

Compensation Peer Groups and their Relation with CEO Compensation

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ABSTRACT

We examine whether compensation peer firms are selected opportunistically to increase CEO pay. Using a sample of 608 firms from the S&P 1500 and 2,154 peer firms, identified from their 2006 proxy statements. We find only limited evidence that firms choose peer groups opportunistically. Although sample firms appear to select bigger and better performing peer firms relative to other potential peers, only size has any power in explaining components of sample firm CEO pay. In addition, firms often select peers that are from the same industry and peers that also have selected the sample firm as its peer, both capturing similarities in economic characteristics between sample firms and chosen peers. Our evidence is more consistent with firms using compensation peer firms to benchmark CEO pay in a competitive labor market than firms strategically selecting peer firms to influence or justify greater CEO pay.

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1. Introduction

Compensation committees frequently cite compensation in peer firms as an important determinant of the structure and level of CEO pay. The widespread use of peer groups along with increasing executive pay levels has led to concerns over the selection and use of peer groups in the pay-setting process. Proponents of peer groups contend that benchmarking represents an efficient and necessary input to the compensation process. In a well-functioning labor market, peers provide data on market wages determined by the supply and demand for executive talent (Holmstrom and Kaplan, 2003). In contrast, critics argue that boards can choose peers in an opportunistic manner to artificially inflate executive pay levels (Crystal, 1991; Morgenson, 2006). This study provides evidence on these competing theories by investigating the selection of peer groups and their relation to executive compensation.

Under the new Securities and Exchange Commission rules (effective for fiscal years on or after December 15, 2006), companies must provide a “Compensation Disclosure and Analysis” (CD&A) report in their annual proxy statement. Among other information, firms must disclose which, if any, peer group the firm uses when setting executive compensation (Securities and Exchange Commission, 2006). From these disclosures in proxy statements filed in 2007, we collect detailed data on peer groups for a sample of 608 firms from the S&P 1500 with December fiscal year ends. To investigate the influence of peer groups on compensation design, we examine the determinants of compensation peer groups and their influence on executive compensation. Identifying each unique peer firm, we complement Compustat and ExecuComp data with additional hand-collection from proxy statements to measure firm characteristics and CEO compensation for the disclosed peers since approximately one-third of peer firms are not in the ExecuComp database.¹ Our final sample consists of 9,844 sample-peer firm observations representing 2,154 unique peers.

We examine potential opportunistic choice of compensation peer groups by testing for biased selection of peer firms and whether differences between sample and peer firms leads to greater CEO pay.

¹ ExecuComp is generally restricted to compensation data for firms in the S&P 500, Mid-Cap 600 and Small-Cap 400. As a result, ExecuComp does not have data for 751 of our 2,154 peer firms. We hand-collect the data for these non-ExecuComp firms, as well as the peer groups for all 2,154 peer firms.

We first consider differences between the sample firms and chosen peers relative to potential but unselected peers. Our group of potential peers consists of firms that have some relation to the sample firm: its actual peers, the peers of the sample firm's peer firms (akin to the transitive property in mathematics) or other firms that list the sample firm as a peer. By allowing disclosed relations to define this group, we believe this sample best captures the potential labor market in which the sample firm competes for managerial talent. As we document in Section 3, 44% of actual peer firms are selected from *outside* the sample firm's industry and, 48% from *outside* the sample firm's S&P size index. This suggests that limiting the group of potential peers to only firms in the same industry and of similar size would not reflect the labor market and would likely bias our analysis.

We find that chosen peers are larger and better performing relative to the sample firm than potential, but unchosen peers. We also find that chosen peers pay relatively higher salaries than unchosen peers. Only in considering performance, however, do firms select peers that are more different from themselves than unchosen peers. Despite being on average larger, chosen peers are closer in size to the sample firm than unchosen peers. We also find that sample firms are more likely to select peers within the same industry and with an interlocking relation (where the peer firm has selected the sample firm as its peer). Our findings indicate that although sample firms select better performing firms, perhaps to increase pay, other economic characteristics of the peer firms are more consistent with benchmarking than opportunistic selection.

We then examine whether the selection of peer firms leads to greater CEO pay in the sample firm, consistent with opportunistic selection. If firms select peers to influence or justify greater compensation, then differences in economic characteristics between sample firms and chosen peers should result in higher CEO compensation. Of all the economic characteristics we examine, only with size do we see evidence of opportunistic selection. Interestingly, despite choosing better performing peers, we find no evidence that differences in ROA are related to CEO pay. For pay that is unexplained by the economic determinants (size, performance, growth opportunities, and industry membership), we find positive relations between peer firm and sample firm pay. However, further analysis reveals that this evidence is

more consistent with meeting labor market conditions than opportunistic selection. Collectively, our results suggest that the use of peer firms is more consistent with benchmarking than with opportunistic selection.

This paper most closely relates to Bizjak, Lemmon, and Naveen (2008) and Faulkender and Yang (2008). Bizjak, et al. (2008) study the use of peer groups in a sample of 100 firms from the S&P 500 index in fiscal 1997. Since in their study period (1992-2005) firms seldom report the actual peer group, the authors form benchmark groups using ExecuComp firms within the same two-digit SIC industry and of similar size, based on being above or below industry median sales.² They find that executive pay is set at appropriate levels given the level of pay at firms of similar size and industry. Thus they conclude that firms use peer groups to benchmark pay against competitors and gauge the reservation wage necessary for retention. In a concurrent working paper, Faulkender and Yang (2008) also focus on firms in the S&P 500 and study a sample of 83 firms that voluntarily disclose peer groups used for benchmarking executive pay in their fiscal 2005 disclosures and 373 firms that disclose the information as part of the new SEC requirements in 2006. Like Bizjak, et al. (2008), they examine the importance of peer firms in explaining sample firm pay and find that peer group median pay contributes significant explanatory power to regressions of CEO pay. Then, they examine the selection of peer firms from a pool of potential peers made of up of all S&P 500 and S&P Midcap 400 firms. While they find that peers are more likely of similar size and industry, they also find that peers with greater pay are more likely to be selected, and that effect is stronger for firms with potentially weaker governance. This latter finding suggests potential bias in the pay setting process and contrasts with that of Bizjak, et al. (2008), which concludes that peers lead to efficient outcomes in CEO pay. Given these conflicting results, the role of peer firms in setting CEO pay remains ambiguous, allowing our study to provide important evidence on this issue.

We provide several contributions to this stream of literature. First, we focus our analysis on a period where the SEC requires firms to disclose peer groups used for the design of executive compensation and examine a broad set of firms in the S&P 1500. Unlike Bizjak, et al. (2008), we identify

² In Section 3, we document that only 55% of actual peer firms are in the same two-digit SIC industry.

the actual peer firms and thus can examine the choice of peers, allowing us to test whether firms select peers opportunistically. Second, by examining a broader set of firms, we provide more generalizable evidence on the influence of firm characteristics in the selection of peer firms. In contrast to Faulkender and Yang (2008), our sample firms extend beyond the S&P 500 and our peer firms extend beyond the ExecuComp database, enabling us to provide evidence on the effect of firm size and growth opportunities, among other characteristics, that are more homogeneous in their sample of larger firms.³ Finally, because our dataset includes the peer groups of our sample firms' peers, we document the potential labor market in which firms compete for talent. In addition, we use this information to more narrowly and accurately define the set of potential peers. This innovation allows us to contribute more complete evidence as to whether firms opportunistically select compensation peer groups to increase CEO pay.

Our paper continues as follows. In Section 2, we present our research question and in Section 3, our research design. Section 4 presents our results and Section 5 concludes.

2. Research Question

Firms generally use peer groups in compensation practices to: (1) benchmark the level of pay, (2) compare the structure and composition of pay, and (3) determine if pay is aligned with performance (Greenblatt and Doubleday, 2007). The compensation committee of the board of directors, at times with input from the firms' executives or an outside compensation consultant (Aguilar, 2007), typically defines these peer groups. While firms may also use peer groups for relative performance evaluation in determining awards from incentive plans, in our study, we focus on the peer group used to benchmark the level of pay.⁴

³ For the S&P 500 firms in our sample, 76% of their peers are also from the S&P 500. However, for our sample of S&P Mid-Cap 400 and S&P Small-Cap 600, not included in Faulkender & Yang (2008), only 31% and 28%, respectively, are from the same index as the sample firm.

⁴ Byrd, et al. (1998) find that peers are used more frequently for benchmarking magnitude of pay and less frequently for relative performance evaluation among their sample of 49 firms of the S&P 500 that voluntarily disclosed peer groups in 1993.

The selection of peer groups is an important process. The rise in executive compensation over the past two decades has fueled criticism of executive compensation levels and increased the importance for boards of directors to demonstrate diligence and responsibility in setting executive pay levels. One way to demonstrate this responsibility and justify executive compensation levels is to benchmark executive pay to a disclosed set of peers. The selection of peer groups may reflect an attempt to measure the appropriate reservation wage for the CEO. Alternatively, the firm may bias their selection of compensation peer firms to either influence or justify high CEO compensation levels.⁵ Indeed, research provides evidence supporting both roles of peer firms (Bizjack, et al., 2008 and Faulkender and Yang, 2008). Using a more comprehensive research design, we examine the whether firms select compensation peer groups to benchmark pay against market wages or whether peer groups are selected in an opportunistic manner to increase CEO pay.

