Shareholder Governance and CEO Compensation: The Peer Effects of Say on Pay

Denis, D.K.; Jochem, T.; Rajamani, A.

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Shareholder Governance and CEO Compensation: The Peer Effects of Say on Pay

Diane K. Denis
Joseph M. Katz Graduate School of Business, University of Pittsburgh

Torsten Jochem
Amsterdam Business School, University of Amsterdam

Anjana Rajamani
Rotterdam School of Management, Erasmus University

We document that firms whose compensation peers experience weak say on pay votes reduce CEO compensation following those votes. Reductions reflect proxy adviser concerns about peers' compensation contracts and are stronger when CEOs receive excess compensation, when they compete more closely with their weak-vote peers in the executive labor market, and when those peers perform well. Reductions occur following peers' disclosures of revised pay and are proportional to those needed to retain firms' relative positions in their peer groups. We conclude that the spillover effects of shareholder voting occur through both learning and compensation targeting channels. (*JEL* G34, G38, J38, M12, M52)

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Growth in institutional ownership and activism combined with regulatory changes have led shareholders to play an increasingly important role in the governance of U.S. firms. A well-developed literature provides evidence on the effects of shareholder governance actions on the firms that are subject to them.[1] A smaller and more recent literature provides evidence that some shareholder governance actions also have spillover effects for firms that are peers of the subject firms.[2]

The compensation of top executives is one of the more visible corporate policies over which shareholders seek to exert influence. Shareholder voting is one potential avenue for such influence. Under the so-called "say on pay" provision of the Dodd-Frank Wall Street Reform and Consumer Protection Act, any publicly listed corporation in the United States must submit the compensation plan of its top executives to shareholders for an advisory vote. Firms must disclose the vote results to shareholders and discuss any changes made in response to the results of prior low votes. Most evidence to date suggests that compensation-related shareholder proposals and say on pay regulation increase firm value.[3]

In this study, we provide evidence on the spillover effects of say on pay voting by documenting that firms undertake relative reductions in CEO compensation following their compensation peers' weak say on pay votes. We define a weak vote as shareholder support in the bottom decile of Russell 3000 firms (less than 72.5%) and label firms that have experienced such a vote *weak-vote firms*. Firms that have weak-vote peers but do not themselves experience a weak vote are *primary firms*; they are the focus of our analysis. All other firms are *control firms*. Changes in the CEO compensation of control firms serve as the counterfactual compensation change to which we compare the primary firm changes. We verify that primary and control firms exhibit parallel trends in CEO pay growth prior to peers' weak votes and do not differ in a range of pay-relevant characteristics, including conventional measures of size, performance, governance, say on pay vote support, and general peer group composition. Our 2009-2014 sample period includes the first 2 years of mandatory say on pay voting (2011 and 2012), as well as 2 pre- and 2 post-event years.

Using a difference-in-differences analysis, we find that primary firms pay their CEOs significantly more than do control firms in the 2 years prior to their compensation peers' weak say on pay votes and exhibit significant relative reductions in CEO compensation in the 2 years after those votes.

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[1] See Brav et al. (2008), Klein and Zur (2009), Greenwood and Schor (2009), Boyson, Gantchev, and Shivdasani (2017), and Fidrmuc and Kanoria (2018) for activism by hedge funds and Del Guercio, Seery, and Woidtke (2008) for general institutional investor activism via vote-no campaigns.

[2] See Aslan and Kumar (2016), Feng, Xu, and Zhu (2018), and Gantchev, Gredil, and Jotikasthira (2018) for the peer effects of hedge fund activism.

[3] See Cai and Walkling (2011), Correa and Lel (2016), Cuñat, Giné, and Guadalupe (2016), Ferri and Maber (2013), and Iliev and Vitanova (2019) for changes in firm value. See Ertimur, Ferri, and Muslu (2011), Ertimur, Ferri, and Oesch (2013), and Bugeja et al. (2016) for changes in firm compensation practices.

In the post-vote period the total compensation for primary firm CEOs declines by 10.1% ($476,300) relative to the pay of control firms, eliminating the pre-vote compensation difference between them. Robustness analyses indicate that mean reversion in compensation changes and unobserved shocks common to primary firms and their peer groups do not drive this result.

