Compensation Benchmarking and The Peer Effects of Say on Pay*

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Abstract

We document that firms whose compensation peers experience weak say on pay votes reduce CEO compensation relative to control firms following those votes. Reductions are concentrated in firms with excess compensation and a lower likelihood of having selected their peers opportunistically. We also find that firms do not disproportionately drop weak-vote peers from their peer groups. Our results indicate that boards of directors are willing to respond to compensation peers' negative pay signals. We conclude that the effects of say on pay votes extend beyond firms that receive low shareholder support and that self-selected compensation peers provide meaningful compensation benchmarks.

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Abstract

We document that firms whose compensation peers experience weak say on pay votes reduce CEO compensation relative to control firms following those votes. Reductions are concentrated in firms with excess compensation and a lower likelihood of having selected their peers opportunistically. We also find that firms do not disproportionately drop weak-vote peers from their peer groups. Our results indicate that boards of directors are willing to respond to compensation peers' negative pay signals. We conclude that the effects of say on pay votes extend beyond firms that receive low shareholder support and that self-selected compensation peers provide meaningful compensation benchmarks.

I. Introduction

The compensation of top executives is of great interest to the popular press, the government, and academic researchers. Despite widespread attention to the issues involved, there is currently little consensus, even among academics, regarding the fundamental nature of the compensation setting process. One school of thought holds that extant compensation practices are the outcome of a competitive assignment of limited CEO talent among firms (for example, Gabaix and Landier (2008); Edmans, Gabaix, and Landier (2009)). A competing school of thought suggests that compensation practices represent rent extraction by entrenched CEOs (for example, Yermack (1997); Bertrand and Mullainathan (2001); Bebchuk and Fried (2004)).

Two recent developments in executive compensation have potentially important implications for the compensation setting process. First, greater institutional ownership and activist intervention by hedge funds have combined with the advent of required shareholder votes on executive compensation to increase shareholder influence on the compensation setting process. In particular, one of the more prominent provisions of the Dodd-Frank Wall Street Reform and Consumer Protection Act is the so-called say on pay (SoP) provision. Under this provision, any publicly listed corporation in the U.S. must submit the compensation plan of its top executives to shareholders for an advisory vote. Information about the vote and the ways in which the results of prior votes have been addressed must be disclosed to shareholders. Most evidence to date suggests that SoP regulation is value increasing for U.S. firms (for example, Cuñat, Giné, and Guadalupe (2016); Iliev and Vitanova (2015)) and that a majority of weak SoP votes are followed by changes in compensation practices in the firms that experience such votes. (Ertimur, Ferri, and Oesch (2013); Ferri and Maber (2013); Correa and Lel (2016)).

A second important development is the availability of systematic data on the self-selected compensation peers to which firms' boards of directors purport to look when setting executive compensation. The use of such peers is common and, beginning in 2006, U.S. securities regulation requires that the identities of these peers be disclosed to shareholders. To date, there is a lack of consensus regarding the economic impact of compensation benchmarking. While prior evidence suggests that compensation peers play a significant role in explaining variation in executive compensation plans, it is mixed as to whether peer influence leads to appropriate market-oriented compensation (for example, Bizjak, Lemmon, and Naveen (2008)) or to inflated executive compensation (for example, Faulkender and Yang (2010, 2013) and Bizjak, Lemmon, and Nguyen (2011)). Albuquerque, De Franco, and Verdi (2013) provide evidence consistent with both effects, with the dominant effect being more market-oriented compensation.[1]

In this study we contribute to both of these streams of literature by examining how firms respond to negative information about the compensation plans of their self-selected compensation peers. Specifically, we examine whether and how weak shareholder support for SoP votes affects changes in CEO compensation in firms that identify the weak-vote firms as compensation peers. There are two primary motivations for this research design.

First, we can provide a more complete picture of the impact of SoP votes in particular – and shareholder involvement in general – on firms in the economy. Shareholder support in SoP votes overall is quite strong. During 2011 and 2012 – the first two years in which SoP votes were mandatory – the median support was 94.8% and more than 70% of the votes conducted garnered the approval of at least 90% of firm shareholders.

[1]Note that firms' compensation peers may be different from their performance peers. Compensation peers are used to determine the level of CEO pay, while performance peers are used to filter out systematic components in firm performance to ascertain the performance-driven component of CEO pay.

Thus, if weak SoP votes affect compensation only for the relatively small set of firms that experience such votes, the effect of SoP on the economy and on managerial pay generally is arguably limited. However, to the extent that such votes provide information or pressure that affects compensation in a broader set of firms, their impact on the economy is of greater consequence.

Second, we can add to existing evidence on firms' use of self-selected compensation peers. Because support in SoP votes is typically very high, a weak SoP vote provides notably negative feedback. If boards of directors employ compensation benchmarking for informational purposes, such feedback on the compensation plans of peers to whom they look in designing their own top executives' compensation plans should provide an impetus for a re-evaluation of and, where warranted, changes in those plans. Boards may respond to their peers' weak votes because it is in their shareholders' interests to do so. Alternatively, such responses could arise from a desire on the part of directors to protect their own positions. Brunarski, Campbell, Harman, and Thompson (2016) provide evidence that directors of firms with low shareholder SoP support experience reductions in external directorships, compensation committee positions, and director compensation. Thus, it is plausible that directors who become aware of weak SoP votes for their compensation peers would actively seek to avoid a similar fate.

If boards are instead inclined to use benchmarking opportunistically to inflate executive compensation – perhaps under the influence of powerful CEOs – they would be likely to ignore information that implies that a reduction in CEO compensation is warranted. Furthermore, to the extent that firms that experience a weak vote respond by reducing their own compensation, other firms may drop the weak-vote firms from their peer groups because they provide less support for compensation inflation than they did previously. We identify three sets of firms from among the firms in the S&P

1500. The first set, which we label *weak-vote firms*, comprises firms that are in the lowest decile of support in the Russell 3000 on their SoP advisory votes in any year between 2011 and 2013 (less than 72.5% support). In the second group are firms that do not themselves experience a weak vote during this period, but whose self-selected compensation peer groups include firms that experience a weak vote. Specifically, we require that at least two of an individual firm's peer firms, representing at least 10% of their peer group, experience a weak SoP vote. These are our *primary firms*, labeled as such because they are the firms in which we are primarily interested. Finally, firms that do not experience a weak vote themselves and do not have the required number of weak-vote peers in their compensation peer group serve as *control firms* in our analysis.

We document that, on average, weak-vote firms are disproportionately among the more highly compensated members of our primary firms' compensation peer groups. Thus, their inclusion in these groups potentially supports higher compensation for our primary firms' CEOs. Consistent with this, we find that our primary firms pay their CEOs significantly more than do the control firms in the sample. This result holds after controlling for lagged compensation and standard determinants of CEO compensation in a difference-in-differences framework.

Our difference-in-differences analysis indicates that the primary firms exhibit significant relative changes in CEO compensation during the two years following weak shareholder support for the SoP votes of firms in their compensation peer groups. The total compensation for primary firm CEOs declines by 8.0% ($383,000) relative to the pay of control firms, shrinking the compensation difference between primary and control firms from 9.4% to 1.4%.

The fact that a primary firm has compensation peers that experience weak SoP votes is not *prima facie* evidence that its own CEO's compensation is too high. We

explore the effect of own-firm CEO compensation on primary firms' response to peers' weak votes using measures of excess compensation that are computed using annual cross-sectional regressions. We find that the relative reductions in total compensation that we document are due to changes in primary firms with above-median excess compensation prior to the votes. Relative compensation does not change for the subset of firms whose excess compensation prior to their peers' weak votes was below median. Thus, primary firms whose own CEO compensation appears to be relatively high are the ones most likely to reduce relative compensation in response to peers' weak votes. These findings also provide additional assurance that the observed changes do not simply reflect mean reversion in compensation levels.[2]

In order to address the possibility that our results reflect a mean reversion in change in compensation, we undertake a first differences analysis in which we regress the year-on-year changes in compensation and include as a control variable the prior-year change in CEO compensation. While the estimated coefficient on this control variable is consistent with mean reversion – CEOs who receive higher raises in one year are likely to receive lower raises in the following year – we continue to find that primary and weak-vote firms significantly reduce CEO compensation relative to control firms following the SoP event.

We also conduct a falsification test, in which we replace firms' actual compensation peers with randomly-drawn, observationally equivalent pseudo compensation peers. We find no primary firm responses to weak votes among their pseudo compensation peers. This indicates that the documented compensation changes among primary firms were

[2]In as yet untabulated results, we also find that relative pay reductions are concentrated among primary firms whose weak-vote peers have high operating performance. In contrast, when peers' weak votes are likely due to general discontent arising from poor performance, primary firms do not change CEO compensation relative to control firms.

driven by the SoP vote outcomes of their actual peers, rather than by some unobserved shocks that are common to primary firms and their peer groups.

We analyze the individual components of compensation and find that relative declines in primary firm compensation are due mostly to declines in long-term compensation, defined as the sum of long-term non-equity incentives (e.g. long-term awards based on accounting metrics) and stock and option awards. Thus, on average, boards of primary firms appear to respond to weak votes in their compensation peers by changing both the level and the overall form of compensation for their CEOs.

We also find that primary firms' pay-for-performance sensitivity, measured as the delta of newly granted stocks and options, does not change relative to that of the control firms.[3] However, further analysis indicates that primary firms whose prior delta was below the median for the sample as a whole significantly increase relative pay-for-performance sensitivity in the period following peers' weak votes, while those above the median reduce relative pay-for-performance sensitivity following peers' weak votes.

The observed changes suggest that the boards of primary firms respond to their compensation peers' weak votes by making changes in their own executives' compensation plans and are more likely to do so when CEO compensation is potentially problematic. This suggests that both compensation benchmarking and shareholder involvement are important factors in the compensation-setting process. Furthermore, the willingness of boards of directors to respond even when peer data points to a need for reductions in compensation supports an informational role for compensation benchmarking.

Although we control for firm performance and for firms' own SoP vote results in our main regression, we further explore the possibility that primary firms' changes in rela-

[3]We follow the methodology of Core and Guay (2002) and calculate delta as the sum of the stock and option deltas, which respectively measure the dollar change in the executive's vested and unvested share/option holdings for a 1% change in stock price.

tive compensation stem from poor performance or from low support on their own SoP votes, rather than from boards acting in response to their peers' weak votes. Specifically, we examine the subsample of firms whose prior year industry-adjusted stock performance falls into the top tercile (7.9% or higher), the subsample that experience above-median SoP vote support (96% or higher), and the subsample for which both of these requirements hold. We find that primary firm compensation drops relative to control firms following the weak votes of compensation peers in each of these subsamples. Thus, primary firm boards do not appear to respond only in the face of poor performance or low support from their own shareholders. We also explore the possibility that compensation changes stem from pressure from activist investors. Our results indicate that significant relative decreases in total compensation are concentrated in those primary firms whose shareholder base includes at least one activist hedge fund. However, separate examination of the firms with above-median excess compensation indicates that primary firms in this subset reduce relative pay even without the presence of an activist. This suggests that activists select into firms with excess compensation and that boards' responses are independent of the presence of activists.

To the extent that firms choose their compensation peers to justify high compensation for their own CEOs, the large relative compensation reductions observed in weak-vote firms likely make them less attractive as compensation peers. We therefore examine whether our primary firms are more likely to drop from their compensation peer groups those peers that have experienced a weak SoP vote. Our results indicate that primary firms are no more likely to drop a compensation peer than are control firms, on average. Furthermore, primary firms are no more likely to drop weak-vote peers than they are to drop any other peers.

The results above suggest that, on average, compensation peers' weak votes provide

boards with information that leads them to examine their own CEOs' compensation and respond where appropriate. Murphy (2013), however, argues that the efficient contracting and managerial power views of executive compensation are not mutually exclusive. To the extent that there are firms in our sample that choose their compensation peers opportunistically, we expect them to be less likely to respond to negative signals about their CEOs' compensation. We explore this possibility by constructing a measure of opportunistic selection and omission of compensation peers. We compare firms' peer groups to those of other industry-, assets-, and sales-matched firms and characterize a firm as a potential opportunistic benchmarker if its peer group shares a low degree of commonality with those of its comparison firms. We find that relative compensation reductions are concentrated among the primary firms that exhibit a high degree of peer group commonality with their matched firms. Opportunistic benchmarkers – i.e., primary firms that have a low degree of peer group commonality – do not, on average, reduce CEO compensation following the weak-votes of their peers.

