Peer Choice in CEO Compensation

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**ABSTRACT:** We study the determinants of firms’ choice of peers used to benchmark compensation and how the choice of peers impacts CEO compensation. Our sample includes 1,046 firms (1,764 firm-years) that disclose peers following the new SEC disclosure rules for executive compensation. Competitive benchmarking predicts that peer choice is explained by similarity in firm characteristics that capture similarity in the labor market for executives. In contrast, the self-serving view predicts that firms opportunistically choose peers to maximize managerial compensation. We find evidence consistent with both competitive benchmarking and self-serving views. Firms choose peers based on economic factors such as similarity in industry, size, performance, investment tangibility, and past earnings and return covariance. Firms also choose peers that pay their CEOs more, which seems to reflect both the need for firms to compensate CEOs for higher talent as well as opportunistic behavior.

**Keywords:** executive compensation; peer choice; benchmarking.

**Data Availability:** The data are available from public sources identified in the paper.
I. INTRODUCTION

“The worry among investors, of course, is that executives, consultants and directors simply cherry-pick peer-group members, thereby pumping up pay packages…. Current disclosure rules require neither the identification of companies in a compensation-related peer group nor the rationale behind their selection. Usually, the most a shareholder learns about companies in a compensation peer group is that they are in the same industry or of a similar size.”

– Morgenson (2006)

We study the determinants of firms’ choice of peers used to benchmark compensation and how the choice of peers impacts CEO compensation using a sample of 1,046 firms (1,764 firm-years) disclosing the identification of 26,426 peers for the years 2006 and 2007. Corporations commonly use peer companies to help determine compensation packages for a CEO (Crystal, 1991; Reda, et al. 2007; Bizjak, Lemmon, and Naveen, 2008). The “competitive benchmarking” view, as discussed in Holmstrom and Kaplan (2003), is that peer CEO compensation represents a natural benchmark to gauge the market compensation for a firm’s CEO. This view predicts that peer choice is driven by similarities between the disclosing firm and the peer, which proxy for similarities between the required CEO skills and the availability of CEOs who have these skills. The “self-serving” view, in contrast, is held by critics who argue that peer selection is a mechanism to justify excessively-high CEO pay (Crystal, 1991). According to this view, peers are opportunistically chosen to maximize firms’ managerial compensation, which is accomplished by firms choosing peers based on how much peers pay their CEO. Morgenson (2006), for example, suggests that many of the peer groups chosen by management are “populated with companies that are anything but comparable.” This concern is exacerbated by the fact that the actual process followed by compensation committees to select peers has until recently been opaque.

Effective December 15, 2006, new disclosure rules issued by the SEC require publicly-traded corporations that use peers to benchmark executive compensation to reveal the identity of
peers in the benchmark group. The disclosures resulting from this new rule provide an opportunity to systematically examine the determinants of peer selection using a large cross-section of firms. Our objective is to shed light on the extent to which peer selection is used by firms to competitively versus self-servingly set executive compensation contracts. We do so by studying the determinants of firms’ choice of peers and how this choice impacts CEO compensation.

In terms of the determinants of firms’ choice of peers, a Probit analysis of actual peers in our sample show that selected peers are more likely to share similar labor market factors, such as being in the same SIC industry and being closer in revenues to the firm. Further, peer choice is also affected by other labor market factors such as similarity in stock performance, the type and intensity of investment (i.e., R&D and capital expenditures), and earnings and return covariance. These results are corroborated by a content analysis of how firms say they choose peers (as filed with the SEC in their proxy statements).

As the first step towards assessing the self-serving view, we find that, controlling for the labor market factors, firms are more likely to choose peers that pay their CEOs higher compensation. We label this finding the “peer pay effect.” This finding, however, does not unambiguously capture self-serving behavior; it could represent compensation for CEO talent not captured by our labor-market factors. This alternative hypothesis is reinforced by the fact that the use of peer selection is often justified in proxy statements as a way to attract and retain executive talent. If firms have CEOs with a high level of talent, then they would select highly-talented CEOs as peers, who are also likely highly-paid.

To empirically disentangle these two effects, we first create a firm-level measure of the peer pay effect, and then decompose it into a part that proxies for talent and another part that
proxies for self-serving behavior. The peer pay effect measure equals the percentage difference between the compensation of firm-chosen peers less the compensation of a sample of predicted peers based on a broad set of labor-market factors. The mean peer pay effect is 0.36, indicating that on average, firms choose peers that pay their CEOs 36% more than a set of predicted peers. The talent component of the peer pay effect is proxied by the fitted value from a regression of the peer pay effect on proxies for CEO talent (i.e., CEO’s historical performance and the market value of the firms that the CEO managed in the past), while the residual proxies for the self-serving component. This decomposition is important because both competitive benchmarking and self-serving views predict a positive association between the peer pay effect and CEO pay. Thus simply documenting such a positive association by itself does not distinguish between competitive benchmarking and self-serving views.

Because CEO talent is inherently hard to measure, we relate these predicted and residual measures to future firm performance to validate their respective use as proxies for talent and self-serving behavior. If the peer pay effect proxies for CEO talent because firms select highly paid peers to presumably meet the market pay for their more talented CEOs, then these firms should produce stronger future performance. In contrast, if the peer pay effect is a proxy for self-serving behavior, then these firms, with their self-serving CEOs, should underperform in the future. We find that the predicted and residual components of the peer pay effect are positively and negatively, respectively, related to future accounting performance. These results hence increase our confidence that the predicted and residual partitions proxy for talent and self-serving constructs, respectively. Nonetheless, given that some of our analysis relies on correctly identifying CEO talent characteristics to decompose the peer pay effect into talent and self-serving components, our results should be interpreted as a joint test of the competitive
benchmarking and self-serving views as well as our ability to decompose the peer pay effect.

Equipped with these measures, we then investigate the effect of peer selection on CEO pay. In cross-sectional regressions, consistent with the competitive benchmarking view, we find that peers’ CEO pay is an incrementally important explanatory variable over and above established economic factors (e.g., size, performance, growth, risk, etc.) previously shown to predict CEO compensation. When we examine the relation between the peer pay effect and compensation, we find that both the predicted and residual measures of the peer pay effect are positively associated with CEO compensation. In terms of economic significance their effects are similar. A one-standard-deviation increase in the predicted (residual) portion of the peer pay effect increases mean compensation by 8.0% (9.3%). Hence the peer pay effect we document is consistent both with firms choosing highly paid peers to reward higher CEO talent and with self-serving behavior.

In our last analysis, we explore whether corporate governance attenuates the relation between the total compensation paid to their CEOs and the residual portion of the peer pay effect, our self-serving proxy. While the board’s compensation committee is responsible for setting executive pay, executives can affect the process. Hence, we consider situations in which the CEO could more strongly influence, relative to the board’s ability to control, the pay-setting process. We also consider situations in which external stakeholders can also influence the pay-setting process. Using three measures of corporate governance – whether the CEO is also the board chair, the percentage of outside directors, and the proportion of shares held by institutional investors – we find no evidence of such an attenuating effect.

Our study makes a number of contributions. First, by studying how compensation peers are selected we contribute to a better understanding of the pay-setting process. More specifically,
prior research uses firm characteristics, normally industry and size, to infer a set of presumed potential peers (e.g., Bizjak et al., 2008). By looking at actual peers used in the compensating process, we provide insights into a wide variety of dimensions firms use to evaluate the labor market conditions for their CEOs. Second, our analyses provide evidence on both competitive benchmarking and self-serving views of peer choice. This contrasts with a few contemporaneous (and independently developed) papers that either conclude for or against the existence of self-serving behavior in CEO pay (Bizjak, Lemmon, and Nguyen 2009; Cadman, Carter, and Semida 2009; Faulkender and Yang 2009). Finally, by explicitly considering the idea that competitive benchmarking and self-serving could co-exist among firms, we better disentangle the CEO talent and self-serving explanations for peer selection. To do so, we predict and demonstrate an opposite relation between our measures for these explanations and firm performance. Further, we demonstrate that firms’ propensity to pick high-CEO-pay peers is consistent with both the need to pay for CEO talent and self-serving behavior.

The next section provides the institutional background on the regulation and discusses the competitive benchmarking and self-serving views of peer choice. Section III describes the data collection and sample selection process. Our empirical tests and results are presented in section IV. Section V concludes.

II. INSTITUTIONAL BACKGROUND AND RESEARCH QUESTION

In this section we describe the general process of peer selection, the change in regulation, and then discuss the competitive benchmarking and self-serving views of peer selection. Determining CEO compensation is a responsibility of the board of director’s compensation

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1 Our analysis does not speak to whether peers are used to pay CEO’s an optimum wage. For example, if CEOs at peers with similar characteristics are paid too much (little) on average, then a firm that competitively benchmarks its CEO pay to that of these peers will also pay it’s CEO too much (little). Thus our inferences speak to the relative level of pay instead of the absolute level.
committee, although some of the compensation committee decisions (e.g., amendments to equity compensation or severance plans) need board ratification. One input into the determination of executive pay is a set of peers used to benchmark executive compensation. These peers are usually suggested by the compensation committee, often under the guidance of a compensation consulting firm. Based on Reda et al. (2007) (and compensation consultant discussions), executives typically review and provide feedback on the choice of peers, part of which may include executives’ view on peers that should be excluded as well as peers that should be added to the final set. These suggestions are formally addressed before the peer set of firms is finalized. Throughout the article we refer to the compensation decisions of the compensation committee as being those made by the “firm.”

Effective December 15, 2006, the SEC (2006) issued new disclosure rules on executive compensation. One objective of the new rules is to increase the transparency of executive officers’ compensation by improving the disclosure of firms’ compensation policy in firms’ annual proxy statements. The new Compensation Discussion and Analysis (CD&A) section of the proxy statement calls for a discussion and analysis of the material factors underlying firms’ compensation policies and decisions regarding the actual compensation data disclosed. The rule requires firms that engage in any material benchmarking when determining executive compensation to identify the benchmark group (see instruction 6 of item 402(a)(3)).