We find evidence consistent with two channels through which relative changes occur. The first is a learning channel, in which peers' weak votes provide primary firm boards with information that is relevant to pay design for their own CEOs. We find that primary firm pay changes are concentrated in firms that exhibit excess CEO compensation and are greater when their weak-vote peers exhibit above-median performance. This suggests that primary firms reduce CEO pay when it is more likely to be too high and when peers' weak say on pay votes are more likely to reflect shareholder discontent with pay design, rather than with general firm performance. In addition, we find that pay spillovers are larger when primary firms compete more closely with their weak-vote peers in the executive labor market, that is, when peer pay is most likely to be a relevant benchmark. Labor market considerations also play a moderating role. We find that primary firms' boards make fewer pay reductions when their CEOs have more outside options. This suggests that compensation committees are not only assessing the information content of their peers' votes but also deliberating the potential consequences of their pay decisions. Finally, we separately examine performance and nonperformance pay and find that primary firm reductions reflect proxy advisers' specific concerns about peers' compensation contracts. Collectively, these findings suggest that relative reductions in the pay of primary firm CEOs are a response to the information in peers' weak say on pay votes.

The second channel is a compensation targeting channel, in which peers' compensation reductions following their weak votes affect primary firms' relative positions in the pay distributions of their compensation peers. Bizjak, Lemmon, and Nguyen (2011) indicate that many firms target a specific range or percentile of their peers' pay levels when setting their own CEO compensation. Using differences in primary and weak-vote firms' fiscal year ends, we find that primary firm reductions are more likely to occur after peers' staggered disclosures of revised pay. This finding suggests that primary firm compensation changes are responses to peers' revised pay, as well as to information about peers' weak votes. Further consistent with this interpretation, we find that primary firms' compensation changes are proportional to those needed to retain firms' relative positions in their peer groups.

Our evidence suggests that compensation consultants play a role in transmitting information about peers' weak votes and compensation changes to primary firms. We explore the types of information that consultants provide to their client firms by reading the CD&A sections of primary firms' proxy statements and by conducting a survey of the compensation consultants employed by the primary firms. The information we collect suggests that

compensation consultants frequently provide their clients with information about peers' compensation and the results of peers' say on pay votes.

We also explore the possibility that primary firm boards reduce relative compensation because shareholders pressure them to do so. We find that primary firm pay changes are unrelated to various measures of potential shareholder pressure, including own-firm performance, the presence of institutional or activist investors, and the threat of negative recommendations from proxy advisors.

Weak-vote outcomes are clearly endogenous for the firms that experience them: factors such as poor performance or excess compensation could independently affect weak votes and firms' responses to them. One advantage of our research design is that weak votes are less likely to be endogenous for *peers* of the firms who experience them. However, firms' choices of compensation peers are also endogenous and, as such, firms and their peers may be subject to common shocks. We seek to alleviate this concern through careful choice of control variables; the inclusion of industry-year, and location-year fixed effects; falsification tests; and subsample analyses. In particular, the findings from several falsification tests based on nonreciprocal, inactive, and observationally identical pseudo peers are inconsistent with a common shock explanation for primary firms' pay responses. Furthermore, the lack of overlap between primary and weak-vote firms avoids the reflection problem described in Manski (1993).

Our findings have implications for three important literatures. First, we contribute to the literature on the spillover effects of shareholder governance.[4] Prior studies document spillover effects associated with hedge fund activism (Aslan and Kumar 2016; Feng, Xu, and Zhu 2018; Gantchev, Gredil, and Jotikasthira 2018). These large-scale and visible actions involve considerable effort and/or expense by hedge funds. In contrast, say on pay votes are low-cost actions that involve all firm shareholders and regularly occur in the normal course of firm activities. Our evidence that peers react to these less-visible expressions of shareholder dissatisfaction suggests that the peer effects of shareholder governance are more nuanced and widespread than indicated by prior evidence.

Second, we contribute to the literature on the impact of say on pay votes on U.S. firms. Shareholder support in say on pay votes overall is quite strong. During 2011 and 2012—the first 2 years in which say on pay 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. Thus, if weak say on pay votes affect compensation only at the relatively small set of firms that experience such votes, the overall effects of say on pay are arguably limited. However, our evidence indicates that weak say on pay votes affect compensation in a broader set of firms.

[4] For evidence on other governance spillover effects, see Bereskin and Cicero (2013) on CEO pay increases, Foroughi et al. (2018) on antitakeover policies, and Servaes and Tamayo (2014) on mergers and acquisitions.

