	Coles/Daniel/ Naveen (2006/ T 3/P A/C 3)	Coles/Daniel/ Naveen (2006/ T 3/P A/C 2)	Graham/Li/Qiu (2011/T 4/P A/C 1)	Linck/Netter/Yang (2008/T 4/C 2)	Linck/Netter/Yang (2008/T 4/M 1)	Linck/Netter/Yang (2008/T 4/M 3)
N; Adj. R²	5,352; 0.48	5,352; 0.20	65,421; 0.49	8,840; 0.17	10,636; 0.44	3,610; 0.116
Data Years	1992-2002	1992-2002	1992-2006	1990-2004	1990-2004	1990-2004
Dependent Variable	CEO ln(delta)	CEO vega	log(executive total pay)	Board independence	Board size	Board leadership
Notes	Industry year FE			Industry, year FE	Industry, year FE	Industry, year FE
Our Sample Based on AKM Connected Group Method (Data years 1993-2013)						
Sample Size	83,670	83,670	83,670	36,745	36,745	30,891
Dep. Variable	NEO delta	NEO vega	NEO total pay	Board Independence	Board Size	Board leadership
Adj.R²: No FEs	0.25	0.28	0.35	0.25	0.39	0.08
Adj. R²: Mgr and Firm FEs	0.75	0.49	0.67	0.75	0.80	0.48
Proportion of Total Variation Explained (Rank)/Proportion of Explained Variation Explained:						
Manager Attributes	0.052 (3)/6.37%	0.058 (2)/9.27%	0.081 (1)/10.90%	0.007 (7)/0.84%	0.044 (4)/5.02%	0.005 (10)/0.78%
Firm Attributes	0.124 (4)/15.32%	0.121 (4)/19.32%	0.150 (2)/20.19%	0.022 (18)/2.63%	0.086 (11)/9.81%	0.060 (14)/9.23%
Year FEs	0.010 (12)/1.23%	0.029 (6)/4.62%	0.100 (2)/13.46%	0.060 (4)/7.22%	0.016 (11)/1.82%	0.020 (9)/3.08%
Manager FEs	0.598 (1)/73.28%	0.370 (5)/59.10%	0.350 (8)/47.10%	0.514 (2)/59.70%	0.460 (3)/52.50%	0.363 (6)/55.85%
Firm FEs	0.031 (20)/3.80%	0.048 (19)/7.67%	0.062 (18)/8.34%	0.228 (14)/27.44%	0.270 (13)/30.82%	0.202 (15)/31.08%
Residual	0.186 (7)/NA	0.374 (3)/NA	0.257 (5)/NA	0.169 (10)/NA	0.124 (16)/NA	0.350 (4)/NA
Changes in Inference?	Firm risk, board independence	Age, R&D, firm risk, market-to- book	Age, R&D	Debt, firm age		

	Corporate Control			Financial Policy		
Paper (Year/ T=Table/P=Panel/ C=Column/ M=Model)	M&A Bidder	M&A Target	Takeover Protections (Pill)	Book Leverage	Market Leverage	Cash Holdings
		Harford (1999/T III/C 3)	Comment/Schwert (1995/T 3/C 1)	Comment/Schwert (1995/T 3/C 3)	Lemmon/Roberts/ Zender (2008/ T II/P A/C 3)	Lemmon/Roberts/ Zender (2008/ T II/P A/C 6)
N; Adj. R²	2,857	21,869	21,871	117,914;0.30	117,300	11,645;0.47
Data Years	1991-93	1977-1991	1977-1991	1965-2003	1965-2003	1993-2004
Dependent Variable	Bidder	Target	Poison pill	Book Leverage	Market Leverage	Cash holdings
Notes		Year FE	Year FE	Year FE	Year FE	
Our Sample Based on AKM Connected Group Method (Data years 1993-2013)						
Sample Size	64,428	48,365	48,365	73,629	73,629	63,698
Dep. Variable	Bidder	Target	Poison pill	Book Leverage	Market Leverage	Cash holdings
Adj.R²: No Fixed Effects	0.12	0.08	0.07	0.23	0.39	0.41
Adj. R²: Mgr and Firm FEs	0.58	0.63	0.91	0.74	0.79	0.82
Proportion of Total Variation Explained (Rank)/Proportion of Explained Variation Explained:						
Manager Attributes	0.003 (12)/0.57%	0.003 (14)/0.64%	0.002 (14)/0.23%	0.006 (9)/0.73%	0.001 (17)/0.13%	0.007 (8)/0.80%
Firm Attributes	0.024 (17)/4.59%	0.005 (20)/0.75%	0.015 (19)/1.70%	0.088 (10)/10.76%	0.191 (1)/22.50%	0.148 (3)/17.03%
Year Fixed Effects	0.004 (15)/0.76%	0.004 (15)/0.60%	0.002 (19)/0.23%	0.004 (17)/0.49%	0.010 (12)/1.17%	0.021 (7)/2.42%
Manager Fixed Effects	0.303 (11)/57.93%	0.293 (14)/62.34%	0.356 (8)/40.60%	0.209 (18)/25.55%	0.209 (19)/24.62%	0.250 (15)/28.77%
Firm Fixed Effects	0.189 (16)/36.14%	0.165 (17)/32.67%	0.50 (3)/57.24%	0.511 (2)/62.47%	0.438 (6)/51.57%	0.443(4)/50.97%
Residual	0.477 (2)/NA	0.530 (1)/NA	0.123 (18)/NA	0.182 (7)/NA	0.151 (12)/NA	0.131 (17)/NA
Changes in Inference?		Poison pill	Control share law, PE, size, CEO	log(sales)	Director	R&D, bond indicator

	Payout Policy	Investment Policy		
Paper (Year/ T=Table/P=Panel/ C=Column/ M=Model)	Dividend Payout	Capital Expenditure	R&D	Firm risk
	DeAngelo/ DeAngelo/Stulz (2006/T 3/ Row D6)	Coles/Daniel/ Naveen (2006/ T 3/P B/C 1)	Coles/Daniel/ Naveen (2006/ T 3/P A/C 1)	Coles/Daniel/Naveen (2006/ T 9/C 1)
N; Adj. R²		9,422; 0.29	9,551; 0.39	9,689; 0.39
Data Years	1973-2002	1992-2002	1992-2002	1992-2002
Dependent Variable	Dividend Payout	CAPEX	R&D	Firm risk
Notes	Industrial firms	Industry FE	Industry FE	Industry FE
Our Sample Based on AKM Connected Group Method (Data years 1993-2013)				
Sample Size	31,980	46,103	68,924	67,846
Dep. Variable	Dividend Payout	CAPEX	R&D	Firm risk
Adj.R²: No FEs	0.34	0.08	0.28	0.48
Adj. R²: Mgr and Firm FEs	0.94	0.63	0.80	0.83
Proportion of Total Variation Explained (Rank)/Proportion of Explained Variation Explained:				
Manager Attributes	0.002 (16)/0.22%	0.001 (18)/0.13%	0.001 (19)/0.12%	0.013 (5)/1.85%
Firm Attributes	0.031 (16)/3.41%	0.080 (12)/10.67%	0.110 (8)/12.87%	0.070 (13)/7.96%
Year FEs	0.006 (14)/0.67%	0.003 (18)/0.40%	0.001 (20)/0.12%	0.244 (1)/27.67%
Manager FEs	0.246 (16)/27.12%	0.312 (10)/41.60%	0.301 (12)/35.20%	0.155 (20)/17.63%
Firm FEs	0.622 (1)/68.58%	0.355 (12)/47.33%	0.442 (5)/51.70%	0.397 (8)/45.16%
Residual	0.093 (20)/NA	0.250 (6)/NA	0.145 (13)/NA	0.121 (19)/NA
Changes in Inference?	TE/TA, MTB	Vega, Surplus cash	Book Leverage	Book Leverage, director

