Peer Firm Selection and Executive Compensation: The Case of Dual-role Peers

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Abstract

The Securities and Exchange Commission's 2006 executive compensation disclosure rule requires firms to disclose how executive pay is determined by benchmarking total compensation at the competitive labor market level (compensation benchmarking) and by benchmarking performance targets in relative performance evaluation (performance benchmarking). Prior studies examining the selection of peer firms typically focus on one or the other benchmark. Using Incentive Lab's detailed data on proxy statements from 2006 through 2015, we find that more than half of peer firms are used for dual benchmarking purposes, a pattern largely ignored in prior literature. We label these peers as "dual-role peers" and show that firms can indeed succeed in selecting such peers in order to achieve high pay and yet low expected performance. Moreover, we find that the extent of such discretionary peer selection is positively associated with realized excess CEO compensation, and negatively associated with ex-post stock performance in the subsequent year. Additional evidence shows that the power of CEOs to intervene the boards' compensation decisions exacerbates the opportunistic peer selection. Our study provides new evidence on managerial self-serving behavior in compensation practices and highlights the importance of considering dual-role peers in compensation research.

Keywords:

Peer selection; Compensation benchmarking; Performance benchmarking; Dual-role peers

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1. Introduction

This study investigates managerial incentives in the selection of peer firms used for dual benchmarking purposes in setting executive pay. The two typical benchmarks are compensation benchmarking and performance benchmarking. In the compensation benchmarking, a firm benchmarks total compensation level against a peer group's executive pay, approximating the competitive pay level in the labor market, to attract and retain talented executives. In the performance benchmarking used for relative performance evaluation (RPE), a firm evaluates executives with reference to its peers' performance to determine performance-based incentive awards. Such peer benchmarking is a common practice in compensation contracting. As an effort to improve compensation transparency, the Securities and Exchange Commission (SEC) mandates the disclosure of information regarding peer composition for any benchmark, if employed, in the Compensation Discussion and Analysis (CD&A) section of proxy statements since December 2006. It is evident from company disclosures that around 90% of S&P 1500 firms employ the compensation benchmarking, and an increasing number of firms from approximately 15% to over 30% use the performance benchmarking in the past decade (Faulkender and Yang, 2010; Bizjak, Lemmon, and Nguyen, 2011; Gong, Li, and Shin, 2011; Albuquerque, DeFranco, and Verdi, 2013; Equilar, 2016; Bizjak, Kalpathy, Li, and Young, 2018).

The mandatory disclosure of actual peers enables researchers to explicitly analyze firms' selection of peers in compensation determination, instead of relying on hypothetical peer groups that are either inferred from firms' voluntary disclosure or constructed based on similarities in firm characteristics such as industry and size (e.g., Rajgopal, Shevlin, and Zamora, 2006; Bizjak, Lemmon, and Naveen, 2008; Albuquerque, 2009). Nonetheless, research examining peer group composition after the new disclosure rule provides mixed evidence, with most studies focusing on one or the other benchmarking, but not both. Focusing on peers for compensation benchmarking (thereafter ***compensation peers***), Faulkender and Yang (2010) and Bizjak, Lemmon, and Nguyen (2011) find that after controlling for firm similarities in efficient contracting, firms are more likely to select highly-paid peers to bias executive compensation upward. Albuquerque, DeFranco, and Verdi (2013) provide counter arguments and suggest that the excess pay due to the "biased" benchmark could also be related to the compensation premium for unobserved CEO talent. Focusing on peers for performance benchmarking (thereafter ***performance peers***), Gong, Li, and Shin (2011) and Bizjak, Kalpathy,

Li, and Young (2018) show that holding the economic determinants constant, firms tend to select peers with worse expected performance, so that executives have greater chances to earn higher performance-based pay.[1]

A key notion from this line of literature is that compensation peers and performance peers serve different purposes and their selection reflects different considerations.[2] Under efficient contracting perspective, the selection of performance peers should capture common exogenous risk, and the selection of compensation peers should reflect a well-functioning labor market for the perceived talent of executives. Under rent-extraction (or self-serving) perspective, executives have incentives to select performance peers that are expected to underperform, and to benchmark against larger and more highly paid peers to increase their compensation. Based on the premise of pay-for-performance linkage, it may appear to be difficult for firms to choose the same peer for both compensation and performance benchmarking.

However, using Incentive Lab's detailed data on proxy statements from 2006-2015, we find that the use of peers concurrently for both compensation and performance benchmarks (labeled as ***dual-role peers***) is actually quite common in practice. In our sample of firms that employ the two benchmarks in their pay design (thereafter ***focal firms***), 41.7% select exactly the same set of peers (i.e., completely overlapping where all peers are dual-role peers). For 54.9% of sample focal firms that use different sets of peers with certain overlaps, the number of dual-role peers represents an average of 44.5% of the whole peer composition.[3] At the peer level (i.e., among peers selected by focal firms), approximately 57% of peers are dual-role peers.

The widespread use of dual-role peers could arise from two possibilities. First, evidence from both anecdotal and published studies suggests that the linkage between pay and performance is not always strong. For example, the MSCI's 2016 report shows that, for a sample of firms included in the MSCI USA Index, the correlation between CEO compensation and total shareholder returns is consistently negative during 2005-2014 (Marshall and Lee,

[1] In the meantime, Bizjak, Kalpathy, Li, and Young (2018) also show that the bias of selecting poor-performing peers increases the ex-ante performance-based awards (estimated from Monte Carlo simulations), but does not necessarily increase the ex-post actual payouts.

[2] As shown in the supplementary analysis by Gong, Li, and Shin (2011), focal firms are more likely to select compensation peers (not used for performance benchmarking) with better performance presumably for targeting a higher total pay level, while selecting performance peers (not used for compensation benchmarking) with worse performance to pay higher performance-based awards.

[3] The remaining 3.4% of focal firms use completely different peer groups (i.e., without any overlap) for compensation and performance benchmarks.

2016).[4] In addition, Bushman, Engel, and Smith (2006) report that the median of compensation return coefficient (i.e., the coefficient on annual stock returns in the regression of percentage change in annual compensation) is merely 0.03 during 1971-2000. As such, focal firms with self-serving incentives have the discretion to select poor-performing peers that pay high compensation to their CEOs. Alternatively, the existence of dual-role peers could also be due to efficient contracting, because the determination of both compensation and performance benchmarking peer groups relies on common economic characteristics such as industry, firm size, and growth, etc. Ex ante, one cannot completely rule out the possibility that a well-governed and rational firm may choose a strong performing peer for relative performance evaluation while strictly setting their CEO pay only at moderate level. It is, therefore, an empirical question whether or not firms choose the so-called dual-role peers in order to boost their executive compensation.

Using 1,311 focal-firm-year observations (309 unique focal firms) from the Incentive Lab employing both compensation and performance benchmarking from 2006-2015, this study investigates whether focal firms can succeed in selecting dual-role peers with high pay level but low expected performance and whether such biased selection benefits their CEOs at the expense of shareholders. We first document that focal firms are indeed more likely to use favorable dual-role peers with the desired pay-performance mix. In particular, the peer-level analysis shows that after controlling for economic similarities in firm and executive characteristics, the probability of being selected as dual-role peers are positively associated with the peers' total CEO pay and negatively associated with the peers' expected stock performance. Moreover, the focal-firm-level analysis confirms that average pay-for-performance sensitivity of dual-role peers is considerably lower than that of compensation or performance peers.

We then test whether such discretionary behavior is consistent with management opportunism. To facilitate the understanding of peer selection process, we propose a peer selection index, labeled as **PSI**, for each focal firm, based on the relative number of peers that are the most vs. the least opportunistically selected. Specifically, firms selecting peers with high pay level and/or low expected performance are considered more likely to be self-serving, whereas firms selecting peers with low pay level and/or high expected performance are considered more in line with efficient contracting. We find that a higher PSI is associated with higher realized excess CEO compensation and lower one-year-ahead stock performance, suggesting that the opportunistic peer selection inflates ex-post executive pay and hurts

[4] Similarly, the *Wall Street Journal* article by Francis and Lublin (2016) shows that none of the top-ten highly paid CEOs in S&P500 firms is among the top-ten best performers in 2015.

shareholders' wealth. Further analysis provides corroborating evidence that entrenched CEOs, as measured by a composite index of CEO power, influence the boards' compensation decision and aggravates the extent of opportunistic peer selection behavior by focal firms. Our results are robust to intertemporal changes in peer composition, decomposition of PSI as well as alternative definitions of PSI. In a supplementary analysis, we also show that firms with solely compensation benchmarking do not use their compensation peers *implicitly* for relative performance evaluation.

This study contributes to the literature on peer benchmarking in compensation design. Although the academic literature on executive compensation is proliferating, we provide new statistics showing that over half of peers firms are used for both compensation and performance benchmarking. While extant studies (e.g., Gong, Li, and Shin, 2011; Albuquerque, DeFranco, and Verdi, 2013) explain differential pay-performance considerations in composing the *divergent* subset of the benchmarking groups (i.e., compensation peers and performance peers), the non-negligible *overlapping* portion of the peer groups (i.e., dual-role peers) is largely ignored and underexplored in the literature.[5] By studying firms' incentive in selecting such dual-role peers and the resulting consequences, we are able to integrate the two separate lines of prior studies on either compensation benchmark or performance benchmark to depict a more complete picture of the determination of peer composition. Thus, our study fills in the gap by providing new insights on the managerial discretion in selecting favorable dual-role peers with the "ideal" combination of high pay and low performance. The findings also highlight the importance of considering such dual-role peers in the research on executive compensation.

This study also sheds more lights on managerial self-serving incentive in compensation contracting. Our findings suggest that powerful CEOs are able to intervene the peer selection process to extract excess compensation. Under such circumstance, compensation committees fail to fulfill their responsibilities of ensuring the efficiency of compensation determination. Moreover, shareholders' interests are severely impaired, as the stock prices underperform subsequently. In addition, we propose a new peer selection index, PSI, to measure the extent of opportunistic peer selection for each focal firm. This focal-firm-level indicator of peer

[5] To our knowledge, the only exception in the published literature is the study by Gong et al. (2011). They note in their supplemental analysis (p.1036) that for the 147 firms using both benchmarks in 2006, the overlapping rate is 72%, where the overlapping rate is defined as the number of common peers between the two groups divided by the size of RPE peer groups. This is comparable to the overlapping rate of 74% (following the same definition) for our sample focal firms. Although they acknowledge the existence of overlapping peers, they do not test these peers empirically.

composition could be practically useful for identifying "suspicious" firms who might behave opportunistically in the pay-setting practice.

The remainder of this paper is organized as follows. Section 2 describes the background of the SEC's compensation disclosure rule, reviews the extant literature on peer selection, and develops research hypothesis. Section 3 presents the main empirical findings. Section 4 discusses the results of additional analyses. Section 5 concludes the paper.

2. Institutional Background, Related Literature and Research Hypothesis

2.1 The SEC's 2006 Compensation Disclosure Rule

There has been extensive debate on the fairness and effectiveness of top executives' compensation contracts (e.g., Jensen and Murphy, 1990; Lo, 2003; Ertimur, Ferri, and Muslu, 2011). Back to 1992, the SEC has required firms to provide tabular disclosures on executive compensation. In response to the increased demand from the investors, the SEC put forward more stringent disclosure requirement in the proposed rule "Executive Compensation and Related Party Disclosure" on January 27, 2006. Most of the comment letters received by the SEC support the new compensation disclosure rule (Gong, Li, and Shin, 2011). On August 29, 2006, the SEC issued the final rule with the effective date of December 15, 2006.

The new disclosure rule requires firms to provide a detailed discussion on the policies and processes of setting executive compensation in the section of Compensation Discussion and Analysis (CD&A) of proxy statements. The main objective is "to provide investors with clearer, better organized and more complete disclosure regarding the mix, size and incentive components of executive and director compensation" (SEC Final Rules 33-8732a, IX-C, 2006). The improved disclosure aims at enhancing the transparency of compensation design, and increases investors' confidence. Hence, the rule is expected to improve the efficiency of capital allocation and facilitate capital raising by the issuers (SEC Final Rules 33-8732a, X, 2006).