2.1 Benchmarking

Firms may choose compensation peer groups to help determine benchmark compensation levels. Firms frequently indicate that they wish to pay competitive levels to attract and retain well-performing executives. That is, firms can benchmark executive pay to set the executive's reservation wage (Holmstrom and Kaplan, 2003). As such, a firm's compensation peer group reflects firms with which the sample firm competes for managerial talent. This conjecture suggests that economic characteristics of peer firms will be similar to those of the sample firm, and that the sample firm may be more likely to choose peers that have selected the sample firm as a peer (an interlocking relation). In addition, in a

⁵ An alternative reason for biased selection may be to influence the market's perception of the firm. For example, firms may choose peer firms that are larger and better performing to signal that they, themselves, should be viewed as larger and better performing (see Hayes and Schaefer, 2008 for a detailed discussion of this conjecture). It is also possible that firms might seek peers that are worse performing so that the firm may appear better performing. Poorly performing peers, however, likely have lower levels of pay corresponding to the worse performance, and therefore selection of such firms would lead to lower pay for the sample firm.

competitive market for managerial talent, compensation in peer firms is likely to be similar to that of sample firms.⁶

If peers are selected to help benchmark CEO pay against other potential employers of those CEOs, then we would not expect any evidence of bias in the selection of peer groups to have a measurable influence on CEO pay. That is, any documented differences in the characteristics of peers are not expected to increase pay. Rather, although differing in characteristics, the selected peers may best capture the labor market for managerial talent, and thus determine the CEO's reservation wage. To the extent there are differences in economic characteristics between peers and the sample firms, sample firms may adjust for those differences (for example, using regression analysis) so as to not increase CEO pay. As a result, we do not expect a relation between CEO compensation and differences in economic characteristics between sample firms and their peer groups if peers are chosen to benchmark CEO pay.

2.2 *Opportunistic selection of peers*

An alternative argument is that firms select compensation peer firms that are larger, better performing, with greater growth opportunities, and that compensate their executives more highly. Such firms may be selected because the compensation committee is trying to justify intentionally higher pay (above the CEOs reservation wage) for fear of losing the CEO or for the CEO's personal benefit. Thus, firms may justify high compensation levels by citing peer groups that are biased towards larger, better-performing firms with greater growth opportunities that pay their CEOs in a manner that is consistent with these characteristics. Baker and Hall (2004) and Baber, Kang, and Kumar (1998) find evidence that compensation is positively related to firm size and performance. Similarly, firms with greater growth opportunities generally compensate their executives more highly (see for example, Smith and Watts, 1992 and Baber, Janakiraman, and Kang, 1996). In addition, firms may simply choose peer firms that provide higher compensation levels. Benchmarking against peer firms that more highly compensate their CEO

⁶ If sample firms have been using peer firms and benchmarking pay to the mean or median of those firms leading up to our sample period, then there should be no statistical difference in pay between the two groups.

may help sample firms justify their own large compensation packages compared to peer firms. Opportunistic selection would result in peer firms that are larger, better performing, and with greater growth opportunities and CEO compensation than the sample firm.⁷

If peers are selected in an opportunistic manner to increase pay, we expect that differences in the economic characteristics and CEO pay between the sample firm and its peer group will be related to greater CEO pay at the sample firm. That is, if firms opportunistically select peers that are bigger, better performing, and that have greater growth opportunities to justify ratcheting up compensation levels, then the extent to which the selected peers have these characteristics will be positively related to CEO pay at the sample firm. Similarly, opportunistic selection of peers that compensate their CEOs more richly will be positively related to pay at the sample firm.

We provide insight into the role of peer groups by examining the selection of peer firms to determine which of the two views presented above best describes the choice of peer firms and the effect of that choice on CEO pay. Evidence that selected peers have economic characteristics previously shown to be associated with higher levels of pay and that differences between sample and peer firms in those characteristics are related to higher pay in the sample firm would support the opportunistic selection of compensation peer groups. On the other hand, evidence that peers are more similar to sample firms that potential, but unselected peers, or than any differences in economic characteristics between sample and peer firms is not related to greater sample firm CEO pay is more consistent with firms selecting compensation peer firms to benchmark pay in a competitive labor market.

3. Research Design

3.1 Sample selection and data sources

Our initial sample consists of 893 firms in the S&P 1500 on the ExecuComp database for fiscal year 2006.⁸ Because the new Compensation Disclosure and Analysis (CD&A) requirement was effective

⁷ Alternatively, such a selection may not be deliberate; the compensation committee may simply lack objectivity and view the CEO and/or the firm as better performing than current measures would suggest.

for filings beginning with fiscal years ending on or after December 15, 2006, we limit our sample to firms with December 31, 2006 fiscal year ends. We hand-collect information on the compensation peer group used for benchmarking levels of pay from the CD&A disclosures in the proxy statements for the 2006 fiscal year.⁹ For our sample firms, we obtain financial statement data from Compustat and CEO compensation data from the ExecuComp database. As reported in Table 1 Panel A, 686 firms indicate that they use a list of peer firms, 85 use an index or survey for benchmarking, 45 use both a list of peer firms and an index/survey, 16 indicate that they do not use a peer group in setting executive compensation, and 56 provide no information on the use of peer groups to benchmark pay. As reported in Table 1 Panel B, of the 731 firms that disclose using a list of firms to benchmark executive pay, 608 firms provide the list of peer firms. The remaining firms do not provide detailed information on the compensation peer groups.

For the 608 firms that provide the list of peer firms for benchmarking pay, we obtain the peer firm names from the proxy statement. If the firm cites more than one peer group, we focus on the peers used to benchmark CEO pay.¹⁰ As reported in Table 1 Panel C, after dropping firms with missing financial statement data from Compustat, 10,067 sample-peer firm observations remain, representing 2,259 unique firms. We then obtain compensation data for the peer firms. Compensation data for approximately two-thirds of the peer firms (1,403) is available from Standard and Poor's ExecuComp database. We hand-collect CEO compensation data from proxy statements for the 2005 fiscal year for the remaining 751 firms.¹¹ Our final sample consists of 9,844 sample-peer firm combinations, representing 2,154 unique firms. As reported in Table 1 Panel D, the average (median) peer group is

⁸ Our selection is as of September 30, 2007.

⁹ Firms may also select peer groups to for relative performance evaluation. Because our analysis focuses on the level of pay, we do not use that information. In addition, often these two peer groups differ. In a random sample of 100 firms, we found that 7 use the same group of firms for benchmarking performance, 23 have some overlap of peer firms between the two groups, and 70 make no mention of benchmarking performance against any comparator group for the purposes of determining compensation. The small proportion of overlap suggests that incentives to bias performance are minimal in our sample.

¹⁰ Some firms identify a different peer group for non-CEO executive pay. Since our analysis is focused on CEO pay, we do not use that information. See footnote 8 for a discussion of peers used to benchmark performance.

¹¹ The fact that approximately one-third of actual peer firms are not in the ExecuComp database highlights the limitations of prior studies that do not examine the actual peer firms but instead use the ExecuComp database as the reference point.

comprised of 16.2 (15) firms and of those peers, 3.5 (3) are interlocking, where interlock is defined as peers that also choose the sample firm as a peer.

Table 2 provides descriptive information on the 608 sample firms and the 2,154 peer firms. Panel A provides summary statistics of financial characteristics and annual compensation of the sample and peer firms. Sample firms are significantly larger (both mean and median) than peer firms, as measured by assets, market value of equity and sales. This is not surprising because our sample firms are restricted to the S&P 1500 but peer firms have no such restriction. Sample firms have better performance, as measured by return on assets, but there is not a significant difference in growth opportunities (book-to-market ratio). Consistent with the larger size and better performance, sample firms have significantly higher pay (salary, bonus, equity and total compensation) than the sample of peer firms.

Table 2 Panel B provides the industry distribution of the sample and peer firms, where industries are defined by the 48 Fama-French industries (Fama and French, 1997). We use these industry definitions because they are less restrictive than 2- or 3-digit SIC, but at the same time, aggregate across similar macroeconomic factors. For example, alcoholic beverage manufacturers, subject to additional regulation, are separated from soft drink manufacturers, although both are in the same 3-digit SIC code. We do not find any striking differences in the industry distribution, most likely because sample firms tend to select peer firms in the same industry. In our sample, approximately 56% of firms in each peer group are of the same Fama-French Industry as the sample firm. Table 2 Panel C presents the proportion of peer firms in the same industry as the sample firm for various definitions of industries including 2-, 3-, and 4-digit SIC, Barth, et al. (1998), and Fama-French. As expected, the proportion of firms from the same industry is greatest when industries are defined as in Barth, et al. (1998) because it aggregates into 15 groupings. We also report the proportion of peers that are of the same S&P index as the sample firm for the three S&P indices covered by ExecuComp (500, Mid-Cap, and Small-Cap). Only 52% of peer firms are from the same S&P index. And, this percent is quite different within each of the sub-indices. Most (77%) of the

peer firms are from the same index when the sample firm is in the S&P 500, while only 31% (28%) of the peers are from the same index when the sample firm is from the S&P Mid-Cap (Small-Cap) index.¹²

3.2 *Determinants of peer groups*

To provide evidence on whether firms select compensation peer groups opportunistically, we first examine the characteristics of firms selected for inclusion in the peer group. If firms select peers to provide a benchmark of the CEO's reservation wage, we expect the economic characteristics of the chosen peers to be more similar to the sample firm than potential, but unselected peers. On the other hand, differences between the two sets of firms may provide evidence that firms select peers opportunistically to influence greater CEO pay. To provide evidence on this, we investigate the differences between the characteristics of selected peers and the sample firm relative to the differences between other potential, but unselected, peer firms and the sample firm. This test provides evidence on whether chosen peers more closely match the firm than other potential, but unselected, peers.