	Diversification		Firm Performance	
Paper (Year/ T=Table/P=Panel/ C=Column/ M=Model)	Herfindahl Index	ln(segments)	Valuation Ratio (Tobin's Q)	Accounting (ROA)
	Coles/Daniel/Naveen (2006/ T 4/P A/C 1)	Coles/Daniel/Naveen (2006/ T 4/P B/C 1)	Mehran (1995/ T 4/P A/C 4)	Mehran (1995/ T 4/P B/C 4)
N; Adj. R²	4,219; 0.29	4,220; 0.32	153; 0.43	153; 0.30
Data Years	1992-2002	1992-2002	1979-1980	1979-1980
Dependent Variable	Herfindahl Index	ln(segments)	Tobin's Q	ROA
Notes	Industry FE	Industry FE	manufacturing firms	manufacturing firms
Our Sample Based on AKM Connected Group Method (Data years 1993-2013)				
Sample Size	61,825	61,825	31,918	31,918
Dep. Variable	Herfindahl Index	ln(segments)	Tobin's Q	ROA
Adj.R²: No FEs	0.16	0.21	0.23	0.17
Adj. R²: Mgr and Firm FEs	0.79	0.79	0.74	0.76
Proportion of Total Variation Explained (Rank)/Proportion of Explained Variation Explained:				
Manager Attributes	0.001 (17)/0.12%	0.004 (11)/0.49%	0.003 (12)/0.36%	0.012 (6)/1.45%
Firm Attributes	0.112 (7)/13.13%	0.100 (9)/11.72%	0.045 (14)/5.45%	0.119 (6)/14.42%
Year FEs	0.030 (6)/3.52%	0.071 (3)/8.32%	0.020 (8)/2.42%	0.021 (8)/2.54%
Manager FEs	0.320 (9)/37.51%	0.298 (13)/34.94%	0.397 (4)/48.12%	0.244 (16)/29.57%
Firm FEs	0.390 (9)/45.72%	0.380 (10)/44.55%	0.360 (11)/43.63%	0.429 (6)/52.00%
Residual	0.147 (14)/NA	0.147 (15)/NA	0.175 (9)/NA	0.175 (11)/NA
Changes in Inference?	Vega, Cash compensation, Sales growth, Age	Cash compensation, Sales growth, Age	Delta, % ind directors. Stdev operating income, log assets, Tenure	CEO

Table 2
Summary Statistics

This table presents summary statistics for the full sample of the cross-sectional yearly data from 1993 to 2013. Refer to the Appendix (Variable Definitions). All dollar values are stated in 2013 dollars. Delta is in \$millions for a 1 % change in equity value, vega is in \$millions per 0.01 change in standard deviation of stock return, and total compensation and net assets are in \$millions. Vega, delta, total compensation, and market-to-book are winsorized at the 1st and 99th percentile levels. The number of executive-year observations with no missing data values is 104,260 for the spell sample, 9,816 for the MDV sample, and 64,245 for the AKM sample.

	Mean	Median	Stdev
Managerial Attributes			
Age	52	51	7.85
Tenure	10	5	10.66
Female	0.06	0	0.24
CEO	0.16	0	0.36
Director	0.28	0	0.45
Mover	0.15	0	0.37
Coles, Daniel, and Naveen (2006) Variables			
Delta (\$ mil)	0.23	0.04	0.60
Vega (\$ mil)	0.05	0.01	0.09
Market-to-book	1.98	1.35	2.52
Firm risk	2.81	2.70	0.94
Log (Net Assets)	5.94	6.22	2.88
R&D	0.03	0	0.10
Surplus Cash	0.10	0.08	0.15
Board Independence	70.13	72.73	16.67
Institutional Holdings	56.84	60.10	22.80
ROA	0.13	0.10	0.14
PPE	0.27	0.18	0.26
CAPEX	0.05	0.03	0.07
Leverage	0.17	0.12	0.17
Sales growth	0.09	0.06	0.30
Cash compensation	0.75	0.50	1.10
Stock Return	0.01	0.001	0.55
Herfindahl Index	0.80	1.00	0.27
Dividend Cut	0.26	0	0.40
CEO Turnover	0.16	0	0.36
Ln(Segments)	0.48	0	0.03
Linck, Netter, and Yang (2008) Variables			
Board size	9.60	9	2.79
Board leadership	0.80	1	0.40
LogMVE	7.10	6.95	1.61
Debt	0.20	0.18	0.15
FirmAge	11.22	7.00	12.10
RETSTD	0.41	0.36	0.21
CEO_Own	0.53	0.07	0.27

Director_Own	0.96	0.90	0.83
FCF	0.08	0.06	0.10
Performance	0.004	0.004	0.02
Lag(CEO_Chair)	0.77	1	0.38
Harford (1999) Variables			
Bidder	0.14	0	0.32
Abnormal return	0.01	0.001	0.45
Noncash working capital	0.01	0.002	0.10
Price-to-earnings	15.93	14.61	14.02
Size	7.40	7.33	1.61
Comment and Schwert (1995) Variables			
Target	0.02	0	0.14
Liquidity	0.10	0.03	0.10
Debt/equity	0.20	0.20	0.17
Control share law	0.18	0	0.33
Business combination law	0.70	1	0.45
Poison pill	0.63	1	0.45
Lemmon, Roberts, and Zender (2008) Variables			
Initial book leverage	0.20	0.19	0.19
Initial market leverage	0.20	0.16	0.20
Profitability	0.12	0.13	0.13
Cash Flow Volatility	0.05	0.03	0.05
Tangibility	0.28	0.25	0.20
Dividend Payer	0.55	1	0.44
Harford, Mansi, and Maxwell (2008) Variables			
Cash Holdings	-2.68	-2.54	1.62
Gindex	9.20	9.00	2.70
Inside Ownership	0.002	0.001	0.004
Size	7.35	7.22	1.48
Working capital	0.08	0.06	0.18
CF Volatility	0.05	0.03	0.05
R&D	0.03	0	0.10
CapEx	0.05	0.03	0.07
Acquisition	0.03	0	0.06
Dividend indicator	0.55	1	0.44
Bond indicator	0.59	1	0.49
DeAngelo, DeAngelo, and Stulz (2006) Variables			
Dividend payout	0.55	1	0.46
RE/TE	0.42	0.03	0.23
TE/TA	0.56	0.40	0.61
Sales growth	0.09	0.06	0.30
Mehran (1995) Variables			
Tobin's Q	2.16	1.67	2.70

% of managers' equity compensation	0.56	0.60	0.23
% of shares held by all outside blockholders	0.17	0	0.30
% of outside directors	0.70	0.72	0.17
Std of % change in operating income	0.43	0.33	0.34

Table 3
Observable and Unobservable Determinants of Delta – Connectedness Sample with AKM Method

This table presents the results for specifications regressing managerial delta on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 3, Panel A, Column 3 in Coles, Daniel, and Naveen (2006) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of delta explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: Delta

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
Tenure	0.011*** (29.31)	0.013*** (30.97)	0.007*** (7.28)	0.000 (0.30)
Age	0.002*** (6.28)	0.004*** (10.84)	0.014*** (11.24)	0.015*** (11.55)
Female	-0.031*** (-3.44)	-0.038*** (-3.70)	N/A	N/A
CEO	0.248*** (32.63)	0.250*** (35.08)	0.095*** (14.81)	0.088*** (13.22)
Director	0.220*** (29.40)	0.194*** (26.69)	0.076*** (10.35)	0.056*** (7.28)
Surplus Cash	-0.112*** (-5.18)	-0.130*** (-4.94)	-0.088*** (-3.79)	-0.050* (-1.80)
Leverage	-0.205*** (-18.11)	-0.140*** (-8.59)	-0.155*** (-10.87)	-0.152*** (-10.24)
R & D	-0.049** (-2.07)	-0.147*** (-3.48)	-0.052** (-1.96)	-0.057** (-1.97)
Market-to-Book	0.078*** (70.15)	0.074*** (36.24)	0.070*** (42.65)	0.070*** (42.01)
Firm Risk	0.186*** (11.21)	-0.122*** (-4.81)	-0.071*** (-3.97)	-0.127*** (-5.50)
Board Independence	-0.233*** (-13.91)	0.068*** (3.27)	0.005 (0.33)	0.010 (0.81)

Institutional Holdings	-0.001*** (-5.33)	-0.000 (-0.66)	-0.000 (-0.58)	-0.000 (-0.18)
Log(NetAssets)	0.088*** (60.57)	0.098*** (23.05)	0.120*** (38.80)	0.152*** (38.80)
Year FE	Yes	Yes	Yes	Yes
Adjusted R ²	0.25	0.37	0.73	0.75
N	83,670	83,670	83,670	83,670

Panel B:
Relative Importance of Components in Determining Delta (Panel A, Model (4))

	$\frac{\text{cov}(\text{delta}, \text{component})}{\text{var}(\text{delta})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.124	15.32%
Observable Manager Characteristics	0.052	6.37%
Firm Fixed Effects	0.031	3.80%
Manager Fixed Effects	0.598	73.28%
Year Fixed Effects	0.010	1.23%
Residual	0.186	

