

# Dynamics of Compensation Peer Benchmarking<sup>\*</sup>

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# **Dynamics of Compensation Peer Benchmarking**

## **Abstract**

It has become a regular practice for firms to benchmark their executive compensation against peer companies. This paper examines the dynamics of the peer benchmarking process, addressing whether the 2006 regulatory requirement of disclosing compensation peers, thereby casting sunshine on the practice, has mitigated firms' behavior of benchmarking CEO compensation against a group of self-selected, highly-paid peer CEOs (Faulkender and Yang, 2010; Bizjak, Lemmon, and Nguyen, 2011). Our evidence shows the gaming of the benchmarking process has actually been exacerbated since disclosure became mandatory in 2006, calling into question the ability of mere disclosure to remedy potential abuses in determining executive compensation.

Classification Code: G34, J31, J33

Keywords: Disclosure Regulation; Executive Compensation; Peer Groups; Benchmarking

## 1. Introduction

The increased level and dispersion of CEO compensation since the early 1990s have triggered an increasingly heated debate on whether current compensation practices reflect the equilibrium outcome of the CEO labor market<sup>1</sup> or merely entrenched CEOs and captured Boards of Directors.<sup>2</sup> It has become a regular practice for firms to justify their high CEO compensation by referring to a group of companies with highly paid CEOs (Bizjak, Lemmon, and Naveen, 2008), claiming they compete for managerial talent with those selected peer companies. This paper examines the dynamics of the peer benchmarking process, addressing whether the 2006 regulatory requirement of disclosing compensation peers has cast sunshine on the practice and thus mitigated firms' behavior of benchmarking CEO compensation against a group of self-selected, highly-paid peer CEOs (Faulkender and Yang, 2010; Bizjak, Lemmon, and Nguyen, 2011).<sup>3</sup> Our evidence instead suggests that the gaming of the benchmarking process has actually been exacerbated since disclosure became mandatory in 2006.

Disclosure regulation has often been put into place during economic downturns (such as the Exchange Act and the Securities Act of 1933) or after corporate scandals (such as the Sarbanes-Oxley Act of 2002) to mitigate firms' bad behavior. There is an extensive literature on the benefits and costs, and the (intended and unintended) consequences of disclosure regulation, well-summarized by surveys conducted by Leuz and Wysocki (2008) and Healy and Palepu (2001). Compared to market solutions (voluntary disclosure), disclosure regulation is intended to

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<sup>1</sup> See Murphy and Zabochnik (2004), Oyer (2004), Baranchuk, MacDonald, and Yang (2006), Gabaix and Landier (2008), Edmans, Gabaix, and Landier (2009), Kaplan and Rauh (2009), and Giannetti (2011).

<sup>2</sup> See, for example, Bebchuk and Fried (2003, 2004), and Bertrand and Mullainathan (2001).

<sup>3</sup> Albuquerque, De Franco, and Verdi (2009) argue that compensation peer benchmarking is consistent with the equilibrium outcomes of the CEO labor market. Hayes and Schaefer (2009) models the "Lake Wobegon effect" in which firms distort CEO pay upward in an attempt to affect market perceptions of firm value. DiPrete, Eirich, and Pittinsky (2010) show the effects of leapfrogging potentially explain a considerable fraction of the overall upward movement of executive compensation over a recent 15 year period.

create positive externalities, save cost in aggregate, and provide strict sanctions on fraud. However, it inevitably imposes direct compliance costs, and sometimes indirect costs as illustrated by Hermalin and Weisbach (2011),<sup>4</sup> especially on smaller firms. More important, disclosure regulation, similar to other regulations, often has unintended consequences. For instance, Carlin and Manso (2011) argue that in the mutual fund industry, attempts to educate investors may generate incentives for financial institutions to create more complex products and services that will enable them to retain an informational advantage. In the context of disclosure, it may similarly be the case that heightened disclosure requirements incentivize firms to increase the complexity of their compensation practices in an attempt to overwhelm unsophisticated investors.

Compensation disclosure is intended to make transparent the compensation process at firms, press the Board of Directors to better perform its monitoring role, and prevent management from setting their own pay.<sup>5</sup> However, disclosed information on high compensation of peer CEOs may help justify a CEO's demand for higher pay. Perry and Zenner (2001) show that the tax legislation in 1992 that caps the corporate income tax deduction of non-performance related compensation at one million dollars (IRS tax code 162(m)) actually increased real compensation levels dramatically, in contrast to the stated intentions of Congress. The externality works in a fashion of ratcheting up executive compensation.<sup>6</sup>

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<sup>4</sup> Hermalin and Weisbach (2011) illustrate that increased corporate disclosure may generate additional agency problems and other costs for shareholders such as increased executive compensation (if the manager has any bargaining power) and distortion of financial information.

<sup>5</sup> *“They [the 2006 SEC amendments] are also intended to provide investors with a clearer and more complete picture of the compensation earned by a company's principal executive officer, principal financial officer and highest paid executive officers and members of its board of directors. In addition, they are intended to provide better information about key financial relationships among companies and their executive officers, directors, significant shareholders and their respective immediate family members.”* — SEC final rules 33-8732a, August 29, 2006

<sup>6</sup> Lo (2003) argues that the one million dollars cap improves shareholders' wealth.

In this paper, we examine the 2006 Securities and Exchange Commission (SEC) rule that requires firms to disclose compensation peer companies if they are used in determining executive compensation. Researchers documented that even after controlling for characteristics that would likely capture the competitive forces of the CEO labor market such as industry identification and relative size of the firm and its peer group members, the compensation levels at the selected peers had incremental power in explaining their inclusion in the peer group (Faulkender and Yang, 2010; Bizjak, Lemmon, and Nguyen, 2011). In other words, firms appeared to be gaming the benchmarking process by including companies with highly paid CEOs in their peer group and omitting companies with lower paid CEOs. By taking the median pay of an upward biased list of peers, they could still claim that they were paying the median compensation, appearing reasonable to their shareholders.