In our analysis, we focus on five economic characteristics: size, performance, growth opportunities, industry membership and CEO pay. We expect benchmarking (opportunistic) selection of peer firms to result in peer firms that are, on average, of similar (larger) size to the sample firm and more similar (larger) in size than other potential peers. As a proxy for firm size, we measure the book value of firm assets. In addition, benchmarking (opportunistic) selection of peer firms would result in peers that have, on average, performance that is similar to (better than) the sample firm and performance that is similar to (better than) the set of possible peers.¹³ We measure return on assets (ROA) as a proxy for performance. To the extent that firms use peers to benchmark pay, we expect firms to select peers with similar growth opportunities. In contrast, biased selection suggests that firms may choose peer firms with

¹² When Mid-Cap firms select peers out of their index, approximately 33% of peers are from the S&P500 and 36% are from the Small-Cap or below. For Small-Cap firms, 36% of peers are from the S&P 500 or Mid-Cap 400 and 36% are from below.

¹³ Because the peer groups we examine are used for benchmarking levels of pay, and not performance, we expect any bias to result in selecting better performing firms to increase pay. To the extent that peer firms also appear in a comparator group used to benchmark performance, it would provide counterbalancing incentives to select worse performing firms.

greater growth opportunities. We measure the ratio of book value to market value of assets (BVMV) as a proxy for growth opportunities.

If product markets also define labor markets, firms' product market competitors provide benchmarks against which the compensation committee can measure CEO pay. But, there are a finite number of competitors in a firm's industry. Firms may expand the possible set of comparator firms by including firms *outside* their industry but that compensate their CEO more richly if the choice of peers reflect opportunistic selection. We therefore expect that a benchmarking (opportunistic) selection of peer firms would result in peers that are more (less) likely to be in the same industry as the sample firm.¹⁴ Similarly, we predict that benchmarking (opportunistic) selection of peers results in CEO compensation that is similar (higher) than pay at sample firms and more similar (larger) than pay at potential, but unselected peer firms. We measure pay as salary, bonus, equity, and total compensation. Salary and bonus are obtained from the proxy statement. Equity is computed as the fair market value of equity payments, calculated as the market value of restricted stock grants and the Black-Scholes (1973) value of stock option grants, respectively.¹⁵ Total compensation is the sum of salary, bonus, equity, and all other annual compensation, where "other annual compensation" is as reported in the firm proxy statements.

Finally, to capture similarities between sample firms and peer firms that are not captured in the economic characteristics described above, we consider whether the potential peer firm has selected the sample firm as its peer (we refer to this as an "interlocking relation"). As shown in Figure 1, an interlocking relation exists between Sample Firm Z and Peer B because Firm Z selects Peer B, among other firms, as a peer firm while Peer B selects Firm Z, among other firms, as a peer firm. In our sample, 81% of our firms (493 of 608) have at least one interlocking relation with a peer. Under the benchmarking hypothesis, firms select peers with similar characteristics and with whom they compete for managerial

¹⁴ Firms often describe their peer groups as the market in which they compete for managerial talent. This market may differ from their product market. If so, we expect to find that peer firms are less likely to be in the same industry group but not more likely to have greater pay.

¹⁵ Because many of our firms are not available on ExecuComp, we calculate the Black-Scholes value of the option grants for all firms using the inputs provided by the firm for time to maturity, average dividend yield, stock returns volatility, and risk-free rate.

talent. We, therefore, expect an interlocking relation between a sample firm and its peer firm. That is, we expect that sample firms are more likely to select, from among potential peer firms, those that select the sample firm as its peer. We would not expect such an interlocking relation under the opportunistic selection hypothesis. Opportunistic selection suggests that firms choose peers with predictably *different* characteristics than other potential peers (e.g. larger, better performing) to increase pay. As such, if the interlocking relation between the two firms represents economic *similarities*, we do not expect sample firms to choose peer firms for which the sample firm is a peer. We identify whether the peer firm has selected the sample firm as its peer by collecting this data from proxy statements for each of our 2,154 peer firms.

We consider, as our pool of potential peers, firms that are related to the sample firm through other peer groups. These potential peers include the sample firm's peers, the firms listed as peers of the sample firm's peers (i.e. peers of the peer firms), and any firms in our full sample that list the sample firm as a peer. This relation is illustrated in Figure 1. For Sample Firm Z, the set of potential peers would be Peers A-C, the peers of Peers A-C (excluding the firm itself) and Peer M, because Peer M (the peer of a different sample firm) lists Sample Firm Z as its peer. By limiting potential peers to firms that are related to the sample firm, we believe this group best captures the potential labor market in which the sample firm competes for talent. Prior research has limited potential peers to firms of similar size and/or of the same industry. But, our description of actual peers indicates that peers are drawn from a wider group. As such, limiting potential peers to only those in a specific industry or size index may bias the finding. On the other hand, allowing all firms with publically available data to be potential peers may also bias the findings since it will include firms for which the sample firm does not compete for managerial talent. We balance these two research design limitations by allowing actual peer relations to guide the set of potential peers. Firms with some relation to the sample firm allows for peers outside the industry and size index but within a reasonable set. Panel D of Table 1 provides summary statistics of the potential peers defined in this manner. With 48,593 sample-potential peer firm observations, there are, on average, 79 potential

peers for each sample firm and, within those, the potential to have 9 interlocking relations, where a potential peer has selected the sample firm as its peer.¹⁶

For each sample firm, we examine the choice of the selected peer as a function of differences between the potential peer and the sample firm. We estimate the following logit regression on the panel of data where the standard errors are cluster-adjusted by sample firm:

$$\begin{aligned} \text{PEER}_{ij} = & \beta_0 + \beta_1 \text{D_ASSETS}_{ij} + \beta_2 \text{D_ROA}_{ij} + \beta_3 \text{D_BVMV}_{ij} \\ & + \beta_4 \text{D_FAMA_IND}_{ij} + \beta_5 \text{POT_INTERLOCK}_{ij} \\ & + \beta_6 \text{D_SALARY}_{ij} + \beta_7 \text{D_BONUS}_{ij} + \beta_8 \text{D_EQUITY}_{ij} + \varepsilon_{ij} \end{aligned} \quad (1)$$

where:

PEER	=	indicator variable equal to 1 if the potential peer firm i is an actual peer firm to sample firm j, 0 otherwise,
D_ASSETS	=	the log of potential peer firm i's assets (Compustat Data Item AT) less the log of sample firm j's assets in 2005,
D_ROA	=	ROA (Compustat Data Item OIADP/ Compustat Data Item AT) of potential peer firm i less the ROA of sample firm j in 2005,
D_BVMV	=	BVMV (Compustat Data Item AT / (Compustat Data Item CSHO*Compustat Data Item PRCC_F + Compustat Data Item LT)) of potential peer firm i less the BVMV of sample firm j in 2005,
D_FAMA_IND	=	indicator variable equal to 1 if the potential peer firm i is NOT in the same industry group (as determined by Fama and French, 1997) as sample firm j, 0 otherwise,
POT_INTERLOCK	=	indicator variable equal to 1 if the potential peer firm i has selected sample firm j as one of its peer firms, 0 otherwise.
D_SALARY	=	salary for the CEO of potential peer firm i less the salary for the CEO of sample firm j in 2005,
D_BONUS	=	bonus for the CEO of potential peer firm i less the bonus for the CEO of sample firm j in 2005,
D_EQUITY	=	equity pay for the CEO of potential peer firm i less the equity pay for the CEO of sample firm j in 2005,

Positive coefficients on D_ASSETS (β_1) and D_ROA (β_2) and a negative coefficient on D_BVMV (β_3) are consistent with the hypotheses that firms opportunistically select peers that are larger, better performing, and with greater growth opportunities than themselves relative to other potential, but

¹⁶ For a robustness test, we also use all 2,154 unique peer firms in our sample to be a possible peer firm for each of the 608 sample firms. This results in 1,309,632 sample-potential peer firm observations. Testing with this broader group eliminates any restrictions we impose on the sample, but would include firms that may be inappropriate for benchmarking for some sample firms. We discuss this test in section 4.1.

unselected peers. A positive coefficient on D_FAMA_IND (β_4) suggests that firms seek peers outside of their industry. At the same time, positive coefficients on the compensation variables (β_6 through β_8) suggest that firms select peers that compensate their CEO more highly, consistent with opportunistic selection. Finally, a negative coefficient on POT_INTERLOCK (β_5) is consistent with opportunistic selection as it suggests that the sample firm is less likely to select a firm that has already selected it as a peer. Coefficients of zero on $\beta_1 - \beta_3$ and $\beta_6 - \beta_8$, a negative coefficient on β_4 , and a positive coefficient on β_5 are consistent with the benchmarking hypothesis that firms select peers that most closely approximate their own characteristics.

The research design above considers opportunistic selection by examining directional effects of differences between potential peers and sample firms. We also consider unsigned differences to examine how similar or different potential peers are to sample firms. For this analysis, we replace the signed differences of D_ASSETS, D_ROA, D_BVMV, D_SALARY, D_BONUS, and D_EQUITY with the absolute value of the differences. If chosen peers are more similar to sample firms than potential, but unchosen, peers, we predict a negative coefficient on these variables.