In accordance with the SEC's 2006 disclosure requirement, firms should disclose "any benchmarking of total compensation or any material element of compensation, identifying the benchmark and, if applicable, its components (including component companies)" (SEC final rules 33-8732a, Item 402 (b) (2) (xiv), 2006). To comply with the rule, firms need to provide the exact names of selected peers used for compensation and/or performance benchmarks as long as they employ benchmarking in compensation determination. Appendix A provides an example of the disclosure on benchmarks used in compensation design. As disclosed in CenturyLink Inc.'s 2016 proxy statement, both "Core Peer Group" and "General Industry Peer Group" consist of self-selected peers used for compensation benchmarking, while "TSR Peer

Group" includes self-selected peers used for performance benchmarking.

The statistics based on company disclosures indicate widespread use of benchmarks in compensation contracting since 2006. Specifically, approximately 90% of S&P 500 firms disclose the use of compensation benchmarking (Faulkender and Yang, 2010; Bizjak, Lemmon, and Nguyen, 2011; Albuquerque, DeFranco, and Verdi, 2013; Equilar, 2016). With respect to performance benchmarking, the number of S&P 1500 firms disclosing self-selected peer groups increase substantially from around 15% to more than 30% (Gong, Li, and Shin, 2011; Bizjak, Kalpathy, Li, and Young, 2018). Hence, the increased popularity of benchmarking for compensation determination necessitates further empirical investigation regarding the incentives and consequences of peer composition in pay design.

2.2 Related Literature on Peer Selection

Prior to 2006, the disclosure of peer groups used for benchmarking purposes in setting executive compensation is voluntary. As very few firms disclose the information, earlier papers have to infer from firm's limited voluntary disclosure or rely on certain assumptions (such as similarities in industry and firm size) to construct hypothetical peers (e.g., Bhojraj and Lee, 2002; Bizjak, Lemmon, and Naveen, 2008; Albuquerque, 2009). Subsequent to the SEC's compensation disclosure rule effective in 2006, two separate lines of research utilize the data on actual peers to examine how firms use peer groups for either compensation benchmarking or performance benchmarking.

2.2.1 Literature on compensation benchmarking

One line of literature investigates the determinants of the selection of compensation benchmarking peers. Self-serving hypothesis expects that firms opportunistically select peers with highly-paid executives to justify excessive compensation. In contrast, efficient contracting hypothesis predicts that firms design competitive compensation packages by selecting peers based on similarities in the labor market (the demand and supply of managerial talents), as proxied by economic similarities in firm characteristics (e.g., industry, size, growth, and profitability, etc.).

This line of literature finds mixed evidence for both explanations. One the one hand, Faulkender and Yang (2010) provide the evidence in supportive of management opportunism. They show that firms select highly-paid peers to extract excessive compensation, after controlling for firm characteristics including industry, size, visibility, CEO responsibility, and CEO talent flows. They further show that the opportunistic behavior is more prominent in the

setting of weak corporate governance, as proxied by smaller size of peer group, CEO/Chair duality, longer CEO tenure, and busier board of directors. Bizjak, Lemmon, and Nguyen (2011) also suggest that firms select the peers with higher CEO pay, larger firm size, and better accounting performance in order to inflate executive compensation. However, they find no evidence that such peer selection is related to corporate governance, as proxied by CEO tenure, percentage of directors hired after the CEO took office, and Gompers, Ishii, and Metrick's (2003) governance index.

To the contrary, Albuquerque, DeFranco, and Verdi (2013) suggests that selection of compensation benchmarking peers is more consistent with efficient contracting hypothesis. They show that firms' preference over highly-paid peers, as documented in the two studies discussed above, could also be driven by the consideration of superior managerial talents in the compensation determination, in addition to opportunistic incentives. Similarly, Cadman and Carter (2014) provide no clear evidence in support of opportunism hypothesis. They find that peer selection is typically based on firm characteristics, including industry membership, firm size, accounting performance, growth, use of compensation consultant, and interlock (i.e., the peer also selects the focal firm as a benchmarking peer). Besides, they show that self-selected peers tend to have higher equity-based compensation and total compensation, but not higher salary or excessive compensation (measured by the residuals estimated from the regression of total compensation on economic determinants).

2.2.2 Literature on performance benchmarking

The second line of literature focuses on performance benchmarking, particularly the factors that affect the use of relative performance evaluation or RPE (Bannister and Newman, 2003; Rajgopal, Shevlin, and Zamora, 2006; Carter, Ittner, and Zechman, 2009; DeAngelis and Grinstein, 2010; Gong, Li, and Shin, 2011). The likelihood of the RPE use is affected by extent of exposure to common risk, availability of peers with similar size and organizational complexity, industry competition, growth opportunity, firm size and performance, CEO wealth, board independence, and compensation consultant.

The research on the selection of peers for performance benchmarking is limited, perhaps in part due to data limitation. Under efficient contracting hypothesis, firms are expected to select peers with better ability of removing exogenous shocks beyond managers' control, and those with economic similarities. Performance measures benchmarked against these peers will be more informative and reliable in evaluating managerial performance. On the contrary, self-

serving hypothesis predicts that firms select peers with worse performance to inflate peer-adjusted performance and thus performance-based incentive awards.

Gong, Li, and Shin (2011) show that firms select performance benchmarking peers with better ability of removing exogenous shocks beyond managers' control (proxied by industry membership and co-movement of stock return performance) and similarity in firm size, consistent with efficient contracting hypothesis. They also provide the evidence of self-serving behavior, showing that the firms select poor-performing peers to inflate peer-adjusted performance and thus performance-based incentive awards. Although they find evidence on both hypotheses, they further show that the relative importance of these competing considerations depends on focal firms' performance. Specifically, selection of peers by better-performing firms are more consistent with efficient contracting, while selection of peers by underperforming firms are more consistent with management opportunism. They argue that executives in better-performing (underperforming) firms have weaker (stronger) self-serving incentives because of less (more) concern over job security and potential decrease in compensation.

In a concurrent working paper, Bizjak, Kalpathy, Li, and Young (2018) confirm the findings in Gong, Li, and Shin's (2011) that firms are more likely to select peers with worse performance for performance benchmarking. However, they find that the biased peer composition does not lead to higher ex-post actual performance-based payouts, although it increases the ex-ante estimates of incentive awards based on Monte Carlo simulations. Hence, their findings provide weak evidence of self-serving behavior in peer selection.[6]

Our study differs from the above-discussed literature in the following two aspects. First, we integrate the two separate lines of extant studies (which focus on either compensation benchmarking or performance benchmarking, but not both) by considering both benchmarks simultaneously. This allows a closer investigation of managerial incentives involving the determination of dual-role peers, which represent a non-negligible portion of peer composition but overlooked in the literature. Second, our sample period covers ten years from 2006-2015, while most prior studies rely on the data disclosed by firms in the initial two to three years after the SEC's compensation disclosure rule. Considering the increasing importance of

[6] Bizjak, Kalpathy, Li, and Young (2018) further show that firms could utilize broad market indices, rather than self-selected peers, to increase actual performance-based payouts. In the additional analysis, they also find that the target total pay level based on compensation benchmarking peers is lower when firms employing self-selected performance benchmarking peers (relative to firms using broad market indices for performance benchmark or firms without using any performance benchmark). They argue that this is possibly due to the constraint arising from the use of poor-performing peers for performance benchmark, if these peers tend to have lower CEO pay in the scenario of strong pay-for-performance linkage.

benchmarking in compensation contracting, our study can provide updated evidence of firms' peer selection behavior. The only exception is the concurrent work by Bizjak, Kalpathy, Li, and Young (2018), whose sample period also spans from 2006 to 2015. Nonetheless, they do not examine the selection of dual-role peers, which is the focus of our study.

2.3 Conceptual Framework and Research Hypothesis

We rely on the following compensation formulas to illustrate the rationale underlying the selection of peers for dual benchmarks employed by a focal firm.

In the case of no benchmarking in the determination of the focal firm's CEO pay,

$$C_i = F_i + v_i * E_i \qquad [F1]$$

The subscript i represents the focal firm. C_i is total CEO compensation; F_i is fixed salary; and E_i is firm performance; and the parameter v_i is the pay-for-performance sensitivity.

If the focal firm employs performance benchmarking,

$$C_i = F_i + v_i * E_i + \alpha_i * (E_i - E_j) \quad (\alpha_i>0) \qquad [F2a]$$

The subscript j denotes the peer used by the focal firm i to benchmark the performance targets in relative performance evaluation. The added term, $\alpha_i*(E_i - E_j)$, is the pay adjustment due to performance benchmarking, where α_i is the sensitivity of the focal firm's CEO pay to peer-adjusted performance $(E_i - E_j)$.

If the focal firm adopts compensation benchmarking,

$$C_i = F_i + v_i * E_i + \beta_i * C_j \qquad (\beta_i>0) \qquad [F2b]$$

The added term (β_i*C_j) reflects the adjustment of focal firm's total compensation with reference to the peer's pay level (C_j).[7]

In aggregate, when the focal firm uses the dual-role peer j for both compensation and performance benchmarks,

$$C_i = F_i + v_i * E_i + \alpha_i * (E_i - E_j) + \beta_i * C_j \qquad (\alpha_i>0 \text{ and } \beta_i>0) \qquad [F3]$$

Extant studies suggest that selection of peers for compensation vs. performance benchmark has opposite implications for compensation determination. On the one hand, firms tend to select peers with higher executive pay for compensation benchmarking (Faulkender and Yang, 2010; Bizjak, Lemmon, and Nguyen, 2011; Albuquerque, DeFranco, and Verdi, 2013). The use of better-paid peers increases the target level of a focal firm's CEO pay, because of larger upward adjustment by β_i*C_j. However, these peers are likely to have better performance,

[7] A more complete notation of the adjustment due to compensation benchmarking is $\beta_i*(C_i - C_j)$. Without loss of generality, we simplify the expression by removing C_i to avoid unduly complication.

if their pay and performance are closely linked. When they are also used for performance benchmarking, the focal firm will set a higher performance target (i.e., higher E_j), and thus increase the difficulty of earning higher performance-based incentive awards. In such case, the adjustment related to performance benchmarking ($\alpha_i*(E_i - E_j)$) will decrease or even become negative when $E_i < E_j$ and $\alpha_i>0$.

On the other hand, firms prefer the peers with worse performance for performance benchmarking purpose (Gong, Li, and Shin, 2011; Bizjak, Kalpathy, Li, and Young, 2018). Similarly due to pay-performance linkage, the poor-performing peers are likely to pay less to their CEOs. If these peers are also used for compensation benchmarking, total CEO pay of the focal firm will be targeted at a lower level.

Hence, the combined findings from prior research predict that focal firms will avoid using the same peers for both benchmarking purposes (i.e., dual-role peers) if they have incentive to opportunistically inflate CEO pay. Nonetheless, executive pay and corporate performance are not always strongly linked. For example, the research report by Marshall and Lee (2016) suggests that CEO pay has a consistently negative correlation with total shareholder returns for a sample of firms in the MSCI USA Index during 2005-2014. Bushman, Engel, and Smith (2006) report a rather weak pay-performance relation in a sample firms covered by annual Forbes surveys over the period of 1970-2000.[8]

Under such circumstances, focal firms have the discretion to employ dual-role peers with high executive pay but low firm performance. More generally, focal firms could select dual-role peers that exhibit low pay-for-performance sensitivity. This can be shown in the following extension of formula [F3].

Assume that the peer's total CEO pay is linked to its own performance (without benchmarking), that is, $C_j = F_j + v_j * E_j$. The formula [F3] can be extended to be:

$$\begin{aligned} C_i &= F_i + v_i * E_i + \alpha_i * (E_i - E_j) + \beta_i * (F_j + v_j * E_j) \\ &= [F_i + (v_i + \alpha_i) * E_i] + [\beta_i * F_j + (\beta_i v_j - \alpha_i) * E_j] \end{aligned} \quad [F4]$$

In the above extended formula, $\beta_i * F_j + (\beta_i v_j - \alpha_i) * E_j$ is the adjusted component related to the focal firm's dual benchmarks. Because lower performance of the dual-role peer E_j is preferred, lower v_j (the peer's pay-for-performance sensitivity) will reduce the negative impact of the decreased E_j on the focal firm' total pay level C_i.

[8] They show that in the regression of percentage change in annual CEO cash compensation, the mean and median coefficient on annual stock returns (denoted as compensation return coefficient in their paper) is only 0.04 and 0.03, respectively.