Our primary focus is on changes in the relative compensation of firms that identify weak-vote firms as their compensation peers. However, our research design also allows us to address relative compensation changes in the weak-vote firms themselves. We find that changes for the weak-vote firms closely mirror those for the primary firms. Firms that experience weak SoP votes have CEO compensation that is significantly higher than that of the control firms prior to the vote and they reduce (relative to control firms) total compensation significantly after the weak vote. The reductions are concentrated in those firms with above-median excess compensation. The average magnitude of the reductions – 20.3% ($1.06 million for the average weak-vote firm) – is greater than for the primary firms. Similarly, weak-vote firms make directionally identical but stronger changes to the composition and performance sensitivity of CEO pay, relative

to primary firms. Finally, compensation reductions in the weak-vote firms occur even in weak-vote firms that are in the top tercile of industry-adjusted stock return and do not appear to be the result of pressure from activist investors. Unlike primary firms, however, weak-vote firms reduce compensation, on average, regardless of the likelihood that they constructed their peer group opportunistically. These results further support that the relative reductions in CEO compensation observed in the weak-vote firms are a reaction to the SoP vote itself.

In summary, we find that weak shareholder support for SoP votes leads to decreases in relative CEO compensation, not only in the weak-vote firms, but also in firms that identify the weak-vote firms as compensation peers. This effect is not due to poor performance or to the presence of activist shareholders. Furthermore, firms do not disproportionately drop their weak-vote peers from their compensation peer groups. These results contribute to the ongoing debate regarding firms' use of self-selected compensation peers in the compensation-setting process. Faulkender and Yang (2010) and Bizjak, Lemmon, and Nguyen (2011) provide evidence that boards choose peers whose CEOs are highly paid to support inflated compensation for their own CEOs. Our evidence suggests that this effect works in reverse as well, in that boards respond to negative signals about the compensation of highly paid peer CEOs by reducing the relative compensation of their own CEOs. Moreover, such spillover effects among compensation peers indicate that the effects of say on pay regulation on compensation practices are broader than is revealed by examining only firms that experience weak votes.

The rest of the paper is organized as follows: Section II reviews the related literature, section III describes the data used in our study, and section IV discusses the methodology and results. We conclude in section V.

II. Related Literature

A. Shareholder voting on executive compensation

Research on shareholder involvement in firms' executive compensation policies has focused primarily on the effects of compensation-related shareholder proposals, activist events, and – more recently – advisory votes. Ertimur, Ferri, and Muslu (2011) investigate changes in compensation at firms that are targets of compensation-related shareholder proposals or "Vote No" campaigns between 1997 and 2007. They find that voting support for such proposals or campaigns is higher at firms with excess CEO pay. They document a significant reduction in CEO pay in the subset of these firms targeted by "Vote No" campaigns. Cuñat, Giné, and Guadalupe (2016) use a regression discontinuity design to study firms that hold an advisory vote on executive compensation during 2006-2010 in response to shareholder proposals. They document increases in market value and improvements in profitability but only limited impact on pay levels or structure.

To the extent that shareholder proposals and "Vote No" campaigns are directed at firms that have experienced poor performance or other such problems, these results may have limited external validity. The advent of mandatory SoP votes provides researchers with opportunities to overcome this particular concern by examining stock price responses to the passage of SoP regulations. Ferri and Maber (2013) examine the effects of the introduction of SoP regulation in the United Kingdom, which was the first country to make such votes mandatory. They document positive abnormal returns upon announcement of the regulation for firms with excess CEO pay or generous severance contracts. Cai and Walkling (2011) provide evidence that firms with positive excess compensation and low pay-for-performance sensitivity experience positive

abnormal returns around the passage of SoP laws in the U.S. House of Representatives.

A number of studies provide evidence of changes in compensation following the adoption of SoP policies. Ferri and Maber (2013) find that their sample firms respond by removing overly generous severance contracts and by increasing pay-for-performance sensitivity. Correa and Lel (2016) use data from 39 countries and find that introductions of SoP laws are followed by declines in compensation levels, higher pay-for-performance sensitivity, and declines in the share of total top management pay awarded to CEOs. These changes are concentrated in firms with high excess pay and shareholder dissent, long CEO tenure, and less independent boards. Ertimur, Ferri, and Oesch (2013) examine firms for which proxy advisors recommend a negative SoP vote and find that the majority of such firms undertake compensation changes following the vote. Bugeja, da Silva Rosa, Shan, Walter, and Yermack (2016) provide evidence that Australia's version of say on pay, which allows shareholders to vote to get rid of the board following support of 75% or less in two consecutive SoP votes, leads directors to respond to a weak vote by reducing excessive CEO pay and altering the compensation mix.

To the extent that the introduction of laws relating to compensation is more likely following periods of general high compensation or poor performance, at least part of firms' responses to the introduction of such laws may be attributable to mean reversion in compensation (Core, Holthausen, and Larcker (1999)). Dodd-Frank, for example, was enacted in the immediate wake of the financial crisis. In order to overcome some of these concerns, Iliev and Vitanova (2015) use a provision in the U.S. say on pay law that exempted firms with a public float under $75 million from holding a SoP vote until 2013. Firms whose public float exceeded that amount were required to hold their first vote in 2011. Iliev and Vitanova examine firms that are close to the $75 million cutoff point and document increases in the level and performance sensitivity of CEO

compensation only for those firms that are above $75 million in float. Kronlund and Sandy (2015) examine within-firm changes in compensation across years in which firms will face SoP votes versus years in which they will not. They find that firms reduce salaries to CEOs in years with votes; however, simultaneous increases in stock awards, pensions, and deferred compensation offset the reduction in salaries such that total compensation increases. The authors conclude that firms alter only the "optics" of pay.

Existing evidence addresses other aspects of SoP voting as well. In their examination of the extent to which proxy advisory services have an impact on shareholder voting, Malenko and Shen (2016) find that a negative SoP vote recommendation by one such advisory firm, Institutional Shareholder Services, leads to a 25 percentage point reduction in voting support. Further, Schwartz-Ziv and Wermers (2017) find that small institutional shareholders are more likely to vote against management and Brunarski, Campbell, Harman, and Thompson (2016) provide evidence that directors of firms with low SoP support experience reductions in external directorships, compensation committee positions, and director compensation.

B. Compensation peer groups

The literature on compensation peer groups reveals an ongoing debate as to whether firms choose their compensation peers to reflect economic factors in the managerial labor market or to support excess compensation for rent-seeking top executives.

Bizjak, Lemmon, and Naveen (2008) find that firms whose CEO compensation is below median for their peer groups receive higher than average compensation increases. However, they also find that such CEOs experience more frequent turnover. Furthermore, they find no evidence that compensation benchmarking is related to poor corporate governance. Bizjak et al. conclude that CEO pay is adjusted for retention

reasons, rather than for rent-seeking reasons. Albuquerque, De Franco, and Verdi (2013) develop proxies for CEO talent and find that the choice of highly-paid peers primarily represents a reward for unobserved CEO talent. The evidence in these studies supports the hypothesis that firms choose compensation peers to reflect economic factors in the managerial labor market.

Faulkender and Yang (2010), on the other hand, find that, after controlling for characteristics related to the market for CEO talent, firms appear to select highly-paid peers to justify their CEOs' compensation. They find this effect to be stronger among firms with smaller peer groups, dual CEO-chairpersons, longer tenured CEOs, and busy boards. Bizjak, Lemmon, and Nguyen (2011) find that, while the choice of peers largely reflects the market for managerial talent, there is some evidence of opportunistic benchmarking in firms outside the S&P 500. Smaller firms that deviate from the economic model of choosing peer firms based on labor or product market characteristics tend to pick larger firms and firms with higher CEO pay. They conclude that opportunistic benchmarking is stronger among firms with potential agency issues. Colak, Yang, and Ye (2016) provide evidence that firms newly added to the S&P 500 alter their own peer groups in ways that support higher executive compensation. In addition, such effects ripple to other firms in the same industry, creating what they term an artificial increase in executive compensation. Faulkender and Yang (2013) investigate whether the increased scrutiny of peer groups following the 2006 requirement that peers be disclosed reduced the instances of opportunistic benchmarking. They find that strategic peer benchmarking did not disappear after enhanced disclosure and that it intensified at firms with low institutional ownership, low director ownership, low CEO ownership, busy boards, large boards, non-intensive monitoring boards, and at firms whose shareholders complained about compensation practices. The evidence

in these papers supports opportunistic benchmarking stemming from agency problems.

C. General Peer Effects in Compensation

Our work is also related to that of Gabaix and Landier (2008), who model contagion effects in compensation practices across firms, and Bereskin and Cicero (2013), who examine how changes in compensation at firms that experience a shock to their governance levels spill over to other firms in the economy. While these papers explain how a contagion effect may contribute to an increase in compensation levels in the economy, we examine whether negative signals regarding the compensation practices of some firms spill over to pay practices in a broader set of firms.

III. Sample Selection and Description

We obtain data on compensation peer groups and say on pay (SoP) voting outcomes from Equilar. Our initial sample consists of all firms covered by Equilar, which equates approximately to the firms in the Russell 3000 Index, for fiscal years 2010-2013. We require detailed data on the CEO compensation packages of firms that are the subjects of advisory SoP votes. The boards of our sample firms propose these packages in their annual proxy filings. We obtain this data from Execucomp; this reduces our sample to the S&P 1500 companies included in that database. We obtain balance sheet variables from Compustat, stock price information from CRSP, and ownership information from the Thomson Reuters Institutional Holdings database.

We classify firms in our sample into three mutually exclusive groups. Firms that experience low support on their SoP advisory vote in any year between 2010 and 2013 are classified as weak-vote firms. We use the 10^{th} percentile of the Russell 3000 SoP vote distribution as a threshold to designate a weak vote; this corresponds to 72.5%

support.[4] Firms that did not experience low support on their own SoP proposals in any year between 2010 and 2013 but had self-selected compensation peers that did experience low support are classified as primary firms. For a firm to be classified as a primary firm we require that at least two peer firms, representing at least 10% of a firm's peer group, experience weak SoP votes in the 365 days prior to the primary firm's proxy filing date for fiscal year 2011, 2012 or 2013.[5] We refer to the first fiscal year in which we classify a firm as a weak-vote or primary firm as its "SoP event year". Finally, we classify all remaining firms from the S&P 1500 as control firms.

In order to capture changes to compensation policies in response to SoP events in 2011 and 2012, we construct a panel for the above firms that includes data on compensation, balance sheet items, and stock performance from 2009 to 2014. To be included in our final sample, firms must have information on compensation and control variables available for at least four of the six years in the sample period. Imposing this restriction yields 5,955 firm-year observations on 1,061 firms from the S&P 1500. Of these, we classify 213 as weak-vote firms, 345 as primary firms, and 503 as control firms. We focus on changes in the compensation of the CEO in particular because the CEO's compensation typically represents a large share of firms' top executive compensation and, therefore, tends to be of greatest interest to external parties.[6]

[4]Less than 2% of Russell 3000 firms receive less than 50% support on their SoP proposal annually. Support below 70% is generally considered a negative view of firms' compensation practices by proxy advisory firms and compensation consultants. ISS, for example, adopted a new policy in November 2011 to provide case-by-case voting recommendations on compensation committee members if a company's prior year SoP vote outcome was below 70%. Likewise, Georgeson and Semler Brossy compile lists of firms with "low" SoP vote support consisting of firms that receive less than 70% support. Our results are robust to changing the threshold to 70%.

[5]We focus on the proxy filing date because it is in the proxy statement that the board of directors reveals the details of the top executive compensation plan for the coming year.

[6]Bebchuk, Cremers, and Peyer (2011) find that the compensation of the mean CEO is 35.6% of the total compensation paid to the top five executives of the firm. Keebough, Martin, and Burek (2016) find that, at median, CEO pay in S&P 500 firms is 2.2 times that of the COO, 3.0 times that of the CFO, and 4.0 times that of the General Counsel.

Table 1 provides descriptive statistics on SoP advisory proposals and compensation peer groups. Column 1 shows the highly skewed nature of the SoP vote distribution for Russell 3000 firms in 2011 and 2012; the mean (median) support level among Russell 3000 firms is 89.7% (94.8%).[7] By constructxxion, the maximum vote support among weak-vote firms is just below the 10th percentile of the Russell 3000 SoP vote distribution (72.5%). The SoP vote distributions of the primary and control firms are largely indistinguishable from each other. Median support is 96.3% and 95.6%, respectively, and outcomes range from just above the 72.5% threshold to 100% support. Columns 5 to 7 indicate similar peer group size across the three groups: the mean (median) peer group size is 17.8 (16) for weak-vote firms, 18 (16) for primary firms, and 16.3 (15) for control firms.[8] Column 8 indicates that a mean (median) of 17.5% (15.8%) of the primary firms' compensation peers suffer a weak SoP vote. By construction, the minimum is just above 10%.

[Insert Table 1 here]

In Table 2 we present comparisons of firm characteristics across the three groups in the SoP event year. We are primarily interested in comparing the primary to the control firms; however, we present comparisons of weak-vote firms to control firms as well. The first thing to note is that the primary and control firms do not differ significantly with respect to conventional measures of size, performance, governance, and general peer group composition. This suggests that it is reasonable to benchmark our primary firms against the control firms. Weak-vote firms also do not differ from control firms in measures of size, governance, or peer group composition; however they exhibit significantly

[7]This is similar to the mean (median) SoP vote support of 87.0% (94.6%) in our final sample.