**Competitive Benchmarking View**

In a competitive labor market, executives are paid (at least) their opportunity cost. In theoretical agency models, this premise takes the form of a “participation” constraint, in which an agent’s expected compensation must be equal to or greater than the agent’s reservation wage (e.g., Lambert, 2001; Holmstrom and Kaplan, 2003). Theoretical agency models, however, are
normally silent about how to determine an agent’s opportunity cost. The reservation wage is typically some exogenously-set fixed amount. In practice, the opportunity cost of an executive is difficult to determine. It includes the contract that the executive would receive from the executive’s next best employment alternative (Himmelberg and Hubbard, 2000; Oyer, 2004). It also includes a set of expectations about the critical inputs into the contract, such as the expected real operating activities, and hence the expected firm performance, of the potential employer.

Benchmarking is often used by firms as a practical way to determine CEO compensation (Bizjak et al., 2008). Competitive compensation packages are driven by market forces, such as the supply and demand for CEO talent, and benchmarking enables firms to gauge the “market compensation” for its CEO (Holmstrom and Kaplan, 2003). For example, Marathon Oil Corp. states in their 2006 DEF 14A (i.e., proxy statement) that:

“In the energy industry, we currently operate in a competitive environment for talented employees. As a result, in order to attract and retain leadership, we believe it is necessary and appropriate to benchmark our executive compensation against that of our competitors.”

The competitive benchmarking view predicts that firms select peers that represent the CEO’s outside employment opportunities. Ideally, we would identify similarities in the talent of CEOs. But these traits are mostly unobservable. Instead, we use observable firm characteristics, which we refer to as labor market factors, as proxies for similarity in the labor market conditions for (i.e., similarity in the demand for and supply of) CEO talent. These characteristics include similarity in business, size, investment, performance, complexity, and growth options between the firm and the potential peer. Some intuition is as follows.

The tasks that managers perform are a function of the interplay among their products and services, customers, suppliers, and competition. We expect firms operating in the same business to compete for similar CEO talent regarding business-specific knowledge about, for example,
how to manage shifts in customer demand, or how best to compete against rivals. We expect that firms with large investments in either tangible investments, such as new manufacturing plants, or intangible investments, such as the development and launch of new products or technologies, require unique managerial skills. As an example, Ittner, Lambert, and Larcker (2003) and Anderson, Banker, and Ravindran (2000) show that high-tech firms that typically invest in R&D projects structure pay packages differently as a way to retain and attract uniquely-qualified CEOs in a highly competitive market. The magnitude and number of, and hence the economic importance of, challenges and opportunities are greater at larger firms. This leads larger firms to demand the highest levels of executive talent and experience (Smith and Watts 1992; Murphy 1999). Better performing firms should also have more talented CEOs that pay more (e.g., Core, Holthausen and Larcker 1999; Murphy 1999). Companies that operate in markets outside the U.S. often need to customize their products and processes to suit global markets, and hence these firms require global management skills and abilities. Last, firms with more growth options may hire CEOs that have particular talents, such as the ability to take risks. Evidence suggests that these firms receive more equity and higher total pay (Smith and Watts 1992).

Note that our labor-market factors encompass a broad set of dimensions. Traditional empirical notions of similarity among firms focus primarily on firms being in the same industry classified group and being similar in size (Lewellen et al. 1996; Bizjak et al. 2008; Albuquerque 2009). Part of our contribution to the literature is to determine the importance of these multiple factors beyond industry and size.

**Self-Serving View**

A number of studies indicate that the pay-setting process has strayed far from the arm’s-length model assumed in most economic models of pay arrangements (Bebchuk and Fried, 2003,
Bebchuk and Fried (2004) claim that flawed compensation packages are widespread, persistent, and systematic. Indeed, the new disclosure regulation is consistent with a response to the general outcry over the level of CEO compensation. Morgenson (2006) suggests that the peer selection model has added to this concern. Firms’ high CEO pay could be partially explained by firms benchmarking their CEO pay against strategically-selected higher-CEO-paying peers to justify awarding their CEOs high compensation. This is possible because, as mentioned above, peer choice is partly influenced by firm executives. In sum, the self-serving view predicts that the higher a peer’s CEO pay, the more likely it will be chosen as a peer.

It is not clear, however, whether our empirical analysis will produce such evidence. First, one could argue that the opportunistic selection of peers is unlikely given the requirements for a fully independent compensation committee as part of the corporate governance rules adopted by NYSE and NASDAQ in 2003. In addition, even if executives can influence the choice of peers in a self-serving way, compensation committees can always simply undue the bias when setting executive pay. Whether the compensation committee is truly independent, however, is unclear (see, e.g., Reda, et al. 2007). Second, self-serving companies that anticipate criticism from the new regulation could alter their compensation setting practice before the compensation disclosure becomes effective. Third, self-serving firms could try to obfuscate or fail to provide details on the actual peer choice.

The competitive benchmarking and self-serving views are not mutually exclusive. Self-serving firms can camouflage their self-serving peer choices. For example, these firms can choose a mix of peers, some self-serving and others consistent with competitive benchmarking. A self-serving firm could also choose the subset of the highest-paid peers from among a set of peers that are all roughly consistent with labor market factors. In addition, a positive relation
between a peer’s CEO pay and the probability it is chosen as a peer does not provide unambiguous evidence of self-serving behavior because we cannot perfectly control for CEO talent. An alternative explanation for why firms pick high-paying peers is that these high-paying peers are correlated with unobserved high levels of CEO talent, and hence represents competitive benchmarking. Indeed, as we will show, our empirical analysis provides some support for this alternative explanation.

Notwithstanding these issues, our study attempts to empirically answer some of the questions raised in the above discussion. In particular, we test whether competitive benchmarking and self-serving factors explain firms’ choices of compensation peers, the relative importance of these factors, and their impact on CEO pay.

III. DATA AND SAMPLE SELECTION

We first identify firms with data available on ExecuComp for fiscal year 2006 (mostly the 1,500 firms composing the S&P 1500 index). For these firms, we download proxy statements (DEF14) for fiscal years 2006 and 2007 filed with the SEC after December 15, 2006, the date when the regulation took effect. Peer information is manually collected from the CD&A section of the proxy statements. We read through the CD&A to ensure that the peer companies listed are the ones used for benchmarking purposes. This is important because peers can be used in other contexts. For example, about a third of the firms disclosing peers for compensation benchmarking also disclose peers for relative performance evaluation (RPE) purposes. (Approximately 34% of these firms use the same peer group for both compensation benchmarking and RPE; a concurrent study by Gong, Li, and Shin (2009) study the role of these RPE peers).
We obtain proxy statements for 2,844 firm-year observations. About 89% of these firms report using a group of peers, a compensation consultant database, or an index of firms to benchmark compensation. The remaining 11% of firms either explicitly mention that they do not use benchmarking or surveys to set compensation or do not disclose any information regarding the use of peers to benchmark compensation. For example, Zenith National Insurance states in its 2007 proxy statements that, “the Compensation Committee does not utilize benchmarking or surveys or the services of compensation consultants, but relies on the experience and knowledge of its members.” Of the firms using peers, 420 firm-year observations do not explicitly report the names of peers. Some of the firms that do not explicitly disclose the names of peers benchmark either against indexes, such as the S&P 500 or S&P Electric Utility index, or against a compensation consultant database. We further exclude 15 firm-year observations for which the number of peers was greater than 75 firms because of the high data-collection cost per peer. For example, in some cases firms listed the 300 peers included in a compensation consultant database. We are thus left with 2,090 firm-year observations.

We collect financial and compensation information for each of the peers. As discussed below, we also collect information for a sample of randomly-selected peers. The requirement of financial and compensation variables further reduces the sample to 1,764 firm-year observations and 26,426 peers (2,537 unique peers) available to estimate the peer choice models. The compensation models require more variables, which further reduces our sample. The sample selection is summarized in Panel A Table 1.

Compensation data are obtained from both ExecuComp and Morningstar databases. Similar to ExecuComp, Morningstar collects data reported by firms in proxy statements or 10-K filings with the SEC. The Morningstar database, however, provides executive compensation data
for a much larger universe of U.S. companies than that of ExecuComp. For example, for fiscal year 2005, Morningstar provides data on approximately 6,400 firms, which includes practically all of the approximately 1,900 firms in ExecuComp. Because peers are often not included in the ExecuComp database, by augmenting our compensation data with Morningstar, we approximately double the final sample size.

Panel B presents descriptive statistics for the number of peers disclosed per firm. The average firm has approximately 15 peers with available data to perform the analysis. In addition, there is considerable cross-sectional variation in the number of peers disclosed per firm. Specifically, the 5th (95th) percentile equals four (31) peers per disclosing firms.

IV. EMPIRICAL TESTS AND RESULTS

This section describes our analyses. The first subsection provides a content analysis of how firms describe their choice of peers. Next we examine the effect of labor-market factors and peers’ CEO pay in explaining peer choice. Then we examine the relation between firms’ tendency to choose highly paid peers and CEO talent. We follow by investigating whether peer pay is associated with higher CEO compensation and then explore the role of corporate governance. The last subsection describes additional untabulated robustness tests.

Firm Explanations for How Peers are Chosen

In the proxy statement filed with the SEC, firms often describe how they choose their peers for compensation benchmarking purposes. Appendix A provides seven examples of proxy statements disclosures. To obtain insights into the specific factors firms say they use to choose peers, we randomly select 500 sample firms that provide descriptions of their peer choice and randomly select a single year per firm if the firm has two years of data. We then perform a content analysis of the characteristics mentioned in firms’ descriptions. We categorize the words
used by firms to describe their peer choice. In some cases we group words together to form one dimension.