Given the possibility of the "ideal" pay-performance mix (i.e., high pay and low performance), focal firms with self-serving incentives could engage in opportunistic peer selection to inflate CEO pay. Moreover, the suboptimal compensation design due to such opportunistic behavior is expected to adversely affect the firms' future performance, which impairs shareholders' interests. We develop the following hypothesis.

H1: Focal firms employing more peers with high pay level but low expected performance (equivalently lower pay-for-performance sensitivity) have higher realized excess CEO compensation and lower ex-post future performance.

3. Empirical Analyses

In this section, we first describe data sources and sample selection. We then discuss the main empirical analyses for the test of research hypothesis, including: 1) peer-level analyses on whether focal firms are more likely to select favorable peers with high pay but low performance; and 2) focal-firm-level analyses regarding the consequences of such discretionary peer selection on focal firms' realized CEO pay and subsequent stock performance, as well as the role of CEO power.

3.1 Data and Sample

We obtain the data on peer composition for compensation and performance benchmarks from proxy statements (DEF14A) in Incentive Lab database.[9] We also obtain financial accounting information from Compustat, CEO compensation data from ExecuComp, stock price information from CRSP, analysts' forecast from I/B/E/S, board structure from Institutional Investors Services (ISS), and institutional and blockholder ownership from Thomson Reuters' Institutional (13F) Holdings.

We start with merging the data on the focal firms and their self-selected peers[10] covered by Incentive Lab with Compustat and other datasets needed for empirical analyses. As shown in Table 1, the initial sample consists of 76,629 peer-years, corresponding to 5,666 focal-firm-years for 854 focal firms during 2006-2015. Since our analyses focus on firms employing both

[9] Incentive Lab provides detailed compensation data (such as executive pay structures, peer groups, performance metrics, performance assessment periods, and compensation consultants, etc.) for S&P500 firms and the majority of S&P400 firms.

[10] Firms may use broad market indices (e.g., S&P500), instead of identifying and selecting individual peers (i.e., self-selected peers), for performance benchmarking purpose. Since this study focuses on the composition of individual peers, we do not consider firms solely relying on broad market indices for our analyses. In our final sample, 120 out of 1,311 (9.2%) focal-firm-years use both self-selected peers and broad market index for performance benchmark.

compensation and performance benchmarks, we exclude observations with compensation benchmark only as well as observations with performance benchmark only.[11] The final sample includes 20,320 peer-years, representing 1,311 focal-firm-years for 309 unique focal firms. In other words, 36.18% of focal firms (23.14% of focal-firm-years) in our sample use both types of benchmarks simultaneously in their pay design. By comparison, the percentage of focal firms using dual benchmarks is 16% of S&P1500 firms in 2006 as reported by Gong, Li, and Shin (2011) and approximately one-third of S&P1500 firms during 2006-2008 as reported by Albuquerque, De Franco, and Verdi (2013). Hence, there is an increasing trend of using dual benchmarks over time.

[Table 1]

3.2 Selection of Peers with the Desired Pay-performance Mix

3.2.1 Peer-level regression specification

Before formally testing H1, we first document whether focal firms are more likely to select peers with high pay but low performance, as expected in the compensation formula [F3]. We run the following multinomial Logit regression at the peer level to test the effects of peers' CEO pay level and expected stock performance on the probability of being selected as dual-role peers, compensation peers, and performance peers, respectively.

$$\begin{aligned}\text{Prob}(\text{PEER}_{i,j,t}) = \Phi(&\text{CEOCOMP}_{i,j,t-1}, \text{STOCKPERF}_{i,j,t},\\ &\text{Similarities in firm charateristics}_{i,j,t-1},\\ &\text{Similarities in CEO ability and responsibility}_{i,j,t-1},\\ &\text{Symbolism effect}_{i,j,t-1})\end{aligned} \quad (1)$$

In Eq.(1), subscripts i and j represent the focal firm and its self-selected peer, respectively. The dependent variable PEER represents three categories of peers including dual-role peers (DUAL_PEER), compensation peers (COMP_PEER), and performance peers (PERF_PEER), and the base category of randomly selected non-peers. Following Albuquerque, De Franco, and Verdi (2013) and Gong, Li, and Shin (2011), we identify the pool of all focal firms and their peers, and then randomly choose candidates from this pool (excluding the focal firm of interest and its self-selected peers) as the control sample of non-peers for each focal

[11] In additional analysis, we separately examine the incentives of peer selection for the 766 focal firms (4,293 focal-firm-years) employing compensation benchmark only. Although these firms do not explicitly disclose the use of performance benchmarking, it is possible that they implicitly evaluate managerial performance with reference to the peer group of compensation benchmark. The results are discussed in Section 4.2.

firm in a given year. We set the number of randomly-selected non-peers to be equal to the number of self-selected peers.

The main independent variables of interest are the peers' CEO pay level ($CEOCOMP_{t-1}$) and expected stock performance ($STOCKPERF_t$). $CEOCOMP_{t-1}$ is the natural logarithm of the peers' total CEO compensation (including salaries, annual cash bonuses, and long-term equity awards) in year t-1. $STOCKPERF_t$ is analysts' forecasted annual stock returns for the peers, computed as the analysts' one-year consensus forecast on target price (issued within 90 days after the beginning of year t) divided by the prevailing stock price, and minus one.

Under compensation benchmarking, firms are expected to select peers based on similarities in the labor market, that is, the demand and supply of managerial talents. Under performance benchmarking, firms also tend to select peers with economic similarities to better evaluate managerial performance with reference to appropriate relative performance measures by removing exogenous shocks beyond managers' control. Hence, although the theoretical rationales of the two types of benchmarking are not the same, the fundamental criteria in the selection of peers are largely similar. The primary considerations include industry, firm size, growth opportunity, and organizational complexity, etc. We follow prior studies (Faulkender and Yang, 2010; Bizjak, Lemmon, and Nguyen, 2011; Gong, Li, and Shin, 2011; Albuquerque, DeFranco, and Verdi, 2013) to control for similarities in the following firm characteristics of the focal firms and their peers: industry membership (SAME_SIC2 and SAME_SIC3), index membership (SAME_SPINDEX), firm size (|DIFF_TA|), market-to-book ratio (|DIFF_MTB|), business and geographical segments (SAME_BUSSEG and SAME_GEOSEG), credit ratings (SAME_RATING), and correlation of stock performance (CORR_RET). All variable definitions are included in Appendix B.

Albuquerque, DeFranco, and Verdi (2013) suggest that choice of highly-paid peers represents unobserved CEO talent rather than management opportunism. Hence, we further control for similarities in CEO's ability and responsibility, by including the following four variables: |DIFF_CEORET| is the absolute value of the difference in median annual stock returns (relative to S&P 500 index returns) in the recent three years achieved by the focal firm versus that achieved by the peer firm; |DIFF_CEOMVE| is the absolute value of the difference in median market value of equity in the recent three years for the focal firm versus that for the peer firm; SAME_DUALITY is equal to one if both CEOs of the focal firm its peer firm serve as chairman of their respective board, or neither one serves as chairman of the board, and zero otherwise; and TALENT_FLOW is equal to one if at least one of the top five executives moves between the focal firm and its peer in any years up until the current year end, and zero otherwise.

In addition, firms prefer to select more visible and established peers (Westphal and Zajac, 1994; Zajac and Westphal, 1995; Gong, Li, and Shin, 2011; Albuquerque, DeFranco, and Verdi, 2013). Therefore, to control for the symbolism effect, we include SALE_ADJ (the peer's sales adjusted by industry median) and MVE_ADJ (the peer's market value of equity adjusted by industry median). We also include year dummies in Eq. (1). The standard errors are corrected for clustering by focal firm. In the regression analysis, we use lagged values for the control variables to avoid look-ahead bias.

3.2.2 Results of peer-level analyses

Panel A of Table 2 shows the descriptive statistics on the variables used for the peer-level analyses. In our sample, the mean (median) number of self-selected peers is 15.5 (13.0). By comparison, Gong, Li, and Shin (2011) reports that the mean (median) number of self-selected peers in the S&P1500 firms using performance benchmarking is 14.7 (13.0) during 2006. Regarding total CEO compensation paid by peers, CEOCOMP has the median of 8.832, equivalent to approximately $6.9 million. Based on analysts' one-year ahead target price forecasts, the peers are expected to experience the median stock return (STOCKPERF) of 8.54%.[12]

With respect to the similarities between focal firms and their peers, 68.5% of the focal-peer firm pairs operate in the same two-digit SIC industry, and 52.2% of the pairs belong to the same S&P sub-index (i.e., S&P 500, S&P Mid-cap 400, and S&P Small-cap 600). 74.2% (80.7%) of pairwise observations have similar number of business (geographical) segments. The median correlation of stock returns between focal firm and peer firm is 0.546. In 59.3% of the pairwise observations, both CEOs of the focal firm and its peer serve as chairperson of their respective boards, or neither one serves as chairperson. Regarding the symbolism effect, peer firms' sales revenue and market capitalization are higher than the industry median by approximately $3.29 billion and $4.93 billion, respectively.

A focal firm could use a peer solely for compensation benchmark (COMP_PEER), or solely for performance benchmark (PERF_PEER), or for both (DUAL_PEER). Panel B of Table 2 provides the univariate comparison of the peer-level variables across the three types of benchmarks.[13] An interesting pattern emerges: among all peers selected by sample focal firms,

[12] Untabulated correlation matrix shows that CEOCOMP and STOCKPERF are not closely related (Pearson correlation coefficient = -0.005; Spearman correlation coefficient = 0.029). The weak correlation suggests the availability of potential peers with high CEO pay but low expected performance, thus allowing focal firms to engage in opportunistic selection of benchmarking peers.

[13] Panel B of Table 2 reports and compares the mean figures. The results of the test of differences are generally

57% (11,582 out of 20,320) of the observations are dual-role peers, while compensation peers and performances peers take up 29.0% (5,885 observations) and 14.0% (2,853 observations) of the aggregate number of peers, respectively. The focal firms select an average of 9.14 dual-role peers, and 8.86 (5.81) compensation (performance) peers. At the focal firm level, an average of 68.48% of self-selected peers within each focal firm are dual-role peers, followed by 46.94% (26.81%) for compensation (performance) peers. The statistics indicate that dual-role peers represent the majority of the peer composition. The literature so far has not paid close attention to this phenomenon; thus, we attempt to fill the gap and focus on this non-negligible portion of peers.

Comparisons of peers' total CEO compensation across Columns (1) to (3) show the average pay level of compensation (performance) peers is the highest (lowest), and that of dual-role peers lies in between. Specifically, the average CEO pay of dual-role peers is $8.30 million, which is slightly lower than that for compensation peers (with a mean of $9.58 million), but much higher than that for performance peers (with a mean of $6.76 million). With respect to expected stock performance, dual-role peers have the mean of 7.24%, which also lies in between compensation peers (with a mean of 8.57%) and performance peers (with a mean of 6.15%). These comparisons provide preliminary evidence that the considerations underlying the choice of peers are fundamentally different for benchmarks applied for different purposes. The univariate analyses on the variables of firm- and executive- characteristics lend further support to this intuition.

Next, we test the determination of peer composition by running peer-level regression as presented in Equation (1) and report the results in Panel C of Table 2. As a baseline analysis, we first run a Logit regression of the probability of a given firm being selected as a peer regardless of benchmarking types. Column (1) shows a significantly positive coefficient on CEOCOMP (0.685, z = 31.10) and a significantly negative coefficient on STOCKPERF (-0.225, z = -3.59). The result indicates that focal firms tend to select peers with high pay level but poor performance in order to justify higher compensation for their own executives.

We then distinguish peers used for either compensation benchmark or performance benchmark or both, together with the base group of randomly-selected non-peers, and run the multinomial Logit regression. Column (2) shows that for the category of dual-role peers, the coefficient on CEOCOMP is significantly positive (0.716, z = 27.13), and the coefficient on STOCKPERF is significantly negative (-0.277, z = -3.70). That is, the probability of a given

similar for the median figures.

firm being selected as a dual-role peer is higher when it has higher executive pay but lower expected performance. This is consistent with the expectation from the compensation formula [F3] that firms attempt to select dual-role peers with the desired pay-performance mix.

While the opposite signs of the coefficients (i.e., positive on CEOCOMP and negative on STOCKPERF) still carry over for compensation peers and performance peers (shown in Columns (3) and (4)), there are subtle differences. We note that among all three types of peers, compensation peers show the most positive and significant coefficient on CEOCOMP (0.764, z = 29.44), while performance peers show the most negative and significant coefficient on STOCKPERF (-0.466, z = -4.46). The results suggest that focal firms give more weight on the total pay level (expected performance) when selecting compensation (performance) peers. This is not entirely surprising given the intended purpose of each benchmarking peer type.