[8]The majority of compensation peer references (55%) are uni-directional, meaning that firm A includes firm B as a compensation peer but firm B does not include firm A as a compensation peer.

worse performance and higher volatility in the event year. This is consistent with prior evidence of poor performance in firms that experience weak SoP votes (for example, Ferri and Maber (2013); Brunarski, Campbell, Harman, and Thompson (2016)).

Compensation comparisons, on the other hand, indicate that there are significant differences in compensation across firms. Both primary and weak-vote firms compensate their CEOs at significantly higher levels than do control firms in the year prior to the SoP event year. The average pay to primary firm CEOs is almost $1.9 million dollars higher than that of control firms; this difference is over $2.5 million dollars for the weak-vote firms. This is consistent with the possibility that including weak-vote firms whose CEOs are highly compensated in their compensation peer groups leads to higher CEO compensation in the primary firms.

[Insert Table 2 here]

In order to more carefully assess the impact that weak-vote peers have on primary firms, we sort each primary firm's peers into deciles according to their pay levels. Column 2 in Figure 1 shows that, on average, weak-vote peers tend to be among the highest paying firms in primary firms' peer groups. Weak-vote peers are more than ten times as likely to occur in the top decile (45.9%) as in the bottom decile (4.4%) of the peer pay distribution. Columns 3 to 6 illustrate how the relative pay distribution would change if the high-paying weak-vote peers were replaced by new peers at the median pay level.[9] In the top decile, the average peer pay ratio would decline from 5.3 times to 4 times the primary firm's pay. This is a decline of 129 percentage points, significant at the 10% level. We also plot the relative pay distribution of primary firms before and

[9]Relative pay is the CEO pay of the compensation peer scaled by the CEO pay of the base firm that lists the peer firm in its compensation peer group.

after adjusting peer groups. After the hypothetical replacement of weak-vote peers, the distribution's median declines from 1.42 to 1.31. This implies that a primary firm that targets CEO pay at the median of its compensation peer group distribution would reduce its CEO's total pay by 7.7% ($532,000 for the average firm in the sample).

[Insert Figure 1 here]

To the extent that weak-vote peers cut CEO pay following their weak votes, primary firms' actual peer pay distributions will shift downward. Bizjak, Lemmon, and Nguyen (2011) collect data on pay targets from proxy filings and find that approximately two-thirds of their sample firms disclose some form of peer-group-relative pay target. If a primary firm's compensation committee targets CEO pay to be at a specific percentile of the distribution of the firm's compensation peer group, a reduction in the compensation of a highly-paid compensation peer could automatically pass through to the primary firm. Thus, changes in primary firms' CEO compensation may result from specific actions by their boards of directors following peers' weak votes or more mechanically from the compensation-targeting policies boards put in place prior to such votes.

IV. Firm Responses to Peers' Weak Say on Pay Votes

In this section we explore changes in the level and composition of CEO pay and potential determinants of such changes, as well as benchmarking practices and changes in peer group composition. We are primarily interested in the responses of primary firms to their peers' weak votes; however, our research design allows us to provide evidence on firms' responses to their own weak votes as well.

A. Compensation changes following weak SoP votes

Weak support for a firm's SoP vote potentially signals to that firm's board of directors that investors perceive the firm's CEO compensation as excessive. In addition, a weak vote potentially sends a signal to the boards of firms that look to the weak-vote firm when designing their own CEOs' compensation plan; i.e. firms that identify the weak-vote firm as a compensation peer. To the extent that boards choose compensation peers for informational purposes, a peer's weak vote should lead a board to consider the possibility that its own CEO's compensation is excessive. While careful review could lead some boards to conclude correctly that such is not the case, on average we would expect to observe reductions in CEO compensation following peers' weak votes. If, instead, boards choose peers opportunistically to support high pay for their own CEOs, directors would be less likely to respond when peers' votes suggest that a reduction in CEO compensation is warranted.

A.1. Univariate results

Figure 2 presents univariate changes in total control-firm-adjusted CEO compensation for primary and weak-vote firms around the SoP event year. In year 0 (the SoP event year), weak-vote firms' CEO pay increases are significantly larger than those of the control firms; such increases may provide the impetus for the low levels of shareholder support on their say on pay advisory votes. Both weak-vote and primary firms reduce CEO compensation relative to control firms following the SoP event year. Weak-vote firms show pronounced and statistically significant relative compensation reductions in the first year after receiving low shareholder support and, to a lesser extent, in year 2. Primary firms reduce pay significantly relative to control firms in the first year after peers' weak votes but not in the second year.

[Insert Figure 2 here]

A.2. Regression results

We use a difference-in-differences model to estimate control-firm-relative changes in CEO compensation in primary and weak-vote firms following SoP events. We define an indicator variable *Post*, which equals 1 in the years following the SoP event and 0 otherwise. For weak-vote firms, the SoP event year is the first year in which the firm experiences weak support on its say on pay advisory votes. For primary firms, the SoP event year is the first year in which at least two and more than 10% of its peers experience weak support on their respective say on pay advisory votes. Our model is as follows:

$$\begin{aligned} &\textit{Log of total CEO compensation}_{it} = \\ &\qquad \alpha + \beta_1 \textit{Primary firm}_i + \beta_2 (\textit{Primary firm} \times \textit{Post})_{it} \\ &\qquad + \gamma_1 \textit{Weak-vote firm}_i + \gamma_2 (\textit{Weak-vote firm} \times \textit{Post})_{it} \\ &\qquad + \delta X_{it} + \rho (\textit{Industry} \times \textit{Year FE}) + \phi \textit{State FE} + \epsilon_{it} \end{aligned}$$

We use the log of total CEO compensation as our dependent variable in order to reduce the impact of outliers.[10] X_{it} is a set of control variables that includes the lag of the dependent variable, firms' own most recent SoP vote support and its squared value, and a large set of firm and performance characteristics. We also include *industry* × *year* fixed effects to allow for industry-specific annual trends in compensation and state

[10] Total compensation is the sum of salary, bonus, perquisites and other long-term incentives, which include restricted stock grants, option grants, and non-equity incentives received by the CEO (Execucomp data item `tdc1`). Because the actual number of stock/option/non-equity incentives awarded depends upon future performance, these components of pay are valued at their target level of awards. The total compensation measure is thus a measure of target pay rather than realized pay.

fixed effects to allow for geographic determinants of pay. Our coefficients of interest, β_2 and γ_2, therefore capture post-SoP-event changes in primary and weak-vote firms' compensation levels in excess of control firm changes, industry-year specific trends, location fixed effects, firm attributes, and performance-related factors.

[Insert Table 3 here]

The coefficients in models 1 and 2 of Table 3 indicate that primary firms pay significantly more to their CEOs than do control firms prior to the SoP event. In model 2, the coefficient on Primary implies that the average primary firm CEO earns 9.4% ($459,000) more than the CEO of the average control firm prior to the SoP event. Following the event, this premium shrinks by 8.0% ($383,000).[11] In model 3 we include firm fixed effects in order to estimate within-firm wage changes and obtain a similar coefficient.[12] The consistency of the coefficients across models 1-3 suggests that peers' weak SoP vote outcomes are uncorrelated with primary firm characteristics.[13]

The results in Table 3 indicate that weak-vote firms also exhibit both pre-weak-vote compensation that exceeds that of the control firms and significant declines in relative compensation following their weak votes. The magnitudes of these differences are greater than for the primary firms. Model 2 indicates that, after adding firm controls and fixed effects, weak vote firms' pre-SoP event CEO compensation is 25.9%

[11] The CEO of the average control firm earns $4.661 million prior to the SoP event and $5.401 million in the *Post* period. Hence, the CEO of the average primary firm has an expected pay of exp(ln(4,661,000)+0.094)=$5.120 million before the SoP event, implying a wage premium of $459,000 (=$5.120M-$4.661M). Similarly, the expected pay of primary firms in the *Post* period is exp(ln(5,401,000)+(0.094-0.080))=$5.477 million, which implies a wage premium of $76,000 (=$5.477M-$5.401M) relative to control firms. Therefore the change in the wage premium is $383,000.

[12] To allow for sufficient within-firm variation in model 3, we require that primary and weak-vote firms have data points for all six sample years (2009-2014).

[13] In Appendix A.2 we show that these results are robust to using a propensity-score-matched sample of control firms in which the matching dimensions include total compensation, market value of equity, sales, market-to-book, and industry in the SoP event year.

greater than that of control firms and exhibits a significant relative decline of 20.6% following their weak votes. For the average weak-vote firm, the compensation premium drops from $1.38 million to $294,000 relative to the average control firm.[14]

The inclusion of lagged compensation in models 1-3 provide some assurance that the relative changes observed in primary firms following their peers' weak votes do not simply reflect reversion to the mean. In models 4-6 we use a first differences specification to further address the issue of potential mean reversion in changes in compensation; i.e. the possibility that a CEO who receives a large raise in one year is likely to receive a smaller raise in the next year. In these models the dependent variable and all independent variables (other than returns and turnover) reflect changes in levels relative to the previous year. While the significant negative coefficients on the control variable *change in lagged compensation* support the existence of mean reversion in compensation changes, we continue to find that primary and weak-vote firms reduce compensation relative to control firms following the SoP event. Hence, the changes in compensation among primary and weak-vote firms following a SoP event are in excess of those due to general mean reversion in compensation.

A.3. Excess compensation and firm responses

As illustrated earlier in Figure 1, weak-vote firms fall disproportionately into the upper deciles of pay relative to primary firms, in which peer firm pay ranges from 1.5 to over 5 times that of the primary firms. Thus, the fact that some of a primary firm's

[14]The CEO of the average control firm earns $4.661 million prior to the SoP event and $5.401 million in the *Post* period. Hence, the CEO of the average weak-vote firm has an expected pay of exp(ln(4,661,000)+0.259)=$6.039 million before the SoP event, implying a wage premium of $1.378 million (=$6.039M-$4.661M). Similarly, the expected pay of weak-vote firms in the *Post* period is exp(ln(5,401,000)+(0.259-0.206))=$5.695 million, which implies a wage premium of $294,000 (=$5.695M-$5.401M) relative to control firms. Therefore the change in the wage premium is $1.084 million.

compensation peers experience weak SoP votes does not necessarily imply that the primary firm should reduce its own CEO's compensation. In Table 4 we examine the impact of primary firms' pre-vote compensation on the extent to which they respond to peers' weak votes by reducing their own relative compensation by reducing their own relative compensation.

[Insert Table 4 here]

For models 1 to 3 we compute firms' level of excess compensation as the residual from annual cross-sectional regressions of log total compensation on firm and performance characteristics, as well as on location and industry fixed effects. We then classify firms in our sample into groups with and without excess pay.[15] The model 1 coefficient estimates indicate that firms without excess pay do not alter control-firm-relative CEO pay following a SoP event; this result holds for both primary and weak-vote firms. Model 2, however, indicates that firms whose pre-SoP-event pay is excessive undertake strong and highly significant reductions in relative CEO compensation: -13.6% following peers' weak votes and -29.2% following own-firm weak votes. Model 3 is a triple difference regression in which the interaction variable equals one for firms with above-median excess compensation. The coefficients on the triple interaction terms confirm that the compensation reduction in the *Post* period among primary and weak-vote firms is limited to those firms with excess compensation.

As an alternative measure of excess compensation we classify firms according to whether or not their CEO pay exceeds the median CEO pay of their compensation

[15]Primary and weak-vote firms are classified as having excess pay if they have above-median residuals in the excess pay regressions in the SoP event year. Control firms are classified as having excess pay if they have above median residuals in the excess pay regressions in 2011 and 2012. The construction of all our variables is described in detail in the variable appendix A.1.

peer group. This classification has the advantage that it uses the pay levels of firms' self-selected compensation peers as the benchmark for competitive managerial wages. The model 4-6 coefficient estimates confirm the earlier findings: only those primary and weak-vote firms with pay above their compensation peer group median make significant relative pay reductions.

A.4. Falsification test

Our goal in Table 3 is to capture compensation changes in primary firms that occur in response to negative signals about the pay practices of some of their compensation peers. One potential concern, however, is that primary firms are responding to shocks that are common to their peer groups, rather than to the low support received by some of their peers. To address this concern, we perform a falsification test in which we replace each firm's actual compensation peers with randomly-drawn pseudo compensation peers. Specifically, each pseudo peer is randomly drawn from the set of firms that are in the same industry (GICS 2-digit) and have assets and sales values that are similar to those of the actual compensation peer ($\pm 30\%$). As a result, each firm is assigned a pseudo peer group that is observationally equivalent to its actual peer group. We then re-classify the primary and control firms based on the say on pay outcomes of those pseudo peers and re-run model 2 of Table 3. We repeat this procedure 10,000 times and obtain the empirical distribution of the coefficient on the variable $Primary \times Post$ and its t-statistic. If the relative primary firm compensation reductions documented in Table 3 are driven by unobserved shocks they share with their compensation peer groups, we would expect to observe similar primary firm pay reductions using equivalent pseudo peer groups.