Table 4
Observable and Unobservable Determinants of Vega – Connectedness Sample with AKM Method

This table presents the results for specifications regressing managerial vega on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 3, Panel A, Column 2 in Coles, Daniel, and Naveen (2006) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of vega explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Dependent variable: Vega

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
Tenure	0.001*** (5.14)	0.001*** (7.25)	0.001*** (4.16)	0.001*** (4.15)
Age	-0.001*** (-8.89)	-0.000*** (-5.17)	0.001*** (4.13)	0.001*** (3.90)
Female	-0.005 (-1.04)	-0.005*** (-3.20)	N/A	N/A
CEO	0.045*** (36.25)	0.045*** (37.01)	0.029*** (17.68)	0.029*** (15.87)
Director	0.027*** (24.17)	0.028*** (23.51)	0.024*** (14.08)	0.024*** (12.00)
Surplus Cash	0.014*** (4.06)	-0.010* (-1.90)	0.002 (0.68)	0.000 (0.11)
Leverage	-0.035*** (-16.87)	-0.015*** (-5.56)	-0.017*** (-5.22)	-0.015*** (-4.98)
R & D	0.090*** (19.76)	0.007 (0.90)	-0.006 (-0.87)	-0.006 (-0.92)
Market-to-Book	0.008*** (33.47)	0.001*** (3.15)	0.000 (0.10)	-0.001** (-2.33)
Firm Risk	0.008 (1.49)	-0.050*** (-12.18)	-0.042*** (-7.70)	-0.042*** (-7.81)
Board Independence	0.013*** (4.63)	0.015*** (4.52)	0.015*** (3.88)	0.016*** (4.10)
Institutional	-0.000***	-0.000	-0.000	0.000

Holdings	(-2.77)	(-0.94)	(-0.73)	(0.57)
Log (NetAssets)	0.026*** (98.01)	0.025*** (35.91)	0.022*** (28.41)	0.023*** (23.68)
Year FE	Yes	Yes	Yes	Yes
Adjusted R ²	0.28	0.40	0.47	0.49
N	83,670	83,670	83,670	83,670

Panel B:

Relative Importance of Components in Determining Vega (Panel A, Model (4))

	$\frac{\text{cov}(vega, component)}{\text{var}(vega)}$	% of R ² attributable to the component
Observable Firm Characteristics	0.121	19.32%
Observable Manager Characteristics	0.058	9.27%
Firm Fixed Effects	0.048	7.67%
Manager Fixed Effects	0.370	59.10%
Year Fixed Effects	0.029	4.62%
Residual	0.374	

Table 5
Observable and Unobservable Determinants of Executive Pay Level – Connectedness Sample with AKM Method

This table presents the results for specifications regressing executive total compensation on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 4, Panel A, Column 1 in Graham, Li, and Qiu (2011) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of pay level explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: Total Compensation

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
Tenure	-0.016*** (-9.16)	-0.007*** (-3.44)	-0.014*** (-2.41)	0.001 (0.08)
Age	-0.010*** (-6.90)	-0.009*** (-3.46)	0.058*** (5.94)	0.053*** (5.42)
Female	-0.028 (-0.82)	-0.187*** (-3.54)	N/A	N/A
CEO	1.912*** (46.93)	1.830*** (45.78)	0.957*** (18.40)	0.872*** (16.09)
Director	1.341*** (35.14)	1.340*** (34.79)	1.322*** (22.76)	1.180*** (19.72)
Surplus Cash	0.201 (1.19)	-0.481*** (-3.06)	-0.155 (-0.85)	-0.221 (-1.09)
Leverage	-1.170*** (-16.57)	-1.081*** (-12.43)	-1.022*** (-9.83)	-1.022*** (-9.81)
R & D	2.149*** (12.81)	-0.181 (-0.88)	-0.281 (-1.10)	-0.334 (-1.29)
Q	0.495*** (56.92)	0.465*** (35.12)	0.481*** (36.12)	0.499*** (36.42)
Firm Risk	3.077*** (31.01)	1.080*** (7.73)	2.522*** (14.30)	2.057*** (10.54)
Board Independence	0.172* (1.99)	0.452*** (3.80)	0.391*** (3.11)	0.507*** (3.84)

Institutional Holdings	-0.001 (-1.17)	-0.000 (-0.09)	0.002 (0.81)	0.002* (1.82)
Log(NetAssets)	1.060*** (126.06)	1.088*** (44.98)	0.924*** (37.37)	1.018*** (31.85)
Year FE	Yes	Yes	Yes	Yes
Adjusted R ²	0.35	0.47	0.64	0.67
N	83,670	83,670	83,670	83,670

Panel B:
Relative Importance of Components in Determining Pay Level

	$\frac{\text{cov}(\text{PayLevel}, \text{component})}{\text{var}(\text{PayLevel})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.150	20.19%
Observable Manager Characteristics	0.081	10.90%
Firm Fixed Effects	0.062	8.34%
Manager Fixed Effects	0.350	47.10%
Year Fixed Effects	0.101	13.82%
Residual	0.257	

Table 6
Observable and Unobservable Determinants of Board Independence – Connectedness Sample with AKM Method

This table presents the results for specifications regressing board independence on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 4, Column 2 in Linck, Netter, and Yang (2008) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of board independence explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: Board Independence

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
LogMVE	0.014*** 17.12	0.012*** 8.58	0.008*** 5.24	0.008*** 5.08
Debt	0.037*** 6.24	-0.010* -1.69	-0.019** -2.53	-0.019** -2.51
Log(Segments)	0.018*** 13.81	0.016*** 10.08	0.016*** 8.40	0.015*** 7.66
FirmAge	-0.008*** -13.45	N/A	0.005*** 2.73	N/A
FirmAge ²	0.000*** 16.90	N/A	-0.000** -1.97	N/A
MTB	-0.009*** -12.11	-0.003*** -4.21	-0.001 -1.10	-0.000 -0.63
R&D	0.093*** 5.07	0.021 0.81	-0.025 -0.85	0.014 0.45
RETSTD	-0.051*** -8.44	-0.015*** -3.71	-0.028*** -4.93	-0.025*** -3.94
CEO_Own	-0.433*** -10.35	0.000 0.00	0.012 0.33	-0.011 -0.19
Director_Own	0.568*** 47.72	0.340*** 31.55	0.358*** 27.70	0.330*** 25.73
FCF	0.144*** 12.32	0.024** 2.68	0.004 0.46	0.004 0.45

Performance	-0.054*** -6.50	-0.008 -0.77	-0.013* -1.66	-0.013* -1.66
Lag(CEO_Chair)	0.049*** 23.00	0.023*** 12.04	0.022*** 10.32	0.018*** 8.75
Age	0.000 0.85	0.000* 1.82	0.002*** 2.78	0.002*** 2.74
Tenure	-0.001*** -3.40	0.000 0.05	-0.000 -0.79	-0.000 -0.20
Female	-0.003 -0.99	-0.001 -0.33	N/A	N/A
Mover	0.015*** 5.84	0.005*** 3.89	N/A	N/A
CEO	0.071*** 21.10	0.018*** 7.94	0.013*** 4.00	0.012*** 3.51
Director	-0.057*** -17.55	-0.028*** -11.25	-0.039*** -11.44	-0.036*** -10.37
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.25	0.73	0.73	0.75
N	36,745	36,745	36,745	36,745

**Panel B:
Relative Importance of Components in Determining Board Independence**

	$\frac{\text{cov}(\text{BoardIndependence}, \text{component})}{\text{var}(\text{BoardIndependence})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.022	2.63%
Observable Manager Characteristics	0.007	0.84%
Firm Fixed Effects	0.228	27.44%
Manager Fixed Effects	0.514	59.70%
Year Fixed Effects	0.060	7.22%
Residual	0.169	

Table 7
Observable and Unobservable Determinants of Board Size – Connectedness Sample with AKM Method

This table presents the results for specifications regressing board size on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 4, Column 1 in Linck, Netter, and Young (2008) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of board size explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: Board Size