3.3 *Relation between peer groups and compensation*

Evidence of opportunistic selection of compensation peer groups requires that differences in characteristics between peer firm and sample firms be related to higher CEO pay. Therefore, we examine the extent to which CEO pay is explained by differences in characteristics between selected peer firms and sample firms, after controlling for economic determinants of pay. We estimate a regression of annual CEO compensation in fiscal year 2006 for firm j as a function of economic determinants and differences from peer group characteristics as of the end of fiscal year 2005:

$$\begin{aligned} \text{PAY}_{jt+1} = & \alpha_0 + \alpha_1 \text{MED_DIFF_ASSETS}_{jt} + \alpha_2 \text{MED_DIFF_ROA}_{jt} \\ & + \alpha_3 \text{MED_DIFF_BVMV}_{jt} + \alpha_4 \text{PCT_DIFF_IND}_{jt} \\ & + \alpha_5 \text{INTERLOCKING}_{jt} + \alpha_6 \text{PEER_COMP_RESID}_{jt} \\ & + \alpha_7 \text{LNASSETS}_{jt} + \alpha_8 \text{ROA}_{jt+1} + \alpha_9 \text{BVMV}_{jt} + \sum \alpha_i \text{IND}_j + \varepsilon \end{aligned} \quad (2)$$

where:

PAY	= measures of CEO compensation for firm j in 2006: logs of salary, bonus, equity, and total compensation
MED_DIFF_ASSETS	= median LNASSETS in 2005 of firm j's peer group - LNASSETS in 2005 for firm j
MED_DIFF_ROA	= median ROA in 2005 of firm j's peer group - ROA in 2005 for firm j
MED_DIFF_BVMV	= median BVMV in 2005 of firm j's peer group - BVMV in 2005 for firm j
PCT_DIFF_IND	= percent of peer firms NOT belonging to the same industry group as firm j
INTERLOCKING	= the percent of peer firms that have selected the sample firm as its peer.
PEER_COMP_RESID	= median of firm j's peer group of PEER_COMP_RESID compensation from a regression of compensation on economic determinants of compensation (log of assets, book to market ratio, return on assets and industry indicators) for all peer firms in 2005
LNASSETS	= log of total assets (Compustat Data Item AT) for firm j in 2005
ROA	= operating income after depreciation scaled by total assets (Compustat Data Item OIADP/ Compustat Data Item AT) for firm j in 2006
BVMV	= book value of total assets scaled by the sum of the market value of equity plus the book value of total liabilities (Compustat Data Item AT / (Compustat Data Item CSHO*Compustat Data Item PRCC_F + Compustat Data Item LT)) for firm j in 2005.
IND	= indicator variables for 15 industries based on Barth, et al. (1998).

Our economic determinants of pay include the log of total assets to control for firm size and book-to-market ratio to control for growth opportunities (Smith and Watts, 1992; Gaver and Gaver, 1993 and 1995; Core and Guay, 1999). We control for firm performance using return on assets (ROA). We also include Barth, et al. (1998) industry indicator variables to control for variations in the level of pay across industries. When equity pay is our dependent variable, we include additional determinants of equity compensation (see for example Smith and Watts, 1992; Dechow, et al., 1996; and Core and Guay, 1999).¹⁷

Because firms commonly state that they target compensation at the median of the peer group (Greenblatt and Doubleday, 2007), we use the median values of the peer group to measure differences from the sample firms. We consider the mean values in robustness tests. If the selection of peer firms has no influence on the level of CEO pay, then differences in the economic characteristics should constitute noise and will have no relation to pay. As such, the coefficients on MED_DIFF_ASSETS (α_1),

¹⁷ We include the deviation of the CEO's equity incentive levels from predicted levels as a function of cross-sectional annual estimations of equity incentives on firm size, firm risk, growth opportunities, CEO tenure, free cash flow, and industry (Core and Guay, 1999). We also include a variable indicating whether the firm has a net operating loss carryforward, the extent to which the firm is cash flow and dividend constrained, and the annual return to shareholders over the prior and current year. The additional data requirements, which require at least three years of data for the CEO, restrict the sample to 496 firms.

MED_DIFF_ROA (α_2), MED_DIFF_BVMV (α_3), and PCT_DIFF_IND (α_4) would be zero. Alternatively, positive coefficients on α_1 , α_2 , and α_4 , and a negative coefficient on α_3 suggest that selecting larger, better performing firms, with greater growth opportunities outside of the sample firm's industry lead to greater CEO pay. Such a finding would be consistent with opportunistic selection of peer firms to influence CEO pay.

It is possible that the economic characteristics included in Eq. (2) may not fully capture the characteristics of peer firms. However, selecting peer firms that have already selected the sample firm as a peer may provide an indication of similarities not captured in our economic characteristics. We consider the percent of peer firms that have selected the sample firm as their own peer (INTERLOCKING). Because interlocking peers reflect similarities in characteristics which would lead to similarities in pay, we expect the coefficient on INTERLOCKING (α_5) to be zero.

As a final test of whether the selection of peer firms reflects opportunistic choices to influence higher CEO pay, we consider the influence of peer firm compensation. Firms may select peers with greater pay because benchmarking pay against such firms would lead to higher pay at the sample firm. Because we include economic determinants of pay at peer firms in our analysis, our measure of peer firm pay is the level of pay unexplained by the economic determinants (LNASSETS, ROA, BTM, industry membership). We measure unexplained pay for each component of pay as the residual from a regression of pay on log of assets, book to market ratio, return on assets, and industry indicators, estimated over all firms in our analysis. If peer firms are selected because of their higher pay not explained by the economic determinants, we expect the coefficient on PEER_COMP_RESID (α_6) to be positive, but we also expect that relation to be asymmetric. That is, we expect that opportunistic selection of peers to result in greater sample firm CEO pay when unexplained pay is positive but not lower sample firm pay when it is negative.

4. Results

4.1 *Determinant of peer groups*

4.1.1 *Univariate comparisons*

In Table 3, we report descriptive evidence of the differences in economic characteristics and CEO compensation between the sample firms and the mean (median) of their selected peer group for fiscal year 2005.¹⁸ The first column reports the mean (median) proxies for firm size (assets, market value of equity, and sales), firm performance (ROA), growth opportunities (book-to-market ratio) and compensation (salary, bonus, equity, and total) for our sample firms. The second column reports the mean (median) values of those variables for the mean of each peer group. The third column reports the mean (median) difference between the mean of the peer group and its sample firm. As reported in the fourth column, peer groups, when measured at the mean, are larger than their corresponding sample firm as evidenced by significant differences in assets, market value of equity and sales. Although there is no difference in performance between peer groups and their sample firms, peer firms have greater growth opportunities (smaller book-to-market ratios) and higher levels of all forms of compensation than their sample firms.

The fifth column reports the mean (median) values of economic and compensation characteristics evaluated at the median of each peer group. The sixth column reports the difference between the peer group and its sample firm. As reported in the seventh column, examining firm size, mean differences suggest that the median of the peer group firms are smaller, whereas median differences suggest they are larger. As before, peer group firms have greater growth opportunities and there is no difference in performance between the two groups. Examining pay, we find that peer group firms have higher levels of pay when evaluated at the mean, but only higher levels of salary when evaluated at the median. One explanation for the inconsistencies within the comparisons to the peer group median and across the evaluation of the peer group mean and peer group median is skewness in the measures of firm size and compensation. As a result, the multivariate analyses that follow use differences in the log of these

¹⁸ We use 2005 data because firms generally choose their compensation peer groups at the beginning of the fiscal year. Therefore, the compensation peer groups disclosed for fiscal year 2006 are most likely based on peers chosen at the end of fiscal year 2005.

characteristics when testing for differences in assets and compensation. In unreported analysis, we examine the differences in the log of these characteristics and find evidence that peer groups are significantly larger and with higher levels of pay than their sample firm.

Recall that 44% of peers are from outside the sample firm's Fama-French industry. As additional evidence on the effects of selecting firms from outside the industry, we examine differences in the economic characteristics between peer firms from within and peer firms from outside the sample firm's industry. In untabulated analysis, we find that peers selected from outside the industry are larger (assets, sales and market value of equity), better performing, and with higher growth opportunities and greater pay (salary, bonus, equity, and total) than peers chosen from within the industry.

4.1.2 Analysis of potential peer firms

Our first set of analyses examines the choice of selected peer firms from the pool of potential peer firms. We test whether differences in economic characteristics and compensation between potential peer firms and the sample firm explains the selection of the actual peer firm as presented in Eq. (1). Table 4 Panel A presents results of the analysis. In column (1) we include only the economic determinants of pay. In columns (2) and (3) we include the components of pay and total pay, respectively. Because pay is correlated with the economic determinants, in column (4) we include the portion of total pay that is unexplained by the economic determinants. To measure unexplained pay, we use all firms (sample, peers, peers of peers) for which we have data, estimate pay as function of LNASSETS, ROA, BTM and industry indicators, and compute the residual pay for each firm.

In all specifications, the positive and significant coefficient on D_ASSETS (p -value < 0.05) suggests that actual peer firms are relatively larger than sample firms as compared to other potential peer firms. In addition, the positive and significant coefficient on D_ROA (p -value < 0.05) suggests that actual peer firms have relatively better performance as compared to the sample firm than do other potential peers. When compensation variables are included in the analysis in column (2), we find evidence that actual peer firms have relatively higher salary (the coefficient on D_SALARY is positive

and significant at p -value < 0.01), but we do not find significant positive relations on the other forms of pay. In fact, we find a negative and significant coefficient on D_EQUITY (p -value < 0.10), which suggests that firms select peers, on average, with relatively lower equity grants. In the third column, we include D_TOT_COMP in place of the components of compensation but find no evidence that firms select peers that have relatively higher total pay. This result remains in column (4) when we include only that portion of total pay that is uncorrelated with the economic characteristics in our regressions. The difference in unexplained pay between the potential peer and the sample firm is not related to the peer selection and our conclusions are unchanged. These findings provide some evidence consistent with opportunism. Sample firms select peers that are larger, better performing, and pay greater salaries than other potential, but unchosen peers.