Table 2 summarizes the analysis. Most firms (80%) refer to selecting peers with a similar business. This often includes using the word industry (63%), usually in the context of naming the industry (e.g., “transportation industry”). Firms use the words “industry” and “business” very broadly. Rarely do firms mention a specific industry classification scheme (such as SIC), and in the few cases that they do, firms are more likely to mention an S&P industry sub-index. Other words used for similar business include words such as business (23%), competitors (11%), or products (9%). The size of peers is the next most important dimension (72%) discussed in peer choice. When a specific size metric is mentioned, it is most often characterized by similar revenues (44%) and similar market capitalization (24%). Performance (14%) is the third most popular dimension, with net income or ROE (6%) being cited most often. Other important dimensions include: geographic location of peers (13%), which is broadly defined to include words such as global, international or location; and, ownership (13%), which refers to the composition of stock holders, such as whether the peer’s equity is publicly traded, whether the CEO is a founder, and the percentage of CEO ownership. Three other dimensions also cited include complexity (9%), scope (7%), and growth (4%). All other dimensions are mentioned less than 1% of the time.

Overall, the contextual analysis suggests that firms believe that similarity in the business, size, performance and complexity are the most important dimensions driving the choice of compensation benchmark peers. These factors are consistent with and hence support the competitive benchmarking view of peer choice. Below, we empirically model peer choice as a function of these firm characteristics, which both confirms and studies the relative importance of
these factors.

**Firms’ Peer Selection**

**Tests**

We estimate various specifications of the following Probit regression:

\[
\text{Peer}_{ijt} = \alpha + \Sigma \beta_m \text{Labor Market Factor}_{m,ijt-1} + \delta \log \text{Pay Peer}_{ijt-1} + \epsilon_{ijt}.
\]  

(1)

Peer\(_{ijt}\) is an indicator variable that equals one if firm \(i\) uses peer \(j\) in determining executive compensation in year \(t\) as disclosed in its proxy statement filed with the SEC, zero otherwise. Labor Market Factor is a set of variables including similarity in business, size, investment, performance, complexity, and growth options between the firm and the potential peer. We use firms’ SIC industry code as a proxy for industry membership. Size is proxied by firms’ revenues. Performance is proxied by annual stock returns and return on assets. Our proxy for complexity is the number of geographical segments that a company participates in. Tobin’s Q is a proxy for growth options. We measure the tangibility of investments by firms’ capital and R&D expenditures. We use measures of earnings and return covariance developed in De Franco et al. (2008) to better capture similarity in business models. (Appendix B provides detailed variable definitions.) Our results are robust to alternative measures for these firm characteristics.\(^2\)

To measure the “similarity” between firms and their potential peers, we take the absolute value of the difference between firm \(i\)’s and peer \(j\)’s respective variable at time \(t-1\). For example, Sim_{Log Revenue\(_{ijt-1}\)} is our proxy for similar size and equals the absolute value of the difference between the logarithm of total revenues for firm \(i\) and the logarithm of total revenues for peer \(j\).

\(^2\) In untabulated sensitivity analysis, we obtain similar results when we use alternative measures to capture these labor-market factors. Alternative measures include: NAICS and GICS industry classifications for industry; total assets, number of employees, and market capitalization for firm size; ROE, profit, and gross margin for profitability; number of business segments for complexity; and, percentage sales growth and book-to-market value of equity for growth options.
both measured at the end of fiscal year \( t-1 \). We multiply the variable by -1 so that greater values indicate more similarity. The earnings and return comparability measures are already defined so that greater values indicate more comparability. We predict that the probability of being chosen a peer is increasing in the value of its labor-market factor.\(^3\)

Finally, \( \text{Log Pay Peer} \) is the logarithm of peer’s CEO total compensation. We expect the probability of choosing a peer is increasing in peers’ CEO pay. While this relation could be perceived as supporting evidence that peers are chosen in a self-serving way, as we will show, this result has multiple potential interpretations.

The treatment sample for this test includes peers chosen by firms as disclosed in their proxy filing. These peers represent cases in which \( \text{Peer} = 1 \). To estimate the model, we require a sample of peers \textit{not chosen} by management. For each individual sample firm, we randomly select a set of peers from a pool of companies with available data to estimate our models.\(^4\) These randomly-chosen peers provide observations in which \( \text{Peer} = 0 \). With a small number of exceptions (20 firm-chosen peers), the number of firm-chosen peers equals the number of matched peers on a per firm basis. For example, if the disclosing firm chooses 15 peers, then that firm also has 15 matched control peers. We intentionally choose a random sample of peers as a way to study the importance of all factors affecting the choice of peers. Specifically, by selecting a random sample we are able to study the relative importance of the most commonly believed drivers of peer choice such as industry membership and firm size.\(^5\)

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\(^3\) These tests are at the firm \( i \) – peer \( j \) – year \( t \) level. We find similar (untabulated) results if we aggregate the data at the firm \( i \) - year \( t \) level before estimating Equation 1. That is, we use the mean or median values of all explanatory variables for the peers and matched companies in a given firm year. By aggregating the data, this alternative approach ensures that each disclosing firm-year receives an equal weight in the model.

\(^4\) The randomly-selected peers for a firm can include a peer chosen by the firm, although the probability of this occurring is low because of the large number of potential peers. Inferences and results are unchanged if we restrict a firm’s randomly-selected peers to exclude the peers it chose.

\(^5\) An alternative approach is to select the non-chosen peers based on industry and size (Lewellen et al. 1996; Bizjak et al. 2008). For a firm disclosing \( N \) peers, we select as matched peers (i.e., cases where \( \text{Peer} = 0 \)) the \( N \)
To ease comparisons across coefficients, when estimating Equation 1 we standardize all continuous variables to mean zero and unit variance. Instead of estimated coefficients, we report elasticities which can be interpreted as the change in probability of being selected as a peer for a one-standard-deviation change in the explanatory variable. For the indicator variables, the reported coefficients can be interpreted as the change in probability of being selected as a peer for a unit change in the indicator variable (e.g., the change in probability for being in the same industry classification). In addition, we cluster standard errors at the firm level to control for the dependence arising from multiple observations per firm. Untabulated tests indicate that results remain qualitatively similar when standards errors are clustered at both the firm and peer level.

**Results**

We first compare the characteristics of firms that disclose peers with those of firms that do not disclose peers. Our analysis of firms’ peer choice is conditional on these firms deciding to use and disclose the identity of their peers. Table 3 provides these descriptive statistics in Columns 1 and 2, respectively. Column 3 presents the results of a Probit model that uses these descriptive variables to predict whether a firm discloses peers. (The sample of firms disclosing peers is smaller here than in Table 2 because we require each observation to have non-missing values for all variables.) Compared to non-disclosing firms, our sample of peer-disclosing firms are larger, have less growth opportunities, invest more in R&D, and have both greater institutional ownership and higher analyst following. These relations are generally consistent with disclosing firms being the ones that are more visible and have more external demand for and monitoring of firm information. We take advantage of this Probit model in later tests to control for self-selection.
Table 4 compares the characteristics of firms disclosing peers with the characteristics of the peers chosen by these firms. Compared to the firms themselves, their chosen peers are larger, have more growth options, and spend more on R&D. The total compensation of peers’ CEOs is also higher than the amount firms’ CEOs are paid. While one must be careful in interpreting these univariate comparisons, the Probit model tests below show that these univariate comparisons are consistent with firms picking peers in part based on the amounts they pay their CEOs.

Table 5 shows the Probit estimation results of various specifications of Equation 1. The sample size of this test is slightly smaller than the 52,852 firm-year-peer observations implied by Table 2 (26,426 firm-chosen peers and an equal number of randomly-chosen peers) because we are not able to find a match for all firm-chosen peers. The first column presents the results using only the labor-market factors and provides support for the idea that peer selection is used to capture similarity in the labor market for executives, and hence is used to competitively set executive compensation contracts. As expected, firms are more likely to choose peers in the same industry as the firm. Specifically, being in the same one-digit SIC industry increases the probability that a peer is selected by 29%. If the peer is also in the same two-digit SIC, then it increases the probability of being chosen by another 26%. The coefficient on Sim_Log Revenue indicates that if the similarity in revenue between the firm and the peer increases by one standard deviation then the peer is 43% more likely to be selected by the firm.

In addition to SIC-defined industry and size, similarity of stock performance and the tangibility of investments also seem important. For example, a one-standard-deviation change in Sim_R&D and Sim_Capex increases the probability of being selected as a peer by 7% and 5%, respectively. Last, both comparability measures are positive and statistically significant. A one-
standard-deviation increase in return comparability results in a 13% increase in the probability of being selected as a peer. These other factors likely help to empirically capture firms’ definitions of similar industry and business, and potentially reflect shortcomings in industry-classification groupings. Model-fit statistics indicate that the percentage of companies correctly classified as chosen peers is 84.4%, and the pseudo-$R^2$ is 49.8%.

The second column of Table 5 shows the results of the full estimation of Equation 1. The coefficient on $\text{Log Pay Peer}$ is positive and significantly different than zero. Consistent with firms choosing peers with higher CEO pay, a one-standard-deviation increase in peers’ CEO total compensation increases the probability of being chosen as a peer by 18%. This peer pay effect is economically important as it is the most important variable at explaining firms’ peer choice beyond same industry and similar size.

One alternative explanation consistent with this peer pay effect is as follows. Some firms choose leading companies as peers because these firms see themselves as one of the industry leaders, either now or in the future, thus justifying the need to compete for similar industry-leading CEO talent. As such, these leading companies award their CEOs leading (i.e., higher) compensation. Hayes and Schaefer (2008) suggest that firms select to benchmark against highly paid peers as a way to influence market perceptions of the manager’s ability to create firm value. To control for these ideas, we augment Equation 1 with an indicator variable, $\text{Industry Leader}$, that equals one if the company is among the top five companies in terms of revenue-based market share in its 2-digit SIC classification (results are similar if we use 3- or 4-digit industry codes), and zero otherwise. Results of estimating this model are presented in Column 3. Being an industry leader increases the probability of being selected as a peer by 19%. While the coefficient on $\text{Log Pay Peer}$ is reduced somewhat, CEO total compensation remains an important
factor predicting whether a company is chosen as a peer.