Finally, we contribute to the literature on compensation benchmarking. Bizjak, Lemmon, and Naveen (2008), Albuquerque, De Franco, and Verdi (2013), and Cadman and Carter (2014) suggest that peer group choices reflect the market for managerial talent and help to attract and retain talented CEOs. On the other hand, Bizjak, Lemmon, and Nguyen (2011) and Faulkender and Yang (2010, 2013) suggest that the use of compensation peer groups contributes to pay inflation among firms with weak corporate governance. Colak, Yang, and Ye (2017) find evidence of both effects. We provide evidence that boards respond to negative information about the compensation of highly paid peer CEOs by reducing relative CEO compensation. Agency problems are unlikely to lead firms to decrease relative CEO pay; thus, our findings add to evidence that compensation benchmarking reflects labor market competition.

1. Methodology, Data, and Sample Description

1.1 Identifying peer effects

Researchers studying peer effects face a number of challenges in identifying what generates the correlation between peers' outcomes. Manski (1993) distinguishes between three sources of comovements: endogenous effects (individual actions are influenced by the actions of peers); contextual/exogenous effects (actions are similar because group members share exogenous characteristics); and correlated effects (actions are similar because groups face a common environment). Both endogenous and exogenous effects are considered peer effects. In our setting, firms may respond to weak votes among their peers because the votes lead peers to cut pay (endogenous effect); because there is a change in conditions in their shared executive labor market (contextual/exogenous effect); or because they are exposed to the same institutional environments such that common (e.g., industry) shocks lead primary and peer firms to take similar actions (correlated effects).

Our findings rule out common shocks (correlated effects) in several ways. First, we measure all primary firm pay changes relative to those made by control firms that exhibit parallel compensation trends prior to the arrival of peers' weak votes. These control firms are observationally similar to primary firms with respect to a large set of pay-relevant characteristics. In addition, placebo regressions indicate that relative pay does not change in pseudo primary firms that have peer groups that are observationally similar to those of primary firms but do not include any peers that experience weak votes.

Second, we make use of the fact that compensation peer groups are directed networks. We conduct a falsification test to examine whether the direction of the peer reference is critical for the propagation of pay shocks. If common shocks drive the observed pay changes in the primary firms, we should observe similar

changes in firms that are *referenced by*—but do not *reference*—the weak-vote firms. Instead, we observe pay changes among primary firms that reference weak-vote firms, but not among firms that are referenced by weak-vote firms.

Third, we use exogenous variation in the differences between primary firms' fiscal year ends and those of their weak-vote peers to examine the relative timing of pay changes. Fiscal year ends are set many years in advance and primary firms cannot modify their weak-vote peers' year ends. Thus, if a common shock leads to the observed pay changes, we would not expect differences in fiscal year ends to matter for the sequence of pay changes. Instead, we find that differences in fiscal year ends predict the timing of primary firms' pay changes: primary firms are more likely to change pay after their weak-vote peers disclose their revised pay.

Finally, several cross-sectional tests tie the information content of peers' weak votes to the existence, composition, and magnitudes of primary firms' pay changes. Taken together, these results make it improbable that an omitted common shock can explain our results.

An additional concern in classical outcome-on-outcome peer effect studies is the "reflection problem" (Manski 1993). Group behavior is an aggregation of individual behaviors; thus, group behavior both influences and is influenced by individual behavior. Our study sidesteps this concern as our design analyzes primary firms (the focal subjects) separate from their weak-vote peers (who provide the mechanism). Peer firms are not subjects of the study. This eliminates the mechanical links between own and peer characteristics that arise when a subject is simultaneously on both sides of the equation, once as a focal subject and once as a peer (Angrist 2014).