[Insert Figure 3 here]

Figure 3 shows the empirical distributions of the coefficient and t-statistic on the variable *Primary* $\times$ *Post*. Both distributions center on zero, suggesting that the use of observationally equivalent pseudo peers does not correlate to pay reductions in primary firms. Moreover, the original coefficient on *Primary* $\times$ *Post* observed in model 2 in Table 3 is in the bottom 1% of the empirical distribution of pseudo coefficients. These findings suggest that the documented relative pay reductions at primary firms are attributable to the say on pay vote outcomes of their compensation peers.

B. Changes in compensation structure and pay-for-performance sensitivity

In order to better understand CEO compensation changes following SoP events we examine separate changes in short-term and long-term compensation. We compute firms' short-term incentive ratio as the sum of salary and annual bonus divided by total compensation and their long-term incentive ratio as long-term non-equity grants plus multi-year stock and option grants divided by total compensation. We present changes in these ratios in Table 5.

[Insert Table 5 here]

The results of models 1-4 indicate that, after controlling for firm and performance characteristics, primary and weak-vote firms provide more long-term incentives and less short-term incentives than do control firms prior to the SoP event. Following the SoP event, primary and weak-vote firms realign their compensation structures such that they converge to those of control firms; i.e. they reduce the relative use of long-term incentives while increasing the relative use of short-term incentives. The average magnitudes of these realignments are such that the post-SoP-event composition of primary and weak-vote firms' CEO compensation is similar to that of control firms.

One potential concern is that the documented changes in compensation levels are the result of differences across the years in how stock and option awards are valued. To allay such a concern we analyze changes in the actual number of stocks and options awarded to CEOs as part of their annual grants. The results of models 5 and 6 in Table 5 indicate that primary and weak-vote firms provide a larger number of stocks and options in annual grants (relative to control firms) in the years prior to the SoP event but reduce those numbers in the years following the SoP event. The reduction in the number of newly awarded stocks and options suggest that our findings result from deliberate actions taken by boards to alter compensation policies, rather than from mechanical differences in the valuation of stock /option packages across years.

A potential consequence of the relative reduction in long-term incentives documented in models 3 and 4 is a lower pay-for-performance sensitivity (PPS). To explore this possibility we follow the methodology of Core and Guay (2002) and calculate the delta of new grants as the sum of the deltas of stock and option awards granted to the CEO at the end of each year.[16] We analyze changes in the deltas of new grants in models 7 and 8. The results of model 7 indicate that, in years prior to the SoP event, CEOs of primary firms receive annual grants with deltas similar to those received by control firm CEOs. Primary firms do not change the deltas of their new grants following a SoP event. In contrast, CEOs in weak-vote firms receive annual grants with higher deltas than those of control firms in the pre-SoP-event period and experience reductions in new-grant deltas – and therefore in pay-for-performance sensitivity – in the post-event years.

In model 8, we further investigate the PPS responses of primary and weak-vote

[16]Delta measures the dollar change in the value of the CEO's stock and option holdings for a 1% change in stock price.

firms. Specifically, we subdivide firms based on the delta of their new grants in the SoP event year into groups with below-median versus above-median deltas.[17] Using a triple difference model, we find that primary firms with above-median deltas reduce the deltas of new grants in the years following their peers' weak SoP votes (-0.122*), while those with below-median deltas in the SoP event year increase the deltas of their new grants (-0.122+0.237=0.115***). Similarly, weak-vote firms with above-median deltas in the SoP event year reduce the deltas of new grants in the *Post* period (-0.316***), while those with below-median deltas keep the deltas of their new grants unchanged (-0.316+0.368=0.052).

Taken together, the results in Table 5 suggest that after boards learn of investors' unfavorable view of the compensation practices of their peers they take deliberate action to align their pay practices towards those of control firms. In the following section we explore potential determinants of the changes in compensation practices of primary firms. Specifically, we are interested in understanding the extent to which the changes in compensation practices of primary firms are voluntary responses on the part of their boards rather than responses to shareholder pressure.

C. Determinants of compensation changes

Prior evidence suggests that shareholders exert greater pressure on boards when firm performance is low (Ertimur, Ferri, and Muslu (2011)). In order to analyze the extent to which low primary firm performance is related to the documented changes in compensation we sort primary and weak-vote firms into below-median and above-median groups based on their industry-adjusted stock performance in the SoP event

[17] We sort control firms into groups with above-median (below-median) delta according to the delta of their new grants in 2011 and 2012.

year.[18] In model 1 we find that, while the coefficient on *Primary* × *Post* is significant, the coefficient on the triple-interaction term *Primary* × *Low Ind-adj. stock return* × *Post* is insignificant. This suggests that primary firms respond to their peers' weak votes independent of their own performance in the SoP event year.

[Insert Table 6 here]

In model 2, we take a different approach and keep only those firms whose stock performance is in the top tercile of the firms in their own industries. We find that even higher-performing primary and weak-vote firms make compensation changes in line with those documented in Table 3. In model 3, we restrict the sample to firms that had above-median (>96%) shareholder support on their most recent say on pay vote. By construction, weak-vote firms drop from this sample and we are left with only primary and control firms. We again find very similar results to those documented earlier: primary firms provide their CEOs with significantly larger pay packages than control firms prior to the SoP event (13.4%), and significantly reduce the relative size of compensation packages in the years following their peers' low say on pay votes (-8.5%). Finally, for model 4 we limit the sample to primary and control firms that both rank in the top tercile of stock performance relative to the firms in their own industries and experience above-median support on their own most recent SoP vote. While it seems unlikely that such firms experience significant shareholder pressure, we find relative reductions in CEO compensation similar to those documented in Table 3.

In model 5 we explore whether CEO pay changes are influenced by the presence of an activist investor among a firm's shareholder base. Specifically, we analyze how the pres-

[18] We sort control firms into the above-median (below-median) group if their industry-adjusted stock performance is above-median (below-median) in 2011 or 2012.

ence of an activist hedge fund impacts the relative changes in compensation among primary and weak-vote firms. The estimated coefficients indicate that relative CEO compensation does not change following the SoP event for primary firms that have no activist investor in their shareholder base, while it falls by a significant 8.6% in those firms that do have an activist investor. This potentially suggests that pressure from activist investors leads the boards of primary firms to alter CEO compensation. Alternatively, it is possible that activists endogenously select into primary firms in which CEO pay is excessive. We investigate this distinction in model 6, in which we repeat the model 5 specification for the subset of firms that exhibit above-median excess compensation. We find that primary firms with high excess compensation significantly reduce relative CEO pay even if there are no activist investors in their shareholder base (-11.6%). Furthermore, the insignificant coefficient on the triple interaction term indicates that the presence of an activist does not affect the size of the compensation reduction. Taken together, the results in Table 6 suggest that boards of primary firms make voluntary and proactive changes to CEO pay, either upon learning about their compensation peers' weak SoP votes or via the compensation targeting plans they put into place.[19]

D. Composition of compensation peer groups

Our results to this point suggest that primary firms respond to negative signals regarding the compensation practices of their peers. This finding is consistent with

[19]In unreported results, we use triple difference settings to analyze the effects of overlapping institutional ownership and firm governance on post-event compensation changes. We do not find any evidence that overlapping institutional ownership between weak-vote peers and primary firms contributes to the observed pay changes among primary firms. A number of governance measures (the fraction of independent directors, CEO-chairman duality, CEO pay slice, and board co-option) also do not affect post-event compensation changes. It is possible that these traditional measures of governance are less likely to impact the workings of firms' compensation committees, which are required to include only independent directors and frequently operate with the guidance of external compensation consultants.

boards of directors using compensation peer groups for informational purposes. We further examine this interpretation by exploring changes in the composition of compensation peer groups. The results above indicate that weak-vote firms undergo large reductions in control-firm-relative CEO compensation. To the extent that boards use peer groups to justify high compensation for their CEOs – rather than to inform themselves regarding appropriate pay practices – firms that reduce CEO compensation should become less attractive as compensation peers. We therefore analyze peer group changes following SoP events and report the results in Table 7. We create a panel consisting of the compensation peers of weak-vote, primary, and control firms between 2009 and 2014 and examine whether primary firms are more likely to drop their weak-vote peers. Note that the unit of observation in Table 7 is base firm-peer-fiscal year.

[Insert Table 7 here]

The dependent variable is an indicator variable that equals one if a specific peer firm is dropped from the compensation peer group of a base firm (which is either a primary, weak-vote, or control firm) during the one or two years following the SoP event.[20] Models 1 and 3 include an indicator variable that takes the value one if a peer firm delists within the next one or next two years because it is acquired, taken private, or files for bankruptcy. In models 2 and 4, we also control for the outcome of the base firm's most recent SoP vote, whether there has been a change in CEO during the current or prior year, whether a peer is from the same industry, changes in the relative assets and sales of the base firm and its peer, and the peer firm's industry-adjusted stock performance.

[20]For firms in the control group, which do not have a SoP event, the dependent variable is set to 1 if the peer is dropped in the 1 or 2 years following 2012. The results are unchanged when modifying this to 2011.

We find that primary firms are no more likely to make peer group changes than are control firms. Furthermore, primary firms are no more likely to replace their weak-vote peers than to replace their other peers. This suggests that primary firms do not attempt to manipulate the composition of their compensation peer groups in an opportunistic manner, further supporting an informational role for compensation peer groups. In contrast, the one-year peer turnover rate of weak-vote firms is 4.7 percentage points higher than that of control firms, corresponding to an increase of 34%. Measured over a two-year period, however, weak-vote firms are no more like to replace compensation peers than are control firms. Control variable coefficients indicate that peer firms overall are more likely to be dropped following changes in the ratio of assets or sales relative to that of the base firm and less likely to be dropped when they are from the same industry.[21] Peer firms' industry-adjusted stock performance does not significantly affect the likelihood that they are dropped as peers.

E. Compensation changes in opportunistic benchmarkers

The results above indicate that, on average, compensation peers' weak votes provide boards with information that leads them to examine their own CEOs' compensation and respond with reductions where appropriate. Murphy (2013), however, argues that the efficient contracting and managerial power views of executive compensation are not mutually exclusive. To the extent that there are firms in our sample that choose their compensation peers opportunistically, we expect them to be less likely to respond to negative signals about their CEOs' compensation. We explore the responses of such firms to peers' weak votes by constructing measures of opportunistic selection and

[21] *Change in relative size (assets)* is defined as the absolute value of the difference between the assets of the base firm and the assets of the peer firm in year $t+1$ in models 1 and 2 ($t+2$ in models 3 and 4) minus the difference between the assets in $t=0$ (the SoP event year). *Change in relative sales* is constructed the same way.

omission of compensation peers and examining whether firms' pay responses relate to these measures.

We create two measures of opportunistic peer group construction, each of which identifies agency frictions in the selection of compensation peers. Specifically, we examine whether firms' changes in CEO compensation following peers' weak votes relate to the appropriateness of the firms' peer group choices. As there is no generally accepted benchmark by which to gauge whether a peer is an appropriate choice for a firm or not, we use the peer group choices of industry-, assets-, and sales-matched firms from the Russell 3000 to establish an external benchmark of appropriate peer group choices. Firms that select peers that are uncommon relative to their matched firms' peer groups or that omit peers that their matched firms commonly include are deemed more likely to have chosen peers opportunistically.

We measure selection-based peer commonality by calculating the average likelihood that the peers included in a firm's compensation peer group also appear in the peer groups of matched firms from the same industry with similar assets and sales.[22] A higher likelihood implies a greater commonality in peer group selection and, therefore, a reduced likelihood that the peer is included for opportunistic reasons. We further describe the construction of this measure in the variable appendix. The results of models 1 and 2 in Table 8 indicate that, relative to control firms, primary firms that display above-median commonality in peer group selection reduce relative CEO compensation by a significant 11.3% (=-0.081-0.032). Primary firms with below-median commonality, which are more likely to have chosen their peers for opportunistic reasons, do not make any significant reductions to CEO pay.

[22]To define similar assets and similar sales, we use a relative range of 50% to 150% as these values are frequently mentioned as the bounds to peer selection criteria in the CD&A sections of firms' proxy filings.

[Insert Table 8 here]

For models 3 and 4 we generate an omission-based peer commonality measure by calculating the likelihood that the base firm excludes peers that are commonly included in the peer groups of industry-, assets- and sales-matched firms. We further describe the construction of this measure in the variable appendix. A higher likelihood implies a lower commonality in peer groups and hence greater likelihood of opportunism in peer omission. The model 3 and 4 results in Table 8 indicate that primary firms with a below-median tendency to exclude peers common to their matched firms (i.e. who exhibit above-median peer commonality using an omission-based measure) reduce CEO pay by a significant 11.8% (=-0.098-0.020) following peers' low SoP vote outcomes. Once again, primary firms that rank low on peer commonality using an omissions-based measure do not experience any significant reductions in CEO pay.