At the same time, firms choose peers that are more similar to themselves on other dimensions. The negative and significant coefficient on D_FAMA_IND (p -value < 0.01) in all specifications suggests that sample firms are more likely to select peers that are of the same industry. Also, the positive and significant coefficient on POT_INTERLOCK (p -value < 0.01) in all specifications, the indicator for potential peers that have selected the sample firm as its own peer, suggests that sample firms are more likely to select peers that have selected the sample firm as its peer. This is consistent with our conjecture that interlocking peers captures similarities among firms not captured in the other economic determinants of our model. These two findings are not consistent with the opportunistic selection of peers. Rather, they support the benchmarking hypothesis that firms select peers with similar characteristics.

The results in Panel A examine directional differences between sample firms and peer firms and indicate that firms, on average, select bigger, better performing firms. In Panel B, we examine the absolute value of differences in economic characteristics to consider the extent of the bias. That is, we examine the absolute value of differences in economic characteristics, to capture whether chosen peers are more similar to the sample firm than unselected peers. We find that chosen peers are more similar in size, growth opportunities, equity pay and total pay, as suggested by negative and significant coefficients on the absolute value of the differences between potential peers and the sample firm. We find no

difference between the chosen and unselected peers and sample firm with respect to salary, bonus, or unexplained pay. As before, chosen peers are more likely from the same industry and are more likely to have selected the sample firm as its peer. Interestingly, we find that chosen peers are more different on performance (ROA).

4.1.3 Further analysis

In this section, we explore additional explanations and robustness tests of the selection of peers. Given the similarity of the results among the various specifications, we examine these tests relative to the results reported in column (3). First, we consider whether the selection of larger peer firms may result from choosing firms with similar levels of complexity. In untabulated results, we include the difference in the number of business segments between the potential peer firm and the sample firm to capture complexity. The coefficient on this measure is not significant and the findings on the differences in size remain. Second, we exclude firms in the bank, insurance and utilities industries (as defined by Fama-French, 1997). Studies of compensation often exclude these firms because they are subject to additional regulation. In untabulated results, we find that differences in size are no longer significant in the constrained sample. Specifically, while all other findings remain, the coefficient on `D_ASSETS` is negative but not significant at conventional levels. One possible explanation is that banks more frequently select peers from within their industry, and banks are among the largest firms in our sample. Of all 48 industries, banks have the smallest proportion (8.8%) of peers chosen from outside their industry, suggesting that the labor market for banks tends to remain within the industry. In addition, 7 of the 10 largest firms in our sample are from the banking industry. This suggests that specialized skill or knowledge is important, and firms are willing to trade off including larger firms in the peer group in order to select peers within their industry.

Although the potential peer firm's selection of the sample firm as a peer may be independent of any decision by the sample firm, it is possible that decision is related to the sample firm's selection of the potential peer as its peer. If so, our variable `POT_INTERLOCK` may be at least partially endogenous.

Where this concern is the greatest is for those observations where there is actually interlocking – the sample and peer firm are in each other’s peer group. This occurs in 2,162 of our 48,593 observations. In untabulated analyses, when we drop these observations and the variable POT_INTERLOCK from our analysis, our findings on D_FAMA_IND remain. In addition, our findings that selected peers are bigger and better performing than unselected peers are weaker but hold for all specifications (p -value < 0.10, one-tailed).

Finally, to determine if the limitations we impose on the potential peers influence our findings, we replicate our analysis using all 2,154 unique peers firms in our sample to be a potential peer firm for each of the 608 sample firms. This results in 1,309,632 sample-peer firm observations. In untabulated results, the findings more strongly indicate opportunistic selection. Not only do the results suggest that sample firms choose bigger, better performing peers, but the expanded sample also suggests that firms choose peers with greater growth opportunities and higher levels of salary and total compensation. The contrast to the results in Panel A likely reflects both the large sample size and the possibility that the pool of potential, unselected peers includes inappropriate potential peer firms that are smaller, worse performing and with lower growth opportunities. We believe that the restricted set of potential peers in Panel A better reflects the true set of potential peers, and provides greater insights into peer selection. As a consequence, we hesitate to draw strong conclusions from the expanded set of potential peers. In fact, the contrast to the findings in Panel A reinforces the importance of how the group of potential peers is defined and illustrates how this might influence the ability to identify bias in peer group selection.

Overall, these findings provide some evidence consistent with opportunistic selection of peer firms. We find that sample firms pick better performing peers even when those peers’ performance is more dissimilar to the sample firm.¹⁹ We also find that sample firms select bigger peers, although those peers are more similar to sample firms than unselected peers. However, we also find that firms are more likely to choose peers from the same industry and those firms that select the sample firm as its peer,

¹⁹ This finding suggests that any incentive sample firms have to select worse performing firms for relative performance evaluation purposes is small in our sample and does not drive the results in our sample.

which is inconsistent with opportunistic selection. But, to reflect opportunistic selection, these characteristics will be associated with higher CEO pay in the sample firm. We address this in the next section.

4.2 *Relation between Peer Groups and Compensation*

To provide evidence on opportunistic selection of compensation peer groups, we examine whether any biased selection of peers increases CEO pay. Table 5 reports the results of tests examining whether differences between peer firms (evaluated at the median of the group) and sample firm characteristics explain levels of CEO pay in sample firms, after controlling for economic determinants of pay as shown in Eq. (2). We find that the difference in size between the peer group and the sample firm is positively related to CEO pay when examining BONUS and TOTAL. The coefficients on MED_DIFF_ASSETS are positive and significant (p -value < 0.10 and p -value < 0.01 , respectively). We also find that the difference in growth opportunities influences total pay; the significantly negative coefficient on MED_DIFF_BVMV (p -value < 0.10) in column (4) indicates that choosing peer firms with greater growth opportunities leads to higher total compensation at the sample firm.

Interestingly, despite selecting better performing firms, we find no evidence that differences in ROA are related to higher pay. One explanation is a signaling hypothesis: firms want to be viewed by the market as better performing and therefore benchmark themselves against better performing firms (Hayes and Schaefer, 2008). Benchmarking against better performing firms is also consistent with a labor market explanation: firms are more likely to compete for talent among better performing firms and are less concerned about losing talent to worse performing firms. In either case, firms do not increase CEO pay when there are differences in performance. We also find no evidence that selecting peers outside the firm's industry leads to greater pay.

We find that BONUS is higher when there are more interlocking peer-sample firm relations. While selecting peers that have selected the sample firm suggest the identification of similarities between the two firms that are not reflected in the characteristics we examine, it appears to lead to a ratcheting up

of bonus pay, inconsistent with the benchmarking hypothesis. One potential explanation is what compensation consultants refer to as the “Lake Wobegon” effect. Since most firms benchmark pay at the median or mean of the peer group, selecting interlocking peers would result in the ratcheting up of pay for all firms. As each firm increases its CEO pay to be at the median of the group, the overall median increases, and each firm then increases pay accordingly. This effect should be mitigated as the proportion of interlocking peers increases. At the limit where 100% of peers are interlocked, all CEOs in the peer group would be paid the same and this variable would have no explanatory power. Consistent with this conjecture, when we include the squared value of INTERLOCKING (untabulated), the coefficient in INTERLOCKING remains positive and significant (at p -value <0.01) and the coefficient on INTERLOCKING_SQ is negative and significant (at p -value <0.05). Thus, although selecting peers with similar economic characteristics reflects benchmarking, these interlocking peers lead to higher bonuses.

Finally, for all but equity pay, higher CEO pay not explained by economic determinants in peer firms is related to higher CEO pay at sample firms, as indicated by the positive coefficients on the PEER_COMP_RESID (significant at p -value <0.01). Recall that we find no evidence that peers are selected based on this variable in Table 4; therefore, an unlikely interpretation is one of opportunistic selection to influence CEO pay. Rather, this result more likely confirms a benchmarking hypothesis. There exist elements of pay that are based on other economic determinants not captured in our analysis. Under a benchmarking hypothesis, we expect symmetric treatment of unexplained pay – when unexplained pay in the peer group is higher (lower) we expect more (less) pay for the sample firm CEO. In untabulated tests, we separate PEER_COMP_RESID into positive and negative residuals and find that sample firms pay their CEOs more (less) salary and total compensation when these elements of pay are higher (lower). This symmetric treatment does not hold when BONUS is the dependent variable but that is not unexpected as firms benchmark *potential* payouts under bonus plans, not actual payouts because actual payouts depend on firm-specific performance criteria. The symmetric treatment for the other elements of pay is consistent with the benchmarking selection of peers.

Overall, our findings provide only marginal support that opportunistic selection of peer firms results in higher pay. Only with bonus and total pay do we see a relation between selecting larger peers, documented in Section 4.1, and greater CEO pay. No other differences in the selection appear to affect pay in sample firms.

4.3 *Robustness tests and further discussion*

We examine whether our results are robust to alternative specifications. First, our analysis uses the difference between the firm and the *median* of the peer group. But, firms may benchmark to the *mean* of their peer group. To allow for this possibility we replicate the analysis of Table 5 measuring compensation as a function of differences between the sample firm and the *mean* of the peer groups. The results on TOTAL are qualitatively similar. Interestingly, the results on BONUS are weaker. We no longer find evidence of larger peers and interlocking peers leading to higher pay. All other inferences are unchanged.