1.2 Data and methodology

We obtain data on compensation peer groups and say on pay 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 2011–2013. We require detailed data on CEO compensation packages, which the boards of our sample firms discuss in their annual proxy filings. We obtain these data from Execucomp; using them 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, governance data from ISS RiskMetrics, 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 say on pay advisory vote in 2011 or 2012 are *weak-vote firms*. We use the 10th percentile of the Russell 3000 say on pay vote distribution as a threshold to designate a weak vote; this corresponds

to 72.5% support.[5] Firms that did not experience low support on their own say on pay proposals in 2011 or 2012 but had self-selected compensation peers that did experience low support are *primary firms*. These firms are the focus of our analysis. We classify a firm as primary if at least two peer firms, representing at least 10% of a firm's peer group, experience weak say on pay votes in the 365 days prior to the filing date of the primary firm's proxy. We refer to the first fiscal year in which we classify a firm as a weak-vote or primary firm as its *(say on pay) event year*. Finally, *control firms* are those S&P 1500 firms that do not experience a weak vote themselves and do not have the required number of weak-vote peers in their compensation peer groups in any year between 2011 and 2013. Control firm changes in CEO compensation serve as the counterfactual to which we compare CEO compensation changes in the primary and weak-vote firms. We extend the requirement period for control firms to 2013 to ensure that control firms do not themselves respond to their own or their peers' weak votes during the post-event period of interest.

To capture changes to compensation policies in response to say on pay 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 4 of the 6 years in the sample period. Imposing this restriction yields 6,183 firm-year observations on 1,073 firms from the S&P 1500. Of these, we classify 214 as weak-vote firms, 349 as primary firms, and 510 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.

We use a difference-in-differences model to estimate the changes in CEO compensation in primary and weak-vote firms following say on pay events, relative to pay changes in control firms. We define an indicator variable, *Post*, which equals one in the years following the say on pay event and zero otherwise. Because the pay packages disclosed in proxy filings are for the fiscal year that just ended, *Post* switches to 1 only in the first year following the event year. For weak-vote firms, the say on pay event year is the first year in which the firm experiences weak support on its say on pay advisory vote. For primary firms, the say on pay event year is the first year in which at least two and more than

[5] Proxy advisers and compensation consultants generally consider support below 70% to indicate a negative view of firms' compensation practices. 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 say on pay vote outcome was below 70%. Likewise, Georgeson and Semler Brossy compile lists of firms with "low" say on pay vote support, consisting of firms that receive less than 70% support. Our results are robust to changing the threshold to 70%.

10% of a firms' peers experience weak support on their respective say on pay advisory votes. Our model is as follows:

$$\begin{aligned} log\ of\ total\ CEO\ compensation_{it} = \\ \alpha + \beta_1 Primary\ firm_i + \beta_2 (Primary\ firm \times Post)_{it} \\ + \gamma_1 Weak\text{-}vote\ firm_i + \gamma_2 (Weak\text{-}vote\ firm \times Post)_{it} \\ + \delta X_{it} + \rho (Industry \times Year\ FE) + \phi (State \times Year\ FE) + \varepsilon_{it} \end{aligned}$$

We use the logarithm of total CEO compensation (Execucomp data item tdc1) as our dependent variable. X_{it} is a set of control variables that includes firms' own most recent say on pay vote support and its squared value, as well as a large set of firm and performance characteristics that have been found to influence compensation levels (see Table 3 for details). We also include *Industry* × *Year* fixed effects to allow for industry-specific annual trends in compensation and *State* × *Year* fixed effects to allow for annual trends in geographic determinants of pay. Because CEO pay is serially correlated (Core, Guay, and Larcker 2008), we follow the literature and control for the lag of the dependent variable.[6] Our coefficients of interest, β_2 and γ_2, capture post-say on pay-event changes in primary and weak-vote firms' compensation levels in excess of control firm compensation changes, industry-year- and location-year-specific trends, firm attributes, and performance-related factors. Note that because weak-vote and primary firms are mutually exclusive categories, including weak-vote firms in the model does not affect the primary firms' coefficients β_1 and β_2.

1.3 Sample description

Table 1 provides descriptive statistics on say on pay advisory proposals and compensation peer groups. Column 1 shows the highly skewed nature of the say on pay vote distribution for Russell 3000 firms in 2011 and 2012. The mean (median) support level among Russell 3000 firms is 89.7% (94.8%). This is similar to the mean (median) say on pay vote support of 87.0% (94.6%) in our final sample. By construction, the maximum vote support among weak-vote firms is just below the 10th percentile of the Russell 3000 say on pay vote distribution (72.5%). The say on pay 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 sizes across the three groups: the mean (median) peer group size is 17.5 (16) for weak-vote firms, 18 (16) for primary firms, and 16.4 (15) for control firms. Column 8 indicates that a mean (median) of 17.4% (15.4%) of the primary

[6] See, for example, Kuhnen and Niessen-Ruenzi (2012) and Ertimur, Ferri, and Muslu (2011). Econometrically speaking, improperly excluding a lagged dependent variable when the data generation process is dynamic can lead to upward biased coefficients (see, e.g., Keele and Kelly 2006; Wilkins 2017).