The timing of the change in disclosure requirements and the process of determining peer group composition make this an interesting setting for examining the effects of a change in disclosure. The SEC issued a disclosure requirement that came into effect for fiscal years ending on or after December 15, 2006, according to which firms must state:

Whether the registrant engaged in any benchmarking of total compensation, or any material element of compensation, identifying the benchmark and, if applicable, its components (*including component companies* [emphasis added]). — SEC final rules 33-8732a, Item 402(b)(2)(xiv), August 29, 2006

Firms generally construct their peer groups and set the compensation level and structure at the beginning of the fiscal year. Because the fiscal year of firms typically ends in December, most firms would have formed their compensation peer groups in February or March of that year; for 2006, this was well before the announcement of the change in the reporting requirement on August 29. Therefore, the first year that we observe, which was examined in the earlier

literature, should be primarily comprised of peer groups that were formed prior to the firm knowing that the names of the peer companies would be disclosed.<sup>7</sup> These observations, therefore, serve as a benchmark for assessing firm behavior prior to the disclosure requirement. In this paper, we follow the peer groups for the proceeding three years, ample time for Boards of Directors and their compensation committees to make changes to the set of peer firms arising from the onset of this new disclosure regime. Analyzing the difference in peer group selection between the first year following the commencement of this new disclosure requirement and the later years of our sample arguably provides a natural experiment for assessing the effects of disclosure.

Firms appeared to be gaming the benchmarking process when they were not required to inform their shareholders of the members of their compensation peer groups. Did that practice continue once disclosure of peer group membership was mandated? Since shareholders could now determine that the selected peer group was biased, did firms act to generate peer groups that were less sensitive to potential peer compensation? Does disclosure have the cleansing effect that regulators anticipated?

We find the sensitivity of peer selection to potential peer pay has significantly increased since firms were required to disclose the members of their compensation peer groups in 2006. Relative to the first year of disclosure, during which peer membership was determined prior to firms knowing that the list of peers would have to be disclosed, firms showed stronger tendency to select peer companies with higher CEO pay during the years they could have altered their peer groups in light of the increased disclosure requirement. Rather than the sunshine of disclosure

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<sup>7</sup> The rule was proposed on January 27, 2006, followed by a period of six months during which comments were solicited. Historically, many proposed SEC rules were postponed in implementation or abandoned all together (e.g., rules related to proxy access were proposed in 2003, 2007, then in 2009 – and they still have not been implemented). Given this uncertainty, it is unlikely that firms modified their peer companies in early 2006.

mitigating potential abuses of peer benchmarking, we find instead the gaming of the benchmarking process has been exacerbated. These findings call into question the ability of mere disclosure to remedy potential abuses in determining executive compensation.

The rest of the paper is organized as follows: Section 2 details the data used throughout the paper. Section 3 examines the factors determining the composition of these peer groups in a multivariate probit framework. These findings are re-examined using propensity score matching in Section 4, while in Section 5 we focus on the changes to peer groups over our four year sample period. Section 6 concludes.

## **2. Data**

Beginning December 15, 2006, the SEC required that firms disclose the companies against which they benchmark executive compensation in their proxy statements. For the first two years after this reporting requirement went into effect, we hand-collected the compensation peers selected by firms in both the S&P 500 and the S&P Mid-Cap 400 (hereafter called the S&P 900) who disclose that they engage in peer benchmarking as part of their executive compensation process. For the latter two years of our sample, we rely upon Compensation Analytics provided by RiskMetrics. This results in a sample of 2,734 firm-years, covering a total of 932 firms.

As discussed in Faulkender and Yang (2010), to evaluate how disclosure has affected the benchmarking process, one has to not only ascertain the companies chosen to be included in the benchmarking set, one must also include the list of potential peers that were not selected. Following Faulkender and Yang (2010), we then match each firm that discloses their peer group to the other 899 firms in the S&P 900 in that corresponding year and note which of those 899 potential peers were actually selected to be in the firm's compensation peer group that year.

As documented in Faulkender and Yang (2010) and Bizjak, Lemmon, and Nguyen (2011), prior to the required disclosure of compensation peers, firms gamed the peer benchmarking process by selecting peer companies with generous CEO pay packages. Our primary objective is to determine whether the gaming of the benchmarking process continued after the SEC mandated that firms list their compensation peers in their proxy statements. Has sunshine cleansed this process, as intended by the SEC? Answering this question requires supplementing the peer group observations with information on the financial condition, industry classification, and compensation at both the firm and the set of potential peers. Measures of the firm's size, leverage, profitability, and industry are obtained from COMPUSTAT while information on the compensation levels and structure come from EXECUCOMP. A sample of 2,407,972 firm-potential peer-year matches with a total of 35,335 selected peers (1.5%) emerges after compiling the data necessary to perform our analysis. Summary statistics for these various metrics for the sample firms, selected peers, and unselected peers can all be found in Panel A of Table 1.

Consistent with the earlier literature, we observe that the average salary and total compensation are larger at the selected companies than at the entire set of potential peer companies. For the average firm in our sample, the median total compensation level among potential peers was \$5.5 million while the median selected peer's CEO received \$7.9 million in total compensation. In addition, we see that salary and total compensation are extremely similar in magnitude for the median chosen peer and the firms in our sample. These results are consistent with most firms benchmarking their CEO compensation to the median of their selected peer group. By selecting a group of peers whose compensation levels are higher than the unselected potential peers, firms can pay the median of their peer group, claiming to be



paying reasonable compensation levels, even though their CEOs are compensated well above the median S&P 900 firm.