In models 5 and 6, we combine the selection- and omission-based peer commonality measures into one measure. We define a *High peer commonality* indicator variable that equals one if the firm exhibits high commonality with its matched firms in both peer selection and peer omission, thus showing little sign of opportunistic benchmarking. The results confirm the models 1-4 findings. Primary firms that have an above-median degree of commonality using the dual measure respond to the weak vote of their compensation peers by reducing their pay by a significant 12.3% (=-0.093-0.030). There is no significant change in CEO pay in the remaining primary firms. In summary, to the extent that our measures of opportunistic peer group selection and omission reflect poor governance in compensation practices, we find that better governed firms are more likely to respond to negative signals regarding peers' pay practices.

The results in Table 8 also indicate that the response of firms to their *own* weak

votes is unrelated to the degree to which they selected their compensation peer group opportunistically. Firms that experience a weak vote undertake similar and significant reductions in CEO compensation regardless of the extent to which their peer groups are similar to those of their matched firms.

V. Conclusions

We analyze firms' reactions to the weak say on pay votes of their compensation peers in order to increase our understanding of the process by which boards of directors set CEO compensation. Our research design allows us to add to the existing evidence on two important aspects of this process: the impact of shareholder advisory votes (say on pay) and the role of compensation peer groups.

While few firms each year receive low shareholder support on their say on pay advisory proposals, we document that these weak votes have significant spillover effects via compensation peer groups. When at least 10% of a firm's self-selected compensation peers experience a weak SoP vote, the average firm responds by making significant reductions in its own CEO compensation relative to control firms that do not benchmark themselves to such weak-vote peers. This occurs despite the fact that these firms with weak-vote peers – which we label primary firms – experience neither weak support for their own SoP votes nor poor performance. These relative reductions in CEO compensation are concentrated among those primary firms that have above-median levels of excess CEO compensation and the changes made align primary firms' pay-for-performance sensitivity with that of control firms.

We contribute also to the debate on whether firms utilize the compensation benchmarking process for informational or opportunistic purposes. We interpret the finding that boards are willing to reduce CEO compensation in response to negative signals

about the compensation of their peers – and to do so in the absence of pressure from their own shareholders – as evidence that boards use compensation benchmarking for informational purposes. Further consistent with this interpretation, we find that primary firms do not disproportionately drop weak-vote peers from their compensation peer groups, despite the fact that weak-vote firms make control-firm-relative CEO compensation reductions that exceed those of primary firms. Nevertheless, we do find evidence that a subset of firms that we deem most likely to have chosen their compensation peers opportunistically do not exhibit changes in CEO compensation following their peers' weak votes.

Overall, our evidence suggests that boards, on average, respond proactively to the arrival of peer-benchmarking-related information about the competitive market wages of their CEOs and that resulting changes are unlikely to be prompted by shareholder pressure. As a result, compensation benchmarking practices and say on pay regulation combine to influence pay practices among a wider set of firms in the economy than previously documented and contribute to an alignment of pay practices among firms that compete with each other for managerial talent in the executive labor market.

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Figure 1. Impact of Weak-Vote Peers' Pay on Primary Firms' Pay Distribution

Fraction of weak-vote peers and average relative pay ratio across primary firms before and after peer group adjustments. Compensation peers of primary firms are sorted into deciles based on relative pay (peer pay divided by the pay of the relevant primary firm). Peer group adjustment assumes that firms replace each weak-vote peer with the median firm in their peer group. The distribution of relative peer pay across all primary firms is plotted before and after adjustment using an Epanechikov kernel density with optimal bandwidths. Vertical lines indicate changes in distribution medians and represent a decline of 0.109 in relative pay ratio following adjustments.

		Relative Pay			
Decile	*Fraction of Peers with Weak Votes*	*Before Adjustment*	*After Adjustment*	*Change in Pct. Points*	*p-value of Change*
1	4.4%	48.8%	46.3%	-2.5	0.429
2	7.3%	75.0%	70.6%	-4.4	0.375
3	7.4%	93.5%	88.5%	-5.0	0.427
4	10.2%	112.3%	104.7%	-7.7	0.318
5	13.2%	132.1%	122.5%	-9.6	0.336
6	15.5%	151.1%	138.9%	-12.2	0.269
7	18.6%	179.3%	160.8%	-18.4	0.145
8	25.4%	215.8%	191.3%	-24.4	0.128
9	31.6%	278.2%	240.5%	-37.7	0.067
10	45.9%	530.8%	402.0%	-128.8	0.068

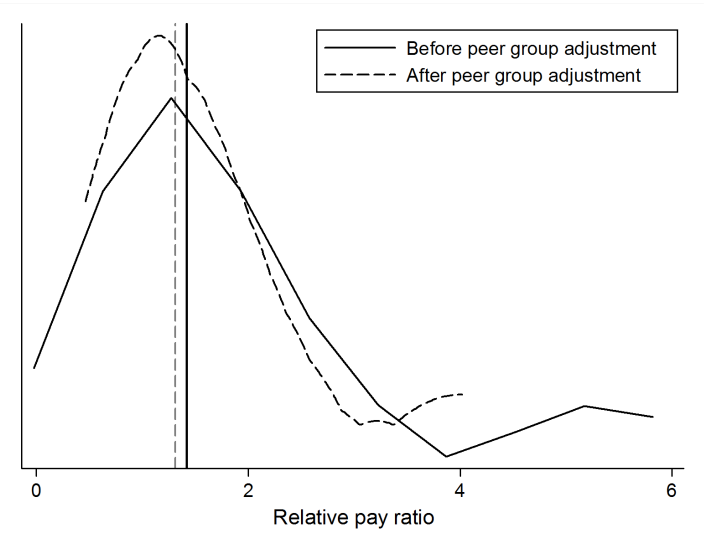


Figure 2. Relative Compensation Changes Around the Say on Pay Event Year

Means and 95% confidence intervals for year- and control firm-adjusted changes in total CEO compensation (`tdc1`) of weak-vote and primary firms. $T = 0$ is the year in which a primary (weak-vote) firm has weak-vote peers (has a weak vote).

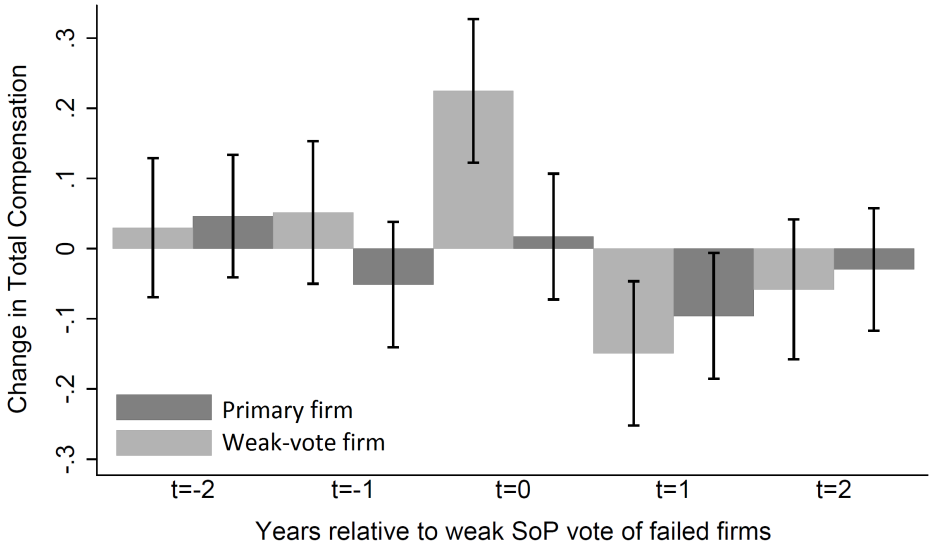
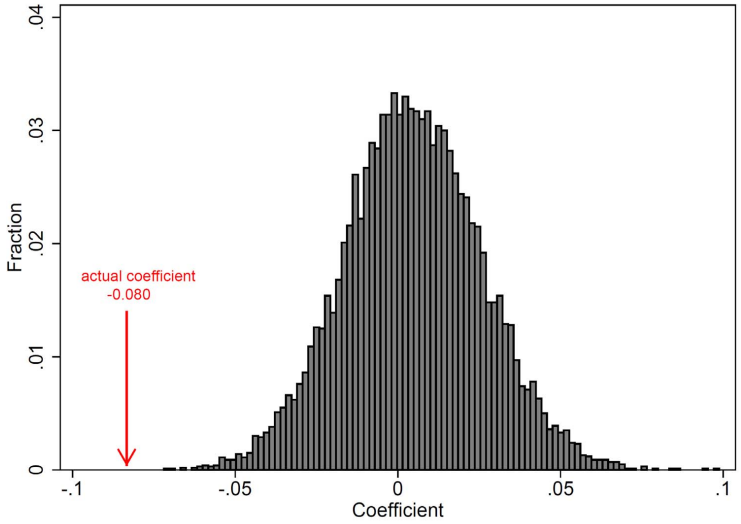
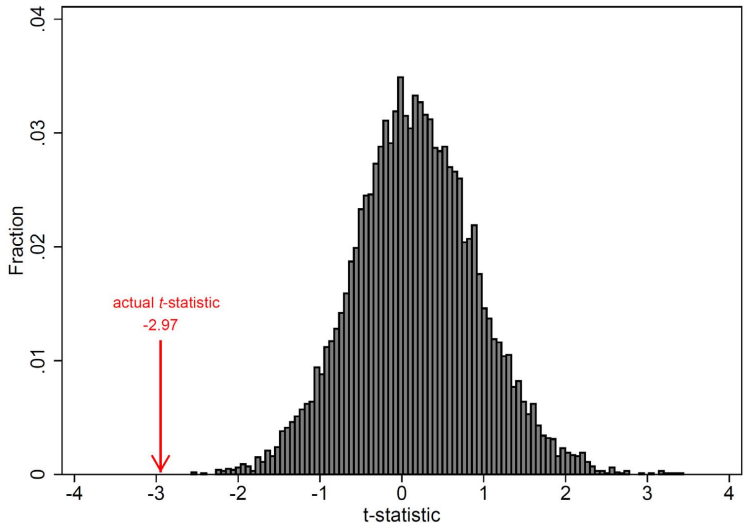


Figure 3. Falsification Test using Pseudo Compensation Peers

Distribution of coefficients and *t*-statistics for the variable *Primary* × *Post* based on 10,000 runs of Model 2 of Table 3. In each run, each of a firm's actual compensation peers is replaced with a *pseudo* compensation peer that is randomly drawn from the same industry (GICS 2-digit) and has assets and sales similar to those of the actual compensation peer (± 30%). Firms are classified as primary and control firms based on the say on pay outcomes of their pseudo compensation peers. Arrows indicate the coefficient and *t*-statistic from Model 2 of Table 3.



(a) Empirical distribution of coefficient on *Primary* × *Post*



(b) Empirical distribution of *t*-statistic on *Primary* × *Post*

Table 1. Say on Pay Vote Outcomes and Compensation Peer Groups

Distribution of say on pay support, number of peers in compensation peer group, and fraction of weak-vote firms in primary firms' compensation peer groups. *Weak-vote* equals 1 for firms that receive low SoP support in any year during the sample period. *Primary* equals 1 for firms with weak-vote peers. Variables for primary and weak-vote firms are measured in the SoP event year. Russell 3000 and control firm variables are averages for 2011 and 2012. Variable appendix A.1 provides variable definitions.