Table 1
Say on pay vote outcomes and compensation peer groups

	Say on pay vote support				*Peer group size*			*Primary firms*
	Russell 3000 (1)	*Weak-vote firms* (2)	*Primary firms* (3)	*Control firms* (4)	*Weak-vote firms* (5)	*Primary firms* (6)	*Control firms* (7)	*% of weak-vote peers* (8)
Min	0.0%	8.7%	74.2%	74.4%	3	5	2	10.3
P10	72.5%	36.1%	86.9%	88.3%	10	12	9	11.4
P25	87.6%	51.7%	92.9%	92.9%	13	14	12	12.5
Median	94.8%	59.9%	96.3%	95.6%	16	16	15	15.4
P75	97.6%	67.4%	98.1%	97.7%	20	19	19	21.1
P90	98.9%	70.5%	99.4%	100.0%	25	24	24	26.3
Max	100.0%	72.4%	100.0%	100.0%	101	116	108	37.5
Mean	89.7%	56.8%	94.5%	94.6%	17.5	18.0	16.4	17.4
N	8,920	214	349	510				

This table presents the distribution of say on pay vote support, the number of compensation peers, and the fraction of weak-vote peers in primary firms' compensation peer groups. *Weak-vote firms* are those firms that receive low say on pay vote support; *Primary firms* are those firms with at least two weak-vote peers representing at least 10% of its compensation peer group; and *Control firms* are firms that are in neither of the above two categories over the sample period. Variables for primary and weak-vote firms are measured in the say on pay event year. Russell 3000 firm variables and control firm variables are averages for 2011 and 2012. Table A.1 describes the construction of all variables.

firms' compensation peers, corresponding to 3.1 (2.5) weak-vote peers for the mean (median) primary firm, suffer a weak say on pay vote. By construction, the minimum is just above 10%.

In Table 2, we present comparisons of firm characteristics across the three groups in the say on pay event year. We are foremost interested in comparing the primary firms to the control firms; nevertheless, we present comparisons of weak-vote firms to control firms as well. The results indicate that primary and control firms do not differ significantly with respect to conventional measures of size, performance, governance, and general peer group composition. The two groups also exhibit similarly high levels of shareholder support in director elections and similarly low rates of "against" say on pay recommendations from Institutional Shareholder Services (ISS). These results suggest that it is reasonable to benchmark our primary firms against the control firms. Weak-vote firms do not differ from control firms in measures of size, governance, or peer group composition; however, they exhibit significantly worse performance and higher volatility in the event year, as well as significantly less shareholder support in director elections and higher "against" say on pay vote recommendations from ISS. This is consistent with prior evidence of poor performance in firms that experience weak say on pay votes (e.g., Ferri and Maber 2013; Fisch, Palia, and Solomon 2018). Table IA.1 in the internet appendix indicates similar industry distributions across the three sets of firms.

Compensation comparisons indicate 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 say on pay event year. The average pay to primary firm CEOs is $1.8 million higher than that of control firms; this difference is over $2.5 million for the weak-vote firms. This is consistent with the possibility that the inclusion of weak-vote firms whose CEOs are highly compensated in their compensation peer groups leads to higher CEO compensation in the primary firms. It also provides a reason to expect that primary firms may reduce compensation after learning about their peers' weak say on pay votes.

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

In this section, we document changes in the level and composition of CEO pay and explore potential mechanisms through which such changes occur. Although we focus on primary firms' responses to their peers' weak votes (the peer effect), our research design allows us to provide evidence on how firms respond to their own weak votes as well (the direct effect).