In summary, Table 5 provides evidence that supports the competitive benchmarking view of peer choice. Peers are similar in business model, performance, size, and investment to the disclosing firms. In addition, as a necessary (but not sufficient) step in assessing the self-serving view, peers are more likely to be chosen if they have higher levels of CEO pay. This peer pay effect is robust to controlling for whether the peer is an industry leader.

**Decomposition of the Peer Pay Effect: Talent versus Self-Serving Behavior**

The Table 5 results show that the compensation of the peer is an important driver of the choice of peers. In this section, we discuss how we decompose the peer pay effect into sub-components capturing talent and self-serving behavior.

We first decompose the firm-chosen peer pay into the component predicted by the labor market factors and its “unexpected” component, which is our firm-level proxy for the peer pay effect. Specifically, we first construct Peer Pay Expected using the median pay at peers more likely to be chosen by the firm based on the peer-choice prediction model. Specifically, we rank all peers in the same SIC 1-digit as the firm based on the predicted labor-market coefficients from Model 2 in Table 5. From among the peers with the highest predicted probabilities of being chosen by the firm, we select the same number of peers as the number of firm-chosen peers. We then define Peer Pay Unexpected as the percentage difference between the median pay of firm i’s chosen peers and the median pay of firm i’s predicted peers as measured using Peer Pay Expected.$^6$

Panel A of Table 6 provides descriptive statistics for this measure. The mean value for

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$^6$ We use the median for each group with one adjustment. To better approximate the targeted percentile among the chosen peers, for firms disclosing that they target a percentile higher than the 65th percentile when setting CEO pay, we use the 75th percentile instead of the median to compare across groups. We have conducted the tests (untabulated) using a difference based solely on the median peer pay and all inferences remain unchanged.
Peer Pay Unexpected is 0.36, which corresponds to firm-chosen peers paying their CEOs approximately 36% higher than the CEO pay at peers selected simply based on labor-market factors. Untabulated analysis indicates this mean is significantly different than zero. Given that the mean CEO pay at predicted peers is $4.6 million, this implies that CEO pay is $1.65 million higher at firm-chosen peers than at predicted peers. This positive amount is consistent with our pooled results above that higher CEO pay increases the probability of being selected as a peer.

As discussed above, Peer Pay Unexpected can potentially capture the self-serving component of peer pay. However, because this measure is derived from the model used to predict peer choice based on the labor market factors, it assumes that all proxies for similarities between the CEO and its peers are included in the model. It is possible, however, that unobservable characteristics such as CEOs’ inherent talent might still not be controlled for. If so, an alternative interpretation of Peer Pay Unexpected, consistent with the competitive benchmarking view, is that the firms’ propensity to choose higher-paying peers represents additional compensation for talented CEOs. As we mention in Section II, the use of peer selection is often justified in proxy statements as a way to attract and retain executive talent. If firms perceive their CEOs to have a high level of talent that is similar to highly-talented CEOs at other companies who pay better, then firms will select those higher-paying companies as peers to justify higher pay for their CEO. Hence, similar talent represents a potentially omitted variable that is correlated with peer pay, and could explain why peer pay loads in our peer-choice model.

To explore this possibility, we examine whether Peer Pay Unexpected is positively related to proxies for CEO talent. We estimate:

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7 While we have all CEO talent proxies for our disclosing firms because they are in ExecuComp, we do not have the same measures for our peers because most peers are not included in the ExecuComp universe. Information on CEOs’ previous employers is not readily available in Morningstar. This precludes our ability to properly measure our proxies for CEO talent, and hence from constructing variables that captures the similarity in CEO talent between
\[ \text{Peer Pay Unexpected}_t = \beta_0 + \sum \beta_m \text{CEO Talent}_{m,t} + \epsilon_{it}. \] (2)

We proxy for CEO Talent using CEOs’ historical performance and the size of the firms that CEOs managed in the past. CEOs that have historically produced greater performance or have worked at larger companies likely have more talent. Thus, firms need to pay these CEOs more, which captures the notion of attracting and retaining these CEOs, as often mentioned by firms in their proxy statements. CEO Abn Ret (t-3, t-1) is the average of the firm’s stock return measured relative to the S&P 500 index over years t-3 to t-1. CEO Abn ROA (t-3, t-1) is the average of the firm’s ROA measured relative to the industry ROA over years t-3 to t-1. CEO Log Market Cap (t-3, t-1) is the natural logarithm of the average market capitalization of the companies the CEO worked for over years t-3 to t-1. When calculating these three measures over this previous three-year period, CEOs need not have worked at the same firm nor be a CEO.

Panel B of Table 6 shows the correlations across unexpected peer pay and the measures of talent. As expected, the correlations are generally positive and significantly different than zero, albeit modest in magnitude. In Panel C, we show the results of regressing unexpected peer pay on the three proxies for talent. Coefficients on both CEO Abn Ret (t-3, t-1) and CEO Log Market Cap (t-3, t-1) are positive and statistically significant. These results indicate that the peer-pay-effect we document in Table 5 is positively related to, and hence partially explained by, the proxies for CEO talent.\(^8\) We then use these models to decompose unexpected peer pay into a proxy for CEO talent, as measured by the predicted part of unexpected peer pay (Peer Pay Unexpected Pred) and a proxy for self-serving behavior, as measured by the residual part (Peer

\(^8\) Untabulated analysis indicates that the inclusion of two alternative proxies for talent in Equation 2 produces similar results. The first measure is whether the CEO was ranked as a top industry CEO as published by Institutional Investor magazine. The second measure is CEO wealth, defined as the logarithm of cumulative total compensation over years t-3 to t-1. These CEOs are expected to have higher talent under an assumption of efficient contracting. An issue with this variable is that it may also capture, in part, self-serving behavior in the past that lead to higher pay in the past.
Pay Unexpected Res).

Because CEO talent is inherently hard to measure, we relate these predicted and residual measures to future firm performance to validate their respective use as proxies for talent and self-serving behavior. If unexpected peer pay proxies for CEO talent, then these firms should produce stronger future performance. In contrast, if unexpected peer pay is a proxy for self-serving behavior, then these firms, with their self-serving CEOs, should underperform in the future. To test these assertions we estimate the following model:

\[
ROA_{it+1} = \beta_0 + \beta_1 Peer Pay Unexpected Pred_{it} + \beta_2 Peer Pay Unexpected Res_{it} + \beta_3 \log \text{Revenue}_{it} + \beta_4 Tobin's Q_{it} + \beta_5 STD \text{ROA}_{it} + \epsilon_{it+1}
\] (3)

\(STD \text{ROA}\) is the standard deviation of return on assets over the prior five years. Other variables were defined above. These tests are in the spirit of Core, Holthausen, and Larcker (1999), who also use future performance to validate whether their measures represent self-serving behavior.

Panel D shows the results. In terms of control variables, firms that have greater growth opportunities and less variation in ROA tend to have higher future ROA. The coefficients on the predicted and residual part of unexpected peer pay are positive and negative, respectively, both of which are statistically significant. In terms of economic significance, a one-standard-deviation increase in the predicted (residual) portion of unexpected peer pay increases (decreases) performance by 1.5% (0.5%). These results are consistent with, and hence increase confidence in our assertion that the former proxies for talent while the latter proxies for self-serving behavior.

A caveat of this analysis is that the residual, in addition to capturing self-serving behavior, will also capture noise in our estimated relation as well as talent unexplained by our measures. Conversely, it is also possible that the predicted portion captures some self-serving behavior.

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9 This is calculated as the coefficient on the predicted (residual) part of Peer Pay Unexpected multiplied by one standard deviation of the predicted (residual) part of Peer Pay Unexpected, i.e., 0.38 \times 0.04 (-0.01 \times 0.48).
behavior. Our results thus reflect a joint test of the competitive benchmarking and self-serving views as well as our ability to decompose the peer pay effect.

The Ability of Peer Pay to Explain CEO Compensation

Tests

If the choice of peers is important in the compensation-setting process, then CEO pay at peers should be positively related to firms’ CEO pay. To test this claim we estimate various specifications of the following equation:

\[
\log \text{Total Pay}_{it+1} = \alpha + \sum \beta_m \text{Compensation Factors}_{m,it} + \gamma_i \text{Peer Pay}_{it} + \epsilon_{it+1}
\]  

(4)

Log Total Pay is equal to total compensation for firm i’s CEO. Compensation Factors include firm size, firm performance measures (change in ROA and stock returns), Tobin’s Q, R&D, firm idiosyncratic variance, CEO tenure and CEO age, all of which have been shown to explain compensation levels (e.g., Smith and Watts 1992; Core and Guay 1999; Murphy 1999).

Our first specification shows the effect of CEO pay at firm-chosen peers on firms’ CEO pay. Peer Pay is the median pay of firm i’s chosen peers. The coefficient on this variable represents the total effect of firm-chosen peers’ CEO pay that is incremental to economic factors previously studied in the compensation literature. In our second specification, we test the effects of expected and unexpected peer pay on firms’ CEO pay. The third specification uses the expected peer pay and the predicted and residual parts of unexpected peer pay. We use the magnitude of these coefficients to infer the relative importance of self-serving versus competitive benchmarking motivations in explaining peer choice. Finally, we also include one specification in which we further control for the choice of firms in disclosing peers by augmenting the compensation regression with the Inverse Mills Ratio computed from the Probit model in Column 3 of Table 3.
To further mitigate endogeneity concerns related to the fact that CEO compensation and the factors are simultaneously determined, the independent variables are measured as lagged values, with the exception of the performance measures. We also include year and industry fixed effects, and cluster the standard errors at the firm-level.

**Results**

Panel A of Table 7 presents descriptive statistics for the Equation 4 variables. Panel B of Table 7 shows the Equation 4 regression results. The estimated coefficients on the control variables are generally consistent with the literature. Firm size, stock returns, and R&D spending are important predictors of compensation. Untabulated $F$-statistics indicate that industry fixed effects are also important.