Regarding control variables, the coefficients are mostly consistent with prior expectations. The probability of a given firm being selected as a peer is higher when the focal firm and its peer operate in the same industry, belong to the same S&P sub-index, have more similarities in firm size and complexity, and executives' ability and responsibility. Finally, focal firms are more likely to choose larger and well-established peers, consistent with the symbolism effect.

[Table 2]

3.2.3 Further evidence of peers' pay-for-performance sensitivity

The extended compensation formula [F4] predicts that focal firms will select dual-role peers with lower pay-for-performance sensitivity. Next, we estimate each peer's pay-for-performance sensitivity from firm-specific time-series regression of change in natural logarithm of total CEO compensation on change in annual stock returns (requiring at least 12 observations). Untabulated descriptive statistics show that the mean pay-for-performance sensitivity for dual-role peers is 0.014, considerably lower than 0.062 for compensation peers and 0.019 for performance peers. We run the following regression to test whether the peers' pay-for-performance sensitivity indeed differs across benchmarking types.

$$\mathrm{PPS\_PEER}_{i,t} = f(\mathrm{DUAL\_PEER}_{i,t}, \mathrm{COMP\_PEER}_{i,t}, \mathrm{PERF\_PEER}_{i,t}, \mathrm{SIZE}_{i,t-1}, \mathrm{MTB}_{i,t-1}, \mathrm{LEV}_{i,t-1}) \quad (2)$$

The dependent variable, PPS_PEER, is the mean pay-for-performance sensitivity for each of the three types of self-selected peers (i.e., dual-role peers, compensation peers, and performance peers) and the mean value for the control sample of randomly-selected non-peers

(as defined in Eq.(1)) for a given focal firm. The independent variables, DUAL_PEER, COMP_PEER, and PERF_PEER are indicators equal to one if the peer firm is used for dual benchmarks, compensation benchmark, and performance benchmark, respectively. The control variables include focal firms' size (SIZE), market-to-book ratio (MTB), and leverage (LEV).

The regression results reported in Table 3 shows that the coefficient on DUAL_PEER is significantly negative (-0.091, t = -3.12), while the coefficients on COMP_PEER and PERF_PEER are not. Consistent with the expectations from the formula [F4], the results suggest that focal firms employ dual-role peers that exhibit lower pay-for-performance sensitivity than either compensation or performance peers.

[Table 3]

3.3 Consequences of Focal Firms' Discretionary Peer Selection

3.3.1 Construction of peer selection index at the focal firm level

To test H1 regarding the effects of discretionary peer selection behavior on focal firms' realized CEO pay and future performance, we self-construct a peer selection index (thereafter ***PSI***) for each focal firm in the following three steps. First, we rank total CEO pay in dollar amount by year for all firms covered by ExecuComp, and rank expected stock performance by year for all firms covered by both CRSP and I/B/E/S. A firm is classified as high (low) pay level if the value is higher (lower) than the annual sample median. Similar classification applies to the determination of high vs. low expected stock performance. Second, we identify the most (least) opportunistically selected peers to be: 1) dual-role peers with high (low) CEOCOMP and low (high) STOCKPERF; 2) compensation peers with high (low) CEOCOMP; and 3) performance peers with low (high) STOCKPERF. Third, the PSI is then calculated as the difference between the number of the most vs. least opportunistically selected peers divided by total number of peers for each focal firm. It is important to note that PSI intends to capture the degree of managerial opportunism. Specifically, by construction, a higher PSI indicates that a focal firm has a higher proportion of opportunistically selected peers.

Appendix C illustrates the construction of PSI. To get further assessment on whether PSI indeed captures managerial opportunism, we conduct univariate analyses for the most vs. least opportunistically selected peers across the benchmarking types and report the results in Section (d) of Appendix C. On average, the dual-role peers have 4.13 most opportunistically selected peers, much higher than the mean number of least opportunistically selected peers (1.91). Similar pattern is observed when we express the number of dual-role peers in percentage terms, and when we repeat the analysis for compensation peers and performance peers. These

findings confirm the previous peer-level analyses that focal firms are inclined to select peers with high pay but low performance for benchmarking purposes.

By construction, the average CEO pay of the most opportunistically selected dual-role peers is significantly higher than that of the least opportunistically selected ones by $7.17 million ($9.81 million vs. $2.64 million). Similarly, the difference in the CEO pay of the two categories for compensation peers is $8.35 million ($11.00 million vs. $2.65 million). As the pay level is not a key consideration for performance peers, there is a negative difference (-$1.74 million) for the most vs. least opportunistically selected group. With respect to expected stock performance, the mean STOCKPERF of the most opportunistically selected dual-role (performance) peers is -6.19% (-5.74%), significantly lower than 25.16% (22.55%) for the least opportunistically selected ones. In contrast, the difference in the mean STOCKPERF is much smaller for compensation peers (8.86% vs. 7.16%). In sum, the univariate comparisons indicate the validity of the peer classifications for the construction of the PSI.

3.3.2 Focal-firm-level regression specifications

We employ the following regression to test the impact of discretionary peer selection (captured by PSI) on realized CEO compensation as hypothesized in H1.

$$\begin{aligned}\mathrm{CEOCOMP\_FF_{i,t}} = \mathrm{f}(&\mathrm{PSI_{i,t}}, \mathrm{RET\_FF_{i,t}}, \mathrm{RET\_FF_{i,t-1}}, \mathrm{ROA_{i,t}}, \mathrm{ROA_{i,t-1}},\\ &\mathrm{SIZE_{i,t-1}}, \mathrm{MTB_{i,t-1}}, \mathrm{LEV_{i,t-1}},\\ &\mathrm{CEORET_{i,t-1}}, \mathrm{CEOMVE_{i,t-1}}, \mathrm{LNTENURE_{i,t}})\end{aligned} \tag{3}$$

The dependent variable CEOCOMP_FF is the natural log of focal firms' total CEO pay. The independent variable of interest is the peer selection index PSI. Based on the notion established earlier that a higher PSI is indicative of a greater degree of managerial opportunism, we expect the coefficient on PSI to be positive if focal firms indeed inflate CEO compensation through opportunistic selection of peers with high pay but low performance. After controlling for economic factors that determine CEO pay (as specified below), the coefficient on PSI can be interpreted as the effect of discretionary peer selected on excess compensation.[14]

We follow prior literature (e.g., Core, Guay, and Larcker, 2008) and include a set of controls for economic determinants of executive pay. These variables are RET_FF (current-year and one-year lagged annual stock returns of the focal firm), ROA (current-year and one-

[14] This is equivalent to the two-step approach of estimating the effect of PSI on excess pay. In the first step, regress CEOCOMP on the set of economic determinants of CEO pay. The residual is the excess component of total pay. In the second step, regress the residual on PSI without controlling for the economic determinants of CEO pay.

year lagged ROA of the focal firm), SIZE (natural logarithm of the focal firm's total assets), MTB (the focal firm's market-to-book ratio), LNTENURE (natural logarithm of the number of years since the CEO of the focal firm takes on the position), and LEV (the focal firm's leverage ratio). As before, we control for CEO talents by including CEORET and CEOMVE. Moreover, we control for industry and year fixed effects, with clustered standard errors by focal firm.

To test whether the biased peer composition adversely affects the focal firms' future performance, we employ the regression below.

$$\text{RET\_FF}_{i,t+1} = f(\text{PSI}_{i,t}, \text{SIZE}_{i,t-1}, \text{MTB}_{i,t-1}, \text{LEV}_{i,t-1}, \text{RETVOL}_{i,t}) \quad (4)$$

The dependent variable, $\text{RET\_FF}_{t+1,}$ is the focal firm's one-year ahead stock returns. If the peer selection behavior is driven by management opportunism that benefits executives at the expense of shareholders' interests, we predict a negative coefficient on PSI in Eq.(4). We control for SIZE (natural logarithm of the focal firm's total assets), MTB (the focal firm's market-to-book ratio), LEV (the focal firm's leverage ratio), and RETVOL (standard deviation of monthly stock returns of the focal firm during the year). We also include firm and year fixed effects, and use standard errors corrected for clustering by focal firm.

3.3.3 Results of focal-firm level regressions

Panel A of Table 4 provides the descriptive statistics on the variables used for the focal-firm-level analyses. For a given focal firm, the median of its CEO pay is 8.889 (equivalent to $7.25 million), and the median of its annual stock returns in the subsequent year is 6.60%. The peer selection index PSI has the median of 0.385, suggesting that the median focal firm employ 38.5% more of the most opportunistically selected peers than the least opportunistically selected ones.

Panel B of Table 4 shows that in the regression of focal firms' CEO pay, the coefficient on PSI is significantly positive (0.146, t = 2.55). The result suggests that holding the economic determinants constant, the greater extent of focal firms' discretionary peer selection results in higher excess compensation paid to their CEOs. In terms of control variables, CEO compensation is higher in larger firms, more profitable firms, firms with higher growth opportunity, CEOs with better talent, and longer tenure. Moreover, as presented in Panel C of Table 5, the regression result shows that PSI has a significantly negative association with one-year ahead stock returns (-0.095, t = -2.37), suggesting that more severe opportunistic peer selection results in worse ex-post performance in the subsequent year. Hence, the overall findings are consistent with the expectations from H1.

[Table 4]

3.4 Impact of CEO Power on Opportunistic Peer Selection

If the discretionary peer selection behavior is indeed due to executives' self-serving behavior, it will be more likely to occur in firms whose CEOs have greater power in corporate decision-making, including the pay-setting process. In setting executive compensation, compensation committees (typically with the assistance of compensation consultants) design and draft pay package plans, which are then approved by the boards (Jensen, Murphy, and Wruck, 2004). Bebchuk, Fried, and Walker (2002) and Bebchuk and Fried (2003) argue that CEOs could have the opportunity to intervene the process of the boards' compensation decision to benefit themselves from excess compensation. Prior studies have documented that a CEO is more powerful when the corporate governance is weaker (Morse, Nanda, and Seru, 2011; Abernethy, Kuang, and Qin, 2015; Van Essen, Otten, and Carberry, 2015). Specifically, a CEO is shown to be more powerful when the he/she takes the dual-role of CEO and chairman of the board, has longer tenure, and serves on more board committees; when the board has a larger size, fewer independent directors, more busy directors, and more directors hired after the CEO; and when the firm has lower block holder and institutional ownership. Under such circumstances, we expect executives to be more likely to engage in opportunistic peer selection for their own benefits at the expense of shareholders.

To test whether CEO power exacerbates discretionary peer selection behavior, we employ the following regression model at the focal firm level.

$$\mathrm{PSI}_{i,t} = \mathrm{f}(\mathrm{POWER}_{i,t-1}, \mathrm{RET\_FF}_{i,t-1}, \mathrm{ROA}_{i,t-1}, \mathrm{BUSSEG}_{i,t-1}, \mathrm{GEOSEG}_{i,t-1}, \mathrm{CONSULTANT}_{i,t-1},) \quad (5)$$

The dependent variable PSI is the peer selection index. The independent variable of interest is lagged POWER, the composite index based on the proxies for CEO characteristics, board structure, and external ownership. The nine proxies of CEO power include: DUALITY is equal to 1 if the CEO of the focal firm serves as the chairman of the board, and 0 otherwise; TENURE is the number of years since the CEO takes on the position; COMMITTEE is number of board committees[15] on which the CEO is serving; BOARDSIZE is the number of directors on the board; INDEP is the percentage of independent directors on the board; OUTBOARD is the number of outside boards on which the directors are serving; HIRED_DIR is the percentage

[15] These committees include including nominating committee, compensation committee, audit committee, and corporate governance committee.

of directors hired after the CEO; BLOCKOWN is the percentage of shares owned by outside block holders (with the ownership of 5% or more); and INSTOWN is the percentage of shares owned by institutional investors. Each proxy is then partitioned into the group of strong (with a value of one) vs. weak (with a value of zero) CEO power. Hence, POWER is the summation of the categorical values of these proxies,[16] with the index values winsorized to range from two to seven.[17] If the peer selection is driven by management opportunism, we expect the coefficient on POWER to be positive.