Second, our analysis is restricted to firms that disclose their compensation peer groups in their proxy statements as we are unable to analyze the choice of peers and effects on pay for firms that do not disclose their peer group. We examine differences in characteristics of firms that do and do not disclose their compensation peer group to increase our understanding of these firms. In untabulated results, we find firms that disclose their peer groups are larger (measured as total assets and sales) and better performing (measured as both operating income scaled by assets and cash from operations scaled by assets). Yet, the growth opportunities do not differ. Turning to the compensation, firms that identify the peer firms compensate their CEO more highly on three dimensions of pay: salary, equity and total compensation, consistent with Byrd, et al. (1998). This finding is consistent with the economic characteristics of these firms being larger and better performing. Interestingly, bonus pay is larger in firms that do not identify the peer firms despite having lower performance. Therefore, our sample of firms that disclose their compensation peer group are on average larger, better performing, and compensate their executive more highly than firms that do not disclose their compensation peer group. It

is difficult to discern how these differences influence our findings. To address these concerns, we control for economic characteristics in our analysis and, since our analysis includes only firms that disclose, there is no “within” sample bias.

Next, as in Section 4.1.3, we eliminate bank, insurance and utilities firms from the analysis. We find (untabulated results) that differences in size no longer lead to higher bonuses and differences in growth opportunities no longer lead to higher total pay. All other findings remain.

Finally, we consider how stable peer groups are over time. We might expect that if peers are chosen opportunistically to increase pay, firms would change peer groups to include new peers with characteristics that increase pay. For a random sample of 100 firms, we examine the peer group used to benchmark pay in 2007. Of the 96 firms that report this data in 2007, the mean (median) percent of 2006 peers retained in 2007 is 86% (100%). This statistic is heavily influenced by the 42 firms that use the identical peer group in 2007 and the 10 firms that only added to their existing peer groups. Of the remaining 44 firms that both dropped and added firms, the mean (median) percent of 2006 peers retained in 2007 is 69% (79%). That the average overall retention rate is 86% suggests that peers are changed infrequently.

Overall, we find some evidence of opportunistic selection of peers based on size. Peer firms are on average larger and that difference in size leads to greater pay in the sample firm. However, among the other dimensions on which firms select peer firms, we find no evidence of opportunism. While peer firms are, on average better performing, their better performance does not lead to higher pay in sample firms. Further, we find peers are more likely selected from within the sample firms industry and when they have similarities in other dimensions (proxied by the interlocking relation), both consistent with benchmarking. Finally, although we find no evidence that peers are selected because of their higher pay, we find that unexplained pay in peer firms is positively related to pay in sample firms. But, since we find symmetric treatment of positive and negative unexplained pay, this supports benchmarking, not opportunism. Our findings are contrary to Faulkender and Yang (2008), who find that selected peers are of similar size but biased towards higher paying firms. One reason for this difference is that we allow greater heterogeneity

in the size of our sample firms. Instead our results are consistent with Bizjack, et al. (2008) who find evidence of the use of peer groups to benchmark reservation wages given the labor market.

5. Conclusion

In this study, we examine whether firms select compensation peer firms opportunistically to increase CEO pay. The role of peer firms in determining executive pay has not been widely studied because, until recently, firms were not required to disclose the firms used for benchmarking compensation. Indeed, the lack of understanding of the relation between compensation peer groups and executive pay has led to allegations that compensation peer groups artificially increase executive pay (Crystal, 1991; Morgenson, 2006), rather than provide appropriate benchmarking for the pay-setting process in a well-functioning labor market (Holmstrom and Kaplan, 2003). This study provides evidence on these competing theories by investigating the selection of peer groups and their relation to executive compensation.

We collect data from proxy statements in which firms are recently required to provide detailed information on their compensation peer group. Using a sample of 608 firms from the S&P 1500 with December 31, 2006 fiscal year ends, we examine whether the choice of these peers is opportunistic, resulting in larger CEO pay. In examining the choice of actual peers from a pool of potential peers, we find little evidence that firms choose peers opportunistically. Firms are more likely to select peers that are from the same industry and that have selected the sample firm as its peer, capturing similarities between the two firms. While selected peers are larger and better performing than other potential peers, only the differences in size are related to higher CEO pay in the sample firm. Despite choosing better performing firms that are more different from the sample firm than other potential peers, these differences in performance do not translate into higher pay for sample firm CEOs, inconsistent with this selection reflecting opportunism.

Finally, we find that greater peer firm pay (salary, bonus and total) that is not explained by the economic characteristics leads to greater pay in sample firms. This finding is more consistent with

benchmarking, and not opportunistic selection since there is symmetric treatment in determining sample firm pay: higher (lower) unexplained peer firm salary and total pay leads to higher (lower) sample firm pay. Our most compelling evidence in support of opportunistic selection is with bonus pay. However, bonuses are arguably least likely affected by benchmarking since firms benchmark *potential* levels of bonus payouts that can be earned by the CEO while actual bonus payouts are a function of firm-specific criteria.

Overall, our results suggest that firms select peers to benchmark CEO pay. Of all the characteristics we examine, we only find evidence of opportunism with respect to the selection of larger peers. In other economic characteristics, we find that firms select peers that are more similar to themselves than other firms they might have selected. Our findings support the contention that benchmarking represents an efficient and necessary input to the compensation process (Holmstrom and Kaplan, 2003) whereby the agent's reservation utility is related to the peer group in a well-functioning labor market.

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Figure 1
Illustration of Interlocking Relations

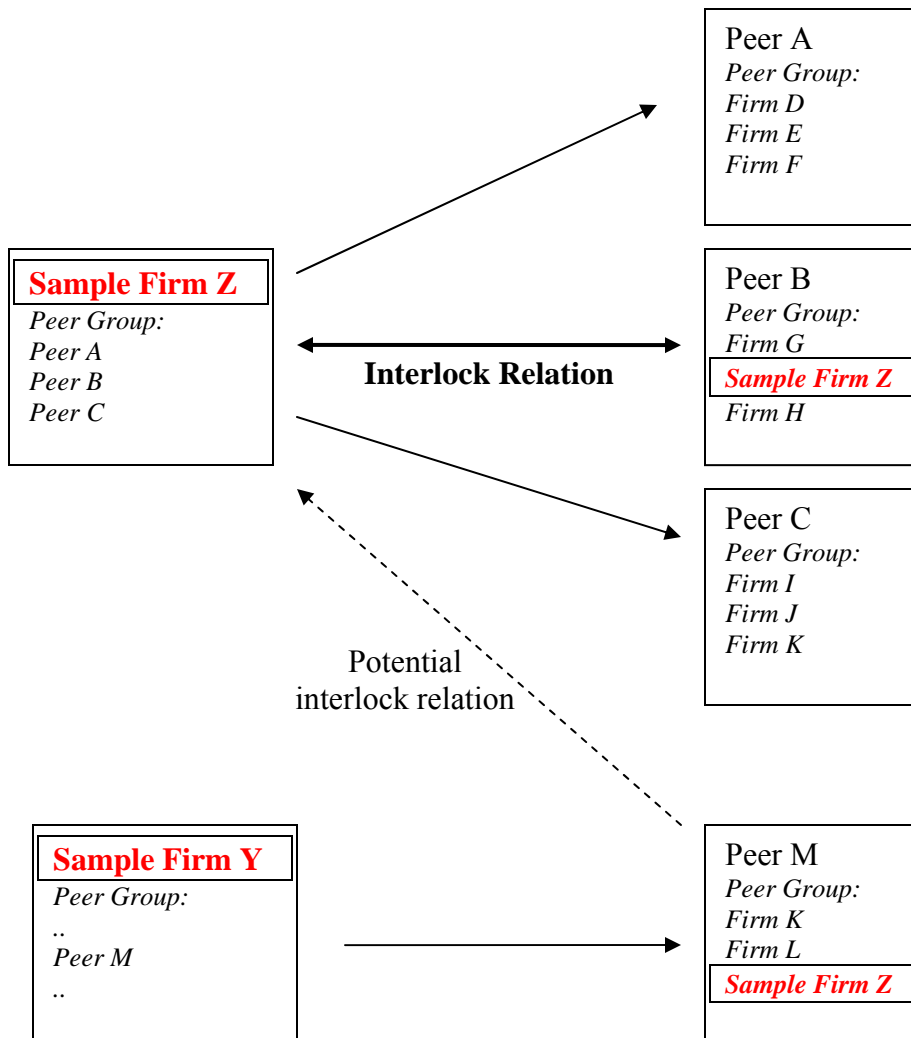


Table 1
Sample Selection

Panel A: Use of Peer Groups in 893 S&P 1500 firms with December 31st 2006 fiscal year-ends

Initial sample of December, 2006 fiscal year-end firms on ExecuComp as of September 30, 2008	893
Breakdown on use of peer groups:	
Firms that use a list of peer firms	686
Firms that use both a list of peers and an index	45
Firms that use only an index	85
Firms that state they do not use peers to benchmark pay	16
Firms that do not mention use of peer groups to benchmark pay	56
Firms with missing Compustat and/or EXECUCOMP data	5

Panel B: Peer group disclosure for firms that cite the list of compensation peers (686) or both a list and an index of compensation peers (45).

	Disclose	Do Not Disclose	Total
Firms that use a list of peer firms	584	102	686
Firms that use both a list and an index	24	21	45
Total	608	123	731

Disclose indicates that the firms discloses a list of peers used for benchmarking pay. Do Not Disclose indicates that the firm cites the use of a compensation peer group, but do not disclose the list of peers.