As we are interested in how selection has changed over time, in Panel B of Table 1, we provide summary statistics on selected peers and unselected potential peers for the first year following the change in disclosure requirement (fiscal year ending during December 2006 – November 2007) and the most recent year (fiscal year ending during December 2009 – November 2010). Over the four years, average salaries have risen but average total compensation at the disclosing firms appears to have declined, though not significantly. When comparing the median selected peer to the median potential peer at the average disclosing firm, chosen peers continue to have greater salary and total compensation four years after peer group disclosure was mandated. In addition, note that chosen peer compensation has grown significantly more over the four year period than the observed growth for the median potential peer. While a univariate result, it foreshadows the results that our more robust analysis will later substantiate, peer selection continues to be sensitive to pay levels at potential peers.<sup>8</sup>

### **3. Multivariate Analysis**

Peer selection is determined by a number of factors. Companies that are similar in size and in the same industry are the most likely to be included in the benchmarking process (Bizjak, Lemmon, and Naveen, 2008; Faulkender and Yang, 2010). Thus, our initial multivariate specification includes various measures of size similarity between the firm and its potential peers as well as whether the firm and its potential peers are in the same industry, as determined by

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<sup>8</sup> Note that chosen peer companies are more similar to disclosing firms in the fourth year than in the first year of our sample period in terms of industry, size, and talent flow. Over our sample period, the number of compensation peer companies reduces from 18.9 to 14.2. This is partially due to many disclosing firms started to benchmark executive compensation against a long list of peer companies included in the surveys of compensation consulting firms (e.g. Towers Perrin, Mercer). We exclude those groups that did not disclose the names of member companies. Those groups typically contain a few hundred companies.

their 2- and 3-digit SIC code. Specifically, we use the following discrete-choice regression from Faulkender and Yang (2010):

Chosen as peer<sub>ij</sub>

$$\begin{aligned}
&= \Phi[\alpha + \beta_1 * Match(two-digit\ industry_{ij}) + \beta_2 * Match(three-digit\ industry_{ij}) \\
&\quad + \beta_3 * Dummy(Sales\ within\ 50-200\%_{ij}) + \beta_4 * Dummy(Assets\ within\ 50-200\%_{ij}) \\
&\quad + \beta_5 * Dummy(Market\ Cap\ within\ 50-200\%_{ij}) + \beta_6 * Match(Dow\ 30_{ij}) \\
&\quad + \beta_7 * Match(S\&P\ 500_{ij}) + \beta_8 * Match(S\&P\ MidCap\ 400_{ij}) + \beta_9 * Match(CEO\ is\ Chair_{ij}) \\
&\quad + \beta_{10} * Match(CEO\ is\ not\ Chair_{ij}) + \beta_{11} * Dummy(Talent\ flows_{ij}) + \varepsilon_{ij}],
\end{aligned} \tag{1}$$

where the dependent variable takes the value one if the potential peer  $j$  is chosen to be a member of the compensation peer group of firm  $i$ ; it takes the value zero otherwise. Independent variables include whether the potential peer has the same two- and three-digit SIC code, respectively, as the firm; whether the potential peer is within 50% and 200% of the firm along the three size measures of sales, book assets, and market capitalization; whether both the potential peer and the firm are Dow (DJIA) 30 members, S&P 500 index components, and S&P MidCap 400 index components; whether CEOs of both the potential peer and the firm are or are not chairmen of the BODs; and whether any of the top five executives moved between the firm and its potential peer during the time period of 1992 to 2005. These variables are intended to capture similarities between the firm and its potential peer along the dimensions relevant for the CEO labor market: industry, size, visibility, and CEO responsibility. In estimating the standard errors, we follow Petersen (2009) and cluster them at both the firm and peer level, arguing that errors in estimating peer group inclusion are likely to be correlated for a particular firm as well as for a particular peer. The results of this baseline estimate for all four years can be found in the first column of Table 2.

Similar to previously documented results, industry overlap and size similarity are important factors in explaining which firms are chosen to be members of the compensation peer group. Our two measures of industry overlap and all three measures of size similarity are statistically and economically significant. In addition, Dow 30 firms have a preference for including other Dow 30 companies in their peer group, likewise for S&P 500 firms choosing other S&P 500 companies, even after controlling for size similarity.

Ultimately, our question is whether firms are continuing to game the pay-setting process by including peers in the compensation peer groups with high levels of compensation, after controlling for firm-peer similarities in other dimensions. We add total compensation at the potential peer in the prior year (to ensure that the firm had that information at the time their peer group was formed) to our multivariate specification. Examining the result contained in column 2 of Table 2, we find that consistent with the prior literature, firms continued to include companies with higher CEO compensation, all else equal, in their compensation peer groups over the sample period. Economically, an increase of one standard deviation in CEO total compensation increases the likelihood of peer group membership for a company that is similar to the firm in size but not in the firm's 3-digit industry from 4.9% to 6.7%, a 37% increase!

To track how this gaming practice has changed over time, we alter the specification above to allow the sensitivity to peer pay to differ each year. If the intent of the SEC's change in disclosure policy were achieved, we would expect to see a significant decline in the sensitivity of peer selection to the compensation at the potential peer company over the four year time period of our sample. Fully achieving that objective means that the sensitivity of selection to potential peer pay would not be significantly different from zero by the final year of the sample. The results of this specification are presented in the third column of Table 2.

The results indicate that the gaming of compensation peer groups has actually intensified. The estimated coefficient of peer CEO compensation is higher in the second, third, and fourth years relative to the first year. The peer membership to peer pay sensitivity increases by 31% from the first year to the fourth year. This increase is statistically significant at the one percent level. Recall that the first year should reflect the peer benchmarking activity of firms prior to knowing that sunshine would be cast on the benchmarking practice. Peer companies were selected early in the fiscal year, generally in the first quarter. The change in SEC disclosure requirements was made in August of 2006 and was implemented for fiscal year ending after December 15, 2006. Therefore the peer groups that we observe in December 2006 were likely constructed before the SEC imposed the change in disclosure requirement. Every year thereafter, firms were aware of the new disclosure requirement and had the opportunity to modify their peer groups should they be concerned about disclosing the identities of their peer companies, enabling shareholders to recognize the gaming of the benchmarking process in which they were engaged. However, rather than disappearing, if anything, the gaming behavior has become more egregious.