As before, we control for other focal-firm-level determinants of peer composition by including RET_FF (the focal firms' annual stock returns), ROA (the focal firm's return on assets), CONSULTANT (an indicator for if the focal firm hires compensation consultants), BUSSEG and GEOSEG (natural logarithm of the focal firm's number of business and geographical segments, respectively). We also include industry and year fixed effects in the regression, with standard errors corrected for clustering by focal firm.

Panel A of Table 5 report the descriptive statistics on the CEO power proxies. 65.6% of the focal firms' CEOs serve as the chairman of the board. The CEOs take on the position for a median of six years. The mean number of board committees in which the CEO is serving on is 0.201.The median board size is 10 directors, and the median percentage of independent directors on the board is 84.6%. The directors serve on a median of nine outside boards. The median percentage of directors hired after the CEO is 40.0%. The median share ownership of blockholders and institutional investors are 11.9% and 72.7%, respectively. The composite POWER index based on the above nine proxies (winsorized to range from two to seven) has a mean of 4.269.

Panel B of Table 5 presents the results when regressing PSI on the CEO power. As expected, the coefficient on POWER is significantly positive (0.028, t = 3.81), suggesting that focal firms with stronger CEO power have stronger incentive and capacity to select peer firms to their own benefits. It is worth noting that the coefficient on CONSULTANT is significantly positive (0.134, t = 2.76). This is consistent with the findings from Waxman (2007) and Murphy and Sandino (2010) regarding the cross-selling conflict of interests faced by compensation consultants. Specifically, compensation consultants may provide biased pay advice to facilitate

[16] We also follow Abernethy, Kuang, and Qin (2015) to use the principal component factor score obtained from factor analysis as an alternative way of constructing CEO power measure. The main results remain unchanged.
[17] We winsorize the POWER index value, because very few observations lie at the two extremes. On one extreme, there are 10 (0.76%) and 63 (4.81%) observations with POWER = 0 and 1, respectively. On the other extreme, there are 35 (2.67%) and 5 (0.31%) observations with POWER = 8 and 9, respectively. The results are qualitatively similar when the POWER index is not winsorized.

excess compensation paid to top executives in order to secure more profitable non-compensation services from the client firms.[18]

[Table 5]

In sum, our analyses in Section 3 first show that dual-role peers tend to have lower pay-for-performance sensitivity. We then provide supportive evidence on H1 that focal firms can indeed succeed in selecting the dual-role peers to their own benefits, which results in higher CEO excess pay and lower future stock performance. Thus, our evidence is consistent with managerial self-serving behavior. Moreover, we construct a novel index, peer selection index (PSI), that captures the degree of managerial opportunism and provides additional insight on how focal firms select desirable peers to achieve high CEO pay and yet low expected performance.

4. Additional Analyses

4.1 Intertemporal Change in Peer Composition

To gain further insight on firms' peer selection process, we next investigate whether focal firms opportunistically add or drop peers over time. We identify the following cases of intertemporal changes in peer compositions: 1) 670 added and 576 dropped dual-role peers; 2) 1,011 added and 929 dropped compensation peers; and 3) 374 added and 290 dropped performance peers. Panel A of Table 6 reports the Logit regressions of the probability of peers being added vs. dropped. In the regression reported in Column 1, the dependent variable, DUAL_PEER_CHG, is equal to one if the focal firm adds a dual-role peer, and zero if the focal firm drops a dual-role peer. The coefficient on STOCKPERF is significantly negative (-0.542, t = -2.41), suggesting that the added peers have lower expected stock performance than the dropped ones. Nonetheless, the coefficient on CEOCOMP is not significant. For the addition vs. dropping of compensation peers shown in Column 2, the coefficient on neither CEOCOMP nor STOCKPERF is statistically significant. In Column 3, the Logit regression of added vs. dropped performance peers shows a significantly negative coefficient on STOCKPERF (-0.692, t = -2.64). Overall, the results suggest that focal firms tend to alter dual-role peers and performance peers opportunistically to lower the performance target in setting executives' performance-based pay.

[18] In contrast, Cadman, Carter, and Hillegeist (2010) find no evidence of higher CEO pay or lower pay-for-performance sensitivity for the firms with conflicted compensation consultants.

We continue to test whether such opportunistic change in peer composition is related to CEO power. Following similar approach of constructing PSI, we compute the peer change index (PCI) for 187 focal firms with 520 peers added and 200 focal firms with 530 peers dropped. Specifically, we measure PCI by summing up the following three differences and then divide by the total number of newly added or dropped peers for each focal firm: 1) difference between the number of newly added or dropped dual-role peers with high CEOCOMP and low STOCKPERF and that with low CEOCOMP and high STOCKPERF; 2) difference between the number of newly added or dropped compensation peers with high CEOCOMP and that with low CEOCOMP; and 3) difference between the number of newly added or dropped performance peers with low STOCKPERF and that with high STOCKPERF. Similar to PSI, the change index PCI intends to capture the degree of opportunism when firms change their peers, with a higher PCI indicating a greater likelihood that the peers are added or dropped in a manner consistent with managerial self-serving. As shown in Panel B of Table 6, the coefficient on POWER is significantly positive (0.036, t = 2.28) in the regression of PCI.[19] This evidence confirms that opportunistic peer selection is more salient when the CEOs have more power to influence pay setting process.

[Table 6]

4.2 Decomposition of PSI

In this subsection, we repeat the focal-firm-level analyses by decomposing the peer selection index into the three components: PSI_DUAL for dual-role peers, PSI_COMP for compensation peers, and PSI_PERF for performance peers. In Panel A of Table 7, we replace PSI with the sub-indices in the regressions of realized CEO pay and one-year-ahead stock performance (as in Panels B and C of Tables 4). Column 1 shows significantly positive coefficients on both PSI_DUAL (0.229, t = 3.29) and PSI_COMP (0.169, t = 2.18) in the regression of CEOCOMP_FF. However, the coefficients on PSI_PERF are insignificant in both regressions. The results show that the inflated CEO compensation is generally due to opportunistic selection of the peer group for compensation benchmarking purpose. Regarding the regression of one-year-ahead stock returns shown in Column 2, the coefficient on PSI_DUAL is significantly negative (-0.116, t = -2.30). In addition, the coefficient on PSI_PERF is negative and significant at the 10% level in the one-tailed test (although insignificant in the two-tailed test). Hence, the negative impact of opportunistic peer selection

[19] Untabulated result suggests that the positive association between peer changes and CEO power is stronger for the focal firms experiencing the addition of peers.

on the subsequent stock performance is mostly related to the peer group for performance benchmarking, because these peers are directly used to evaluate managerial performance. Panel B of Table 7 shows the effects of CEO power on the three sub-indices. The coefficient on POWER is significantly positive (0.017, t = 2.67) in the regression of PSI_DUAL, but not in the regressions of PSI_COMP and PSI_PERF. The result suggests that strong CEO power exacerbates opportunistic selection of dual-role peers.

[Table 7]

4.3 Alternative Definition of Peer Selection Index

In the construction of PSI for the main analyses, we classify peers into 2x2 matrix of CEOCOMP and STOCKPERF based on annual sample median, and count the relative number of the most vs. least opportunistically selected peers. Alternatively, we construct the peer selection index in the following way. First, for each peer, we calculate a ranking score as the average of the annual percentile ranks of CEOCOMP and inversed STOCKPERF (because higher CEO pay and lower expected performance are considered more opportunistic selection). Second, for each focal firm, we obtain the alternative peer selection index (PSI_ALT) by taking the mean of the peer-level ranking scores across all peers. Hence, a higher PSI_ALT indicates a greater extent of opportunistic selection averaged over peers for a focal firm, but ignores the distribution of peers that are more or less opportunistically selected (as indicated by the original PSI).

We replace PSI with PSI_ALT and repeat the focal-firm-level analyses. As shown in Table 8, the main results remain unchanged. Specifically, the coefficient on PSI_ALT is significantly positive (0.836, t = 3.34) in the regression of focal firms' CEO compensation and significantly negative (-0.423, t = -2.59) in the regression of focal firms' one-year ahead stock returns. The results are consistent with the main findings that opportunistic peer selection leads to higher excess CEO pay and worse future performance. In addition, the regression of PSI_ALT in Panel B shows a significantly positive coefficient on POWER (0.010, t = 5.43), suggesting that stronger CEO power is associated with more severe opportunistic peer selection.

[Table 8]

4.4 Focal Firms Employing Compensation Benchmark Only

Earlier studies suggest that firms may implicitly employ performance benchmarking prior to 2006 when no disclosure of explicit use of benchmarking was required (e.g.,

Albuquerque, 2009). In this additional analysis, we test the possibility that the peer group of compensation benchmark is *implicitly* used for performance benchmark when the firms do not disclose the explicit use of performance benchmarking peers. In the sample for main analyses, we exclude 4,293 focal-firm-years (55,528 peer-years) using compensation benchmark only.[20] Based on this sample of firms, we run the Logit regression of the probability of being selected as a compensation peer (with the base group being the randomly-selected non-peers) on CEOCOMP and STOCKPERF. The results presented in Table 8 show that the coefficient on CEOCOMP is significantly positive (0.635, t = 59.12) and the coefficient on STOCKPERF is significantly negative (-0.190, t = -6.33). Moreover, the magnitude of the negative coefficient on STOCKPERF for compensation peers in this subsample (-0.190) is similar to that for compensation peers (-0.121) in the main sample, and smaller than that for dual-role peers (-0.277) or performance peers (-0.466) in the main sample (as reported in Panel C of Table 2). These findings suggest that for the firms with compensation benchmarking only, their peers are employed more like compensation peers and not for the implicit use as dual-role peers.

[Table 9]

5. Conclusions

Based on the compensation disclosure mandated by the SEC's new rule in 2006, we investigate empirically the peer selection practices for dual benchmarks in executive pay design. Using compensation benchmarking, firms aim at targeting total CEO pay at the competitive labor market level in order to attract and retain talent. Based on performance benchmarking in relative performance evaluation, firms set performance targets against peer groups in determining performance-based incentive awards.

Prior studies imply that firms with self-serving incentives will avoid using the same peers for both compensation and performance benchmarks (i.e., dual-role peers). On the one hand, the dual-role peers with high CEO pay level have to justify their pay by delivering superior performance, thus increasing the difficulty for focal firms' executives to exceed heightened performance target to earn performance-based pay. On the other hand, the dual-role peers with poor performance may be associated with lower CEO pay, resulting in lower target level of total compensation for focal firms. In this study, we provide new statistics showing that dual-role peers represent a large portion of peer composition and they tend to have lower pay-for-performance sensitivity. This phenomenon has not been documented before. Thus, it

[20] We do not conduct the separate analysis on the focal firms using performance benchmark only, because of a considerably small number of such firms.

motivates us to study firms' incentives in selecting such dual-role peers and the resulting consequences, which remain unexplored in the literature.

We document that, after considering similarities in firm and executive characteristics, firms can succeed in selecting dual-role peers with high total pay level but poor expected performance. We then propose a peer section index that captures the degree of managerial opportunism in peer selection. Using this index, we find that firms' discretionary peer selection behavior leads to higher realized excess CEO pay and poor ex-post firm performance. Furthermore, we find that powerful CEOs exacerbate the opportunistic peer selection process to inflate their pay. Our results are robust to intertemporal changes in peer composition, and decomposition and alternative definitions of peer selection index. Supplementary analysis also shows that firms employing solely compensation benchmarking do not implicitly use compensation peers for performance benchmarking purpose. Overall, our study provides further evidence on managerial self-serving incentives in compensation contracting, and suggests the importance of considering the role of dual-role peers in further research on the use of benchmarks in executive compensation.

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Appendix A: An Example of the Disclosure on Peer Composition

The following disclosure is excerpted from the CD&A section of the proxy statement filed by CenturyLink Inc. (Ticker: CTL.NYSE) on April 5, 2016.

IV. Our Policies, Processes and Guidelines Related to Executive Compensation
Use of "Benchmarking" Data

Compensation Benchmarking. The Committee, based on input from its compensation consultant, adopted the following two peer groups in support of pay decisions for our senior officers in 2015 in order to benchmark compensation levels for our executives against individuals who work in similarly-situated positions at companies that are comparable to ours based on revenue size, market cap, industry and business model:

Core Peer Group for Compensation Benchmarking

Cablevision Systems Corporation	Level 3 Communications, Inc.
Charter Communications, Inc.	Liberty Global PLC
CISCO Systems Inc.	Motorola Solutions, Inc.
Comcast Corporation	QUALCOMM Incorporated
Computer Sciences Corporation	Sprint Corporation
DIRECTV	Time Warner Cable Inc.
DISH Network Corporation	Windstream Holdings, Inc.