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
LogMVE	0.591*** 59.07	0.270*** 14.22	0.341*** 15.70	0.233*** 9.75
Debt	1.217*** 15.94	0.031 0.30	0.272*** 2.55	0.080 0.73
Log(Segments)	0.214*** 11.85	0.118*** 5.30	0.133*** 5.08	0.118*** 4.40
FirmAge	-0.112*** -11.81	N/A	0.050 0.97	N/A
FirmAge ²	0.003*** 16.89	N/A	0.001 1.30	N/A
MTB	-0.259*** -24.08	-0.156*** -15.90	-0.157*** -12.08	-0.122*** -9.58
R&D	-2.651*** -11.75	0.258 0.68	0.263 0.66	0.151 0.30
RETSTD	-1.066*** -13.80	-0.438*** -6.81	-0.418*** -5.02	-0.321*** -4.50
CEO_Own	-3.047*** -5.32	-0.846** -2.50	-1.660*** -2.86	-1.137* -1.82
Director_Own	-3.142*** -18.72	-2.248*** -14.37	-2.332*** -12.54	-2.177*** -12.10
Age	0.008*** 3.51	0.003 1.45	0.003 0.51	-0.004 -0.84
Tenure	0.017***	0.005***	0.030***	0.077***

	5.54	3.41	4.55	8.70
Female	0.240*** 4.58	0.027 0.50	N/A	N/A
Mover	0.028 0.88	0.029 1.74	N/A	N/A
CEO	-0.455*** -9.83	-0.141*** -5.17	-0.320*** -6.97	-0.277*** -6.16
Director	0.434*** 10.54	0.093*** 3.81	0.167*** 3.60	0.319*** 6.77
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.39	0.79	0.78	0.80
N	36,745	36,745	36,745	36,745

Panel B:
Relative Importance of Components in Determining Board Size

	$\frac{\text{cov}(\text{BoardSize}, \text{component})}{\text{var}(\text{BoardSize})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.086	9.81%
Observable Manager Characteristics	0.044	5.02%
Firm Fixed Effects	0.270	30.82%
Manager Fixed Effects	0.460	52.50%
Year Fixed Effects	0.016	1.82%
Residual	0.124	

Table 8
Observable and Unobservable Determinants of Board Leadership – Connectedness Sample with AKM Method

This table presents the results for specifications regressing board leadership (i.e., CEO/Chair duality) on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a logistic regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 4, Column 3 in Linck, Netter, and Young (2008) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, Model (4) includes both firm and manager fixed effects, and Model (5) is a linear probability model (LPM) with both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (5) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of board leadership explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:

Dependent variable: Board Leadership

	(1) Logistic (no firm or manager FE)	(2) Logistic Firm FE (no manager FE)	(3) Logistic Manager FE (no firm FE)	(4) Logistic Firm & Manager FE	(5) LPM Firm & Manager FE
LogMVE	0.340*** 26.22	0.175*** 3.02	0.306*** 4.18	0.135 1.40	0.025*** 4.11
MTB	-0.224*** -15.51	-0.110*** -3.47	-0.228*** -5.49	-0.118*** -2.42	-0.011*** -3.25
R&D	0.167 0.24	0.841 0.55	1.448 1.22	2.837* 1.89	0.184* 1.80
RETSTD	-0.624*** -5.84	-0.343 -1.21	-0.357 -1.07	-0.288 -0.75	0.006 0.27
Performance	-0.497*** -4.14	-1.384*** -5.33	-1.509*** -4.87	-1.261*** -3.10	-0.059*** -2.90
Age	0.002 0.45	0.011** 2.36	0.016 0.77	0.016 0.50	0.003 0.52
Tenure	0.002 0.19	-0.000 -0.00	0.017 0.85	0.002 0.33	0.001 0.62
Female	0.242*** 2.88	0.070 0.51	N/A	N/A	N/A
Mover	0.145*** 3.73	-0.023 -0.33	N/A	N/A	N/A
CEO	0.155** 2.74	0.097 1.11	0.080 0.41	0.190 1.04	0.002 0.18
Director	-0.008 -0.00	-0.301*** -3.44	-0.990*** -5.73	-0.834*** -4.54	-0.079*** -4.55

Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.08	0.62	0.65	0.68	0.48
N	30,891	30,891	30,891	30,891	30,891

Panel B:

Relative Importance of Components in Determining Board Leadership

	$\frac{\text{cov}(\text{BoardLeadership}, \text{component})}{\text{var}(\text{BoardLeadership})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.060	9.23%
Observable Manager Characteristics	0.005	0.78%
Firm Fixed Effects	0.202	31.08%
Manager Fixed Effects	0.363	55.85%
Year Fixed Effects	0.020	3.08%
Residual	0.350	

Table 9
Observable and Unobservable Determinants of Bidder Dummy – Connectedness Sample with AKM Method

This table presents the results for specifications regressing bidder dummy on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The dependent variable is one if the firm announces a bid in year t and zero otherwise. The benchmark specification (model (1) in Panel A) is a probit regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table III, Column 3 in Harford (1999) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, Model (4) includes both firm and manager fixed effects, and Model (5) is a linear probability model (LPM) with both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (5) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of bidder dummy explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:

Dependent variable: Bidder dummy

	(1) Probit (no firm or manager FE)	(2) Probit Firm FE (no manager FE)	(3) Probit Manager FE (no firm FE)	(4) Probit Firm & Manager FE	(5) LPM Firm & Manager FE
Abnormal return	0.024* 1.89	0.018* 1.64	0.018* 1.58	0.015* 1.84	0.003*** 5.90
Sales growth	0.511*** 17.87	0.420*** 9.54	0.251** 2.87	0.275*** 2.70	0.022*** 3.27
Noncash working capital	0.357*** 2.48	0.105 1.22	0.001 0.00	0.007 0.00	0.020 0.94
Leverage	-1.118*** -18.07	-2.360*** -17.85	-4.596*** -15.41	-4.279*** -13.00	-0.182*** -10.79
Market-to-book	0.067*** 41.34	0.094*** 8.70	0.227*** 27.48	0.155*** 6.18	0.024*** 11.77
Price-to-earnings	0.021*** 3.98	-0.005*** -3.41	-0.009*** -3.83	-0.008*** -2.99	-0.002** -2.13
Size	0.186*** 25.19	0.270*** 8.80	0.220*** 4.17	0.789*** 28.79	0.067*** 13.50
Manager's delta	0.000*** 3.10	0.000* 1.68	0.000 0.35	0.000 0.68	0.000*** 2.61
Age	-0.001 -1.08	0.001 0.44	-0.011 -0.97	0.005 0.56	0.003 0.59
Tenure	0.001 1.09	-0.000 -0.29	0.045*** 3.73	0.011 0.48	0.005 1.08

Female	-0.034 -0.55	-0.041 -0.69	N/A	N/A	N/A
Mover	0.009 0.86	-0.058 -1.03	N/A	N/A	N/A
CEO	0.011 0.15	0.020 0.25	-0.020 -0.31	0.009 0.22	0.001 0.29
Director	-0.085** -1.94	-0.068 -1.18	-0.279** -2.55	-0.097 -1.11	-0.019 -1.20
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.12	0.55	0.56	0.59	0.38
N	64,428	64,428	64,428	64,428	64,428

Panel B:
Relative Importance of Components in Determining Bidder

	$\frac{\text{cov}(\text{bidder}, \text{component})}{\text{var}(\text{bidder})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.024	4.59%
Observable Manager Characteristics	0.003	0.57%
Firm Fixed Effects	0.189	36.14%
Manager Fixed Effects	0.303	57.93%
Year Fixed Effects	0.004	0.76%
Residual	0.477	

Table 10
Observable and Unobservable Determinants of Target Dummy – Connectedness Sample with AKM Method

This table presents the results for specifications regressing bidder dummy on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The dependent variable is one if the firm is announced to be a target of a successful tender offer, merger proposal, or merger agreement in year t and zero otherwise. The benchmark specification (model (1) in Panel A) is a probit regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 3, Column 1 in Comment and Schwert (1995) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, Model (4) includes both firm and manager fixed effects, and Model (5) is a linear probability model with both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (5) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of target dummy explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: Target dummy

	(1) Probit (no firm or manager FE)	(2) Probit Firm FE (no manager FE)	(3) Probit Manager FE (no firm FE)	(4) Probit Firm & Manager FE	(5) OLS Firm & Manager FE
Poison pill	0.131*** 2.81	-0.461** -2.38	-0.207 -0.75	-0.641** -2.42	-0.010 -1.39
Control share law	-0.277*** -5.80	0.073 0.00	-0.344*** -3.76	-0.112 -0.05	-0.002 -0.13
Business combination law	-0.054 -0.79	0.319 0.40	1.087 1.38	-0.094 -0.05	0.005 0.19
Abnormal return	0.381** 2.14	0.322*** 2.60	0.385*** 2.99	0.434*** 3.15	0.040** 2.73
Sales growth	-0.000 -0.00	-0.381 -1.10	-0.599* -1.87	-0.487 -1.09	-0.011** -2.48
Liquidity	0.035** 3.11	0.573*** 6.48	0.670*** 5.51	0.822*** 5.12	0.051*** 3.87
Debt/equity	0.051 0.48	-0.431 -0.86	-0.874 -1.14	-1.461 -1.18	-0.000 -0.04
Market-to-book	-0.044** -2.53	-0.591*** -6.71	-0.561*** -4.70	-0.596*** -4.78	-0.005*** -4.65
Price/earnings	0.001 0.82	-0.015* -1.84	-0.001 -0.00	-0.005 -0.66	-0.001 -0.73
Size	-0.107***	-0.290	-0.441**	-0.071	-0.001