Weak support for a firm's say on pay vote indicates to that firm's board of directors that investors perceive the firm's CEO compensation to be inappropriate. We are interested in whether a weak say on pay vote sends a signal to the boards of firms that look to the weak-vote firm when designing their

Table 2
Firm characteristics

	Weak-vote firms (N=214)	*Primary firms* (N=349)	*Control firms* (N=510)	Weak-vote firms - Control firms		**Primary firms - Control firms**	
	Mean	Mean	Mean	Difference	*t*-stat	Difference	*t*-stat
A. Compensation characteristics							
Total compensation	6902.0	6235.4	4396.5	2,505.5	6.55***	1,838.9	5.62***
Nonincentive compensation	1328.2	1004.4	954.8	373.4	3.22***	49.6	0.57
Incentive compensation	5253.7	5014.1	3314.4	1,939.3	5.89***	1,699.7	5.89***
Existence of golden parachute	0.865	0.838	0.807	0.058	1.74*	0.032	1.09
Value of golden parachute	20,469	13,770	11,962	8,506	3.57***	1,808	1.25
B. Firm characteristics							
Assets	10,200	13,859	11,995	−1,796	−0.74	1,863	0.81
Market leverage	0.475	0.571	0.622	−0.147	−1.35	−0.051	−0.48
Stock performance (industry-adj.)	−0.140	0.038	0.031	−0.171	−8.54***	0.071	0.37
ROA (industry-adj.)	0.008	0.035	0.028	−0.020	−2.61***	0.007	1.08
Idiosyncratic volatility (market-adj.)	0.026	0.022	0.023	0.003	4.14***	−0.001	−0.89
C. Governance characteristics							
E-index	3.412	3.269	3.302	0.110	1.31	−0.033	−0.47
CEO-chairman duality	0.576	0.501	0.530	0.046	1.14	−0.029	−0.83
Classified board	0.485	0.435	0.480	0.005	0.12	−0.045	−1.18
CEO age	55.25	55.03	55.72	−0.472	−0.80	−0.693	−1.45
Fraction of independent directors	0.794	0.802	0.794	−0.001	−0.09	0.008	0.98
D. Shareholder voting characteristics							
Average director vote support	0.915	0.958	0.954	−0.039	−7.46***	0.004	0.93
Average director vote support comp. comm.	0.889	0.957	0.956	−0.068	−11.38***	0.001	0.17
Fraction of firms with say on pay "against" ISS vote recommendation	0.832	0.034	0.022	0.810	44.7***	0.013	1.30
Fraction of directors on comp. comm. with ISS "against" recommendation	0.019	0.002	0.002	0.017	3.02***	0.000	0.23
E. Compensation peer group characteristics							
Peer group size	18.34	18.10	17.09	1.25	1.30	1.01	1.31
Fraction of same-industry peers	0.581	0.562	0.569	0.011	0.37	−0.007	−0.30
Fraction of similar-sized peers	0.441	0.441	0.439	0.003	0.15	0.002	0.16
Fraction of similar-sales peers	0.515	0.544	0.509	0.007	0.27	0.035	1.84*

This table presents summary statistics on firm, governance, voting, peer group, and compensation characteristics across groups of firms. *Weak-vote firms* are those firms that receive low say on pay vote support; *Primary firms* are those firms with at least two weak-vote peers representing at least 10% of its compensation peer group; and *Control firms* are firms that are in neither of the above two categories over the sample period. Variables for primary and weak-vote firms are measured in the say on pay event year and are averages of 2011 and 2012 for control firms. Table A.1 describes the construction of all variables. Two-sample, two-tailed *t*-tests are used to compare means for differences between weak-vote and primary firms relative to control firms.
* $p<0.10$; ** $p<0.05$; *** $p<0.01$.

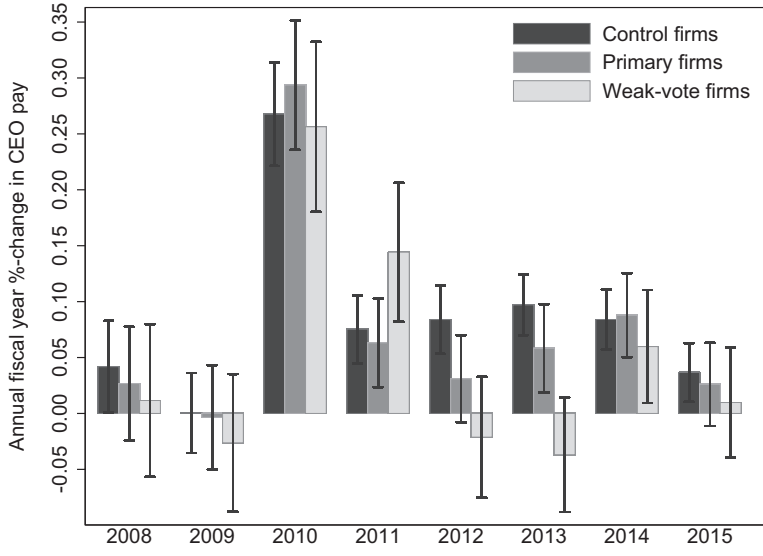

Figure 1
Parallel trends
Annual changes in CEO total compensation (tdc1) reported in fiscal year proxy filings for primary, weak-vote, and control firms with 95% confidence intervals.