	Say on pay vote support				*Peer group sizes*			*Primary firms*
	Russell 3000	*Weak-vote firms*	*Primary firms*	*Control firms*	*Weak-vote firms*	*Primary firms*	*Control firms*	*% of weak--vote peers*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Min	0.0%	8.7%	73.3%	74.4%	5	8	3	10.3%
P10	72.5%	36.1%	86.9%	88.2%	10	12	9	11.1%
P25	87.6%	51.9%	92.9%	92.9%	13	14	12	13.0%
Median	94.8%	59.9%	96.3%	95.6%	16	16	15	15.8%
P75	97.6%	67.5%	98.1%	97.7%	21	19	20	21.4%
P90	98.9%	70.5%	99.3%	100.0%	26	24	25	25.0%
Max	100.0%	72.4%	100.0%	100.0%	101	116	78	37.5%
Mean	89.7%	57.0%	94.4%	94.6%	17.8	18.0	16.3	17.5%
N	5,839	213	345	503				

Table 2. Firm Characteristics

Summary statistics on firm, governance, peer group, and compensation characteristics across groups of firms. *Weak-vote* equals 1 for firms that receive low SoP support in any year during the sample period. *Primary* equals 1 for firms with weak-vote peers. Variables for primary and weak-vote firms are measured in the say on pay event year. Control firm variables are averages for 2011 and 2012. Variable appendix A.1 provides variable definitions. Two-sample, two-tailed t-tests are used to compare means for differences between weak-vote and primary firms relative to control firms. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Weak-vote firms (N=213)	*Primary firms* (N=345)	*Control firms* (N=503)	*Weak-vote firms - Control firms*		***Primary firms - Control firms***	
	Mean	Mean	Mean	Difference	t-stat	Difference	t-stat
Total compensation [t-1]	7029.6	6357.8	4463.3	2566.3	6.64***	1894.5	5.74***
Short-term incentives [t-1]	1328.9	1020.1	959.2	369.7	3.17***	60.9	0.69
Long-term incentives [t-1]	5421.7	5125.5	3377.5	2044.2	6.11***	1748	5.97***
Short-term incentive ratio [t-1]	0.266	0.240	0.317	-0.051	-3.03***	-0.077	-5.55***
Long-term incentive ratio [t-1]	0.692	0.721	0.643	0.049	2.76***	0.078	5.17***
Assets [t-1]	10,362.2	14,334.0	12,177.2	-1,815.0	-0.74	2,156.9	0.93
Market leverage [t-1]	0.471	0.591	0.616	-0.145	-1.32	-0.025	-0.23
Stock return (ind. adj.) [t]	-0.140	0.044	0.027	-0.167	-8.73***	0.017	0.90
ROA (ind. adj.) [t]	0.009	0.034	0.029	-0.020	-2.68***	0.005	0.83
Stock volatility [t]	0.026	0.022	0.022	0.004	4.55***	0.000	0.60
E-Index [t-1]	3.420	3.259	3.307	0.113	1.36	-0.048	-0.69
CEO chairman duality [t-1]	0.579	0.505	0.534	0.045	1.12	-0.029	-0.84
Staggered board [t-1]	0.486	0.432	0.485	0.001	0.01	-0.053	-1.40
CEO age [t-1]	55.31	55.11	55.67	-0.360	-0.61	-0.560	-1.16
Frac. ind. directors [t-1]	0.794	0.801	0.795	-0.001	-0.06	0.006	0.78
Fraction of same-industry peers [t]	0.577	0.559	0.572	0.005	0.16	-0.013	-0.55
Fraction of similar-sized peers [t]	0.443	0.438	0.437	0.006	0.38	0.001	0.08
Fraction of similar-sales peers [t]	0.513	0.540	0.508	0.005	0.21	0.032	1.71*

Table 3. Compensation Regressions around Weak Say on Pay Votes

The dependent variable in columns 1-3 is the logarithm of total compensation (`tdc1`) and in columns 4-6 the change in total compensation (`tdc1`) between t and $t-1$. *Weak-vote* equals 1 for firms that receive low SoP support in any year during the sample period. *Primary* equals 1 for firms with weak-vote peers. *Post* equals 1 in years following the SoP event year. In columns 4-6, all control variables marked with a star (*) are the the first differences thereof. Appendix A.1 provides variable definitions. When including firm fixed effects, we require that firms have data for all years during the sample period (2009-2014). Standard errors are clustered at the industry level and p-values are shown in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

Dependent variable	*Log of total compensation*			*Change in total compensation*		
Control variables marked with a star (*)	contemporaneous values			first differences		
Model	(1)	(2)	(3)	(4)	(5)	(6)
Primary	0.093***	0.094***		0.085***	0.085**	
	(0.000)	(0.001)		(0.009)	(0.010)	
Primary × Post	-0.064**	-0.080***	-0.076**	-0.103**	-0.130***	-0.105**
	(0.031)	(0.004)	(0.021)	(0.011)	(0.004)	(0.031)
Weak vote	0.138***	0.259***		0.108***	0.104**	
	(0.000)	(0.000)		-0.003	(0.022)	
Weak vote × Post	-0.186***	-0.206***	-0.246***	-0.151***	-0.181**	-0.199*
	(0.000)	(0.000)	(0.000)	(0.007)	(0.017)	(0.054)
Log of total compensation (lagged)	0.797***	0.530***	-0.021			
	(0.000)	(0.000)	(0.537)			
Change in total compensation				-0.212***	-0.223***	-0.352***
				(0.000)	(0.000)	(0.000)
SoP support (on most recent vote)*		0.749	0.446		-0.033	-0.139
		(0.329)	(0.739)		(0.772)	(0.459)
SoP support (on most recent vote)-sq.*		-0.521	-0.347		0.204	0.580
		(0.269)	(0.675)		(0.724)	(0.373)
CEO ownership (lagged)*		-0.010***	-0.003		-0.006	0.004
		(0.000)	(0.424)		(0.405)	(0.573)
Market value of assets (lagged)*		0.002**	0.003		0.001	0.000
		(0.021)	(0.323)		(0.922)	(0.965)
Squared market value of assets (lagged)*		-0.000***	-0.000		-0.000	-0.000
		(0.008)	(0.323)		(0.478)	(0.731)
Log of sales (lagged)*		0.174***	0.189***		0.243***	0.163
		(0.000)	(0.003)		(0.005)	(0.185)
Market leverage (lagged)*		-0.004	-0.013		0.001	0.019
		(0.459)	(0.283)		(0.970)	(0.569)
Market-to-book value (lagged)*		0.008***	0.008**		0.002	-0.001
		(0.001)	(0.040)		(0.880)	(0.933)
GICS6-ind.adj. ROA*		0.360***	0.529***		0.286**	0.379**
		(0.006)	(0.000)		(0.048)	(0.041)

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GICS6-ind.adj. ROA (lagged)*		-0.274***	0.116		-0.183	-0.059
		(0.002)	(0.174)		(0.426)	(0.798)
GICS6-ind.adj. stock perf.		0.151***	0.122***		0.170***	0.187***
		(0.000)	(0.000)		(0.001)	(0.006)
GICS6-ind.adj. stock perf. (lagged)		0.085***	0.085***		0.085**	0.100**
		(0.000)	(0.000)		(0.010)	(0.029)
GICS6 industry stock perf.		0.036	0.011		-0.047	-0.062
		(0.585)	(0.902)		(0.571)	(0.623)
GICS6 industry stock perf. (lagged)		0.071	0.000		0.007	0.015
		(0.276)	(0.997)		(0.952)	(0.910)
Idiosyncratic (mkt.adj.) volatility*		-3.862***	-2.735		-2.669	-3.916
		(0.001)	(0.227)		(0.330)	(0.185)
Indicator, CEO transition in current year		-0.052	-0.044		0.163**	0.148*
		(0.170)	(0.247)		(0.031)	(0.086)
Constant	3.109***	3.214***	11.617***		0.161*	0.655***
	(0.000)	(0.000)	(0.000)		(0.064)	(0.000)
Observations	5,953	5,953	5,252	5,748	5,736	5,141
R-squared	0.692	0.767	0.870	0.076	0.176	0.347
Year FE	Yes	No	No	Yes	No	No
State FE	No	Yes	No	No	Yes	No
Industry × Year FE	No	Yes	Yes	No	Yes	Yes
Firm FE	No	No	Yes	No	No	Yes

Table 4. Excess Compensation Regressions around Weak Say on Pay Votes

The dependent variable is the logarithm of total compensation (`tdc1`). *Weak-vote* equals 1 for firms that receive low SoP support in any year during the sample period. *Primary* equals 1 for firms with weak-vote peers. *Post* equals 1 in years following the SoP event year. *Above-median excess compensation* is an indicator variable that equals 1 for firms whose residual in a cross-sectional regression of log total compensation on current and lagged firm characteristics is above median, else 0. Similarly, *Compensation above peer group median* is an indicator variable that equals 1 for firms whose pay is above the median pay in their compensation peer group, else 0. Variable appendix A.1 provides further details. When including firm fixed effects, we require that firms have data for all years during the sample period (2009-2014). Standard errors are clustered at the industry level and p-values are shown in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

Dependent variable	*Log of Total Compensation*					
Sample	Firms with below-median excess comp.	Firms with above-median excess comp.		Firms with comp. below peer group median	Firms with comp. above peer group median	
Interaction variable			Above-median excess comp. (0/1)			Above peer group median comp. (0/1)
Model	(1)	(2)	(3)	(4)	(5)	(6)
Primary	0.013	0.019	0.025	0.054*	0.022	0.048
	(0.642)	(0.561)	(0.371)	(0.095)	(0.631)	(0.104)
Primary × *Post*	-0.019	-0.136***	-0.028	-0.032	-0.117**	-0.031
	(0.523)	(0.002)	(0.381)	(0.261)	(0.020)	(0.287)
Weak-vote	-0.019	0.152***	0.011	0.126**	0.196***	0.136***
	(0.708)	(0.000)	(0.833)	(0.012)	(0.000)	(0.004)
Weak-vote × *Post*	0.006	-0.292***	0.087	-0.094	-0.231***	-0.034
	(0.942)	(0.000)	(0.203)	(0.206)	(0.001)	(0.587)
Primary × *Interaction var.*			0.026			0.017
			(0.540)			(0.696)
Primary × *Interaction var.* × *Post*			-0.116**			-0.103**
			(0.021)			(0.022)
Weak-vote × *Interaction var.*			0.151***			0.070
			(0.007)			(0.184)
Weak-vote × *Interaction var.* × *Post*			-0.375***			-0.224***
			(0.000)			(0.006)
Interaction var.			0.281***			0.167***
			(0.000)			(0.000)
Log of total compensation (lagged)	0.459***	0.321***	0.427***	0.506***	0.383***	0.491***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
SoP support (most recent vote)	-2.344	0.548	0.633	-1.865	0.595	0.625
	(0.248)	(0.510)	(0.423)	(0.287)	(0.556)	(0.486)
SoP support (most recent vote)-sq.	1.245	-0.373	-0.436	0.964	-0.341	-0.431
	(0.294)	(0.474)	(0.370)	(0.360)	(0.587)	(0.433)

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CEO ownership (lagged)	-0.011***	0.002	-0.009***	-0.013***	0.006*	-0.010***
	(0.000)	(0.651)	(0.000)	(0.000)	(0.063)	(0.000)
Market value of assets (lagged)	0.005***	0.003**	0.003***	0.002*	0.001	0.001*
	(0.000)	(0.021)	(0.000)	(0.082)	(0.465)	(0.086)
Squared market value of assets (lagged)	-0.000***	-0.000***	-0.000***	-0.000*	-0.000	-0.000**
	(0.005)	(0.001)	(0.000)	(0.090)	(0.228)	(0.024)
Log of sales (lagged)	0.202***	0.247***	0.212***	0.177***	0.233***	0.183***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market leverage (lagged)	0.021*	-0.020***	-0.008	0.003	-0.046***	-0.001
	(0.071)	(0.005)	(0.181)	(0.661)	(0.000)	(0.852)
Market-to-book (lagged)	0.003	0.009**	0.006***	0.004	0.014**	0.007***
	(0.536)	(0.035)	(0.009)	(0.176)	(0.018)	(0.000)
Industry adjusted RoA	0.263*	0.493**	0.377***	0.333**	0.441***	0.369***
	(0.064)	(0.012)	(0.001)	(0.041)	(0.004)	(0.006)
Industry adjusted RoA (lagged)	-0.381**	-0.091	-0.273***	-0.324**	-0.319**	-0.314***
	(0.048)	(0.570)	(0.002)	(0.039)	(0.011)	(0.001)
Industry adjusted stock return	0.130***	0.171***	0.140***	0.117***	0.178***	0.131***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)
Industry adjusted stock return (lagged)	0.060**	0.119***	0.084***	0.069***	0.096***	0.084***
	(0.031)	(0.000)	(0.000)	(0.004)	(0.001)	(0.000)
Industry stock return	-0.002	0.100	0.028	0.069	0.116	0.035
	(0.984)	(0.249)	(0.684)	(0.471)	(0.235)	(0.603)
Industry stock return (lagged)	0.152*	-0.055	0.058	0.048	-0.072	-0.001
	(0.086)	(0.478)	(0.352)	(0.629)	(0.490)	(0.985)
Idiosyncratic (mkt.adj.) volatility	-4.102***	-3.236**	-3.090***	-5.175***	-2.312	-4.296***
	(0.007)	(0.020)	(0.006)	(0.009)	(0.269)	(0.002)
CEO turnover event	-0.048	-0.052	-0.043	-0.044	-0.034	-0.035
	(0.383)	(0.228)	(0.259)	(0.434)	(0.553)	(0.377)
Constant	4.887***	5.240***	3.878***	4.513***	4.507***	3.656***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3,137	2,816	5,953	3,346	2,076	5,422
R-squared	0.796	0.768	0.787	0.754	0.803	0.778
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Interaction var. × Year FE	n/a	n/a	Yes	n/a	n/a	Yes