This finding does potentially suffer from a mis-specification problem if disclosure altered the sensitivity of peer group selection to other characteristics. Because we forced the coefficients for all other characteristics to be the same over the full four years, it could be the case that firms became better at matching on size and industry after the change in disclosure but since we force the sensitivities to be the same, the change spuriously loaded on compensation. To address this potential concern, in Table 3 we provide the results of separately estimating the choice equation found in column 2 of Table 2 for each year. Contrary to the regulatory objective, we find that the sensitivity of peer membership to CEO compensation at a potential

peer has increased since the SEC mandated disclosure of compensation peers, even after allowing the coefficients on all other control variables to vary each year.

One may argue that perhaps in more recent years, firms do not follow peer benchmarking as closely as in 2006 so that higher peer CEO compensation at peer companies does not necessarily lead to higher CEO compensation at the disclosing firm. Results presented in Table 4 show that, after controlling for other determinants of CEO compensation, the sensitivity of CEO pay at disclosing firms to the CEO pay at compensation peers does not decrease over time. Thus, greater bias in selecting compensation peers does translate into higher CEO compensation at disclosing firms.

#### **4. Matching**

An alternative empirical approach to the multivariate probit conducted above is a propensity score matching algorithm that matches each selected peer company to its closest non-chosen potential peer and to compare compensation levels at the selected peer relative to the matched unselected company. The procedure works as follows. Similar to Faulkender and Yang (2010), for each disclosing firm, we calculate the probability of being its peer group members (*propensity score*) for all potential peers using equation (1). Equation (1) is estimated year-by-year, thus allowing the sensitivity of firm and peer characteristics to change each year. The propensity score is calculated using the estimated coefficients and the realizations of the corresponding independent variables for each potential peer. Each selected peer is then matched to the unselected potential peer with the closest propensity score, without replacement. This generates a sample of 34,281 chosen peers and the same number of unselected potential peers. To validate the results of the multivariate probit approach, we then take the difference in

compensation (in both dollar and percentage terms<sup>9</sup>) between the chosen peer and its propensity-score matched unselected company and estimate whether the difference is significantly different from zero. We are further interested in how that difference has changed over time, as the multivariate results would suggest that the difference has actually grown since the change in the disclosure requirement. The results of this analysis are available in Table 5.

First, one can observe that in all four years, the average and the median chosen peer is paid significantly more than the non-chosen best-matched firm. Looking at the median pair of the chosen peer with its best-matched non-chosen company (as ranked by the corresponding pay level), the difference in salary rises from \$85 thousand to \$100 thousand between the first year in which the change in disclosure requirements went into effect and the fourth year. Similarly, the median total compensation difference rose from \$376 thousand to \$693 thousand over that same time period. Both of these increases for the median pair are significantly different from zero. We also find an increase in salary and total compensation when examining the means of the differences between chosen peers and their best-matched unselected companies. However, these results are more impacted by some of the extreme differences and so the increases in the means are not statistically significant.

For robustness, we also examine the increase in the percentage pay difference between chosen peers and their best-matched unselected counterparts. Note that the percentage difference is also positive and statistically significant in all four years for both salary and total compensation. The economic magnitudes range from 12.19% to 14.05% for the average salary difference, 10.26% to 12.98% for the average total compensation difference. These findings

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<sup>9</sup> We normalize the pay difference by the average compensation between the chosen peer and the matched company. This approach limits the range of this statistic to be between -200% and +200%, thereby limiting the effect of outliers that exists when normalizing by one of the two compensation levels.

again demonstrate that the gaming of the peer selection process has not been curtailed by the increased disclosure requirement. We find no change in the percentage salary difference over the four years since disclosure was mandated. For total compensation, the percentage pay difference has increased by 2.72% at the mean and 5.11% at the median; both estimates are statistically significant.

## **5. Changes of peer group members**

We show that firms have selected more upward biased peer companies over the four year period of our sample. How is the sensitivity of peer membership to compensation increasing over time? Are firms actively changing their peer groups? Or is it merely the case that highly paid CEOs who were already included in peer groups at the beginning of the period have become even more highly paid? To answer this question, we focus on the companies that were added and dropped from the compensation peer groups of disclosing firms over time. If firms are reducing the gaming of the benchmarking process, consistent with the expectation of regulators, we should observe that they drop companies with highly-paid CEOs from their peer groups and add more moderately-paid peers.

The process that we follow for this examination is similar to the propensity score matching approach described above. For each added peer company (a company that is a peer group member in a particular year but not the previous year), we match it to another company that has not been in the peer group both years and has the closest selection likelihood to the added company. Similarly, for each company dropped from the compensation peer group (a company was a peer group member the previous year but not this year), we match it to another company that has been a peer both years and has the closest propensity score to the dropped peer

company. We then compare compensation at the 1,814 added and 808 dropped companies with their best matches. The results are provided in Table 6.

The increase in the sensitivity of peer group membership to executive compensation does seem to at least partially result from the active changes that firms and their compensation committees made to their compensation peer groups. Added peers on average make \$554 thousand more in total compensation than the closest unselected peer. This difference does not seem to be driven by outliers as the median difference in total compensation between added peers and their matched unselected peer is estimated at \$640 thousand. On a percentage basis, these added firms make an average of 9.3% more (10.8% at the median) than the closest non-selected potential peer. Salary differences are also positive, though only marginally significant. All of these additions took place after the change in the disclosure requirement and yet we continue to see compensation playing a significant role in peer selection. This indicates that disclosure did not deter firms from incorporating compensation into their benchmarking process.