own CEOs' compensation plans. To the extent that boards choose compensation peers to obtain information about appropriate market wages, a peer's weak vote should lead a board to consider the possibility that its own CEO's compensation is excessive. Careful review could lead some boards to conclude correctly that their CEO's compensation is appropriate. However, the elevated compensation of primary firms documented in Table 2 suggests that, on average, we expect to observe reductions in CEO compensation following peers' weak votes.

2.1 Compensation responses

We describe CEO compensation changes between 2008 and 2015 for our three sets of sample firms. Figure 1 indicates a general pattern of increasing compensation over the time period. Primary, control, and weak-vote firms exhibit parallel trends in compensation growth in 2008–2010 and again in 2014–2015. Growth rates diverge, however, in 2011–2013. Weak-vote firms exhibit significantly higher pay growth in 2011, a likely cause of their weak votes, while primary firms remain on trend with control firms in 2011. Although the majority of weak-vote and primary firms fail to reduce compensation in an absolute sense, both groups reduce CEO pay relative to control firms in 2012 and 2013. Weak-vote firms are most likely responding to dissatisfaction on the part of their own shareholders. However, relative reductions in the compensation of primary firm CEOs are consistent with primary firms reacting to their *peers'* weak votes. We explore this more fully in a multivariate setting.

Table 3 provides the results of our main difference-in-differences model. The coefficients in models 1 and 2 indicate that primary firms pay significantly more to their CEOs than do control firms prior to the say on pay event. In model 2, the coefficient on *Primary* implies that, prior to the say on pay event, the average primary firm CEO earns 9.4% ($438,300) more than the CEO of the average control firm does. Following the event, this premium shrinks by 10.1% ($476,300).[7] In model 3, we include firm fixed effects to estimate within-firm wage changes. To avoid the Nickell (1981) bias, we follow the advice of Angrist and Pischke (2008, p. 245) and drop the lagged dependent variable as a control in model 3. The consistency of the key coefficients on *Primary* and *Primary* × *Post* across models 1–3 suggests that peers' weak say on pay vote outcomes are uncorrelated with primary firm characteristics. Tables IA.2 and IA.3 further show that these results are robust to using a propensity-score-matched sample of control firms and to controlling for compensation consultant × fiscal year fixed effects.

The results in Table 3 indicate that weak-vote firms also exhibit pre-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-say on pay event CEO compensation is 21.0% greater than that of control firms and exhibits a relative decline of 16.7% following their weak votes. For the average weak-vote firm, the compensation premium drops from $1.039 million to $239,800 relative to the average control firm.[8] Table IA.4 shows similar relative pay changes at various percentiles in the compensation distribution, including for the median primary and weak-vote firms.

The inclusion of lagged compensation in models 1 and 2 provides some assurance that the relative changes observed in primary firms following their peers' weak votes do not simply reflect reversion to the mean, that is, 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 models 4–6, we use a first-differences specification to address this issue further. In these models, the dependent variable and independent variables other than the key indicator variables, stock performance, and indicator variables for CEO turnover, ISS

[7] The CEO of the average control firm earns $4.447 million prior to the say on pay event and $5.457 million in the post-period. Thus, the CEO of the average primary firm has expected pay of (exp(ln(4,447,000)+0.094)=) $4.885 million, implying a wage premium of $438,300. The expected pay of primary firms in the post-period is (exp(ln(5,457,000)+(0.094-0.101))=) $5.419 million, which implies a wage premium of −$38,100 relative to control firms. Therefore, the estimated change in the wage premium is $476,300.