In Column 1, the coefficient on *Peer Pay* is positive and statistically significant, indicating that firm-chosen peer pay is incrementally important explanatory variable, over and above established economic factors shown to predict CEO compensation. In terms of economic significance, a one-standard-deviation increase in *Peer Pay* leads to an increase in CEOs’ mean total compensation of approximately $1.08 million. This amount corresponds to an increase of 16.9% of total compensation for the average CEO in our sample. In Column 2, we replace *Peer Pay* with its expected and unexpected parts. Consistent with the competitive benchmarking view, a one-standard-deviation increase in the expected component results in a total compensation increase of 16.5%. This is an effect that is about two thirds greater than a similar increase in the unexpected component.

In Column 3, we replace the unexpected peer pay with its predicted and residual values as partitioned using the Table 6, Panel C regression model, which proxies for talent and self-serving

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10 This is obtained as the difference between exponential \((0.30 \times \text{variable standard deviation of } 0.77 + \text{mean of logarithm of total pay of } 8.33)\) and exponential \((8.33)\).
behavior, respectively. Both coefficients are positive and statistically significant, consistent with both a talent and self-serving peer pay effect on compensation. In terms of economic significance their effects are similar. A one-standard-deviation increase in the predicted (residual) portion of Peer Pay Unexpected increases mean compensation by 8.0% (9.3%), which is about $510,000 ($596,000).

In the last column, we estimate our tests while correcting for potential self-selection of disclosing firms using the Heckman correction. The coefficient on the Inverse Mills Ratio is statistically significant, consistent with the choice to disclose peers affecting compensation. While the coefficients on the peer pay variables are slightly less positive, they remain statistically significant and hence our inferences remain unchanged.

In summary, the evidence in Table 7 suggests that peers’ CEO pay positively affects the amount of total compensation for CEOs. This is true when we divide peers’ CEO pay into an expected and unexpected part as well as when we decompose the unexpected part into a predicted portion proxying for talent and a residual portion proxying for self-serving behavior. Hence, our results are consistent with both competitive benchmarking and self-serving views of peer selection.

**Corporate Governance**

In this section, we explore whether corporate governance attenuates the relation between the total compensation paid to their CEOs and firms’ propensity to selecting peers with higher compensation in a self-serving way. As Section II points out, while the board’s compensation committee is responsible for setting executive pay, executives can affect the process. Hence, we consider situations in which the CEO could more strongly influence, relative to the board’s ability to control, the pay-setting process. We expect that CEO influence over the pay-setting
process is greater when the CEO is also the board chair (*CEO Also Chair*) and is decreasing in the percentage of outside directors (*Independent Board*). External stakeholders can also influence the pay-setting process, in particular now that the new SEC compensation disclosure regulations allow them to observe firms’ peer choices. More external influence can reduce CEO influence. We proxy for this external influence by the proportion of shares held by institutional investors (*Institutional Ownership*).

We then augment Equation 4 with an interaction of these corporate governance variables with the residual part of unexpected peer pay, our proxy for self-serving peer choice. The self-serving view predicts that CEOs use their greater influence to have their board select higher CEO paying peers to bias their pay upwards, which should be captured by the coefficient on the interaction of the residual part of unexpected peer pay and corporate governance.

Table 8 presents these results. The interaction variables are generally insignificant. The only exception is when institutional ownership is interacted with *Peer Pay Unexpected Res*. The coefficient is negative and statistically significant at the 10% level. This is consistent with increased institutional ownership leading to a greater effect of self-serving peer choice on compensation. In this specification, the *Institutional Ownership* coefficient is also positive and statistically significant indicating that more institutional ownership is associated with higher CEO pay. These results are inconsistent with the prediction that institutional investors mitigate firms’ self-serving behavior by monitoring CEOs.

In summary, there is little evidence that corporate governance attenuates the relation between the self-serving choice of peers and CEO pay. One caveat of this analysis is the difficulty in identifying suitable measures of corporate governance proxies. For example, the CEO could also be the board chair because the CEO is more talented, which further warrants the
choice of high-paying peers and their use in setting pay. Similarly, it is unclear whether outside directors are best suited to identify CEO talent because they could be less intimate with the executive labor market than inside directors. In addition, the requirement for a majority of independent board members as part of the corporate governance rules adopted by the NYSE and NASDAQ in 2003, can account for the lack of cross sectional variation of board independence, and thus lack of power in the tests. Last, in the spirit of Hayes and Schaefer (2008), and as a potential explanation for our institutional ownership results in Column 3, if firms use high paying peers to benchmark compensation as a signal to shareholders about the quality of the CEO and hence firm value, then more shareholder attention could lead firms to bolster this behavior.

Robustness Tests

As robustness checks, we perform several additional untabulated tests. First, we use an alternative measure of the peer pay effect. This alternative measure is the coefficient on Log Pay Peer from firm-specific Probit regressions of Equation 1, where labor market factors are parsimoniously measured using Same SIC 1-digit, Same SIC 2-digit, and Sim_Log Revenue. The idea is to capture the effect of peer compensation on the probability that a peer is selected, allowing each firm to have a different sensitivity to peers’ CEO pay. Our results are generally insensitive to this measure.

Second, to address the concern that our results are driven by the inclusion of financial firms, we exclude these firms from our analysis. This test is motivated by the recent outcry over the compensation of executives at financial firms in the wake of the financial crisis. We obtain similar results.

Third, we estimate our tests using only data for fiscal year 2007. If the regulation is
operating as expected, self-serving peer choices will be subject to more scrutiny by external parties (i.e., investors, analysts, media, etc.) as the information becomes available leading to higher pressure on firms to adopt less self-serving behavior in peer choices during the 2007 fiscal year. The untabulated results for the 2007 fiscal year remain qualitatively the same.

Fourth, we test for the impact of the peer pay effect, and its decomposition, on CEO pay (i.e., the Table 7 analysis) using market capitalization instead of revenues to proxy for firm size. Gabaix and Landier (2008) argue that firm size measured by market capitalization better explains the patterns in CEO pay across firms, time, and countries. The untabulated results show that the results remain qualitatively the same.

V. CONCLUSION

This paper studies the determinants of firms’ choice of peers used to benchmark compensation and how the choice of peers impacts CEO compensation. Effective after December 15, 2006, new SEC (2006) disclosure rules for executive compensation for publicly-traded corporations require that firms provide extensive descriptions of their compensation practices, and if using peers to benchmark compensation, reveal the identity of companies in the benchmark peer group. Competitive benchmarking predicts that peer choice is explained by factors capturing the opportunity costs of CEOs. In contrast, the self-serving view predicts that firms opportunistically choose peers to maximize managerial compensation.

Our sample includes 1,764 firm-year observations disclosing the identification of 26,426 peers for executive compensation benchmarking purposes for the years 2006 and 2007. We find evidence consistent with both competitive benchmarking and self-serving views. Firms choose peers based on economic factors such as similarity in industry, size, performance, investment tangibility, and past earnings and return covariance. Firms also tend to choose peers that pay
their CEOs more, which in turn translates into firms paying their CEOs more, after controlling for economic determinants of CEO compensation. This “peer pay effect” seems to reflect both the need for firms to compensate CEOs for higher talent as well as opportunistic behavior. By studying how compensation peers are selected, this study contributes to a better understanding of the executive pay-setting process.
REFERENCES


APPENDIX A
Seven Quotes from Proxy-Statements Describing How Peers are Selected

Quote #1
“The decision to consider data for companies beyond those in the peer group in Invacare’s performance graph in setting executive compensation levels reflects Invacare’s view that a broad range of companies of comparable size compete with Invacare for senior executive talent. The Company believes that the use of this survey data helps ensure that it is positioned to attract and retain qualified senior executives in the face of competitive pressures.” (Source: Invacare Corp 2008 DEF 14A)

Quote #2
“We offer total compensation packages at levels we consider to be competitive with a peer group of companies of similar size in the restaurant industry. In determining our executive officer compensation, we may consider generally available source material on companies in the restaurant industry from business periodicals, proxy statements, and other resources. From time to time, we may consider publicly available compensation data from national companies that we believe are generally comparable to us in terms of size, organization structure and growth characteristics, and against which we believe we compete for executive talent.” (Source: Panera Bread Co. 2008 DEF 14A)

Quote #3
“We use a peer group of companies as a reference for determining competitive total compensation packages. […] These companies were selected because we share many distinguishing criteria, including, but not limited to, a common industry, similar distribution system challenges, market capitalization, global operations, significant brand equity and/or certain financial criteria. We also compete with these companies for executive talent.” (Source: Coca-Cola Co. 2006 DEF 14A)

Quote #4
“To identify appropriate peer group companies, management, the Committee and the Committee’s consultants mutually developed the following selection criteria: 1. Labor market and capital market competitors; 2. High technology … companies….; and 3. Similar pay models and growth experiences.” (Source: Apple Inc. 2006 DEF 14A)

(continued on next page)
APPENDIX A (continued)

Quote #5
“The committee selected this peer group because the group consisted of companies that were competitors of Mellon for business and talent; these companies were considered to be the comparators by analysts covering Mellon, the aggregate mix of the peer group companies resembled Mellon’s overall business mix and Mellon’s scope was closely aligned with the median of the peer group’s scope measures (namely, revenue, net income, market capitalization, total assets and current assets under management).” (Source: Bank of New York Mellon Corp 2007 DEF 14A)

Quote #6
“It is the Committee’s policy to position the base salaries of Deere’s executives at approximately the median level of base salaries provided to comparable positions within a peer group of companies that are similar to Deere in sales volume, products and services, and a global presence. For fiscal 2006, this peer group consisted of 23 companies—three of which are also included among the four companies, other than Deere, that comprise the S&P 500 Construction & Farm Machinery index…. The Committee believes that this larger peer group of companies provides a more appropriate and reliable benchmark for assessing competitive levels of compensation than the limited number of companies within the S&P 500 Construction & Farm Machinery index.” (Source: Deere & Co. 2006 DEF 14A)