	-7.76	-1.59	-2.17	-0.25	-0.91
Age	0.001 0.12	0.004 0.19	-0.004 -0.20	-0.015 -0.12	0.000 0.51
Tenure	-0.006 -1.24	0.012 1.09	0.071 1.14	0.024 0.10	-0.000 -0.27
Female	0.181*** 3.17	0.246* 1.80	N/A	N/A	N/A
Mover	0.155*** 3.61	-0.117 -0.82	N/A	N/A	N/A
CEO	0.050 0.31	0.091 0.40	-0.119 -0.28	-0.108 -0.39	0.000 0.12
Director	-0.088 -1.29	-0.061 -0.38	0.127 0.24	-0.141 -0.15	-0.002 -0.36
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.08	0.57	0.63	0.63	0.29
N	48,365	48,365	48,365	48,365	48,365

Panel B:
Relative Importance of Components in Determining Target

	$\frac{\text{cov}(\text{target}, \text{component})}{\text{var}(\text{target})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.005	0.75%
Observable Manager Characteristics	0.003	0.64%
Firm Fixed Effects	0.165	32.67%
Manager Fixed Effects	0.293	62.34%
Year Fixed Effects	0.004	0.60%
Residual	0.530	

Table 11
Observable and Unobservable Determinants of Poison Pill – Connectedness Sample with AKM Method

This table presents the results for specifications regressing bidder dummy on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The dependent variable is one if the firm adopts poison pill in year t and zero otherwise. The benchmark specification (model (1) in Panel A) is a probit regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 3, Column 4 in Comment and Schwert (1995) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, Model (4) includes both firm and manager fixed effects, and Model (5) is a linear probability model with both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (5) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of poison pill explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:

Dependent variable: Poison pill dummy

	(1) Probit (no firm or manager FE)	(2) Probit Firm FE (no manager FE)	(3) Probit Manager FE (no firm FE)	(4) Probit Firm & Manager FE	(5) OLS Firm & Manager FE
Control share law	0.084*** 5.57	-1.538*** -7.75	-0.598*** -2.84	-2.708*** -5.36	-0.148*** -5.20
Business combination law	0.618*** 21.77	1.481*** 7.84	4.277*** 8.41	5.731*** 4.08	0.171*** 7.78
Abnormal return	0.611*** 4.64	0.624*** 2.48	0.174*** 2.57	0.071 0.42	-0.025 -0.54
Sales growth	-0.194*** -5.80	-0.068 -1.24	-0.074 -0.57	-0.300** -2.19	-0.031*** -2.94
Liquidity	-0.076 -1.21	-0.824*** -3.95	-0.698* -1.74	-1.770*** -2.97	-0.071 -0.92
Debt/equity	-0.000 -0.07	0.397** 2.20	0.789** 2.51	0.712* 1.91	0.045** 2.35
Market-to-book	-0.086*** -20.74	0.015 0.67	-0.236*** -6.16	0.022 0.40	-0.010* -1.71
Price/earnings	0.058*** 30.57	-0.000 -0.37	-0.007*** -2.92	-0.008*** -3.43	-0.005*** -3.23
Size	0.055*** 31.14	-0.281*** -6.79	-0.724*** -7.60	-0.756*** -5.88	-0.022*** -4.02
Age	0.005*** 3.76	0.005 0.84	0.100 1.55	-0.007 -0.42	0.004* 1.67

Tenure	0.005*** 3.54	0.018*** 4.55	-0.018 -0.96	0.124*** 3.27	0.008** 2.33
Female	-0.087** -2.48	-0.145** -2.20	N/A	N/A	N/A
Mover	0.128*** 6.24	0.075 1.25	N/A	N/A	N/A
CEO	0.120*** 4.76	-0.134 -1.27	-0.218 -1.33	-0.442** -2.91	-0.020** -2.48
Director	-0.085*** -3.71	0.055 0.82	0.294* 2.04	-0.192 -0.87	-0.012 -1.16
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.07	0.88	0.89	0.91	0.83
N	48,365	48,365	48,365	48,365	48,365

Panel B:
Relative Importance of Components in Determining Poison Pill

	$\frac{\text{cov}(PoisonPill, component)}{\text{var}(PoisonPill)}$	% of R ² attributable to the component
Observable Firm Characteristics	0.015	1.70%
Observable Manager Characteristics	0.002	0.23%
Firm Fixed Effects	0.500	57.24%
Manager Fixed Effects	0.356	40.60%
Year Fixed Effects	0.002	0.23%
Residual	0.123	

Table 12
Observable and Unobservable Determinants of Book Leverage – Connectedness Sample with AKM Method

This table presents the results for specifications regressing corporate book leverage on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table II, Panel A, Column 3 in Lemmon, Roberts, and Zender (2008) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of book leverage explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: Book Leverage

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
Initial book lev.	0.266*** 65.76	N/A	0.233*** 21.60	N/A
Log(Sales)	0.003*** 5.48	-0.004** -2.33	0.000 0.27	0.000 0.30
Market-to-book	-0.009*** -20.22	-0.007*** -12.57	-0.007*** -11.05	-0.007*** -11.03
Profitability	-0.128*** -18.46	-0.143*** -19.57	-0.105*** -13.29	-0.082*** -10.02
Tangibility	0.090*** 23.31	0.084*** 10.51	0.110*** 12.74	0.108*** 10.75
Industry median lev.	0.320*** 38.47	0.302*** 16.19	0.245*** 14.57	0.199*** 9.16
Dividend payer	0.020*** 12.41	0.012*** 5.20	0.010 0.73	0.005 1.27
Cash flow vol.	-0.109*** -7.44	0.008 0.25	-0.049** -2.08	-0.040** -2.01
Age	0.000 0.56	-0.000 -0.17	-0.000 -1.08	0.000 0.01
Tenure	-0.001*** -6.04	-0.000** -2.48	0.001*** 2.66	0.000 0.27
Female	0.001 0.37	-0.000 -0.30	N/A	N/A
Mover	-0.004*	0.001	N/A	N/A

	-1.64	0.55		
CEO	0.009*** 3.01	0.003 1.48	0.003 1.40	0.004* 1.78
Director	-0.003 -0.74	0.002 0.85	0.006* 1.79	0.006** 2.03
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.23	0.67	0.71	0.74
N	56,590	56,590	56,590	56,590

Panel B:
Relative Importance of Components in Determining Book Leverage

	$\frac{\text{cov}(\text{BookLeverage}, \text{component})}{\text{var}(\text{BookLeverage})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.088	10.76%
Observable Manager Characteristics	0.006	0.73%
Firm Fixed Effects	0.511	62.47%
Manager Fixed Effects	0.209	25.55%
Year Fixed Effects	0.004	0.49%
Residual	0.182	

Table 13
Observable and Unobservable Determinants of Market Leverage – Connectedness Sample with AKM Method

This table presents the results for specifications regressing corporate market leverage on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table II, Panel A, Column 6 in Lemmon, Roberts, and Zender (2008) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of market leverage explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: Market Leverage

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
Initial book lev.	0.265*** 67.24	N/A	0.250*** 23.30	N/A
Log(Sales)	0.012*** 20.77	0.018*** 16.45	0.014*** 11.35	0.024*** 15.33
Market-to-book	-0.036*** -59.86	-0.016*** -29.71	-0.016*** -26.94	-0.015*** -24.03
Profitability	-0.277*** -39.69	-0.255*** -35.98	-0.201*** -24.63	-0.187*** -22.24
Tangibility	0.063*** 16.43	0.027 1.40	0.058*** 6.64	0.034*** 2.89
Industry median lev.	0.390*** 47.65	0.509*** 28.65	0.429*** 25.88	0.408*** 18.95
Dividend payer	0.001 0.25	0.009*** 4.79	0.001 0.57	0.009*** 4.00
Cash flow vol.	-0.155*** -10.60	-0.108*** -6.65	-0.080*** -4.15	-0.083*** -4.54
Age	-0.000** -2.56	-0.000 -0.58	-0.001 -0.84	-0.001 -1.61
Tenure	-0.001*** -11.12	-0.000*** -3.24	-0.000 -1.77	0.000 0.60
Female	0.003 0.74	-0.000 -0.08	N/A	N/A