And who was dropped from the peer group? Looking at the dropped companies relative to the closest retained peer company, we observe similarly strong results. Dropped companies have average salaries that are \$44 thousand less per year (median difference of \$40 thousand) and \$639 thousand less per year (median difference of \$461 thousand) in total compensation. On a percentage basis, dropped firms make an average of 8.4% less (8.26% at the median) in total compensation than the closest retained peer. Overall, the evidence suggests that even after firms were required to list the members of their compensation peer groups, they engaged in a process of dropping the low paid members of their peer group and adding peers that are paid higher than otherwise similar companies. Firms appear to have continued their practice of actively gaming the benchmarking process, even though peer group members have to be disclosed.



## 6. Discussion of Results and Conclusion

Four years after the enactment of the SEC rule on disclosing compensation peers, firms continue to select peer companies that pay their CEOs generously, after controlling for other economic determinants of peer group membership, such as the similarity in industry, size, visibility, CEO/chairman duality, and talent flow between the disclosing firm and a potential peer company. The disclosure regulation on disclosing compensation peer companies did not mitigate the bias in the peer selection process.

There are a number of potential explanations for why greater disclosure of the compensation benchmarking process did not lead to a reduction in the gaming of that process. First, proxy statements have become overwhelming for the average shareholder. We examine a randomly selected set of 50 proxy statements out of the S&P 500 component firms and find that the average length of the proxy statement was 41 pages in 2006. It increased to 61 pages in 2009, an increase of 49%. The section that contains peer benchmarking information, Compensation Discussion and Analysis, went from six pages to 15 pages, an increase of 150%.<sup>10</sup> In addition to listing various components of direct compensation (e.g., salary payment, cash bonuses, stock and option grants, performance shares) and perquisites (e.g., use of corporate aircraft for personal travel, medical benefit, exercise tax gross-up, financial planning, and country club membership), the proxy statement also contains information on how compensation was determined by explaining the benchmarking process and how bonuses (Kim and Yang, 2010) and performance-based equity pay are calculated.

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<sup>10</sup> At the median, the length of the proxy statement went from 39 pages in 2006 to 60 pages in 2009; and the CD&A section went from six to 15 pages.

Even if shareholders focus on the benchmarking process, it is probably beyond their capabilities to reach our conclusion. Consider what a shareholder would have to do to see whether compensation peers are properly selected. The proxy statement offers a list of the companies against which a disclosing firm benchmarks its executive compensation. To show that the gaming behavior has increased over the last four years, one has to match this list of companies to the compensation provided to executives at those companies. For the average shareholder, that would require accessing the proxy statement for each of those companies and finding the relevant statistics. It is even more challenging to identify a set of comparable companies that were not selected as peers, presumably using accounting and industry data, and then finding the compensation amounts for CEOs at those unselected companies. This is not a simple task. The peer group may seem to be reasonable, unless shareholders engage in the detailed analysis that the firms' compensation consultants engage in when constructing the peer group. Disclosure becomes less effective as a cleansing mechanism as the cost of acquiring, analyzing, and acting on the information increases. This calls into question whether regulatory disclosure that requires such a complex analysis is a viable solution to cure agency problems at firms.

This type of complex analysis does explain the increasing importance of shareholder advisory firms. As the fraction of equity held by institutions increases, institutional investors are looking for guidance on how to vote on proxy issues and what role to play in influencing the corporate governance of firms. Institutional shareholder advisory services, such as RiskMetrics, advise numerous institutions, thus having the resources, knowledge, and incentives to address issues such as compensation structure and the peer benchmarking process. Recognize that should disclosure be the regulatory course taken by the SEC, one would have to consider

whether shareholder advisory groups face the same agency conflicts that we have recently witnessed among credit rating agencies.

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Table 1. Summary Statistics

In Panel A, summary statistics are provided for each firm-year in the sample; in panel B, the means for each variable are provided for the first and fourth years for the subsample of 431 firms that are in the sample in both years. *Total compensation* is *TDC1* in the ExecuComp database. *Median Potential Peer* compensation values are the statistics for the median of the other 899 firms in the S&P 900 for that corresponding pay variable. *Median Chosen Peer* compensation values are the statistics for the median among the selected peers for that corresponding pay variable. *Number of peers* is the number of chosen compensation peers. The remaining variables are tabulated as the percentage of the selected peers of each firm-year that meet the following criteria: *Match (two-digit industry)* and *Match (three-digit industry)* are one if a chosen peer in the same two-digit and three-digit industry of the firm and zero otherwise, respectively. *Dummy (Size within 50–200%)* is one if the sizes (*Sales, Assets, and Market Cap*) of the firm and peer are within 50–200% of each other and zero otherwise. *Peer CEO is chair and firm CEO is chair* is one if the Chief executive officer (CEO) is the chairman of the board for both the firm and the selected peer. *Dummy (Talent flows)* is one if at least one of the top five executives moved between the firm and any firm in the same 4-digit SIC code as the selected peer during 1992-2005. In Panel B, \* = difference between the 4<sup>th</sup> year and the 1<sup>st</sup> year is significant at 10%; \*\* = significant at 5%; and \*\*\* = significant at 1%.