Quote #7
“The proxy peer group was developed using the following protocols. First, companies within the same industry sector were identified (as determined by the Standard & Poor’s Global Industry Classification Standards). Because Unum is a niche player, the list was broadened to include both property and casualty as well as life and health insurers. Second, the peer list was adjusted to include both larger and smaller companies, with Unum being about median within the peer group in terms of assets, revenue, and market capitalization. Third, the peer group was reviewed to confirm that the companies represented a comparable labor market (organizations that have recruited from us in the past and who are themselves potential sources of talent for us) and similar financial performance levels.” (Source: Unum Group 2007 DEF 14A)
APPENDIX B
Variable Definitions

<table>
<thead>
<tr>
<th>Variable Definition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyst Following</td>
<td>Number of analysts following the firm.</td>
</tr>
<tr>
<td>Capex</td>
<td>Capital expenditures scaled by total assets.</td>
</tr>
<tr>
<td>CEO Abn Ret (t-3, t-1)</td>
<td>Average of the firm’s ROA measured relative to the industry ROA over the last three years. This variable is calculated using the ROA of the firm the CEO was working for at the time even if it was not assuming the role of CEO. We require that the CEO was one of the top three executives ranked by total pay, in order to attribute firm performance to the executive’s effort.</td>
</tr>
<tr>
<td>CEO Abn ROA (t-3, t-1)</td>
<td>Average of the firm’s stock return measured relative to the S&amp;P 500 index over the last three years. This variable is calculated using the stock return of the firm the CEO was working for at the time even if it was not assuming the role of CEO. We require that the CEO was one of the top three executives ranked by total pay, in order to attribute firm performance to the executive’s effort.</td>
</tr>
<tr>
<td>CEO Age</td>
<td>CEO age as disclosed on ExecuComp.</td>
</tr>
<tr>
<td>CEO Also Chair</td>
<td>Indicator variable that equals one if the CEO is also the chairman of the board of directors, zero otherwise.</td>
</tr>
<tr>
<td>CEO Log Market Cap (t-3, t-1)</td>
<td>Natural logarithm of the average market capitalization of the companies the CEO worked for over the last three years. This variable is calculated using the market capitalization of the firm the CEO was working for at the time even if it was not assuming the role of CEO.</td>
</tr>
<tr>
<td>Earn Comparability</td>
<td>$R^2$ from a regression of firm i’s quarterly earnings on the quarterly earnings of peer j.</td>
</tr>
<tr>
<td>Geo Seg</td>
<td>Number of geographical segments that the firm operates in.</td>
</tr>
<tr>
<td>Gov</td>
<td>Defined as either CEO Also Chair, Independent Board, or Institutional Ownership.</td>
</tr>
<tr>
<td>Idio Return Volatility</td>
<td>Idiosyncratic firm stock return variance calculated using the market model, measured over the previous 60 months.</td>
</tr>
<tr>
<td>Independent Board</td>
<td>Percentage of outside directors in the board.</td>
</tr>
<tr>
<td>Industry Concentration</td>
<td>Herfindahl index calculated using the sales market share at the 2-digit SIC code.</td>
</tr>
<tr>
<td>Industry Leader</td>
<td>Indicator variable that equals one if the firm is among the five largest firms in terms of market share in its 2-digit SIC code in a given year, zero otherwise.</td>
</tr>
<tr>
<td>Institutional Ownership</td>
<td>Percentage of shares held by institutional investors.</td>
</tr>
<tr>
<td>Log CEO Age</td>
<td>Natural logarithm of CEO age.</td>
</tr>
<tr>
<td>Log CEO Tenure</td>
<td>Natural logarithm of CEO tenure.</td>
</tr>
<tr>
<td>Log Market Cap</td>
<td>Natural logarithm of market capitalization measured at the end of the year.</td>
</tr>
<tr>
<td>Log Pay Peer</td>
<td>Natural logarithm of peer’s Total Pay.</td>
</tr>
<tr>
<td>Log Revenue</td>
<td>Natural logarithm of total revenues measured at the end of the year.</td>
</tr>
<tr>
<td>Log Total Pay</td>
<td>Natural logarithm of Total Pay.</td>
</tr>
<tr>
<td>Peer</td>
<td>Indicator variable that equals one if the firm uses the firm-chosen peer in determining executive compensation, zero otherwise.</td>
</tr>
<tr>
<td>Peer Pay</td>
<td>Natural logarithm of the median Total Pay of the firm’s chosen peers. For firms disclosing that they target a percentile higher than the 65th percentile when setting CEO pay, we use the 75th percentile instead of the median.</td>
</tr>
</tbody>
</table>

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APPENDIX B (continued)

Peer Pay Expected
Natural logarithm of the median Total Pay of the firm’s “predicted” peers. For firms disclosing that they target a percentile higher than the 65th percentile when setting CEO pay, we use the 75th percentile instead of the median. The “predicted” peers’ sample is generated using companies that are more likely to be peers based on the peer-choice prediction model.

Peer Pay Unexpected
Percentage difference between Peer Pay and Peer Pay Expected.

Peer Pay Unexpected Pred = Predicted component of regressing Peer Pay Unexpected on CEO Abn ROA (t-1, t-3), CEO Abn Ret (t-1, t-3), and CEO Log Market Cap (t-1, t-3).

Peer Pay Unexpected Res = Residual component of regressing Peer Pay Unexpected on CEO Abn ROA (t-1, t-3), CEO Abn Ret (t-1, t-3), and CEO Log Market Cap (t-1, t-3).

R&D = Research and development expense scaled by total assets.

Ret Comparability = R² from a regression of firm i’s monthly returns on the monthly returns of peer j.

Return = Stock return over the 12-month period ending at the end of the fiscal year.

ROA = Net income before extraordinary items divided by total assets.

Same SIC 1-digit = Indicator variable that equals one if the firm is in the same 1-digit SIC code as the potential peer, zero otherwise.

Same SIC 2-digit = Indicator variable that equals one if the firm is in the same 2-digit SIC code as the potential peer, zero otherwise.

Same SIC 3-digit = Indicator variable that equals one if the firm is in the same 3-digit SIC code as the potential peer, zero otherwise.

Same SIC 4-digit = Indicator variable that equals one if the firm is in the same 4-digit SIC code as the potential peer, zero otherwise.

Sim_ = Prefix added to variables that are measured as the absolute value of the difference between firm i’s and firm j’s respective variables, multiplied by -1. Used in the construction of the labor-market factors.

STD ROA = Standard deviation of return on assets (ROA) calculated over the prior five years.

Tenure Dummy = Indicator variable that equals one if we are able to calculate CEO tenure, zero otherwise. This avoids losing observations due to lack of data.

Tobin’s Q = Market value of assets scaled by book value of assets.

Total Pay = Total CEO compensation, calculated as the sum of salary, bonus, non-equity incentive plan compensation, grant-date fair value of option awards, grant-date fair value of stock awards, and other compensation for fiscal years 2006 and 2007. For fiscal year 2005, total CEO compensation is calculated as the sum of salary, bonus, long-term incentive plans, other annual compensation, market value of restricted stock grants, value of options awarded and all other compensation. The value of options awarded for 2005 is calculated using the Black-Scholes value or, when the Black-Scholes value is not available, assumed to be the total grant-date present value of options awarded.
TABLE 1
Sample Selection

This table presents our sample selection. Panel A shows the criteria we used. Panel B provides descriptive statistics for the number of peers disclosed per firm.

**Panel A: Sample selection**

<table>
<thead>
<tr>
<th>Description</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firms for which we tried to collect data</td>
<td>1,554</td>
</tr>
<tr>
<td>Firm-year observations with available data for fiscal years of 2006 and 2007</td>
<td>2,844</td>
</tr>
<tr>
<td>Firm-year observations reporting usage of compensation peers</td>
<td>2,525</td>
</tr>
<tr>
<td>Firm-year observations explicitly disclosing peers</td>
<td>2,090</td>
</tr>
<tr>
<td>Firm-year observations with required data to estimate peer choice models (Tables 4 and 5)</td>
<td>1,764</td>
</tr>
<tr>
<td>Firm-year observations with required data to estimate compensation models (Tables 6 to 8)</td>
<td>1,470</td>
</tr>
</tbody>
</table>

**Panel B: Number of peers per firm (26,426 total peer observations)**

<table>
<thead>
<tr>
<th>Mean</th>
<th>Std. Dev.</th>
<th>1st</th>
<th>5th</th>
<th>25th</th>
<th>Median</th>
<th>75th</th>
<th>95th</th>
<th>99th</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0</td>
<td>9.1</td>
<td>1</td>
<td>4</td>
<td>10</td>
<td>14</td>
<td>18</td>
<td>31</td>
<td>50</td>
</tr>
</tbody>
</table>
TABLE 2
Firm Explanations for How Peers are Chosen

This table provides a content analysis of the characteristics firms use to describe how they choose their peers as filed in their SEC proxy statements. The sample consists of 500 randomly-selected unique firms that provided a description. The first column refers to the specific words firms used to describe its choice of peers. Some words are grouped together to form a category. For example, Any Business Mention includes a reference to any of the different words used above it. The category Other refers to an assortment of dimensions that each account for less than 1% of total firms. The second column is the number of firms that specifically mention the word or category. The third column represents the number from Column 2 divided by 500 total firms.