General Industry Peer Group for Compensation Benchmarking

Altria Group Inc.	Goodyear Tire & Rubber Co.
Arrow Electronics Inc.	Jabil Circuit Inc.
Bristol-Myers Squibb Co.	Kimberley-Clark Corp.
Colgate-Palmolive Co	Lear Corp.
Congra Foods Inc.	Nucor Corp.
Cummins Inc.	Southern Co.
Danaher Corp.	Union Pacific Corp.
Ebay Inc.	United States Steel Corp.
Freeport-McMoran	Whirlpool Corp.
General Mills Inc.	XEROX Corp.

Performance Benchmarking. With the aid of its compensation consultant, the Committee reviewed in 2015 the broad industry peer group that it introduced in 2013 for purposes of benchmarking our relative performance based upon our historical three-year total shareholder return. This peer group is focused principally on telecommunications, cable and other communications companies that are generally comparable to us in terms of size, markets and operations.

TSR Peer Group for Performance Benchmarking

AT&T, Inc.	JDS Uniphase Corporation
Cablevision Systems Corporation*	Level 3 Communications, Inc.*
Ciena Corporation	Liberty Global plc*
Cincinnati Bell Inc.	Motorola Solutions, Inc.*
Cogent Communications Holdings, Inc.	Rackspace Hosting, Inc.
Comcast Corporation*	Sirius XM Holdings Inc.
Consolidated Communications Holdings Inc.	Spok Holdings, Inc.
Crown Castle International Corp.	Sprint Corporation*
Dish Network Corp.*	Telephone & Data Systems Inc.
Finisar Corp.	United States Cellular Corporation
Frontier Communications Corporation	Verizon Communications Inc.
General Communication Inc.	Viacom, Inc.
IDT Corporation	Windstream Holdings, Inc.*

* Also included in the Committee's above-listed Core Peer Group used for 2015 compensation benchmarking.

Appendix B: Variable Definitions

Peers' benchmark types:

DUAL_PEER	=	1 if the peer is used for both compensation and performance benchmarks, and 0 otherwise.
COMP_PEER	=	1 if the peer is used only for compensation benchmark, and 0 otherwise.
PERF_PEER	=	1 if the peer is used only for performance benchmark, and 0 otherwise.
ALL_PEER	=	1 if the firm is selected as a peer for benchmarks, and 0 for the control sample of randomly selected non-peers that are not used for benchmarks.

Determinants of peer selection:

CEOCOMP	=	Natural logarithm of the peer's total CEO compensation.
STOCKPERF	=	The peer's expected stock performance, equal to one-year target price divided by prevailing stock price at the beginning of the year.
SAME_SIC2	=	1 if the focal firm and its peer operate in the same two-digit SIC industry, and 0 otherwise.
SAME_SIC3	=	1 if the focal firm and its peer operate in the same three-digit SIC industry, and 0 otherwise.
SAME_SPINDEX	=	1 if the focal firm and its peer are in the same S&P sub-index (S&P 500, S&P Mid-cap 400, and S&P Small-cap 600), and 0 otherwise.
|DIFF_TA|	=	Absolute value of the difference in total assets between the focal firm and its peer.
|DIFF_MTB|	=	Absolute value of the difference in market-to-book ratio between the focal firm and its peer.
SAME_BUSSEG	=	1 if both the focal firm and its peer have single business segment or both have multiple business segments, and 0 otherwise.
SAME_GEOSEG	=	1 if both the focal firm and its peer have single geographical segment or both have multiple geographical segments, and 0 otherwise.
SAME_RATING	=	1 if the focal firm and its peer have the same credit rating, and 0 otherwise.
CORR_RET	=	Pearson correlation of annual stock returns between the focal firm and its peer in the recent five years.
|DIFF_CEORET|	=	Absolute value of the difference in median annual stock returns (relative to S&P 500 index returns) in the recent three years achieved by the CEO of the focal firm and the CEO of the peer.
|DIFF_CEOMVE|	=	Absolute value of the difference in median market value of equity in the recent three years for the CEO of the focal firm and the CEO of the peer.
SAME_DUALITY	=	1 if both the CEO of the focal firm and the CEO of the peer serve as chairman of their respective board, or neither one serves as chairman of the board, and 0 otherwise.
TALENT_FLOW	=	1 if at least one of the top five executives moves between the focal firm and its peer in any previous year up until the current year end, and 0 otherwise.

SALE_ADJ = The peer's sales adjusted by industry median.

MVE_ADJ = The peer's market value of equity adjusted by industry median.

Peers' pay-for-performance sensitivity:

PPS_PEER = Mean pay-for-performance sensitivity of dual-role peers, compensation peers, and performance peers. Pay-for-performance sensitivity is estimated from firm-specific time-series regression of change in natural logarithm of total CEO compensation on change in annual stock returns (with at least 12 observations).

Focal firms' peer selection index:

PSI = Peer selection index, computed as the summation of the three differences: 1) between the number of dual-role peers with high CEOCOMP and low STOCKPERF and the number of those with low CEOCOMP and high STOCKPERF, 2) between the number of compensation peers with high CEOCOMP and the number of those with low CEOCOMP, and 3) between the number of performance peers with low STOCKPERF and the number of those with high STOCKPERF, then all divided by the total number of peers for each focal firm.

Variables for focal-firm-level analyses:

CEOCOMP_FF = Natural logarithm of the focal firm's total CEO compensation.

RET_FF = Focal firm's annual stock returns.

ROA = Focal firm's return on assets.

SIZE = Natural logarithm of the focal firm's total assets.

MTB = Focal firm's market-to-book ratio.

LEV = Focal firm's leverage ratio.

CEORET = Median annual stock returns (relative to S&P 500 index returns) in the recent three years achieved by the CEO of the focal firm.

CEOMVE = Median market value of equity in the recent three years for the CEO of the focal firm.

LNTENURE = Natural logarithm of the number of years since the CEO of the focal firm takes on the position.

RETVOL = Standard deviation of monthly stock returns of the focal firm during the year.

BUSSEG = Natural logarithm of the focal firm's number of business segments.

GEOSEG = Natural logarithm of the focal firm's number of geographical segments.

CONSULTANT = 1 if the focal firm hires compensation consultant, and 0 otherwise.

Focal firms' CEO power proxies:

DUALITY = 1 if the CEO of the focal firm serves as the chairman of the board, and 0 otherwise.

TENURE = Number of years since the CEO takes on the position.

COMMITTEE = Number of board committees (including nominating committee, compensation committee, audit committee, and corporate governance committee) on which the CEO is serving.

BOARDSIZE = Number of directors on the board.

INDEP = Percentage of independent directors on the board.

OUTBOARD = Number of outside boards on which the directors are serving.

HIRED_DIR = Percentage of directors hired after the CEO.

BLOCKOWN = Percentage of shares owned by outside blockholders (with the share ownership higher than 5%).

INSTOWN = Percentage of shares owned by institutional investors.

POWER = Composite index of CEO power based on the nine proxies including DUALITY, TENURE, COMMITTEE, BOARDSIZE, INDEP, OUTBOARD, HIRED_DIR, BLOCKOWN, and INSTOWN, by partitioning focal firms by each proxy into strong (with a value of one) vs. weak (with a value of zero) CEO power group, and then summing up the values of the nine proxies, with the index values winsorized to range from two to seven.

Variables for additional analyses:

DUAL_PEER_CHG = 1 for if the firm added a dual-role peers, and 0 if the firm dropped a dual-role peer.

COMP_PEER_CHG = 1 for if the firm newly added a compensation peer, and 0 for if the firm newly dropped a compensation peer.

PERF_PEER_CHG 1 for if the firm newly added a performance peer, and 0 for if the firm newly dropped a performance peer.

PCI = Peer change index, computed as the summation of the following three differences divided by the total number of peers newly added or dropped for each focal firm: 1) between the number of newly added or dropped dual-role peers with high CEOCOMP and low STOCKPERF and the number of those with low CEOCOMP and high STOCKPERF, 2) between the number of newly added or dropped compensation peers with high CEOCOMP and the number of those with low CEOCOMP, and 3) between the number of newly added or dropped performance peers with low STOCKPERF and the number of those with high STOCKPERF.

PSI_DUAL = Difference between the number of dual-role peers with high CEOCOMP and low STOCKPERF and that with low CEOCOMP and high STOCKPERF, divided by the total number of peers for each focal firm.

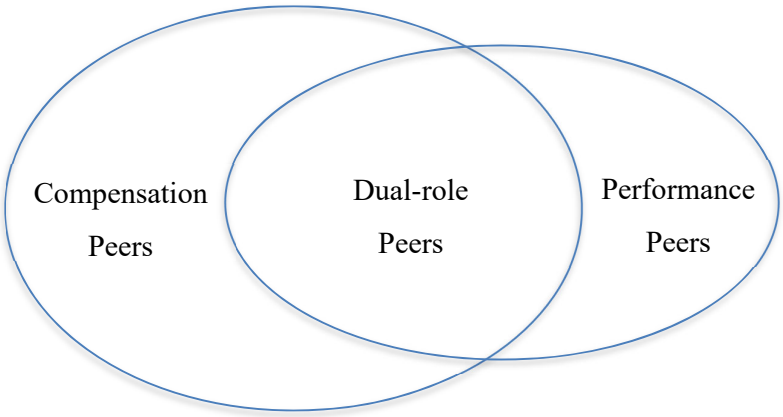
PSI_COMP = Difference between the number of compensation benchmarking peers with high CEOCOMP and that with low CEOCOMP, divided by the total number of peers for each focal firm.

PSI_PERF = Difference between the number of performance benchmarking peers with low STOCKPERF and that with high STOCKPERF, divided by the total number of peers for each focal firm.

PSI_ALT	=	Alternative definition of PSI, calculated as the average of the annual percentile ranks of CEOCOMP and inversed STOCKPERF for each peer and take the mean across all peers for the focal firm.

Appendix B: Construction of Peer Selection Index (PSI)

(a) Peers by benchmark types for a focal firm



(b) Partition of peers by total CEO compensation and expected stock performance

Dual-role Peers:

		STOCKPERF	
		High	Low
CEOCOMP	High	HH	HL
	Low	LH	LL

PSI_DUAL = (HL – LH) / NUM_PEER

Compensation Peers:

		STOCKPERF	
		High	Low
CEOCOMP	High	HH	HL
	Low	LH	LL

PSI_COMP = [(HH + HL) – (LH + LL)] / NUM_PEER

Performance Peers:

		STOCKPERF	
		High	Low
CEOCOMP	High	HH	HL
	Low	LH	LL

PSI_PERF = [(HL + LL) – (HH + LH)] / NUM_PEER

(c) Computation of PSI

PSI = PSI_DUAL + PSI_COMP + PSI_PERF

Note: NUM_PEER is the total number of peers for each focal firm.

(d) The Most vs. Least Opportunistically Selected Peers by Benchmarking Types

Variable	DUAL_PEER			COMP_PEER			PERF_PEER		
	Most opportunistic (N=4,612)	Least opportunistic (N=1,102)	Difference	Most opportunistic (N=4,884)	Least opportunistic (N=1,001)	Difference	Most opportunistic (N=1,654)	Least opportunistic (N=1,199)	Difference
Average number of peers per focal firm:									
Number of peers	4.13	1.91	2.22	7.69	2.94	4.75	4.07	3.07	1.00
Percent of all peers	30.29%	14.66%	15.63%	40.80%	15.47%	25.33%	17.69%	15.30%	2.39%
Percent of peers within the group	44.07%	20.93%	23.14%	85.20%	36.16%	49.04%	64.30%	58.81%	5.49%
Peers' total CEO compensation:									
Raw $CEOCOMP_{t-1}$ (in thousands)	9,806	2,635	7,171	11,000	2,653	8,347	6,027	7,765	-1,738
$CEOCOMP_{t-1}$	9.044	7.775	1.269	9.156	7.780	1.376	8.389	8.578	-0.189
Peers' expected Stock Performance:									
$STOCKPERF_t$	-6.193%	25.160%	-31.353%	8.857%	7.160%	1.697%###	-5.735%	22.554%	-28.289%

All variables are defined in Appendix B. The mean figures are reported in the above table. The results of the test of differences are similar for the median figures. ### represents significance at the level of 5%. All other figures of the differences in mean are significant at the 1% level.