Panel A. Entire Sample	Mean	Median	Standard Deviation
Firm Salary (thousands)	\$932.97	\$922.76	\$345.32
Median Potential Peer Salary (thousands)	\$860.23	\$881.92	\$30.06
Median Chosen Peer Salary (thousands)	\$943.59	\$945.00	\$259.95
Firm Total Compensation (thousands)	\$8,132.89	\$6,098.85	\$7,006.14
Median Potential Peer Total Compensation (thousands)	\$5,512.42	\$5,703.64	\$359.28
Median Chosen Peer Total Compensation (thousands)	\$7,917.14	\$6,623.44	\$4,818.27
Number of chosen peers	16.3	14.0	16.0
<i>Statistics on the disclosing firm/chosen peer pairs:</i>			
Match (two-digit industry)	51.7%	50.0%	34.1%
Match (three-digit industry)	36.3%	25.0%	33.7%
Dummy (Sales within 50–200%)	55.2%	56.0%	22.9%
Dummy (Assets within 50–200%)	50.6%	50.0%	22.0%
Dummy (Market Cap within 50–200%)	45.2%	45.5%	21.5%
Peer CEO is chair and firm CEO is Chair	42.7%	0.0%	49.4%
Dummy (Talent flows)	10.2%	0.0%	22.3%

Table 1, Panel B. First Year and Fourth Year for Firms in Both Years of the Sample

	1st Year	4th Year	Difference
Firm Salary (thousands)	\$956.38	\$984.36	\$27.98
Potential Peer Salary (thousands)	\$827.57	\$891.91	\$64.34***
Chosen Peer Salary (thousands)	\$930.41	\$1,023.91	\$93.50***
Firm Total Compensation (thousands)	\$8,579.22	\$8,264.54	-\$314.68
Potential Peer Total Compensation (thousands)	\$4,934.30	\$5,706.49	\$772.19***
Chosen Peer Total Compensation (thousands)	\$7,310.33	\$8,425.72	\$1,115.39***
Number of chosen peers	18.9	14.2	-4.7***
<i>Statistics on the disclosing firm/chosen peer pairs:</i>			
Match (two-digit industry)	46.8%	56.6%	9.8%***
Match (three-digit industry)	33.0%	39.8%	6.8%***
Dummy (Sales within 50–200%)	50.3%	59.5%	9.2%***
Dummy (Assets within 50–200%)	46.1%	56.4%	10.3%***
Dummy (Market Cap within 50–200%)	42.0%	44.4%	2.4%*
Peer CEO is chair and firm CEO is Chair	52.2%	45.3%	-6.9%***
Dummy (Talent flows)	10.1%	13.2%	3.1%*

## Table 2: Multivariate Probit Regressions of Peer Group Selection

The dependent variable is one if a potential peer [Standard & Poor's (S&P) 500 and S&P Mid Cap 400] is chosen as a compensation peer by a disclosing firm and zero otherwise. *Peer salary*, *Peer salary and bonuses*, and *Peer total pay* are from the matching year and are measured in millions of dollars. We winsorize peer pay at the 1st and 99th percentiles and use  $\text{Ln}(\text{peer pay})$  in the regression. *Number of peers* is the number of compensation peers chosen by the firm. *Match (two-digit industry)* and *Match (three-digit industry)* are one if a potential peer is in the firm's two-digit and three-digit industry, respectively, and zero otherwise. *Dummy (Size within 50–200%)* is one if the sizes (*Sales*, *Assets*, and *Market Cap*) of the firm and the potential peer are within 50–200% of each other and zero otherwise. *Match (Dow 30 membership)*, *Match (S&P 500 membership)*, and *Match (S&P 400 MidCap membership)* are one when both the firm and its potential peer are Dow 30 members, S&P 500 index components, and S&P MidCap 400 index components, respectively, and zero otherwise. *Match (CEO is chair)* is one when CEOs of both the firm and its potential peer are chairmen of the board of directors; and *Match (CEO is not chair)* is one when both CEOs are not chairmen. *Dummy (Talent flows)* is one if at least one of the top five executives moved between the firm and its potential peer during 1992–2005. The specification in the third column contains year dummies but the estimated coefficients are omitted for brevity. Standard errors are in parentheses. \* = significant at 10%; \*\* = significant at 5%; and \*\*\* = significant at 1%.



Table 2: Multivariate Probit Regressions of Peer Group Selection (Continued)

Model	(1)	(2)	(3)
Ln(Peer total pay)		0.180*** (0.011)	
Ln(Peer total pay) 1 <sup>st</sup> year			0.149*** (0.014)
Ln(Peer total pay) 2 <sup>nd</sup> year			0.189*** (0.015)
Ln(Peer total pay) 3 <sup>rd</sup> year			0.201*** (0.015)
Ln(Peer total pay) 4 <sup>th</sup> year			0.195*** (0.014)
Match (two-digit industry)	1.185*** (0.029)	1.201*** (0.030)	1.202*** (0.030)
Match (three-digit industry)	0.660*** (0.033)	0.669*** (0.033)	0.670*** (0.033)
Dummy (Sales within 50–200%)	0.424*** (0.010)	0.433*** (0.010)	0.434*** (0.010)
Dummy (Assets within 50–200%)	0.304*** (0.010)	0.314*** (0.010)	0.314*** (0.010)
Dummy (Market cap within 50–200200%)	0.114*** (0.010)	0.127*** (0.010)	0.128*** (0.010)
Dummy (Talent flows)	0.558*** (0.030)	0.570*** (0.029)	0.571*** (0.029)
Match (Dow 30 membership)	1.670*** (0.076)	1.553*** (0.077)	1.548*** (0.077)
Match (S&P 500 membership)	0.474*** (0.020)	0.397*** (0.019)	0.396*** (0.019)
Match (S&P MidCap 400 membership)	0.025 (0.018)	0.082** (0.018)	0.082*** (0.018)
Match (CEO is chair)	0.091*** (0.012)	0.076*** (0.012)	0.075*** (0.012)
Match (CEO is not chair)	-0.023* (0.013)	-0.009 (0.013)	-0.007 (0.013)
Number of peers	0.007*** (0.000)	0.007*** (0.000)	0.007*** (0.000)
Intercept	-3.183*** (0.018)	-3.506*** (0.028)	-3.512*** (0.032)
Number of observations	2,407,972	2,407,972	2,407,972
Pseudo r-squared	0.295	0.303	0.304