Panel C: Sample selection of unique peer firms and sample-peer firm combinations

	Sample-Peer Combinations	Unique Peers
Initial Sample from Proxy Statement	10,542	2,634
Private firms/subsidiaries/No GVKEY	(183)	(175)
Missing Compustat Data	<u>(292)</u>	<u>(200)</u>
Net	10,067	2,259
Compensation Data Unavailable	(223)	(105)
Net	9,844	2,154
<i>Data Sets</i>		
Available on ExecuComp	8,405	1,403
Hand-Collected Sample	1,434	751

Table 1 (continued)

Panel D: Distribution of the set of related potential peer groups

	Mean	Median
Set of Related Potential Peers	79	70
Actual Peers	16	16
Potentially Interlocked	9.0	7.0
Interlocked	3.5	3.0
% Potentially Interlocked	13.96	11.10
% Interlocked	21.45	16.67

Set of related potential peers include the peer firms, the peers of peers, and the firms that choose the sample firm as a peer. Actual Peers is the number of peers identified by the firm. Potentially interlocked is the number of firms that identify the sample firm as a peer. Interlocked is the number of actual interlocking relations for the sample firm. % Potentially Interlocked is the percent of potential peers that choose the sample firm as a peer. % Interlocked is the percent of chosen peers that interlock with the sample firm. All statistics are based on 608 sample firms.

Table 2
Descriptive characteristics of 608 sample firms
and 2,154 unique peer firms for fiscal year 2005

Panel A: Mean (median) financial and compensation characteristics for fiscal year 2005

	Sample Firms N=608	Peer Firms N=2,154	Tests of differences
ASSETS	27,138.02 (4,134.87)	13,390.82 (1,666.94)	3.66*** 10.89***
MVE	12,666.28 (3,456.55)	6,762.89 (1,545.07)	5.59*** 11.07***
SALES	8,829.06 (2,532.96)	4,917.06 (1,094.03)	4.78*** 10.90***
ROA	0.05 (0.04)	0.03 (0.04)	2.88** 2.15**
BVMV	0.66 (0.66)	0.64 (0.65)	1.61 1.67
SALARY	812.96 (762.00)	691.08 (625.00)	6.72*** 8.91***
BONUS	1,413.05 (937.38)	1,015.17 (533.51)	4.47*** 8.58***
EQUITY COMP	3,646.98 (1,931.20)	2,566.65 (1,064.78)	4.90*** 6.93***
TOTAL COMP	5,979.18 (3,678.05)	4,380.61 (2,442.98)	5.72*** 8.69***

, **, and * indicate significant differences at the 10%, 5%, and 1% confidence interval, respectively, where tests of differences are based on *t*-statistics when comparing mean values and Wilcoxon rank-sum *z*-statistics when comparing medians. ASSETS = Total assets (Compustat Data Item AT), MVE = (Compustat Data Item CSHO*Compustat Data Item PRCC_F), SALES= Net sales (Compustat Data Item SALE), ROA = Operating income after depreciation/Total assets (Compustat Data Item OIADP / Compustat Data Item AT), BVMV = Total assets divided by the sum of Market value of equity and Total liabilities (Compustat Data Item AT/(Compustat Data Item CSHO*Compustat Data Item PRCC_F + Compustat Data Item LT)), SALARY = the annual salary paid to the CEO, BONUS = the annual bonus paid to the CEO, EQUITY COMP = sum of the market value of total shares granted to the CEO and the Black-Scholes value of the annual stock option grants, TOTAL COMP = the sum of SALARY, BONUS, EQUITY COMP, and all other annual compensation, where all other annual compensation is obtained from firm proxy statements.

Table 2 (continued)

Panel B: Industry Distribution (Fama French, 1997 industries)

Industry	Sample Firms		Peer Firms	
	Obs.	Percent	Obs.	Percent
Aero	6	0.99	12	0.56
Agric	0	0.00	4	0.19
Autos	11	1.81	37	1.72
Banks	54	8.88	169	7.85
Beer	4	0.66	7	0.32
BldMt	12	1.97	32	1.49
Books	3	0.49	20	0.93
Boxes	6	0.99	9	0.42
BusSv	45	7.40	223	10.35
Chems	20	3.29	53	2.46
Chips	24	3.95	128	5.94
Clths	7	1.15	32	1.49
Cnstr	7	1.15	28	1.30
Coal	3	0.49	11	0.51
Comps	13	2.14	72	3.34
Drugs	26	4.28	83	3.85
ElcEq	3	0.49	25	1.16
Enrgy	32	5.26	79	3.67
FabPr	0	0.00	5	0.23
Fin	27	4.44	129	5.99
Food	8	1.32	30	1.39
Fun	2	0.33	13	0.60
Gold	3	0.49	5	0.23
Guns	1	0.16	3	0.14
Hlth	14	2.30	36	1.67
Hshld	8	1.32	28	1.30
Insur	52	8.55	122	5.66
LabEq	14	2.30	44	2.04
Mach	26	4.28	74	3.44
Meals	9	1.48	40	1.86
MedEq	9	1.48	48	2.23
Mines	4	0.66	8	0.37
Misc	2	0.33	10	0.46
Paper	15	2.47	36	1.67
PerSv	3	0.49	19	0.88
REst	1	0.16	4	0.19
Rtail	12	1.97	110	5.11
Rubbr	5	0.82	11	0.51
Ships	4	0.66	5	0.23
Smoke	3	0.49	3	0.14
Soda	3	0.49	6	0.28
Steel	9	1.48	35	1.62
Telcm	14	2.30	54	2.51
Toys	1	0.16	12	0.56
Trans	11	1.81	53	2.46
Txtls	1	0.16	6	0.28
Util	55	9.05	114	5.29
Whlsl	16	2.63	67	3.11
Total	608	100.00	2,154	100.00

Table 2 (continued)

Panel C: Proportion of peers in the same industry (index) as the sample firm

	% of peer group
% Same Barth, et al. (1998)	69
% Same Fama-French	56
% Same 2-digit SIC	55
% Same 3-digit SIC	37
% Same 4-digit SIC	31
% Same S&P Index	52
% Same Index for sample firms in the S&P 500 index	76
% Same Index for sample firms in the S&P Mid-Cap index	31
% Same Index for sample firms in the S&P Small-Cap index	28

Barth et al is the Barth, et al. (1998) industry, Fama-French are the 48 Fama-French industries, 2-, 3-, and 4-digit SIC represent the 2,3,4, and four digit SIC, S&P index is the S&P 500, Mid-Cap, or Small-Cap index. Same Index is the percent of peer firms from the same S&P Index when the sample firm is from the S&P 500, Mid-Cap, or Small-Cap, respectively.

Table 3
Mean (median) fiscal year 2005 economic and compensation characteristics for 608 sample firms
and the mean and median of their peer group

	Sample Firms	Peer Group Mean	Difference	Tests of differences	Peer Group Median	Difference	Tests of differences
ASSETS	27,138.02 (4,134.87)	33,935.84 (7,270.43)	-6,797.82 (-1,713.72)	2.55*** 14.37***	19,538.48 (4,630.67)	7,599.54 (-196.00)	2.66*** 1.48*
MVE	12,666.28 (3,456.55)	16,792.03 (6,539.25)	-4,125.75 (-2,033.04)	5.79*** 14.19***	11,234.62 (4,191.97)	1,431.66 (-391.10)	2.04** 3.87***
SALES	8,829.06 (2,532.96)	10,387.66 (4,492.66)	-1,558.60 (-937.39)	2.62*** 15.29***	7,008.96 (3,107.81)	1,820.10 (-221.95)	2.77*** 5.10***
ROA	0.05 (0.04)	0.05 (0.06)	0.00 (0.00)	0.44 0.55	0.05 (0.05)	0.00 (0.00)	1.30 0.69
BVMV	0.66 (0.66)	0.64 (0.62)	-0.02 (-0.02)	3.12*** 2.62***	0.64 (0.62)	-0.02 (-0.02)	3.27*** 2.61**
SALARY	812.96 (762.00)	858.50 (833.78)	-45.54 (-52.31)	4.31*** 7.10***	836.77 (849.42)	23.81 (-30.62)	2.32** 5.10***
BONUS	1,413.05 (937.38)	1,600.80 (1,185.57)	-187.75 (-7.00)	3.41*** 7.11***	1,334.78 (1,000.00)	78.27 (-19.10)	1.51* 0.55
EQUITY COMP	3,646.98 (1,931.20)	4,121.40 (3,223.57)	-474.42 (-878.10)	2.62*** 8.48***	3,005.58 (2,398.13)	641.40 (-121.93)	3.37*** 0.03
TOTAL COMP	5,979.18 (3,678.05)	6,714.15 (5,407.50)	-734.97 (-1099.54)	3.62*** 9.31***	5,480.52 (4,341.60)	498.66 (-297.86)	2.36*** 1.58

*, **, and *** indicate significant at the 10%, 5%, and 1% confidence interval, respectively, where tests of differences are based on *t*-statistics when comparing mean values and Wilcoxon rank-sum *z*-statistics when comparing medians. ASSETS = Total assets (Compustat Data Item AT), MVE = (Compustat Data Item CSHO*Compustat Data Item PRCC_F), SALES= Net sales (Compustat Data Item SALE), ROA = Operating income after depreciation/Total assets (Compustat Data Item OIADP / Compustat Data Item AT), BVMV = Total assets divided by the sum of Market value of equity and Total liabilities (Compustat Data Item AT/(Compustat Data Item CSHO*Compustat Data Item PRCC_F + Compustat Data Item LT)), SALARY = the annual salary paid to the CEO, BONUS = the annual bonus paid to the CEO, EQUITY COMP = sum of the market value of total shares and the Black-Scholes value of the annual stock options granted to the CEO, TOTAL COMP = the sum of SALARY, BONUS, EQUITY COMP, and all other annual compensation, where all other annual compensation is obtained from firm proxy statements. Peer Group Mean (Median) is the mean (median) of the sample firm's peer group. All Statistics are based on 608 sample firm observations.