Table 5. Compensation Structure and Pay-for-Performance Sensitivity Regressions around Weak Say on Pay Votes

The short-term incentive ratio is the sum of salary and annual bonus scaled by total compensation. The long-term incentive ratio is the sum of stock, option, and long-term non-equity grants scaled by total compensation. Firms are classified as having a low delta if their delta is below median. *Weak-vote* equals 1 for firms that receive low SoP support in any year during the sample period. *Primary* equals 1 for firms with weak-vote peers. *Post* equals 1 in years following the SoP event year. Appendix A.1 provides variable definitions. Standard errors are clustered at the industry level and *p*-values are shown in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

Dependent variable	*Short-term incentive ratio*		*Long-term incentive ratio*		*Log number of stocks & options granted*		*Delta of new stock & options granted*	
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Primary	-0.031***	-0.022***	0.034***	0.024**	0.591***	0.401**	0.002	0.077
	(0.000)	(0.005)	(0.000)	(0.011)	(0.000)	(0.016)	(0.955)	(0.131)
Primary × *Post*	0.024***	0.023***	-0.029***	-0.027***	-0.407**	-0.347**	0.002	-0.122*
	(0.001)	(0.001)	(0.001)	(0.002)	(0.021)	(0.049)	(0.961)	(0.080)
Weak-vote	-0.026***	-0.032***	0.024***	0.032***	0.650***	0.647***	0.157***	0.178***
	(0.000)	(0.000)	(0.003)	(0.001)	(0.000)	(0.001)	(0.001)	(0.003)
Weak-vote × *Post*	0.027***	0.023***	-0.032***	-0.025**	-0.761***	-0.523**	-0.243***	-0.316***
	(0.000)	(0.009)	(0.000)	(0.030)	(0.000)	(0.013)	(0.000)	(0.000)
Primary × *Low delta*								-0.063
								(0.309)
Primary × *Low delta* × *Post*								0.237**
								(0.011)
Weak-vote × *Low delta*								-0.151*
								(0.085)
Weak-vote × *Low delta* × *Post*								0.368***
								(0.000)
Low delta								-0.406***
								(0.000)
Lag of dependent variable	0.643***	0.528***	0.639***	0.516***	0.583***	0.487***	0.651***	0.564***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.141***	0.761***	0.200***	-0.364***	3.824***	-4.261	-1.409**	0.049
	(0.000)	(0.000)	(0.000)	(0.006)	(0.000)	(0.147)	(0.014)	(0.938)
Observations	5,955	5,955	5,955	5,955	5,955	5,955	3,887	3,383
R-squared	n/a	n/a	n/a	n/a	n/a	n/a	0.741	0.782
Firm controls	No	Yes	No	Yes	No	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes	Yes	Yes
Industry × Year FE	No	Yes	No	Yes	No	Yes	Yes	Yes
Interaction var. × Year FE	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6. Effects of Shareholder Pressure and Firm Performance

The dependent variable is the logarithm of total compensation (`tdc1`). *Low industry-adjusted stock return* equals 1 for firms that have a below-median industry-adjusted stock return in the SoP event year. *Activist Hedge Fund* equals 1 if a firm had an activist hedge fund as a disclosed owner in the SoP event year. Models 2-4 and 6 present subsample analyses. *Weak-vote* equals 1 for firms that receive low SoP support in any year during the sample period. *Primary* equals 1 for firms with weak-vote peers. *Post* equals 1 in years following the SoP event. Appendix A.1 provides variable definitions. Standard errors are clustered at the industry level and p-values are shown in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

Dependent variable	*Log of total compensation*					
Sample	Full sample	Top tercile ind. adj. stock perf-mance only	Above-median SoP vote support only	Top tercile ind. adj. stock performance and above-median SoP vote only	Full sample	Above-median excess comp.
Interaction variable	*Low ind. adj. stock return*				*Activist hedge fund*	*Activist hedge fund*
Model	(1)	(2)	(3)	(4)	(5)	(6)
Primary	0.098***	0.067*	0.134***	0.147***	0.152***	-0.018
	(0.003)	(0.086)	(0.000)	(0.006)	(0.000)	(0.707)
Primary × *Post*	-0.087***	-0.080**	-0.085**	-0.118**	-0.003	-0.116*
	(0.009)	(0.031)	(0.015)	(0.016)	(0.953)	(0.077)
Weak-vote	0.233***	0.238***			0.355***	0.124**
	(0.000)	(0.000)			(0.000)	(0.015)
Weak-vote × *Post*	-0.184***	-0.220***			-0.241***	-0.278***
	(0.001)	(0.005)			(0.000)	(0.001)
Primary × *Interaction var.*	0.021				-0.077**	0.085
	(0.662)				(0.036)	(0.137)
Primary × *Interaction var.* × *Post*	0.022				-0.086**	0.020
	(0.697)				(0.045)	(0.769)
Weak-vote × *Interaction var.*	0.081*				-0.115***	0.082
	(0.074)				(0.005)	(0.219)
Weak-vote × *Interaction var.* × *Post*	-0.029				0.039	0.039
	(0.658)				(0.526)	(0.656)
Interaction var.	-0.059				0.142***	-0.016
	(0.166)				(0.001)	(0.805)
Constant	3.221***	3.459***	4.436***	4.494***	3.428***	5.156***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	5,955	2,492	2,561	1,289	5,648	2,696
R-squared	0.767	0.775	0.750	0.782	0.778	0.736
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Interaction var. × Year FE	Yes	n/a	n/a	n/a	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 7. Peer Group Changes after Peers' Weak SoP Votes

The dependent variable is an indicator variable that equals 1 if a peer is dropped from the compensation peer group of a firm in the 1 or 2 years following an SoP event. *Weak-vote peer* equals 1 if the peer firm received a week-vote in its SoP proposal in the year prior to the fiscal year end of the base firm. *Change in relative assets (sales)* refers to the absolute value of the change in the ratio of peer assets (peer sales) to the base firm's assets (sales) over the next 1 or 2 years. *Same-industry peer* is an indicator variable that equals 1 if the peer firm belongs to the same industry as the base firm. *Peer firm delists* is an indicator variable that equals 1 if the peer firm is delisted due to bankruptcy, liquidation, acquisition or privatization in the next 1 or 2 years. *Weak-vote* equals 1 for firms that receive low SoP support in any year during the sample period. *Primary* equals 1 for firms with weak-vote peers. *Post* equals 1 in years following the SoP event year. Appendix A.1 provides variable definitions. Standard errors are clustered at the firm level and p-values are shown in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

Dependent variable	*Peer dropped within 1 Year*		*Peer dropped within 2 Years*	
Model	(1)	(2)	(3)	(4)
Weak-vote peer	-0.007	-0.024	-0.016	-0.018
	(0.652)	(0.295)	(0.450)	(0.524)
Primary	-0.003	-0.008	-0.006	-0.039*
	(0.871)	(0.576)	(0.805)	(0.054)
Weak-vote	0.060***	0.047**	0.032	-0.005
	(0.006)	(0.032)	(0.188)	(0.843)
Primary firm × Weak-vote peer	0.005	-0.021	0.019	-0.014
	(0.799)	(0.369)	(0.489)	(0.642)
Weak-vote firm × Weak-vote peer	0.010	-0.007	0.057	0.018
	(0.810)	(0.862)	(0.312)	(0.710)
Peer firm delists	0.884***	0.766***	0.781***	0.667***
	(0.000)	(0.000)	(0.000)	(0.000)
Say on pay support (most recent vote)		0.355		-1.046
		(0.884)		(0.761)
Say on pay support (most recent vote) – squared		-0.147		0.526
		(0.914)		(0.785)
CEO transition		0.041*		0.027
		(0.087)		(0.437)
Same-industry peer		-0.068***		-0.111***
		(0.000)		(0.000)
Change in relative size (assets)		0.039***		0.035***
		(0.000)		(0.000)
Change in relative sales		0.073***		0.057***
		(0.000)		(0.000)
Peer firm's ind.-adj. stock performance		0.008		-0.025
		(0.521)		(0.137)
Constant	0.107***	-0.267	0.216***	0.737
	(0.000)	(0.805)	(0.000)	(0.630)
Observations	21,030	14,758	20,028	13,745
R-squared	0.240	0.241	0.193	0.278
Industry × Year FE	No	Yes	No	Yes
Peer FE	No	Yes	No	Yes
State FE	No	Yes	No	Yes

Table 8. Compensation in Opportunistic Benchmarkers

The dependent variable is the logarithm of total compensation (`tdc1`). *High peer commonality (selection)* is an indicator variable that equals 1 for firms with above-median commonality in peer selection relative to matched firms. *High peer commonality (omission)* is an indicator variable that equals 1 for firms with below-median commonality in peer omissions relative to matched firms. *High peer commonality (selection or omission)* is an indicator variable that equals 1 if a firm is classified as having a high peer commonality in selection or omission as described above. *Weak-vote* equals 1 for firms that receive low SoP support in any year during the sample period. *Primary* equals 1 for firms with weak-vote peers. *Post* equals 1 in years following the SoP event year. Appendix A.1 provides variable definitions. Standard errors are clustered at the industry level and p-values are shown in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

Dependent variable	*Log of total compensation*					
Interaction variable	*High peer commonality (selection)*		*High peer commonality (omission)*		*High peer commonality (selection and omission)*	
Model	(1)	(2)	(3)	(4)	(5)	(6)
Primary	0.116***	0.090*	0.131***	0.105**	0.129***	0.095**
	(0.002)	(0.059)	(0.001)	(0.027)	(0.000)	(0.023)
Primary × *Post*	-0.001	-0.032	0.007	-0.020	0.001	-0.030
	(0.979)	(0.417)	(0.862)	(0.639)	(0.972)	(0.445)
Weak-vote	0.273***	0.279***	0.264***	0.261***	0.279***	0.270***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Weak-vote × *Post*	-0.178***	-0.218***	-0.185***	-0.221***	-0.186***	-0.225***
	(0.002)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Primary × *Interaction var.*	0.027	0.012	0.001	-0.011	-0.004	-0.003
	(0.377)	(0.744)	(0.979)	(0.767)	(0.906)	(0.950)
Primary × *Interaction var.* × *Post*	-0.100***	-0.081***	-0.111**	-0.098**	-0.110**	-0.093*
	(0.002)	(0.008)	(0.022)	(0.040)	(0.044)	(0.064)
Weak-vote × *Interaction var.*	0.006	-0.003	0.025	0.034	-0.013	0.011
	(0.859)	(0.953)	(0.498)	(0.442)	(0.770)	(0.847)
Weak-vote × *Interaction var.* × *Post*	0.016	0.006	0.034	0.019	0.041	0.024
	(0.731)	(0.899)	(0.522)	(0.736)	(0.489)	(0.669)
Interaction var.	-0.004	0.010	0.012	0.024**	0.013	0.012
	(0.660)	(0.326)	(0.239)	(0.033)	(0.671)	(0.696)
Constant	3.544***	3.442***	3.543***	3.436***	3.541***	3.442***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	4,798	4,798	4,798	4,798	4,798	4,798
R-squared	0.717	0.760	0.717	0.760	0.717	0.760
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	No	Yes	No	Yes	No	Yes
Interaction var. × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	Yes	No	Yes

Appendix A-1. Variable Definitions

Variable	Definition	Source
I. Classification of firms into Weak-vote/Primary/Control categories		
Weak-vote firm	Indicator variable that equals 1 if the firm was in the bottom 10 percent of Russell 3000 firms' support vote (< 72.5% support) on say on pay advisory proposals in fiscal years 2011, 2012 or 2013; 0 otherwise.	Equilar
Primary firm	Indicator variable that equals 1 if at least two of the firm's peers, representing at least 10% of its compensation peer group, receive weak SoP advisory votes; and 0 otherwise.	Equilar
Control firm	All remaining S&P 1500 firms that did not belong to the weak-vote or to the primary categories in any fiscal year between 2011 and 2013.	Equilar; Execucomp
Weak-vote peer	Indicator variable that equals 1 if the compensation peer received weak shareholder support (that is, had less than 72.5% support) on its SoP vote; 0 otherwise.	Equilar
Post	Indicator variable that equals 1 for weak-vote firms and primary firms in years following a firm's SoP event year, 0 otherwise. The SoP event year for weak-vote firms is the first fiscal year in which they received weak support (72.5% or less) on their SoP advisory vote. The SoP event year for primary firms is the first fiscal year in which more than 10% of their compensation peers (but at least two peers) receive weak support on their SoP advisory votes.	Equilar
Say on pay support (on most recent vote)	Support received by the firm in its most recent SoP advisory vote.	Equilar
II. Compensation related variables		
Log of total compensation	Log of one plus total compensation (Execucomp data item `tdc1`) awarded to the CEO in a fiscal year. Total compensation is the sum of salary, bonus, stock awards (fair value), option awards (Black-Scholes value), non-equity incentives and other compensation (perquisites).	Execucomp
Short-term incentive ratio	Salary plus annual bonus divided by total compensation.	Execucomp
Long-term incentive ratio	Long-term non-equity incentives plus the fair value of multi-year stock awards plus the Black-Scholes value of option awards divided by total compensation.	Execucomp