Table 3: Multivariate Probit Regressions of Peer Group Selection Year-By-Year

The dependent variable is one if a potential peer [Standard & Poor's (S&P) 500 and S&P Mid Cap 400] is chosen as a compensation peer by a disclosing firm and zero otherwise. *Peer salary*, *Peer salary and bonuses*, and *Peer total pay* are from the matching year and are measured in millions of dollars. We winsorize peer pay at the 1st and 99th percentiles and use  $\text{Ln}(\text{peer pay})$  in the regression. *Number of peers* is the number of compensation peers chosen by the firm. *Match (two-digit industry)* and *Match (three-digit industry)* are one if a potential peer is in the firm's two-digit and three-digit industry, respectively, and zero otherwise. *Dummy (Size within 50–200%)* is one if the sizes (*Sales*, *Assets*, and *Market Cap*) of the firm and the potential peer are within 50–200% of each other and zero otherwise. *Match (Dow 30 membership)*, *Match (S&P 500 membership)*, and *Match (S&P 400 MidCap membership)* are one when both the firm and its potential peer are Dow 30 members, S&P 500 index components, and S&P MidCap 400 index components, respectively, and zero otherwise. *Match (CEO is chair)* is one when CEOs of both the firm and its potential peer are chairmen of the board of directors; and *Match (CEO is not chair)* is one when both CEOs are not chairmen. *Dummy (Talent flows)* is one if at least one of the top five executives moved between the firm and its potential peer during 1992–2005. Standard errors are in parentheses. \* = significant at 10%; \*\* = significant at 5%; and \*\*\* = significant at 1%.

Table 3: Multivariate Probit Regressions of Peer Group Selection Year-By-Year (Continued)

Model	Year 1	Year 2	Year 3	Year 4
Ln(Peer total pay)	0.153*** (0.015)	0.172*** (0.015)	0.220*** (0.017)	0.217*** (0.016)
Match (two-digit industry)	1.149*** (0.030)	1.159*** (0.031)	1.269*** (0.034)	1.259*** (0.033)
Match (three-digit industry)	0.743*** (0.036)	0.675*** (0.036)	0.672*** (0.039)	0.691*** (0.038)
Dummy (Sales within 50–200%)	0.423*** (0.012)	0.418*** (0.012)	0.461*** (0.014)	0.464*** (0.013)
Dummy (Assets within 50–200%)	0.295*** (0.013)	0.302*** (0.012)	0.325*** (0.014)	0.331*** (0.013)
Dummy (Market cap within 50–200%)	0.124*** (0.014)	0.142*** (0.013)	0.153*** (0.014)	0.108*** (0.013)
Dummy (Talent flows)	0.572*** (0.034)	0.541*** (0.033)	0.550*** (0.037)	0.579*** (0.037)
Match (Dow 30 membership)	1.673*** (0.083)	1.595*** (0.077)	1.368*** (0.090)	1.366*** (0.088)
Match (S&P 500 membership)	0.395*** (0.023)	0.429*** (0.021)	0.326*** (0.024)	0.310*** (0.022)
Match (S&P MidCap 400 membership)	0.097*** (0.024)	0.091*** (0.022)	0.114*** (0.024)	0.130*** (0.023)
Match (CEO is chair)	0.036** (0.017)	0.116*** (0.016)	0.026 (0.019)	0.104*** (0.016)
Match (CEO is not chair)	0.042* (0.025)	-0.058*** (0.019)	0.007 (0.020)	-0.008 (0.021)
Number of peers	0.011*** (0.000)	0.006*** (0.000)	0.030*** (0.000)	0.026*** (0.001)
Intercept	-3.491*** (0.036)	-3.508*** (0.036)	-3.919*** (0.043)	-3.850*** (0.040)
Number of observations	591,908	620,649	555,001	640,414
Pseudo r-squared	0.298	0.302	0.328	0.323

Table 4: Peer Group Compensation as an Explanation for Executive Compensation

The dependent variable is *CEO Salary* and *CEO Total Pay*, respectively, at the disclosing firm. Firm *Sales*, *ROA*, *Stock return*, and *Volatility* (BS volatility) are from ExecuComp. *Leverage* is  $total\ debt / (total\ debt + market\ capitalization)$ . *Market-to-book value* is the ratio of market value to book value of assets. *Dummy (CEO is chair)* is one when the CEO of the firm serves as the chairman of the board, and *CEO tenure* is number of years the CEO has been in the post. We winsorize compensation variables at the 1st percentile and the 99th percentile, and apply log transformation to compensation variables and sales to overcome the skewness in the data. We report the regression results for the full sample and for each of the four years separately. Standard errors are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4: Peer Group Compensation as an Explanation for Executive Compensation (Continued)