Table 1: Sample Selection

This table reports the selection process of sample firms (focal firms and self-selected peers) for the main analyses.

	Number of peer-years	Number of focal-firm-years
Initial Sample: Focal firms and self-selected peers with available data during 2006-2015	76,629	5,666 (854 focal firms)
Exclude:		
Focal firms using compensation benchmark only	55,528	4,293 (766 focal firms)
Focal firms using performance benchmark only	781	62 (24 focal firms)
Final Sample	20,320	1,311 (309 focal firms)

Table 2: Selection of Peers with the Desired Pay-Performance Mix

This table reports the peer-level analyses regarding focal firms' selection of favorable peers with high pay level but low expected performance. Panel A presents the descriptive statistics. Panel B shows the univariate analyses by types of benchmarking peers (i.e., dual-role peers, compensation peers, and performance peers) and report the mean figures. Panel C reports the results of the multinomial Logit regression of the probabilities of firms being selected as dual-role peers, compensation peers, and performance peers. The base group is the random sample of non-peers. Z-statistics are presented in parentheses. All variables are defined in Appendix B. ***, **, and * represent significance at the levels of 1%, 5%, and 10%, respectively.

Panel A: Descriptive statistics on peer-level variables (N = 20,320)

Variable	Mean	Std. Dev.	25%	Median	75%
Number of peers	15.500	9.836	10	13	18
Peers' total CEO compensation:					
Raw $CEOCOMP_{t-1}$ (in thousands)	8,453	7,095	3,930	6,852	11,016
$CEOCOMP_{t-1}$	8.757	0.780	8.276	8.832	9.307
Peers' expected stock performance:					
$STOCKPERF_t$	7.470%	23.579%	-0.712%	8.540%	18.343%
Similarities in firm characteristics:					
$SAME\_SIC2_{t-1}$	0.685	0.464	0	1	1
$SAME\_SIC3_{t-1}$	0.450	0.498	0	0	1
$SAME\_SPINDEX_{t-1}$	0.522	0.500	0	1	1
$\|DIFF\_TA\|_{t-1}$ (in billions)	33.081	95.913	2.202	6.645	21.958
$\|DIFF\_MTB\|_{t-1}$	2.651	7.095	0.332	0.813	1.946
$SAME\_BUSSEG_{t-1}$	0.742	0.437	0	1	1
$SAME\_GEOSEG_{t-1}$	0.807	0.395	1	1	1
$SAME\_RATING_{t-1}$	0.131	0.338	0	0	0
$CORR\_RET_{t-1}$	0.408	0.477	0.116	0.546	0.798
Similarities in executives' ability and responsibility:					
$\|DIFF\_CEORET\|_{t-1}$	0.202	0.188	0.068	0.150	0.277
$\|DIFF\_CEOMVE\|_{t-1}$ (in billions)	15.823	30.217	1.625	4.714	14.170
$SAME\_DUALITY_{t-1}$	0.593	0.491	0	1	1
$TALENT\_FLOW_{t-1}$	0.009	0.092	0	0	0
Symbolism:					
$SALE\_ADJ_{t-1}$ (in billions)	10.894	19.934	0.239	3.293	11.318
MVE_ADJ_{t-1} (in billions)	17.532	34.842	0.362	4.932	17.144

Panel B: Univariate analyses by benchmark types (N = 20,320)

Variable	DUAL_PEER (1)	COMP_PEER (2)	PERF_PEER (3)	Test of differences		
				(1) – (2)	(1) – (3)	(2) – (3)
Aggregate number of peers	11,582 (57.0%)	5,885 (29.0%)	2,853 (14.0%)			
Number of peers for each focal firm	9.141	8.863	5.811	0.278$^{\#}$	3.330	3.052
Percent of peers for each focal firm	68.480%	46.943%	26.813%	21.537%	41.667%	20.130%
Peers' total CEO compensation:						
Raw $CEOCOMP_{t-1}$ (in thousands)	8,298	9,580	6,758	-1,282	1,540	2,822
$CEOCOMP_{t-1}$	8.744	8.922	8.468	-0.178	0.276	0.454
Peers' expected stock performance:						
$STOCKPERF_t$	7.236%	8.569%	6.154%	-1.333%	1.082%$^{\#\#\#}$	2.415%
Similarities in firm characteristics:						
$SAME\_SIC2_{t-1}$	0.791	0.410	0.823	0.381	-0.032	-0.413
$SAME\_SIC3_{t-1}$	0.555	0.208	0.524	0.347	0.031	-0.316
$SAME\_SPINDEX_{t-1}$	0.554	0.550	0.333	0.004$^{\#}$	0.221	0.217
$\lvert DIFF\_TA\rvert_{t-1}$ (in billions)	32.096	35.569	31.944	-3.473$^{\#\#\#}$	0.152$^{\#}$	3.625$^{\#}$
$\lvert DIFF\_MTB\rvert_{t-1}$	2.215	3.611	2.438	-1.396	-0.223$^{\#\#}$	1.173
$SAME\_BUSSEG_{t-1}$	0.766	0.710	0.713	0.056	0.053	-0.003$^{\#}$
$SAME\_GEOSEG_{t-1}$	0.843	0.740	0.798	0.103	0.045	-0.058
$SAME\_RATING_{t-1}$	0.140	0.124	0.112	0.016	0.028	0.012$^{\#}$
$CORR\_RET_{t-1}$	0.427	0.371	0.407	0.056	0.020$^{\#\#\#}$	-0.036
Similarities in executives' ability and responsibility:						
$\lvert DIFF\_CEORET\rvert_{t-1}$	0.197	0.219	0.185	-0.022	0.012	0.034
$\lvert DIFF\_CEOMVE\rvert_{t-1}$ (in billions)	13.741	20.310	15.020	-6.569	-1.279$^{\#\#\#}$	5.290
$SAME\_DUALITY_{t-1}$	0.598	0.597	0.566	0.001#	0.032	0.031
$TALENT\_FLOW_{t-1}$	0.011	0.006	0.004	0.005	0.007	0.002$^{\#\#}$
Symbolism:						
$SALE\_ADJ_{t-1}$ (in billions)	9.767	15.002	6.996	-5.235	2.771	8.006
MVE_ADJ_{t-1} (in billions)	16.531	23.381	9.532	-6.850	6.999	13.849

Panel C: Peer-level multivariate analyses on peer selection

Variable	Logit Regression	Multinomial Logit Regression		
	ALL_PEER_t	$DUAL\_PEER_t$	$COMP\_PEER_t$	$PERF\_PEER_t$
	(1)	(2)	(3)	(4)
Peers' total CEO compensation and expected stock performance:				
$CEOCOMP_{t-1}$	0.685***	0.716***	0.764***	0.341***
	(31.10)	(27.13)	(29.44)	(9.99)
$STOCKPERF_t$	-0.225***	-0.277***	-0.121*	-0.466***
	(-3.59)	(-3.70)	(-1.66)	(-4.46)
Similarities in firm characteristics:				
$SAME\_SIC2_{t-1}$	3.371***	3.719***	2.632***	4.073***
	(61.01)	(61.97)	(42.43)	(53.58)
$SAME\_SIC3_{t-1}$	1.294***	1.537***	0.682***	1.179***
	(16.37)	(19.01)	(7.84)	(13.54)
$SAME\_SPINDEX_{t-1}$	0.761***	0.913***	0.776***	0.113**
	(22.01)	(22.55)	(19.82)	(2.05)
$\lvert DIFF\_TA\rvert_{t-1}$	-0.003***	-0.003***	-0.003***	-0.003***
	(-15.97)	(-12.32)	(-14.45)	(-9.65)
$\lvert DIFF\_MTB\rvert_{t-1}$	0.009***	0.005**	0.012***	0.008**
	(4.98)	(2.14)	(5.83)	(2.22)
$SAME\_BUSSEG_{t-1}$	0.581***	0.769***	0.473***	0.458***
	(17.50)	(19.11)	(12.41)	(8.54)
$SAME\_GEOSEG_{t-1}$	1.173***	1.460***	1.007***	1.003***
	(34.73)	(34.44)	(25.87)	(17.36)
$SAME\_RATING_{t-1}$	0.531***	0.552***	0.527***	0.464***
	(9.39)	(8.69)	(8.46)	(5.57)
$CORR\_RET_{t-1}$	0.190***	0.238***	0.168***	0.144***
	(5.73)	(6.07)	(4.39)	(2.75)
Similarities in executives' ability and responsibility:				
$\lvert DIFF\_CEORET\rvert_{t-1}$	0.096	0.037	0.296***	-0.566***
	(1.26)	(0.40)	(3.40)	(-4.23)
$\lvert DIFF\_CEOMVE\rvert_{t-1}$	-0.016***	-0.022***	-0.015***	-0.005***
	(-20.90)	(-23.22)	(-16.97)	(-4.50)
$SAME\_DUALITY_{t-1}$	0.222***	0.243***	0.209***	0.211***
	(7.01)	(6.53)	(5.77)	(4.25)
$TALENT\_FLOW_{t-1}$	2.378***	2.646***	2.250***	1.645***
	(4.86)	(5.31)	(4.47)	(2.82)
Symbolism:				
$SALE\_ADJ_{t-1}$	0.017***	0.013***	0.017***	0.025***
	(11.91)	(7.80)	(11.45)	(10.76)
MVE_ADJ_{t-1}	0.015***	0.020***	0.015***	0.003
	(16.27)	(17.98)	(14.50)	(1.58)

Constant	-8.638***	-10.058***	-9.898***	-8.220***
	(-41.52)	(-40.26)	(-40.06)	(-24.85)
Year Dummies	Yes	Yes	Yes	Yes
N	40,640		40,640	
Pseudo R^2	52.65%		36.20%	
Test of difference in the coefficients on $CEOCOMP_{t-1}$:				
(2) vs. (3)			$\chi^2 = 3.24$; p = 0.072	
(2) vs. (4)			$\chi^2 = 146.12$; p = 0.000	
(3) vs. (4)			$\chi^2 = 146.07$; p = 0.000	
Test of difference in the coefficients on $STOCKPERF_{t-1}$:				
(2) vs. (3)			$\chi^2 = 4.41$; p = 0.036	
(2) vs. (4)			$\chi^2 = 3.87$; p = 0.049	
(3) vs. (4)			$\chi^2 = 10.67$; p = 0.001	

Table 3: Peers' Pay-for-Performance Sensitivity (Dependent Variable: PPS_PEER_t)

This table reports the results of the regression of peers' pay-for-performance sensitivity on the types of benchmarking peers (i.e., dual-role peers, compensation peers, and performance peers). All variables are defined in Appendix B. The base group is the random sample of non-peers. ***, **, and * represent significance at the levels of 1%, 5%, and 10%, respectively.

Variable	Coefficient
$DUAL\_PEER_t$	-0.091***
	(-3.12)
$COMP\_PEER_t$	-0.028
	(-0.66)
$PERF\_PEER_t$	-0.065
	(-1.34)
$SIZE_{t-1}$	-0.013
	(-1.01)
MTB_{t-1}	0.009**
	(2.22)
LEV_{t-1}	-0.007
	(-0.06)
Constant	0.154
	(0.95)
Industry-year fixed effects	Yes
N	3,457
Adj. R^2	5.08%

Table 4: Effects of PSI on Focal Firms' Realized Excess CEO Pay and Future Performance

This table reports the focal-firm-level analyses regarding the consequences of focal firms' discretionary peer selection behavior on realized CEO compensation and subsequent stock performance. Panel A presents the descriptive statistics. Panel B reports the results of regressing focal firms' CEO pay on peer selection index (PSI). Panel C reports the results of regressing focal firms' one-year ahead stock returns on peer selection index (PSI). All variables are defined in Appendix B. ***, **, and * represent significance at the levels of 1%, 5%, and 10%, respectively.