Appendix A-1. Variable Definitions (cont'd)

Variable	Definition	Source
Excess compensation	The residual from cross-sectional regressions (by fiscal year) of log total compensation on current and lagged firm characteristics (market value of assets, sales, market leverage, market-to-book), performance measures (industry-adjusted ROA, industry-adjusted stock performance, industry stock performance), state and industry fixed effects.	Execucomp; Compustat; CRSP
Log number of stock & option grants	Log of one plus the number of stock and option awards granted to CEO in a fiscal year.	Execucomp
Log delta of new stock and option grants	Log of one plus the delta of new stock and option awards made to the CEO in the current fiscal year. Following the methodology by Core and Guay (2002) the stock and option deltas are calculated as: • stock delta – sensitivity of the value of stock awards to a one percent change in stock price. • option delta – sensitivity of the (Black-Scholes) value of option awards to a one percent change in stock price.	Execucomp
High (Low) delta	Indicator variable that equals 1 for weak-vote firms and primary firms with above-median (below-median) delta of new stock and option grants in the SoP event year; 1 for control firms with above-median (below-median) delta in the fiscal years 2011 and 2012; 0 otherwise.	Execucomp
III. Moderating variables		
Activist hedge fund	Indicator variable that equals 1 for weak-vote firms and primary firms with one or more activists hedge funds in their shareholder base in the SoP event year; 1 for control firms with one or more activists hedge funds in their shareholder base in fiscal year 2012; and 0 otherwise.	Thomson Reuters 13F database; Activist hedge funds lists†
Low industry-adjusted stock performance	Indicator variable that equals 1 for weak-vote firms and primary firms with below-median industry-adjusted stock performance in the SoP event year; 1 for control firms with below-median industry-adjusted stock performance in 2011 or 2012; and 0 otherwise.	Compustat; CRSP

Appendix A-1. Variable Definitions (cont'd)

Variable	Definition	Source
Peer commonality – selection	Average of the likelihood that each of the firm's compensation peers also appears in the compensation peer groups of other matched firms that are similar in assets (±50%) and sales (±50%) and in the same industry (2-digit GICS) as itself. For each compensation peer of a base firm, we identify the fraction of matched firms that include the peer firm in their own peer groups. The peer commonality in selection measure is the average of these values across all base firm peers. We calculate the z-score of the commonality measure for each base firm by subtracting from its commonality score the industry's average commonality score in that year and scaling it by the standard deviation of the commonality scores in its industry.	Equilar; Compustat
High peer commonality – selection	Indicator variable that equals 1 for weak-vote firms and primary firms with above median commonality in peer selection in the SoP event year; 1 for control firms with above median commonality in peer selection in the fiscal years 2012; 0 otherwise.	Equilar; Compustat
Peer commonality – ommission	The likelihood that peers that appear in the peer groups of other matched firms that are similar in assets (±50%) and sales (±50%) and in the same industry (2-digit GICS) have been excluded from the base firm's peer group. We compare the peer group of matched firms with that of the base firm to identify peers that were omitted by the base firm. For each base firm, the peer commonality in omission is calculated as the sum of the number of omitted peers across the peer groups of all its matched firms and divided by the total number of peers across all its match firms. We calculate the z-score of the commonality measure for each base firm by subtracting from its commonality score the industry's average commonality score in that year and scaling it by the standard deviation of the commonality scores in its industry.	Equilar; Compustat
High peer commonality – omission	Indicator variable that equals 1 for weak-vote firms and primary firms with below-median peer commonality in omission in the SoP event year; 1 for control firms with below-median peer commonality in peer omission in the fiscal year 2012; 0 otherwise.	Equilar; Compustat

Appendix A-1. Variable Definitions (cont'd)

Variable	Definition	Source
IV. Control variables		
Market value of assets	Total market value (in $ billions) of equity plus the value of short- and long-term debt in the fiscal year.	Compustat
Log of sales	Log of one plus net sales in the fiscal year.	Compustat
Market-to-book value	Total market value of equity divided by book value of equity in the fiscal year.	Compustat
Market leverage	Short- plus long-term debt divided by total Market value of equity in the fiscal year.	Compustat
Industry-adjusted ROA	For each firm and fiscal year, the firm's return on assets minus its industry (6-digit GICS) average return on assets in the same fiscal year. Return on assets is calculated as the income before extraordinary items divided by the lagged total book assets.	Compustat
Industry stock performance	The value-weighted buy-and-hold return of all firms that are in the same industry (6-digit GICS). For each firm the industry stock performance is calculated over its fiscal year.	CRSP; Compustat
Industry-adjusted stock performance	Buy-and-hold return of the firm over its fiscal year minus the buy-and-hold (6-digit GICS) industry return over the same period.	CRSP; Compustat
Idiosyncratic volatility	Volatility of residuals of firm's daily stock returns over its fiscal year estimated from the Fama-French 3-factor model.	CRSP; FF daily factors
Tenure	Years since the CEO took office.	Execucomp
CEO transition	Indicator variable that equals 1 in the fiscal year of and the fiscal year after a CEO turnover; 0 otherwise. A CEO turnover occurs in a given year if the firm's CEO name differs from that in the year before.	Execucomp
Peer dropped in the next year	Indicator variable that equals 1 if the peer firm is dropped from the compensation peer group of the primary/weak-vote firm in the year following treatment; 1 if the peer firm is dropped from the compensation peer group of the control firm in 2013; 0 otherwise.	Equilar
Peer dropped in the next 2 years	Indicator variable that equals 1 if the peer firm is dropped from the compensation peer group of the primary/weak-vote firm in the two years following treatment; 1 if the peer firm is dropped from the compensation peer group of the control firm in 2013 or 2014; 0 otherwise.	Equilar
Same-industry peer	Indicator variable that equals 1 if the compensation peer belongs to the same 4-digit GICS industry as the base firm.	Equilar; Compustat

Appendix A-1. Variable Definitions (cont'd)

Variable	Definition	Source
Relative difference in assets (sales) in t+1 (t+2)	The absolute value of the difference in relative assets (sales) in $t+1$ ($t+2$) and the relative assets (sales) in year t. The relative assets (sales) is the ratio of the total assets (net sales) of the compensation peer to that of the base firm in a given year. For the primary and the weak-vote firms year $t+1$ ($t+2$), is the year (2 years) following the SoP event year. For control firms year $t+1$ ($t+2$) is fiscal year 2013 (2014).	Equilar; Compustat
Peer firm's industry-adjusted stock return in t+1 (t+2)	The 1 year (2 year) cumulative industry-adjusted stock return of the compensation peer following the SoP event. For control firms, it is the 1 year (2 years) cumulative industry-adjusted stock return of the compensation peer over 2013 (2013 and 2014).	Equilar; Compustat
Fraction of similar-assets (similar-sales) peers	The fraction of compensation peers that are within 50% of total assets (sales) of the base firm.	Equilar; Compustat

† `http://www.hedgetracker.com/top_shareholder_activist_investors.php` and `https://www.carriedin.com/activist-investors/`.

Appendix A-2. Compensation Regressions Around Weak Say on Pay Votes using Propensity-Score-Matched Control Firms

The dependent variable is the logarithm of total compensation (`tdc1`). A matched firm is the control firm that is closest based on its Mahalanobis-distance propensity score, calculated using log of total compensation, market value of equity, sales, market-to-book, and industry. *Weak-vote* equals 1 for firms that receive low SoP support in any year during the sample period. *Primary* equals 1 for firms with weak-vote peers. *Post* equals 1 in years following the SoP event year. Appendix A.1 provides variable definitions. When including firm fixed effects, we require that firms have data for all years during the sample period (2009-2014). The construction of control variables is as described in the variable appendix. Standard errors are clustered at the industry level and p-values are shown in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% level respectively.

	Log of total compensation							
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Primary	0.072**	0.084***	0.074**	0.090***	0.085**	0.091**		
	(0.024)	(0.006)	(0.036)	(0.006)	(0.022)	(0.018)		
Primary × *Post*	-0.088***	-0.075**	-0.070**	-0.075**	-0.110***	-0.110***	-0.058*	-0.092***
	(0.009)	(0.016)	(0.018)	(0.014)	(0.001)	(0.001)	(0.090)	(0.007)
Weak-vote	0.117***	0.232***	0.249***	0.231***	0.258***	0.256***		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
Weak-vote × *Post*	-0.201***	-0.191***	-0.197***	-0.190***	-0.237***	-0.233***	-0.220***	-0.274***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log Total compensation (lagged)	0.779***	0.561***	0.497***	0.537***	0.520***	0.500***	-0.025	-0.035
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.543)	(0.466)
Say on pay support (most recent vote)		0.698	0.754	0.605	0.599	0.597	0.447	0.382
		(0.413)	(0.326)	(0.482)	(0.448)	(0.460)	(0.746)	(0.782)
Say on pay support (most recent vote)-sq.		-0.500	-0.551	-0.430	-0.447	-0.429	-0.353	-0.317
		(0.349)	(0.244)	(0.425)	(0.356)	(0.393)	(0.686)	(0.715)
CEO ownership (lagged)		-0.009***	-0.012***	-0.009***	-0.012***	-0.012***	-0.003	-0.003
		(0.002)	(0.000)	(0.002)	(0.000)	(0.000)	(0.431)	(0.548)
Market value of assets (lagged)		0.003***	0.002**	0.004***	0.002*	0.002**	0.003*	0.003
		(0.004)	(0.043)	(0.000)	(0.084)	(0.025)	(0.082)	(0.241)
Squared market value of assets (lagged)		-0.000***	-0.000**	-0.000***	-0.000**	-0.000**	-0.000*	-0.000
		(0.008)	(0.020)	(0.000)	(0.045)	(0.012)	(0.063)	(0.286)
Log of sales (lagged)		0.122***	0.173***	0.127***	0.167***	0.171***	0.143**	0.157**
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.016)	(0.012)
Market leverage (lagged)		-0.005	-0.007	-0.006	-0.006	-0.009	-0.013	-0.008
		(0.428)	(0.151)	(0.353)	(0.264)	(0.161)	(0.142)	(0.512)
Market-to-book (lagged)		0.003	0.004	0.003	0.005*	0.007**	0.006	0.009*
		(0.415)	(0.140)	(0.289)	(0.057)	(0.015)	(0.104)	(0.054)
Industry adjusted RoA		0.604***	0.453**	0.595***	0.433**	0.426**	0.637***	0.633***
		(0.000)	(0.011)	(0.000)	(0.026)	(0.026)	(0.001)	(0.009)
Industry adjusted RoA (lagged)		-0.274*	-0.354***	-0.273*	-0.364***	-0.353***	0.074	0.108
		(0.065)	(0.004)	(0.058)	(0.006)	(0.007)	(0.556)	(0.390)
Industry adjusted stock return		0.140***	0.142***	0.139***	0.140***	0.142***	0.107***	0.109***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.002)
Industry adjusted stock return (lagged)		0.077***	0.085***	0.076***	0.079***	0.078***	0.080***	0.076***
		(0.002)	(0.001)	(0.002)	(0.003)	(0.003)	(0.002)	(0.009)
Industry stock return		0.122***	0.083*	0.116***	0.008	0.010	0.072	-0.004
		(0.009)	(0.088)	(0.009)	(0.926)	(0.899)	(0.251)	(0.974)
Industry stock return (lagged)		0.102**	0.092**	0.101**	0.074	0.074	0.043	0.007
		(0.027)	(0.025)	(0.026)	(0.340)	(0.335)	(0.257)	(0.936)
Mkt. adj. Idiosyncratic colatility		-4.128***	-5.413***	-4.408***	-5.015***	-5.148***	-5.202**	-3.882
		(0.009)	(0.000)	(0.004)	(0.000)	(0.000)	(0.047)	(0.138)
CEO turnover event		-0.038	-0.035	-0.032	-0.041	-0.034	-0.002	-0.003
		(0.320)	(0.352)	(0.386)	(0.333)	(0.416)	(0.958)	(0.948)
Constant	3.418***	3.892***	3.719***	4.045***	3.688***	3.869***	12.407***	12.633***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	4,087	4,087	4,087	4,087	4,087	4,087	3,386	3,386
R-squared	0.652	0.704	0.717	0.709	0.739	0.744	0.832	0.854
Year FE	Yes	Yes	Yes	Yes	No	No	Yes	No
Industry FE	No	No	Yes	No	No	No	No	No
State FE	No	No	No	Yes	No	Yes	No	No
Industry × Year FE	No	No	No	No	Yes	Yes	No	Yes
Firm FE	No	No	No	No	No	No	Yes	Yes