Independent variables	CEO Salary					CEO Total Pay				
	Full Sample	Year 1	Year 2	Year 3	Year 4	Full Sample	Year 1	Year 2	Year 3	Year 4
	Ln(Median peer total pay)	0.712*** (0.03)	0.737*** (0.07)	0.913*** (0.07)	0.716*** (0.07)	0.553*** (0.07)	0.587*** (0.03)	0.599*** (0.06)	0.540*** (0.06)	0.609*** (0.07)
Ln(Lagged sales)	0.050*** (0.01)	0.036** (0.01)	0.028** (0.01)	0.054*** (0.01)	0.074*** (0.01)	0.174*** (0.01)	0.172*** (0.03)	0.158*** (0.03)	0.198*** (0.03)	0.162*** (0.02)
ROA	0.003*** (0.00)	0.002 (0.00)	-0.001 (0.00)	0.008*** (0.00)	0.007*** (0.00)	0.003 (0.00)	0.004 (0.01)	-0.003 (0.00)	-0.007 (0.00)	0.007* (0.00)
Lagged ROA	-0.002 (0.00)	0.001 (0.00)	0.002 (0.00)	-0.005 (0.00)	-0.003 (0.00)	-0.008*** (0.00)	-0.012* (0.01)	0.004 (0.01)	-0.004 (0.00)	-0.014*** (0.00)
Stock return	-0.007 (0.01)	-0.041 (0.05)	0.008 (0.04)	0.128** (0.06)	0.036 (0.02)	0.056*** (0.02)	0.254** (0.11)	0.309*** (0.08)	0.112 (0.10)	-0.028 (0.04)
Lagged stock return	0.071*** (0.02)	-0.004 (0.05)	0.119** (0.05)	0.049 (0.04)	0.099* (0.06)	0.243*** (0.04)	0.252*** (0.10)	0.412*** (0.12)	0.249*** (0.07)	0.061 (0.09)
Lagged market-to-book value	-0.024*** (0.01)	-0.020 (0.02)	-0.035** (0.01)	-0.030* (0.02)	-0.061*** (0.02)	0.072*** (0.02)	0.062** (0.03)	0.019 (0.03)	0.117*** (0.03)	0.156*** (0.04)
Lagged leverage	-0.054 (0.05)	-0.174 (0.11)	-0.226** (0.11)	0.093 (0.12)	0.042 (0.10)	0.047 (0.10)	0.263 (0.23)	-0.167 (0.23)	0.258 (0.20)	0.048 (0.16)
Dummy (CEO is chair)	0.054*** (0.01)	0.046* (0.03)	0.005 (0.03)	0.047* (0.03)	0.107*** (0.03)	0.079*** (0.03)	0.097* (0.06)	0.168*** (0.06)	0.030 (0.05)	0.042 (0.04)
CEO tenure	0.004*** (0.00)	0.004* (0.00)	0.006*** (0.00)	0.004* (0.00)	0.002 (0.00)	0.001 (0.00)	0.000 (0.00)	0.004 (0.00)	-0.001 (0.00)	-0.000 (0.00)
Intercept	-0.504*** (0.07)	-0.287** (0.14)	-0.226** (0.13)	-0.514*** (0.14)	-0.773*** (0.13)	-0.967*** (0.09)	-0.975*** (0.21)	-0.787*** (0.21)	-1.211*** (0.18)	-1.020*** (0.17)
Number of observations	2,449	608	576	579	688	2,448	608	575	579	688
Adjusted r <sup>2</sup>	0.374	0.366	0.447	0.396	0.334	0.434	0.438	0.435	0.462	0.430

Table 5: Summary Statistics for Chosen Peers versus Matched Unselected Companies

This table contains median differences between the selected peers and the propensity score matched unselected companies in *Salary* and *Total Compensation*. In Columns 1 and 2, the differences are expressed in thousands of dollars, and in Columns 3 and 4, they are expressed as percentages of the average CEO compensation at the chosen peer and the best-matched unselected company. To calculate these differences, we first calculate the difference for each selected-propensity score matched pair (pay at the selected peer minus pay at the propensity score matched unselected company) and then take the median difference for each firm. Each disclosing firm has only one observation for each year. The table provides the mean and median across firms for those firm-level median pay differences (mean of the medians in Columns 1 and 3, median of the medians in Columns 2 and 4). We report results for each year separately and calculate the difference of these pay differences between Year 4 and Year 1. For the difference between Year 4 and Year 1, \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

CEO Compensation	Mean of Dollar Pay Difference (thousands of dollars)	Median of Dollar Pay Difference (thousands of dollars)	Mean of Percentage Pay Difference	Median of Percentage Pay Difference
Salary Year 1	102.245***	85.315***	12.45%***	9.83%***
Salary Year 2	124.798***	104.167***	14.05%***	11.60%***
Salary Year 3	103.049***	109.655***	12.54%***	12.29%***
Salary Year 4	102.817***	100.000***	12.19%***	10.79%***
Year 4 minus Year 1	0.572	14.685**	0.09%	0.96%
Total Compensation Year 1	759.716***	376.437***	10.26%***	6.59%***
Total Compensation Year 2	662.707***	620.102***	11.59%***	11.03%***
Total Compensation Year 3	778.443***	786.750***	12.24%***	12.32%***
Total Compensation Year 4	862.392***	693.493***	12.98%***	11.70%***
Year 4 minus Year 1	102.676	317.056***	2.72%**	5.11%***

Table 6: Companies Added to and Dropped From the Compensation Peer Group

This table contains median differences between added peers and the propensity score matched unselected companies in *Salary* and *Total compensation*. It also contains median differences between dropped peers and the propensity score matched retained peer companies in *Salary* and *Total compensation*. In Columns 1 and 2, the differences are expressed in thousands of dollars, and in Columns 3 and 4, they are expressed as percentages of the average CEO compensation at the chosen peer and the best-matched unselected company. To calculate these differences, we first calculate the difference for each propensity score matched pair (pay at the added peer minus pay at the propensity score matched unselected company, and pay at the dropped peer minus pay at the propensity score matched retained peer, respectively) and then take the median difference for each disclosing firm. The table provides the mean and median across firms for those firm-level median pay differences (mean of the medians in Column 1, median of the medians in Column 2). \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

CEO Compensation	Mean of Dollar Pay Difference (thousands of dollars)	Median of Dollar Pay Difference (thousands of dollars)	Mean of Percentage Pay Difference	Median of Percentage Pay Difference
Added:				
Salary	21.662**	4.744	1.19%	0.46%
Total Compensation	554.074**	640.035***	9.26%***	10.79%***
Dropped:				
Salary	-44.356***	-40.001***	-4.97%***	-4.07%***
Total Compensation	-639.030*	-461.202**	-8.44%***	-8.26%**