Panel A: Descriptive statistics on focal-firm-level variables (N = 1,311)

Variable	Mean	Std. Dev.	25%	Median	75%
$CEOCOMP\_FF_t$	8.863	0.651	8.411	8.889	9.340
RET_FF_{t+1}	0.083	0.323	-0.091	0.066	0.246
PSI_t	0.360	0.322	0.161	0.385	0.588
RET_FF_t	0.079	0.315	-0.095	0.071	0.240
RET_FF_{t-1}	0.109	0.343	-0.081	0.083	0.251
ROA_t	0.049	0.063	0.014	0.039	0.084
ROA_{t-1}	0.054	0.057	0.015	0.040	0.088
$SIZE_{t-1}$	9.452	1.395	8.430	9.274	10.430
MTB_{t-1}	2.855	3.540	1.341	2.030	3.159
LEV_{t-1}	0.639	0.190	0.508	0.643	0.786
$CEORET_{t-1}$	0.066	0.215	-0.056	0.040	0.177
$CEOMVE_{t-1}$	8.694	1.815	7.979	8.647	9.705
$LNTENURE_t$	1.485	0.900	0.693	1.609	2.079
$RETVOL_t$	0.078	0.044	0.048	0.067	0.096

Panel B: Focal firms' realized excess CEO pay (Dependent variable: $CEOCOMP\_FF_t$)

Variable	Coefficient
PSI_t	0.146**
	(2.55)
RET_FF_t	0.230***
	(4.51)
RET_FF_{t-1}	0.161***
	(3.55)
ROA_t	0.961***
	(3.42)
ROA_{t-1}	-0.641*
	(-1.91)
$SIZE_{t-1}$	0.326***
	(15.78)
MTB_{t-1}	0.014***
	(3.44)
LEV_{t-1}	-0.110
	(-0.78)
$CEORET_{t-1}$	0.233***
	(3.34)
$CEOMVE_{t-1}$	0.016
	(1.44)
$LNTENURE_t$	0.093***
	(4.48)
Constant	5.592***
	(26.12)
Industry-year fixed effects	Yes
N	1,311
Adj. R^2	58.48%

Panel C: Focal firms' one-year ahead stock returns (Dependent variable: RET_FF_{t+1})

Variable	Coefficient
PSI_t	-0.095**
	(-2.37)
$SIZE_{t-1}$	-0.098**
	(-2.05)
MTB_{t-1}	-0.013***
	(-3.66)
LEV_{t-1}	0.348**
	(2.18)
$RETVOL_t$	2.181***
	(6.71)
Constant	0.563
	(1.25)
Firm-year fixed effects	Yes
N	1,311
Adj. R^2	32.88%

Table 5: CEO Power and Opportunistic Peer Selection

This table reports the focal-firm-level analyses regarding the impact of focal firms' CEO power on discretionary peer selection behavior. Panel A presents the descriptive statistics. Panel B reports the results of regressing peer selection index (PSI) on the composite index of CEO power. All variables are defined in Appendix B. ***, **, and * represent significance at the levels of 1%, 5%, and 10%, respectively.

Panel A: Descriptive statistics on CEO power proxies (N = 1,311)

Variable	Mean	Std. Dev.	25%	Median	75%
$DUALITY_{t-1}$	0.656	0.475	0	1	1
$TENURE_{t-1}$	7.124	5.797	3	6	9
$COMMITTEE_{t-1}$	0.201	0.660	0	0	0
$BOARDSIZE_{t-1}$	9.471	3.812	9	10	12
$INDEP_{t-1}$	0.745	0.270	0.750	0.846	0.900
$OUTBOARD_{t-1}$	9.164	5.990	5	9	13
$HIRED\_DIR_{t-1}$	0.430	0.312	0.182	0.400	0.667
$BLOCKOWN_{t-1}$	0.142	0.124	0.052	0.119	0.219
$INSTOWN_{t-1}$	0.665	0.255	0.580	0.727	0.831
$POWER_{t-1}$	4.269	1.603	3	4	6

Panel B: Regression analysis (Dependent variable: PSI_t)

Variable	Coefficient
$POWER_{t-1}$	0.028***
	(3.81)
RET_FF_{t-1}	-0.015
	(-0.57)
ROA_{t-1}	-0.014
	(-0.07)
$BUSSEG_{t-1}$	0.012
	(1.53)
$GEOSEG_{t-1}$	0.035
	(0.98)
$CONSULTANT_{t-1}$	0.134***
	(2.76)
Constant	0.096
	(1.21)
Industry-year fixed effects	Yes
N	1,311
Adj. R^2	12.67%

Table 6: Intertemporal Changes in Peers

This table reports the time-serial analyses regarding addition or dropping of peers by focal firms. Panel A reports the results of the peer-level regression of the probability of peers being added to or dropped from the three types of benchmarking peer groups (i.e., dual-role peer group, compensation peer group, and performance peer group). Panel B reports the results of the focal-firm-level regression of peer change index (PCI) on the composite index of CEO power. All variables are defined in Appendix B. ***, **, and * represent significance at the levels of 1%, 5%, and 10%, respectively.

Panel A: Logit regression of peers added or dropped at the peer level

Variable	DUAL_PEER_CHG$_t$	COMP_PEER_CHG$_t$	PERF_PEER_CHG$_t$
CEOCOMP$_{t-1}$	-0.026	0.014	-0.023
	(-0.28)	(0.20)	(-0.20)
STOCKPERF$_t$	-0.542**	-0.202	-0.692***
	(-2.41)	(-1.43)	(-2.64)
SAME_SIC2$_{t-1}$	0.167	0.182	0.054
	(0.78)	(1.40)	(0.20)
SAME_SIC3$_{t-1}$	-0.099	0.053	-0.125
	(-0.72)	(0.32)	(-0.60)
SAME_SPINDEX$_{t-1}$	0.853***	0.367**	0.237
	(4.95)	(2.47)	(0.92)
|DIFF_TA|$_{t-1}$	-0.000	-0.001	-0.003
	(-0.34)	(-1.16)	(-1.50)
|DIFF_MTB|$_{t-1}$	0.008	0.006	0.010
	(0.45)	(1.01)	(1.33)
SAME_BUSSEG$_{t-1}$	0.056	-0.132	-0.118
	(0.39)	(-0.98)	(-0.61)
SAME_GEOSEG$_{t-1}$	-0.339*	-0.063	-0.112
	(-1.86)	(-0.43)	(-0.61)
SAME_RATING$_{t-1}$	-0.086	0.058	-0.134
	(-0.44)	(0.37)	(-0.58)
CORR_RET$_{t-1}$	-0.282*	0.213	0.135
	(-1.91)	(1.61)	(0.71)
|DIFF_CEORET|$_{t-1}$	1.027***	-0.622*	0.193
	(3.18)	(-1.90)	(0.37)
|DIFF_CEOMVE|$_{t-1}$	-0.010***	-0.001	0.001
	(-2.69)	(-0.45)	(0.10)
SAME_DUALITY$_{t-1}$	0.177	0.048	-0.116
	(1.21)	(0.44)	(-0.71)
TALENT_FLOW$_{t-1}$	1.253	-0.385	-1.103
	(1.00)	(-0.58)	(-1.49)
SALE_ADJ$_{t-1}$	0.000	-0.003	0.010
	(0.03)	(-0.47)	(1.10)
MVE_ADJ$_{t-1}$	0.005	0.001	0.015
	(1.15)	(0.34)	(1.32)
Constant	-16.079***	-16.171***	-14.760***
	(-18.91)	(-21.27)	(-11.40)
Year Dummies	Yes	Yes	Yes
N	1,246	1,940	664
Pseudo R^2	10.86%	11.14%	9.14%

Panel B: Peer changes and CEO power at the focal firm level

Variable	PCI_t
$POWER_{t-1}$	0.036**
	(2.28)
RET_FF_{t-1}	-0.094
	(-1.46)
ROA_{t-1}	-0.391
	(-0.78)
$BUSSEG_{t-1}$	0.001
	(0.13)
$GEOSEG_{t-1}$	0.076
	(1.17)
$CONSULTANT_{t-1}$	0.039
	(0.41)
Constant	0.051
	(0.31)
Industry fixed effect	Yes
N	1,050
Adj. R^2	7.65%

Table 7: Decomposition of PSI

This table reports the focal-firm-level analyses based on the three decomposed PSI components related to dual-role peers (PSI_DUAL), compensation peers (PSI_COMP), and performance peers (PSI_PERF). Panel A replicates Table 4 (Panel B and Panel C) by replacing peer selection index (PSI) with its three components, and reports the results of regressing focal firms' CEO pay and one-year-ahead stock returns on the PSI components. Panel B replicates Table 5 (Panel B) by replacing peer selection index (PSI) with its three components, and reports the results of regressing the PSI components on the composite index of CEO power. All variables are defined in Appendix B. ***, **, and * represent significance at the levels of 1%, 5%, and 10%, respectively.

Panel A: Effect of PSI components on focal firms' CEO pay and future stock performance

Variable	$CEOCOMP\_FF_t$	RET_FF_{t+1}
PSI_DUAL_t	0.229***	-0.116**
	(3.29)	(-2.30)
PSI_COMP_t	0.169**	0.004
	(2.18)	(0.06)
PSI_PERF_t	-0.137	-0.158
	(-0.92)	(-1.62)
Controls	Yes	Yes
N	1,311	1,311
Adj. R^2	57.52%	32.94%

Panel B: Effect of CEO power on PSI components

Variable	PSI_DUAL_t	PSI_COMP_t	PSI_PERF_t
$POWER_{t-1}$	0.017***	0.008	0.002
	(2.67)	(1.24)	(1.08)
Controls	Yes	Yes	Yes
N	1,311	1,311	1,311
Adj. R^2	11.61%	16.64%	6.28%

Table 8: Alternative Definition of PSI

This table reports the focal-firm-level analyses based on the alternative peer selection index (PSI_ALT). Panel A replicates Table 4 (Panel B and Panel C) by replacing peer selection index (PSI) with the alternative index, and reports the results of regressing focal firms' CEO pay and one-year-ahead stock returns on PSI_ALT. Panel B replicates Table 5 (Panel B) by replacing peer selection index (PSI) with the alternative index, and reports the results of regressing the PSI_ALT on the composite index of CEO power. All variables are defined in Appendix B. ***, **, and * represent significance at the levels of 1%, 5%, and 10%, respectively.

Panel A: Effect of PSI_ALT on focal firms' CEO pay and future stock performance

Variable	$CEOCOMP\_FF_t$	RET_FF_{t+1}
PSI_ALT_t	0.836***	-0.423**
	(3.34)	(-2.59)
Controls	Yes	Yes
N	1,311	1,311
Adj. R^2	58.80%	32.95%

Panel B: Effect of CEO power on PSI_ALT

Variable	PSI_ALT_t
$POWER_{t-1}$	0.010***
	(5.43)
Controls	Yes
N	1,311
Adj. R^2	22.98%

Table 9: Focal Firms Using Compensation Benchmarking Only

This table reports the results of Logit regression of the probability of firms being selected as compensation peers based on the sample of focal firms using compensation benchmark only (but not performance benchmark. All variables are defined in Appendix B. The base group is the random sample of non-peers. Z-statistics are presented in parentheses. ***, **, and * represent significance at the levels of 1%, 5%, and 10%, respectively.

Variable	Coefficient
$CEOCOMP_{t-1}$	0.635***
	(59.12)
$STOCKPERF_t$	-0.190***
	(-6.33)
$SAME\_SIC2_{t-1}$	2.417***
	(79.35)
$SAME\_SIC3_{t-1}$	1.274***
	(28.97)
$SAME\_SPINDEX_{t-1}$	0.664***
	(37.02)
$\lvert DIFF\_TA\rvert_{t-1}$	-0.003***
	(-24.18)
$\lvert DIFF\_MTB\rvert_{t-1}$	0.003***
	(2.85)
$SAME\_BUSSEG_{t-1}$	0.424***
	(25.41)
$SAME\_GEOSEG_{t-1}$	0.810***
	(47.48)
$SAME\_RATING_{t-1}$	0.539***
	(16.52)
$CORR\_RET_{t-1}$	0.008
	(0.49)
$\lvert DIFF\_CEORET\rvert_{t-1}$	-0.260***
	(-7.17)
$\lvert DIFF\_CEOMVE\rvert_{t-1}$	-0.017***
	(-39.68)
$SAME\_DUALITY_{t-1}$	0.124***
	(7.66)
$TALENT\_FLOW_{t-1}$	2.694***
	(8.19)
$SALE\_ADJ_{t-1}$	0.010***
	(13.25)
MVE_ADJ_{t-1}	0.022***
	(38.23)
Constant	-7.143***
	(-72.23)
Year Dummies	Yes
N	111,056
Pseudo R^2	38.19%