Mover	-0.010*** -4.26	-0.005 -1.65	N/A	N/A
CEO	0.012*** 4.77	0.003* 1.70	0.004** 2.02	0.005 1.08
Director	-0.006** -2.15	-0.000 -0.48	0.009*** 3.19	0.000 0.18
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.39	0.74	0.77	0.79
N	73,629	73,629	73,629	73,629

Panel B:

Relative Importance of Components in Determining Market Leverage

	$\frac{\text{cov}(\text{MarketLeverage}, \text{component})}{\text{var}(\text{MarketLeverage})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.191	22.50%
Observable Manager Characteristics	0.001	0.13%
Firm Fixed Effects	0.438	51.57%
Manager Fixed Effects	0.209	24.62%
Year Fixed Effects	0.010	1.17%
Residual	0.151	

Table 14
Observable and Unobservable Determinants of Cash Holdings – Connectedness Sample with AKM Method

This table presents the results for specifications regressing corporate cash holdings on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 3, Column 1 in Harford, Mansi, and Maxwell (2008) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of cash holdings explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:

Dependent variable: Natural logarithm of the ration of cash holdings to sales

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
Gindex	-0.030*** -12.48	-0.007** -2.00	-0.013*** -3.78	-0.003 -0.75
Inside Ownership	2.068*** 9.84	0.461*** 3.34	0.862*** 5.84	0.595*** 3.71
Pay sensitivity	0.255*** 3.35	0.184*** 3.64	0.185** 2.24	0.152** 2.18
Institutional ownership	0.115** 2.10	0.005 0.25	0.130** 2.28	0.084* 1.86
Size	-0.085* -1.85	-0.110*** -11.24	-0.125*** 11.25	-0.151*** -11.31
Leverage	-1.558*** -38.79	-0.262*** -7.52	-0.392*** -8.48	-0.196*** -4.45
Market-to-book	0.080*** 15.62	0.020*** 4.48	0.011* 1.85	0.006* 1.75
Cash flow	0.657*** 9.68	0.184*** 2.74	0.347*** 5.37	0.318*** 4.57
Working capital	-1.491*** -36.70	-0.637*** -12.86	-0.681*** -9.15	-0.482*** -4.88
CF volatility	4.264*** 28.51	0.884*** 6.20	0.797*** 4.68	0.278* 1.64
R&D	5.945*** 55.76	-0.968*** -7.84	-0.528*** -4.41	-0.741*** -6.93

CapEx	-3.622*** -26.08	-1.323*** -11.56	-1.306*** -10.16	-1.180*** 9.32
Acquisition	-2.311*** -22.85	-1.416*** -21.38	-1.180*** -16.28	-1.088*** -16.11
Dividend indicator	-0.465*** -32.10	-0.072*** -3.43	-0.091*** -4.82	-0.083*** -4.12
Bond indicator	-0.144*** -9.74	-0.049* -1.78	0.009 0.35	0.038** 2.25
Age	0.000 0.87	0.000 0.51	-0.006* -1.79	-0.010** -2.33
Tenure	-0.008*** -7.14	-0.006*** -4.74	-0.015*** -6.10	-0.026*** -7.40
Female	-0.051* -1.69	-0.002 -0.34	N/A	N/A
Mover	-0.026* -1.95	-0.011 -0.99	N/A	N/A
Director	-0.050*** -2.84	-0.027** -2.35	-0.028 -1.23	-0.028 -1.27
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.41	0.80	0.80	0.82
N	48,215	48,215	48,215	48,215

Panel B:
Relative Importance of Components in Determining Cash Holdings

	$\frac{\text{cov}(\text{CashHoldings}, \text{component})}{\text{var}(\text{CashHoldings})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.148	17.03%
Observable Manager Characteristics	0.007	0.80%
Firm Fixed Effects	0.443	50.97%
Manager Fixed Effects	0.250	28.77%
Year Fixed Effects	0.021	2.42%
Residual	0.131	

Table 15
Observable and Unobservable Determinants of Dividend Payout – Connectedness Sample with AKM Method

This table presents the results for specifications regressing corporate decision to pay dividends (a dummy variable) on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 3, Column 1 in DeAngelo, DeAngelo, Stulz (2006) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects, and Model (5) is a linear probability model with both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (5) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of dividend payout explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: Dividend Payout

	(1) Logistic (no firm or manager FE)	(2) Logistic Firm FE (no manager FE)	(3) Logistic Manager FE (no firm FE)	(4) Logistic Firm & Manager FE	(5) OLS Firm & Manager FE
RE/TE	1.685*** 6.76	-0.025 -0.78	0.008 0.07	-0.035 -0.87	-0.054 -0.38
TE/TA	-1.284*** -24.89	4.819*** 3.54	1.408 0.97	6.715*** 3.21	0.254*** 3.90
ROA	4.732*** 21.15	1.941*** 2.90	1.496* 1.84	2.233** 2.28	0.081*** 2.77
Sales growth	-1.258*** -48.71	-0.310* -1.94	-1.194*** -4.587	-0.855*** -3.17	-0.030*** -3.55
MTB	-0.084*** -4.48	0.108** 2.10	0.283*** 4.51	0.254*** 3.97	0.005*** 2.99
Log(assets)	0.463*** 80.50	1.173*** 10.34	1.320*** 12.01	0.924*** 4.99	0.040*** 5.95
Age	0.027*** 10.84	0.007 0.89	-0.011 -0.14	-0.105 -1.05	0.000 0.10
Tenure	0.021*** 5.33	0.125** 2.31	0.190*** 4.78	0.212*** 3.97	0.009*** 3.18
Female	-0.134** -2.08	-0.483*** -3.17	N/A	N/A	N/A
Mover	-0.038 -0.76	-0.274 -1.28	N/A	N/A	N/A
CEO	0.062	0.089	-0.384	-0.482	-0.002

	0.33	0.14	-1.04	-1.09	-0.57
Director	0.092	-0.025	-0.177	-0.375	-0.024***
	1.21	-0.10	-0.94	-1.25	-3.42
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.34	0.93	0.92	0.94	0.87
N	31,980	31,980	31,980	31,980	31,980

Panel B:

Relative Importance of Components in Determining Dividend Payout

	$\frac{\text{cov}(\text{Dividend}, \text{component})}{\text{var}(\text{Dividend})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.031	3.41%
Observable Manager Characteristics	0.002	0.22%
Firm Fixed Effects	0.622	68.58%
Manager Fixed Effects	0.246	27.12%
Year Fixed Effects	0.006	0.67%
Residual	0.093	

Table 16
Observable and Unobservable Determinants of CAPEX – Connectedness Sample with AKM Method

This table presents the results for specifications regressing corporate capital expenditure on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 3, Panel B, Column 1 in Coles, Daniel, and Naveen (2006) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of CAPEX explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: CAPEX

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
Vega	-0.008*** -3.76	0.006** 2.24	-0.005* -1.78	-0.002 -0.85
Delta	0.003*** 4.60	0.002*** 5.58	0.006*** 6.70	0.006*** 6.49
Cash compensation	0.000 1.21	-0.001** -2.12	-0.001** -1.80	-0.001** -2.25
Log(sales)	0.000 0.85	0.003*** 4.30	0.003*** 3.19	0.003*** 3.96
Market-to-book	0.003*** 9.16	0.003*** 17.20	0.002*** 9.55	0.002*** 9.34
Surplus cash	-0.015*** -4.46	0.010*** 4.37	0.010*** 3.99	0.013*** 3.71
Sales growth	0.016*** 14.74	0.006*** 8.45	0.004*** 4.30	0.003*** 3.23
Stock return	-0.000 -0.90	0.000 1.07	-0.000 -0.25	0.000 0.14
Book leverage	-0.005* -1.88	-0.015*** -8.41	-0.010*** -4.32	-0.010*** -4.24
Age	-0.000** -2.29	-0.000 -0.13	0.000 0.28	0.000 0.05
Tenure	0.000*** 5.19	-0.000 -1.88	-0.000 -1.09	-0.000 -0.78