<table>
<thead>
<tr>
<th>Words Used</th>
<th>Number of firms</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>313</td>
<td>63%</td>
</tr>
<tr>
<td>Business</td>
<td>117</td>
<td>23%</td>
</tr>
<tr>
<td>Competitors</td>
<td>53</td>
<td>11%</td>
</tr>
<tr>
<td>Product</td>
<td>46</td>
<td>9%</td>
</tr>
<tr>
<td>Any Business Mention</td>
<td>400</td>
<td>80%</td>
</tr>
<tr>
<td>Size</td>
<td>184</td>
<td>37%</td>
</tr>
<tr>
<td>Revenue</td>
<td>222</td>
<td>44%</td>
</tr>
<tr>
<td>Market Capitalization</td>
<td>119</td>
<td>24%</td>
</tr>
<tr>
<td>Employees</td>
<td>30</td>
<td>6%</td>
</tr>
<tr>
<td>Assets</td>
<td>32</td>
<td>6%</td>
</tr>
<tr>
<td>Any Size Mention</td>
<td>360</td>
<td>72%</td>
</tr>
<tr>
<td>Performance</td>
<td>29</td>
<td>6%</td>
</tr>
<tr>
<td>Net Income or ROE</td>
<td>28</td>
<td>6%</td>
</tr>
<tr>
<td>Stock return</td>
<td>17</td>
<td>3%</td>
</tr>
<tr>
<td>Operating Income or ROA</td>
<td>7</td>
<td>1%</td>
</tr>
<tr>
<td>Profitability</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Cash flow</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>EBITDA</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Any Performance Mention</td>
<td>69</td>
<td>14%</td>
</tr>
<tr>
<td>Geography</td>
<td>37</td>
<td>7%</td>
</tr>
<tr>
<td>Global or International</td>
<td>21</td>
<td>4%</td>
</tr>
<tr>
<td>Location</td>
<td>8</td>
<td>2%</td>
</tr>
<tr>
<td>Any Geography Mention</td>
<td>66</td>
<td>13%</td>
</tr>
<tr>
<td>Ownership</td>
<td>66</td>
<td>13%</td>
</tr>
<tr>
<td>Complexity</td>
<td>44</td>
<td>9%</td>
</tr>
<tr>
<td>Scope</td>
<td>37</td>
<td>7%</td>
</tr>
<tr>
<td>Growth</td>
<td>18</td>
<td>4%</td>
</tr>
<tr>
<td>Asset Intensity or Capital Intensity</td>
<td>6</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>30</td>
<td>6%</td>
</tr>
</tbody>
</table>
TABLE 3
Comparison of Firms Disclosing and Not Disclosing Peers

This table presents means and medians of firm characteristics for firms disclosing and not disclosing peers. The sample is slightly smaller than that indicated in Table 2 because of data availability. The last column presents the results of a Probit model that uses the variables to predict whether a firm discloses peers. Observations are at the firm-year level. Reported z-statistics in parentheses are clustered at the firm level. Variables are defined in Appendix B. ***,, **, and * denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Firms Disclosing Peers (1)</th>
<th>Firms Not Disclosing Peers (2)</th>
<th>Probit Model (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Market Cap</td>
<td>Mean 8.051</td>
<td>7.275</td>
<td>0.116***</td>
</tr>
<tr>
<td></td>
<td>Median 7.914</td>
<td>7.181</td>
<td>(3.27)</td>
</tr>
<tr>
<td>Tobin’s Q</td>
<td>Mean 1.890</td>
<td>2.025</td>
<td>-0.173***</td>
</tr>
<tr>
<td></td>
<td>Median 1.578</td>
<td>1.562</td>
<td>(4.83)</td>
</tr>
<tr>
<td>ROA</td>
<td>Mean 0.052</td>
<td>0.041</td>
<td>0.631</td>
</tr>
<tr>
<td></td>
<td>Median 0.049</td>
<td>0.046</td>
<td>(1.55)</td>
</tr>
<tr>
<td>Return</td>
<td>Mean 0.147</td>
<td>0.131</td>
<td>0.137</td>
</tr>
<tr>
<td></td>
<td>Median 0.109</td>
<td>0.087</td>
<td>(1.64)</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Mean 0.024</td>
<td>0.025</td>
<td>1.564**</td>
</tr>
<tr>
<td></td>
<td>Median 0.000</td>
<td>0.000</td>
<td>(2.08)</td>
</tr>
<tr>
<td>Industry Concentration</td>
<td>Mean 0.078</td>
<td>0.079</td>
<td>0.271</td>
</tr>
<tr>
<td></td>
<td>Median 0.046</td>
<td>0.047</td>
<td>(0.70)</td>
</tr>
<tr>
<td>Institutional Ownership</td>
<td>Mean 0.669</td>
<td>0.627</td>
<td>0.160*</td>
</tr>
<tr>
<td></td>
<td>Median 0.776</td>
<td>0.725</td>
<td>(1.71)</td>
</tr>
<tr>
<td>Analyst Following</td>
<td>Mean 13.210</td>
<td>9.362</td>
<td>0.028***</td>
</tr>
<tr>
<td></td>
<td>Median 12.000</td>
<td>8.000</td>
<td>(4.22)</td>
</tr>
<tr>
<td>Observations</td>
<td>2,009</td>
<td>769</td>
<td>2,778</td>
</tr>
</tbody>
</table>
TABLE 4
Comparison of Disclosing Firms and Chosen Peers

This table presents means and medians of firm characteristics for firms disclosing peers and the peers chosen by these firms. Observations are at the firm-year level. The last column reports a $t$-statistic from a test of difference in means between the two groups. Variables are defined in Appendix B. ***, **, and * denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Firms Disclosing Peers</th>
<th>Peers Chosen By These Firms</th>
<th>$t$-statistic that (1) = (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td></td>
</tr>
<tr>
<td>Log Revenue</td>
<td>Mean 7.683</td>
<td>8.023</td>
<td>8.64***</td>
</tr>
<tr>
<td></td>
<td>Median 7.596</td>
<td>7.974</td>
<td></td>
</tr>
<tr>
<td>ROA</td>
<td>Mean 0.054</td>
<td>0.057</td>
<td>1.36</td>
</tr>
<tr>
<td></td>
<td>Median 0.051</td>
<td>0.056</td>
<td></td>
</tr>
<tr>
<td>Return</td>
<td>Mean 0.147</td>
<td>0.141</td>
<td>-0.90</td>
</tr>
<tr>
<td></td>
<td>Median 0.107</td>
<td>0.107</td>
<td></td>
</tr>
<tr>
<td>Tobin’s Q</td>
<td>Mean 1.929</td>
<td>2.018</td>
<td>3.38***</td>
</tr>
<tr>
<td></td>
<td>Median 1.634</td>
<td>1.672</td>
<td></td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Mean 0.027</td>
<td>0.030</td>
<td>2.44**</td>
</tr>
<tr>
<td></td>
<td>Median 0.000</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Capex</td>
<td>Mean 0.047</td>
<td>0.047</td>
<td>-0.11</td>
</tr>
<tr>
<td></td>
<td>Median 0.032</td>
<td>0.033</td>
<td></td>
</tr>
<tr>
<td>Geo Seg</td>
<td>Mean 2.589</td>
<td>2.651</td>
<td>1.07</td>
</tr>
<tr>
<td></td>
<td>Median 2.000</td>
<td>2.000</td>
<td></td>
</tr>
<tr>
<td>Log Total Pay</td>
<td>Mean 8.243</td>
<td>8.406</td>
<td>6.34***</td>
</tr>
<tr>
<td></td>
<td>Median 8.251</td>
<td>8.464</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>1,764</td>
<td>26,426</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 5
Probit Analysis of Peer Choice

This table reports the results of estimating Probit models predicting the peer choice \((Peer_{ij})\) based on one-year lagged labor market factors and peers’ CEO compensation. The reported coefficient is the elasticity, which represents the change in the probability of a peer being selected for a one-standard-deviation change in the independent variable (or a unit change in the case of an indicator variable). Observations are at the firm-peer-year level. Reported \(z\)-statistics in parentheses are clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Variables are defined in Appendix B.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Same SIC 1-digit</strong></td>
<td>0.29***</td>
<td>0.29***</td>
<td>0.29***</td>
</tr>
<tr>
<td></td>
<td>(18.34)</td>
<td>(19.02)</td>
<td>(18.77)</td>
</tr>
<tr>
<td><strong>Same SIC 2-digit</strong></td>
<td>0.26***</td>
<td>0.28***</td>
<td>0.29***</td>
</tr>
<tr>
<td></td>
<td>(13.21)</td>
<td>(14.58)</td>
<td>(15.28)</td>
</tr>
<tr>
<td><strong>Same SIC 3-digit</strong></td>
<td>0.16***</td>
<td>0.18***</td>
<td>0.17***</td>
</tr>
<tr>
<td></td>
<td>(5.10)</td>
<td>(5.84)</td>
<td>(5.67)</td>
</tr>
<tr>
<td><strong>Same SIC 4-digit</strong></td>
<td>0.06*</td>
<td>0.07**</td>
<td>0.07**</td>
</tr>
<tr>
<td></td>
<td>(1.67)</td>
<td>(2.16)</td>
<td>(2.18)</td>
</tr>
<tr>
<td><strong>Sim_Log Revenue</strong></td>
<td>0.43***</td>
<td>0.41***</td>
<td>0.42***</td>
</tr>
<tr>
<td></td>
<td>(17.17)</td>
<td>(16.65)</td>
<td>(17.48)</td>
</tr>
<tr>
<td><strong>Sim_ROA</strong></td>
<td>0.00</td>
<td>-0.01*</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>(0.30)</td>
<td>(-1.67)</td>
<td>(-1.63)</td>
</tr>
<tr>
<td><strong>Sim_Return</strong></td>
<td>0.03***</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>(5.53)</td>
<td>(1.54)</td>
<td>(1.21)</td>
</tr>
<tr>
<td><strong>Sim_Tobin’s Q</strong></td>
<td>-0.01*</td>
<td>-0.00</td>
<td>-0.00</td>
</tr>
<tr>
<td></td>
<td>(-1.78)</td>
<td>(-0.68)</td>
<td>(-0.68)</td>
</tr>
<tr>
<td><strong>Sim_R&amp;D</strong></td>
<td>0.07***</td>
<td>0.06***</td>
<td>0.05***</td>
</tr>
<tr>
<td></td>
<td>(8.38)</td>
<td>(7.24)</td>
<td>(6.37)</td>
</tr>
<tr>
<td><strong>Sim_Capex</strong></td>
<td>0.05***</td>
<td>0.05***</td>
<td>0.04***</td>
</tr>
<tr>
<td></td>
<td>(6.60)</td>
<td>(6.28)</td>
<td>(6.07)</td>
</tr>
<tr>
<td><strong>Sim_Geo Seg</strong></td>
<td>0.00</td>
<td>0.01*</td>
<td>0.01*</td>
</tr>
<tr>
<td></td>
<td>(0.19)</td>
<td>(1.69)</td>
<td>(1.82)</td>
</tr>
<tr>
<td><strong>Earn Comparability</strong></td>
<td>0.02***</td>
<td>0.02***</td>
<td>0.02***</td>
</tr>
<tr>
<td></td>
<td>(5.74)</td>
<td>(5.57)</td>
<td>(5.52)</td>
</tr>
<tr>
<td><strong>Ret Comparability</strong></td>
<td>0.13***</td>
<td>0.11***</td>
<td>0.11***</td>
</tr>
<tr>
<td></td>
<td>(19.21)</td>
<td>(16.88)</td>
<td>(16.78)</td>
</tr>
<tr>
<td><strong>Log Pay Peer</strong></td>
<td>0.18***</td>
<td>0.16***</td>
<td>0.16***</td>
</tr>
<tr>
<td></td>
<td>(23.82)</td>
<td>(22.53)</td>
<td></td>
</tr>
<tr>
<td><strong>Industry Leader</strong></td>
<td></td>
<td></td>
<td>0.19***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(13.11)</td>
</tr>
<tr>
<td><strong>% Concordant</strong></td>
<td>84.4</td>
<td>85.8</td>
<td>86.0</td>
</tr>
<tr>
<td><strong>Pseudo R² (%)</strong></td>
<td>49.8</td>
<td>53.6</td>
<td>54.2</td>
</tr>
<tr>
<td><strong>Observations</strong></td>
<td>52,819</td>
<td>52,819</td>
<td>52,819</td>
</tr>
</tbody>
</table>
**TABLE 6**