Table 4
Logit estimation determining choice of peers among the pool of potential peers
for 608 sample firms that use a list of peer firms and identify the firms

Panel A: Determinants of selected compensation peers based on differences in economic characteristics between potential peers and the sample firm.

		(1)	(2)	(3)	(4)
D_ASSETS _{ij}	+/0	0.029** (2.311)	0.028** (2.230)	0.034** (2.552)	0.029** (2.262)
D_ROA _{ij}	+/0	0.478** (2.128)	0.487** (2.181)	0.491** (2.194)	0.481** (2.143)
D_BVMV _{ij}	-/0	0.104 (1.239)	0.103 (1.223)	0.094 (1.096)	0.107 (1.269)
D_FAMA_IND _{ij}	+/-	-1.056*** (-26.208)	-1.062*** (-26.305)	-1.060*** (-26.209)	-1.061*** (-26.231)
POT_INTERLOCK _{ij}	-/+	0.840*** (19.651)	0.832*** (19.414)	0.829*** (19.399)	0.829*** (19.401)
D_SALARY _{ij}	+/0		0.025*** (3.204)		
D_BONUS _{ij}	+/0		0.001 (0.383)		
D_EQUITY _{ij}	+/0		-0.003* (-1.673)		
D_TOT_COMP _{ij}	+/0			-0.014 (-1.186)	
D_TOT_RESID _{ij}	+/0				-0.006 (-0.394)
Constant		-0.886*** (-29.613)	-0.874*** (-29.054)	-0.874*** (-29.098)	-0.874*** (-29.086)
Observations		48,593	48,292	48,292	48,292
Pseudo-R-squared		0.0512	0.0647	0.0651	0.065

Table 4 (continued)

Panel B: Determinants of selected compensation peers based on the absolute differences in economic characteristics between potential peers and the sample firm.

		(1)	(2)	(3)	(4)
ABS_D_ASSETS _{ij}	+/-	-0.596*** (-18.565)	-0.598*** (-18.551)	-0.583*** (-17.847)	-0.595*** (-18.562)
ABS_D_ROA _{ij}	+/-	0.530** (2.061)	0.568** (2.246)	0.525** (2.034)	0.526** (2.035)
ABS_D_BVMV _{ij}	+/-	-0.362*** (-2.690)	-0.365*** (-2.723)	-0.328** (-2.415)	-0.359*** (-2.656)
D_FAMA_IND _{ij}	+/-	-1.063*** (-25.225)	-1.074*** (-25.519)	-1.073*** (-25.511)	-1.067*** (-25.265)
POT_INTERLOCK _{ij}	-/+	0.679*** (15.725)	0.663*** (15.477)	0.658*** (15.304)	0.668*** (15.506)
ABS_D_SALARY _{ij}	+/-		0.009 (0.623)		
ABS_D_BONUS _{ij}	+/-		-0.001 (-0.320)		
ABS_D_EQUITY _{ij}	+/-		-0.011*** (-4.226)		
ABS_D_TOT_COMP _{ij}	+/-			-0.103*** (-3.735)	
ABS_TOT_RESID _{ij}	+/-				-0.024 (-1.030)
Constant		-0.200*** (-3.665)	-0.136** (-2.504)	-0.113** (-2.051)	-0.171*** (-3.073)
Observations		48,593	48,292	48,292	48,292
Pseudo-R-squared		0.0986	0.0993	0.0997	0.0987

*, **, and *** indicate significant coefficient at the 10, 5, and 1 percent confidence intervals, respectively. *t*-statistics (provided in parentheses), are based on Huber-White Robust standard errors clustered by firm. Predicted signs correspond to biased selection / benchmarking reservation wage. We lose 300 observations in Columns (2) and (3) of Panels A and B as a result of missing compensation data for potential peer firms. The dependent variable is PEER = indicator equal to 1 if the firm is a peer of the sample firm, zero otherwise. D_ASSETS = the log of potential peer firm *i*'s assets (Compustat Data Item AT) less the log of sample firm *j*'s assets in 2005, D_ROA = ROA (Compustat Data Item OIADP/ Compustat Data Item AT) of potential peer firm *i* less the ROA of sample firm *j* in 2005, D_BVMV = BVMV (Compustat Data Item AT / (Compustat Data Item CSHO*Compustat Data Item PRCC_F + Compustat Data Item LT)) of potential peer firm *i* less the BVMV of sample firm *j* in 2005, D_FAMA_IND = indicator variable equal to 1 if the potential peer firm *i* is NOT in the same Fama-French (1997) industry group as sample firm *j*, 0 otherwise, POT_INTERLOCK = indicator variable equal to 1 if the potential peer firm *i* has selected sample firm *j* as one of its peer firms, 0 otherwise, D_SALARY = salary for the CEO of potential peer firm *i* less the salary for the CEO of sample firm *j* in 2005, D_BONUS = bonus for the CEO of potential peer firm *i* less the bonus for the CEO of sample firm *j* in 2005, D_EQUITY = equity pay for the CEO of potential peer firm *i* less the equity pay for the CEO of sample firm *j* in 2005, D_TOT_COMP = total pay for the CEO of potential peer firm *i* less the total pay for the CEO of sample firm *j* in 2005, D_TOT_COMP = residual of total pay for the CEO of potential peer firm *i* from regression of total pay on LNASSETS, ROA, BTM and industry indicators using all sample firms less the residual of total pay for the CEO of sample firm *j* in 2005. Variables starting with "ABS" are absolute values.

Table 5
Regression of fiscal year 2006 CEO compensation as a function of economic determinants
and differences from the peer group median

	(1) LnSALARY _{t+1}	(2) LnBONUS _{t+1}	(3) LnEQUITY _{t+1}	(4) LnTOTAL _{t+1}
MED_DIFF_ASSETS _t	0.022 (0.444)	0.266* (1.658)	-0.181 (-0.791)	0.148*** (2.788)
MED_DIFF_ROA _t	0.474 (0.470)	1.000 (0.720)	-3.192 (-1.464)	-0.600 (-1.308)
MED_DIFF_BVMV _t	0.194 (0.657)	0.344 (0.363)	-1.642 (-1.381)	-0.605* (-1.918)
PCT_DIFF_IND	0.108 (1.040)	0.201 (0.582)	0.563 (1.162)	0.154 (1.347)
INTERLOCKING	0.250 (1.576)	0.981* (1.849)	0.412 (0.520)	0.250 (1.426)
PEER_COMP_RESID _t	1.238*** (5.926)	0.858*** (4.178)	0.079 (0.619)	0.587*** (5.493)
LNASSETS _t	0.109*** (4.481)	0.423*** (5.417)	0.576*** (5.136)	0.429*** (16.458)
BVMV _t	0.025 (0.095)	-0.202 (-0.258)	-2.936*** (-2.895)	-1.057*** (-4.025)
ROA _{t+1}	0.273 (0.269)	4.502*** (3.640)	0.007* (1.700)	-0.118 (-0.289)
Constant	5.420*** (19.975)	2.627*** (3.013)	4.492*** (3.716)	5.666*** (20.165)
Observations	608	608	496	608
R-squared	0.218	0.181	0.236	0.550

*, **, and *** indicate significant coefficient at the 10, 5, and 1 percent confidence intervals. *t*-statistics (in parentheses) are based on Huber-White Robust standard errors. LnSALARY = Ln(salary) paid to the CEO in fiscal year 2006, BONUS = Ln(1+bonus) paid to the CEO in fiscal year 2006, LnEQUITY = Ln(1+Equity comp) where Equity comp is the sum of the market value of shares and Black-Scholes value of the options granted to the CEO over the fiscal year 2006, LnTOTAL = the Ln(Total Comp) where Total Comp is the sum of SALARY, BONUS, EQUITY COMP and all other annual compensation, where all other annual compensation is obtained from firm proxy statements, LNASSETS = Log of total assets (Compustat Data Item AT), BVMV = Total assets divided by the sum of Market value of equity and Total liabilities (Compustat Data Item AT/(Compustat Data Item CSHO*Compustat Data Item PRCC_F + Compustat Data Item LT)), ROA = Operating income after depreciation/Total assets (Compustat Data Item OIADP / Compustat Data Item AT), MED_DIFF_ASSETS = log of median assets of peer group – log of assets of sample firm scaled by assets of sample firm, MED_DIFF_ROA = median ROA of peer group – ROA of sample firm, MED_DIFF_BVMV = median BVMV of the peer group - BVMV of the sample firm, PCT_DIFF_IND = proportion of the total peer group in a different Fama-French industry (1997) than the sample firm. PEER_COMP_RESID is the median residual from a prediction model of compensation for the peer firms in 2005. Because salaries are typically set before the start of the fiscal year, we use 2005 values of ROA when SALARY is the dependent variable and 2006 ROA when BONUS, and TOTAL are dependent variables, and annual stock return when EQUITY is the dependent variable. The models also include 15 industry indicator variables (not reported). Column 4 includes the deviation of the CEO's equity incentive levels from predicted levels as a function of cross-sectional annual estimations of equity incentives on firm size, firm risk, growth opportunities, CEO tenure, free cash flow, and industry as in Core and Guay (1999). We also include a variable indicating whether the firm has a net operating loss carry forward, the extent to which the firm is cash flow and dividend constrained, and the annual return to shareholders over the previous and contemporaneous year. The additional data requirements, which require at least three years of data for the CEO, restrict the sample to 496 firms.