Female	0.002** 2.19	0.000 0.13	N/A	N/A
Mover	-0.001 -0.61	0.003 0.92	N/A	N/A
CEO	-0.003*** -3.49	-0.000 -0.50	0.001 1.19	0.000 0.62
Director	0.001* 1.85	0.001 0.82	0.001 0.70	0.001 1.33
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.08	0.62	0.61	0.63
N	46,103	46,103	46,103	46,103

Panel B:
Relative Importance of Components in Determining CAPEX

	$\frac{\text{cov}(\text{CAPEX}, \text{component})}{\text{var}(\text{CAPEX})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.080	10.67%
Observable Manager Characteristics	0.001	0.13%
Firm Fixed Effects	0.355	47.33%
Manager Fixed Effects	0.312	41.60%
Year Fixed Effects	0.003	0.40%
Residual	0.250	

Table 17
Observable and Unobservable Determinants of R&D – Connectedness Sample with AKM Method

This table presents the results for specifications regressing corporate R&D investment on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 3, Panel A, Column 1 in Coles, Daniel, and Naveen (2006) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of R&D explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: R&D

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
Vega	0.068*** 19.44	0.013* 1.58	0.008 0.49	0.002 0.24
Delta	-0.008*** -3.15	-0.000 -0.26	0.000 0.31	0.000 0.15
Cash compensation	0.002*** 8.56	-0.000 -0.78	0.000 0.08	-0.000 -0.02
Log(sales)	-0.016*** -83.91	-0.010*** -22.80	-0.010 0.77	-0.010*** -14.60
Market-to-book	0.010*** 31.16	0.002*** 18.09	0.002*** 8.74	0.002*** 9.31
Surplus cash	0.189*** 62.90	0.052*** 21.65	0.049*** 25.91	0.063*** 25.29
Sales growth	-0.023*** -26.70	-0.013*** -17.47	-0.013*** -15.73	-0.012*** -13.04
Stock return	-0.001* -1.69	-0.000 -0.23	-0.000 -0.20	-0.000 -0.22
Book leverage	-0.023*** -13.67	0.013*** 8.76	0.009*** 6.12	0.013*** 6.79
Age	-0.000*** -2.80	0.000 0.01	-0.000 -1.74	0.000 0.47
Tenure	-0.000* -1.98	-0.000 -0.79	-0.000 -0.09	-0.000* -1.85

Female	-0.008*** -6.99	-0.003** -1.92	N/A	N/A
Mover	0.003*** 5.07	0.001 0.85	N/A	N/A
CEO	-0.001 -0.84	-0.001 -1.19	-0.001 -1.24	-0.001 -1.30
Director	-0.007*** -5.84	0.001 0.97	-0.001 -1.01	-0.001 -0.78
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.28	0.77	0.78	0.80
N	68,924	68,924	68,924	68,924

Panel B:
Relative Importance of Components in Determining R&D

	$\frac{\text{cov}(R \& D, \text{component})}{\text{var}(R \& D)}$	% of R ² attributable to the component
Observable Firm Characteristics	0.110	12.87%
Observable Manager Characteristics	0.001	0.12%
Firm Fixed Effects	0.442	51.76%
Manager Fixed Effects	0.301	35.20%
Year Fixed Effects	0.001	0.12%
Residual	0.145	

Table 18
Observable and Unobservable Determinants of Firm Risk – Connectedness Sample with AKM Method

This table presents the results for specifications regressing firm stock volatility on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 9, Column 1 in Coles, Daniel, and Naveen (2006) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of firm risk explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: Firm Risk

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
Vega	-0.305*** -8.90	-0.186*** -7.33	-0.198*** -6.28	-0.169*** -5.78
Delta	0.094*** 17.55	0.030*** 7.74	0.066*** 8.95	0.063*** 7.39
Cash compensation	-0.005** -2.23	-0.006*** -2.83	-0.010*** -3.55	-0.012*** -5.28
Log(sales)	-0.192*** -79.84	-0.130*** -25.13	-0.132*** -27.15	-0.089*** -12.80
Market-to-book	-0.025*** -12.11	-0.013*** -3.84	-0.015*** -6.89	-0.015*** -6.25
R&D	2.652*** 55.13	0.469*** 9.42	0.429*** 8.40	0.311*** 4.67
CAPEX	0.620*** 10.11	-0.054 -0.43	0.085 1.20	0.079 1.13
Book leverage	-0.076*** -3.03	0.314*** 19.73	0.344*** 15.14	0.308*** 14.51
Age	-0.012** -16.07	-0.002 -0.46	-0.002 -0.80	-0.002 -0.39
Tenure	-0.007*** -13.79	-0.003*** -6.22	-0.018*** -9.30	-0.022*** -10.42
Female	0.025* 1.78	-0.001 -0.29	N/A	N/A

Mover	-0.003 -0.62	0.002 0.58	N/A	N/A
CEO	0.006 0.64	-0.003 -0.12	0.007 0.60	0.007 0.73
Director	-0.036*** -2.81	0.011* 1.99	0.051*** 4.29	0.017** 2.36
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.48	0.81	0.81	0.83
N	67,846	67,846	67,846	67,846

Panel B:

Relative Importance of Components in Determining Firm Risk

	$\frac{\text{cov}(FirmRisk, component)}{\text{var}(FirmRisk)}$	% of R ² attributable to the component
Observable Firm Characteristics	0.070	7.96%
Observable Manager Characteristics	0.013	1.85%
Firm Fixed Effects	0.397	45.16%
Manager Fixed Effects	0.155	17.63%
Year Fixed Effects	0.244	27.67%
Residual	0.121	

Table 19
Observable and Unobservable Determinants of Herfindahl Index – Connectedness Sample with AKM Method

This table presents the results for specifications regressing company's Herfindahl index on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 4, Panel A, Column 1 in Coles, Daniel, and Naveen (2006) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of Herfindahl index explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:

Dependent variable: Herfindahl Index

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
Vega	-0.051*** -4.13	0.025** 2.62	0.007 0.33	0.013 0.62
Delta	0.010*** 4.52	-0.001 -0.38	0.007*** 2.82	0.005** 2.14
Cash compensation	-0.005*** -3.65	0.004*** 5.97	0.005*** 5.38	0.005*** 5.62
Log(sales)	-0.045*** -41.60	-0.067*** -36.97	-0.060*** -35.63	-0.060*** -25.97
Market-to-book	0.013*** 20.38	0.006*** 5.56	0.006*** 6.41	0.005*** 5.83
ROA	0.041*** 5.73	0.131*** 13.26	0.092*** 6.07	0.095*** 7.71
Stock return	-0.008*** -3.83	-0.006*** -3.37	-0.003 -1.42	-0.002 -1.01
Sales growth	0.028*** 6.23	-0.008 -0.71	-0.000 -0.13	-0.007** -2.11
Dividend cut	-0.074*** -27.72	-0.005** -2.37	-0.006*** -2.85	-0.003 -0.99
CEO turnover	-0.000 -0.25	-0.005*** -2.74	-0.005*** -2.79	-0.005*** -2.92
Book leverage	-0.044***	-0.080***	-0.047***	-0.060***

	-5.54	-11.91	-5.96	-7.01
Age	-0.001** -10.74	-0.000 0.78	0.000 0.66	0.001* 1.62
Tenure	-0.001*** -5.86	-0.000 -0.99	-0.002*** -3.93	-0.001 -1.31
Female	0.046*** 8.37	0.002 0.46	N/A	N/A
Mover	-0.021*** -5.24	-0.005 -0.50	N/A	N/A
CEO	-0.002 -0.36	-0.003 -1.05	-0.002 -0.69	-0.002 -0.52
Director	0.030*** 5.82	0.008 0.68	0.020*** 4.70	0.018*** 2.79
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.16	0.73	0.75	0.79
N	61825	61825	61825	61825

Panel B:
Relative Importance of Components in Determining Herfindahl Index

	$\frac{\text{cov}(\text{HerfindahlIndex}, \text{component})}{\text{var}(\text{HerfindahlIndex})}$	% of R ² attributable to the component
Observable Firm Characteristics	0.112	13.13%
Observable Manager Characteristics	0.001	0.12%
Firm Fixed Effects	0.390	45.72%
Manager Fixed Effects	0.320	37.51%
Year Fixed Effects	0.030	3.52%
Residual	0.147	

Table 20
Observable and Unobservable Determinants of Business Segments – Connectedness Sample with AKM Method

This table presents the results for specifications regressing Ln(segments) on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 4, Panel B, Column 1 in Coles, Daniel, and Naveen (2006) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of Ln(segments) explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: Ln(segments)