Decomposition of Unexpected Peer Pay Effect

This table reports the results of decomposing the peer pay effect into a predicted part proxying for CEO talent and a residual proxying for self-serving behavior. Panel A provides descriptive statistics for the peer-pay-effect and CEO talent measures. Panel B presents Pearson (Spearman) correlations above (below) the main diagonal. Panel C presents the results of regressing the peer pay effect (Peer Pay Unexpected) on contemporaneous measures of CEO talent. Panel D reports the results of regressing firms’ future accounting performance (ROA$_{i,t+1}$) on the predicted and residual values from the Panel C regression, controlling for variables expected to explain performance, including industry and year effects. Observations are at the firm-year level. Reported $t$-statistics in parentheses are clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Variables are defined in Appendix B.

### Panel A – Descriptive statistics of peer pay effect and CEO talent measures

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>5th</th>
<th>Median</th>
<th>95th</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer Pay Unexpected</td>
<td>1,470</td>
<td>0.361</td>
<td>0.477</td>
<td>-0.341</td>
<td>0.325</td>
<td>1.181</td>
</tr>
<tr>
<td>CEO Abn Ret (t-3, t-1)</td>
<td>1,470</td>
<td>0.016</td>
<td>0.065</td>
<td>-0.063</td>
<td>0.001</td>
<td>0.125</td>
</tr>
<tr>
<td>CEO Abn ROA (t-3, t-1)</td>
<td>1,470</td>
<td>0.098</td>
<td>0.216</td>
<td>-0.153</td>
<td>0.046</td>
<td>0.485</td>
</tr>
<tr>
<td>CEO Log Market Cap (t-3, t-1)</td>
<td>1,470</td>
<td>8.087</td>
<td>1.504</td>
<td>5.880</td>
<td>7.905</td>
<td>10.951</td>
</tr>
</tbody>
</table>

### Panel B – Correlations

<table>
<thead>
<tr>
<th></th>
<th>Peer Pay Unexpected</th>
<th>CEO Abn Ret (t-3, t-1)</th>
<th>CEO Abn ROA (t-3, t-1)</th>
<th>CEO Log Market Cap (t-3, t-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer Pay Unexpected</td>
<td>–</td>
<td>0.0508*</td>
<td>0.0585*</td>
<td>0.0585*</td>
</tr>
<tr>
<td>CEO Abn Ret (t-3, t-1)</td>
<td>0.0680*</td>
<td>–</td>
<td>0.1030*</td>
<td>0.2222*</td>
</tr>
<tr>
<td>CEO Abn ROA (t-3, t-1)</td>
<td>0.0343</td>
<td>0.1256*</td>
<td>–</td>
<td>-0.0357</td>
</tr>
<tr>
<td>CEO Log Market Cap (t-3, t-1)</td>
<td>0.0742*</td>
<td>0.2101*</td>
<td>0.0184</td>
<td>–</td>
</tr>
</tbody>
</table>

### Panel C – Regression of peer pay effect on CEO talent

<table>
<thead>
<tr>
<th>CEO Abn Ret (t-3, t-1)</th>
<th>CEO Abn ROA (t-3, t-1)</th>
<th>CEO Log Market Cap (t-3, t-1)</th>
<th>Adj. $R^2$ (%)</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.13** (2.18)</td>
<td>0.24 (1.23)</td>
<td>0.02** (1.99)</td>
<td>0.61</td>
<td>1,470</td>
</tr>
</tbody>
</table>

### Panel D – Regression of future firm performance on peer pay effect

<table>
<thead>
<tr>
<th>Peer Pay Unexpected Pred</th>
<th>Peer Pay Unexpected Res</th>
<th>Log Revenue</th>
<th>Tobin's Q</th>
<th>STD ROA</th>
<th>Adj. $R^2$ (%)</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.38*** (3.64)</td>
<td>-0.01** (-2.16)</td>
<td>-0.00</td>
<td>0.03***</td>
<td>-0.48***</td>
<td>42.22</td>
<td>1,470</td>
</tr>
</tbody>
</table>
TABLE 7
Analysis of Peer Pay Effect on CEO Compensation

This table reports the results of regression models predicting firms’ CEO total compensation ($\text{Log Total Pay}_{it+1}$) using various measures of peer pay, and controlling for economic factors expected to explain compensation. Panel A provides descriptive statistics for the dependent and independent variables. Panel B presents the regression results. Observations are at the firm-year level. Reported $t$-statistics in parentheses are clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Variables are defined in Appendix B.

### Panel A – Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>5th</th>
<th>Median</th>
<th>95th</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Pay$_{it+1}$</td>
<td>1,470</td>
<td>6,390.7</td>
<td>6,530.2</td>
<td>815.4</td>
<td>4,189.4</td>
<td>19,826.7</td>
</tr>
<tr>
<td>Log Total Pay$_{it+1}$</td>
<td>1,470</td>
<td>8.33</td>
<td>0.97</td>
<td>6.70</td>
<td>8.34</td>
<td>9.89</td>
</tr>
<tr>
<td>Peer Pay$_{it}$</td>
<td>1,470</td>
<td>8.51</td>
<td>0.77</td>
<td>7.18</td>
<td>8.54</td>
<td>9.72</td>
</tr>
<tr>
<td>Peer Pay Expected$_{it}$</td>
<td>1,470</td>
<td>8.15</td>
<td>0.73</td>
<td>6.99</td>
<td>8.19</td>
<td>9.31</td>
</tr>
<tr>
<td>Peer Pay Unexpected$_{it}$</td>
<td>1,470</td>
<td>0.36</td>
<td>0.48</td>
<td>-0.34</td>
<td>0.32</td>
<td>1.18</td>
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<td>0.04</td>
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(continued on next page)
TABLE 7 (continued)

Panel B – Compensation regressions

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<td>(0.37)</td>
<td>(0.82)</td>
<td>(1.15)</td>
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<td>0.28***</td>
<td>0.28***</td>
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<td>(4.19)</td>
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<td>(3.94)</td>
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<td>(3.08)</td>
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<td>(2.18)</td>
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<td>(0.92)</td>
<td>(-0.73)</td>
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<td>1.57**</td>
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<td>(2.30)</td>
<td>(2.58)</td>
<td>(0.61)</td>
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<td>(0.52)</td>
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<td>0.24</td>
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<td>(1.21)</td>
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<td>Yes</td>
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This table reports the results of regression models predicting firms’ CEO total compensation ($\text{Log Total Pay}_{it+1}$) using various measures of peer pay, and controlling for economic factors expected to explain compensation. The model includes an interaction between the residual peer pay effect and three proxies for corporate governance variables – CEO Also Chair, Independent Board, and Institutional Ownership. Observations are at the firm-year level. Reported $t$-statistics in parentheses are clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Variables are defined in Appendix B.

<table>
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<th>Gov = CEO Also Chair</th>
<th>Gov = Independent Board</th>
<th>Gov = Institutional Ownership</th>
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<td>Peer Pay Unexpected Res $\times$ Gov_{it}</td>
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<td>-0.43 (1.29)</td>
<td>0.18* (1.67)</td>
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<td>$\text{Gov}_{it}$</td>
<td>0.25*** (5.12)</td>
<td>0.46*** (2.70)</td>
<td>0.15** (2.20)</td>
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<td>Peer Pay Expected_{it}</td>
<td>0.29*** (4.37)</td>
<td>0.31*** (4.14)</td>
<td>0.28*** (4.30)</td>
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<td>3.50** (2.45)</td>
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<td>Peer Pay Unexpected Res_{it}</td>
<td>0.32*** (5.15)</td>
<td>0.59** (2.35)</td>
<td>0.16* (1.94)</td>
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<td>$\text{LogRevenue}_{it}$</td>
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<td>$\Delta \text{ROA}_{it+1}$</td>
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<td>-0.02 (0.60)</td>
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