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
Vega	0.125*** 3.68	-0.016 -0.67	0.044* 1.51	0.030 0.96
Delta	-0.031*** -5.39	0.004 1.15	-0.013*** -2.94	-0.011 -1.29
Cash compensation	0.016*** 6.61	-0.007*** -3.22	-0.005* -1.84	-0.006*** -4.06
Log(sales)	0.112*** 52.41	0.136*** 30.97	0.130*** 28.21	0.128*** 18.82
Market-to-book	-0.047*** -22.20	-0.005** -2.18	-0.010*** -4.62	-0.010*** -3.96
ROA	-0.212*** -9.88	-0.281*** -8.30	-0.145*** -5.14	-0.140*** -5.34
Stock return	0.006** 2.16	0.003 1.08	0.003 0.74	0.002 0.50
Sales growth	-0.042*** -4.10	0.028*** 4.43	0.012** 2.11	0.025*** 3.44
Dividend cut	0.176*** 27.76	0.001 0.82	0.011** 2.17	0.001 0.91
CEO turnover	0.003 0.43	0.012*** 2.91	0.014*** 3.10	0.012*** 3.03
Book leverage	0.130*** 7.83	0.228*** 13.82	0.127*** 6.83	0.145*** 7.14

Age	0.006*** 14.14	-0.001 -1.31	-0.004*** -2.90	-0.003* -1.91
Tenure	0.003*** 4.84	0.001 0.73	0.003*** 3.20	0.000 0.28
Female	-0.087*** -7.59	-0.005 -0.49	N/A	N/A
Mover	0.019* 1.84	0.008 0.38	N/A	N/A
CEO	-0.010 -0.21	0.011 0.68	0.005 0.57	0.009 1.12
Director	-0.045*** -5.39	-0.009* -1.32	-0.050*** -4.47	-0.051*** -4.11
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.21	0.73	0.75	0.79
N	61,825	61,825	61,825	61,825

Panel B:
Relative Importance of Components in Determining Ln(segments)

	$\frac{\text{cov}(\text{Ln}(\text{segments}), \text{component})}{\text{var}(\text{Ln}(\text{segments}))}$	% of R ² attributable to the component
Observable Firm Characteristics	0.100	11.72%
Observable Manager Characteristics	0.004	0.49%
Firm Fixed Effects	0.380	44.55%
Manager Fixed Effects	0.298	34.84%
Year Fixed Effects	0.071	8.32%
Residual	0.147	

Table 21
Observable and Unobservable Determinants of Tobin's Q – Connectedness Sample with AKM Method

This table presents the results for specifications regressing company's Tobin's Q on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 4, Panel A, Column 4 in Mehran (1995) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of Tobin's Q explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: Tobin's Q

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
% of managers' equity compensation	0.725*** 22.83	0.223*** 8.04	0.183*** 6.55	0.170*** 6.18
Managers' delta	0.381*** 28.15	0.058*** 5.76	-0.062*** -3.75	-0.059*** -3.63
% of shares held by all outside blockholders	0.207** 2.35	0.129*** 4.15	0.084** 2.12	0.151*** 3.97
% of outside directors	-0.374*** -6.80	0.010 0.31	0.074 1.48	0.138** 2.52
R&D/sales	5.328*** 35.68	3.010*** 14.51	3.002*** 12.05	0.992*** 3.74
(Inventory+PPE)/assets	-0.594*** -8.37	-1.113*** -11.51	-0.591*** -5.19	-0.980*** -8.29
Long-term debt/assets	-0.174*** -31.90	-0.137*** -21.23	-0.108*** -15.47	-0.096*** -15.07
Std of % change in operating income	0.103*** 5.01	-0.570*** -21.50	-0.391*** -12.11	-0.429*** -15.28
Log of assets	0.028*** 5.29	-0.723*** -44.83	-0.352*** -22.32	-0.634*** -30.71
Age	-0.010*** -6.26	-0.009 -1.07	-0.015** -2.55	-0.009 -0.73
Tenure	0.012** 2.49	-0.000 -0.35	-0.010** -2.62	-0.010* -1.69

Female	0.054 1.60	-0.003 -0.04	N/A	N/A
Mover	-0.210*** -10.12	-0.034** -2.33	N/A	N/A
CEO	-0.246*** -7.29	-0.071*** -3.18	-0.044* -1.91	-0.005 -0.81
Director	-0.051 -0.80	0.050* 1.87	0.021 0.81	0.093*** 2.96
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.23	0.70	0.71	0.74
N	31,918	31,918	31,918	31,918

Panel B:
Relative Importance of Components in Determining Tobin's Q

	$\frac{\text{cov}(Q, \text{component})}{\text{var}(Q)}$	% of R ² attributable to the component
Observable Firm Characteristics	0.045	5.45%
Observable Manager Characteristics	0.003	0.36%
Firm Fixed Effects	0.360	43.63%
Manager Fixed Effects	0.397	48.12%
Year Fixed Effects	0.020	2.43%
Residual	0.176	

Table 22
Observable and Unobservable Determinants of ROA – Connectedness Sample with AKM Method

This table presents the results for specifications regressing company's ROA on observable managerial and firm characteristics and on various combinations of fixed effects that proxy for time and for unobserved manager and firm attributes. The benchmark specification (model (1) in Panel A) is a pooled OLS regression, without firm or manager fixed effects (FE), which is based on the explanatory variables in Table 4, Panel B, Column 4 in Mehran (1995) plus selected observable managerial attributes. Model (2) adds firm fixed effects only to the benchmark model, Model (3) adds manager fixed effects only, and Model (4) includes both firm and manager fixed effects. We include year fixed effects in all specifications. We delete observations with missing values for RHS variables included in the benchmark specification, but include observations with missing values of tenure and age by using indicator variables for whether each is missing. Panel B uses the coefficient estimates in specification (4) of Panel A to decompose model R-squared in order to quantify the relative importance of each class of variable in determining the portion of ROA explained. Refer to the Appendix for variable definitions. Heteroskedasticity robust t-statistics clustered at the firm level are in parenthesis. ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.

Panel A:
Dependent variable: ROA

	(1) Pooled OLS (no firm or manager FE)	(2) Firm FE (no manager FE)	(3) Manager FE (no firm FE)	(4) Firm & Manager FE
% of managers' equity compensation	2.267*** 8.23	0.436*** 2.68	0.287* 1.70	0.269 1.38
Managers' delta	1.009*** 9.54	0.243*** 3.58	0.122 1.03	0.254** 2.19
% of shares held by all outside blockholders	1.880*** 4.80	0.639*** 3.15	0.774*** 2.93	0.848*** 3.58
% of outside directors	1.882*** 5.43	0.437 0.88	-0.540 -1.18	-0.141 -0.44
R&D/sales	-22.774*** -19.65	-9.795*** -5.86	-20.159*** -10.06	-18.045*** -9.18
(Inventory+PPE)/assets	6.716*** 22.87	1.703** 2.47	5.087*** 7.49	1.378* 1.69
Long-term debt/assets	-1.256*** -29.38	-0.903*** -22.52	-0.978*** -22.04	-0.879*** -19.33
Std of % change in operating income	-6.083*** -33.25	-10.184*** -50.08	-8.402*** -33.87	-9.081*** -34.20
Log of assets	-0.216*** -4.99	-1.871*** -17.42	-1.124*** -10.10	-2.379*** -15.84
Age	-0.035*** -3.45	-0.008 -0.34	0.031 0.51	0.008 0.49
Tenure	0.068*** 7.08	-0.002 -0.26	0.055** 2.08	0.079** 2.10

Female	0.883*** 4.53	-0.018 -0.16	N/A	N/A
Mover	-0.923*** -5.50	-0.020 -0.71	N/A	N/A
CEO	-0.404* -1.79	0.048 0.39	0.181 1.10	0.335* 1.81
Director	-0.113 -1.02	0.001 0.01	0.029 0.43	0.410* 1.77
Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.17	0.72	0.73	0.76
N	31,918	31,918	31,918	31,918

Panel B:
Relative Importance of Components in Determining ROA

	$\frac{\text{cov}(ROA, \text{component})}{\text{var}(ROA)}$	% of R ² attributable to the component
Observable Firm Characteristics	0.119	14.42%
Observable Manager Characteristics	0.012	1.45%
Firm Fixed Effects	0.429	52.00%
Manager Fixed Effects	0.244	29.57%
Year Fixed Effects	0.021	2.54%
Residual	0.175	