[8] The CEO of the average control firm earns $4.447 million prior to the say on pay event and $5.457 million in the post-period. Thus, the CEO of the average weak-vote firm has an expected pay of (exp(ln(4,447,000)+0.21)=) $5.486 million before the say on pay event, implying a wage premium of $1.039 million. The expected pay of weak-vote firms in the post-period is (exp(ln(5,457,000)+(0.21−0.167))=) $5.696 million, which implies a wage premium of $239,800 relative to control firms. Therefore, the change in the wage premium is $799,300. Note that the majority of primary and weak-vote firms actually increase CEO pay in absolute terms but reduce it in relative terms.

Table 3
Compensation changes following weak say on pay votes

Dependent variable	*log of total compensation*			*Change in total compensation*		
Sample	Full sample			Full sample		
Control variables	Contemporaneous values			First differences		
Model	(1)	(2)	(3)	(4)	(5)	(6)
Primary	0.093***	0.094***		0.097***	0.114***	
	(0.001)	(0.001)		(0.008)	(0.005)	
Primary × *Post*	−0.074**	−0.101***	−0.083***	-0.117***	−0.154***	−0.134**
	(0.031)	(0.001)	(0.003)	(0.009)	(0.005)	(0.025)
Weak-vote	0.147***	0.210***		0.127**	0.094	
	(0.000)	(0.000)		(0.012)	(0.120)	
Weak-vote × *Post*	−0.208***	−0.167***	−0.241***	-0.151**	−0.092	−0.130
	(0.000)	(0.000)	(0.000)	(0.018)	(0.338)	(0.223)
log of total compensation (lagged)	0.791***	0.516***				
	(0.000)	(0.000)				
Change in total compensation				-0.193***	−0.193***	
				(0.000)	(0.000)	
Say on pay support (on most recent vote)		1.617	1.677		−0.269*	−0.090
		(0.113)	(0.308)		(0.094)	(0.691)
Say on pay support (on most recent vote) - squared		−1.000	−1.104		0.760	0.787
		(0.109)	(0.284)		(0.345)	(0.356)
CEO ownership (lagged)		−0.009***	−0.004		−0.021	−0.014
		(0.000)	(0.317)		(0.264)	(0.497)
Market value of assets (lagged)		0.001	0.000		0.000	0.005
		(0.112)	(0.908)		(0.949)	(0.617)
Market value of assets (lagged) - squared		−0.000**	0.000		−0.000	−0.000
		(0.046)	(0.993)		(0.489)	(0.871)
log sales (lagged)		0.178***	0.154***		0.152	0.152
		(0.000)	(0.003)		(0.103)	(0.271)

Table 3
(Continued)

Dependent variable	*log of total compensation*			*Change in total compensation*		
Sample	Full sample			Full sample		
Control variables	Contemporaneous values			First differences		
Model	(1)	(2)	(3)	(4)	(5)	(6)
Market leverage (lagged)		−0.005	−0.014		−0.016	−0.006
		(0.390)	(0.214)		(0.714)	(0.908)
Market-to-book value of equity (lagged)		0.009***	0.008*		−0.015	−0.025
		(0.001)	(0.059)		(0.213)	(0.144)
ROA (ind.adj.)		0.316**	0.472***		0.108	0.194
		(0.016)	(0.002)		(0.545)	(0.383)
ROA (ind.adj., lagged)		−0.252**	0.071		−0.452*	−0.546*
		(0.014)	(0.448)		(0.072)	(0.062)
Stock performance (ind.adj.)		0.148***	0.105***		0.323***	0.336***
		(0.000)	(0.000)		(0.000)	(0.000)
Stock performance (ind.adj., lagged)		0.090***	0.076***		0.071*	0.029
		(0.000)	(0.000)		(0.051)	(0.512)
Idiosyncratic volatility (mkt.adj.)		−4.179***	−3.257		−4.604	−4.760
		(0.001)	(0.174)		(0.267)	(0.290)
CEO turnover event		−0.060*	−0.046		0.161**	0.182**
		(0.083)	(0.185)		(0.013)	(0.041)
ISS against-vote recommendation		0.223***	0.158***		0.255***	0.286***
		(0.000)	(0.000)		(0.000)	(0.001)
Percentage of votes cast against comp. comm. members		0.080	0.151		0.046	0.077
		(0.417)	(0.319)		(0.806)	(0.764)
Annual say on pay vote frequency		−0.018	0.131		−0.157***	0.442*
		(0.478)	(0.291)		(0.003)	(0.074)
Golden parachute value		0.006***	0.000		−0.027	−0.048
		(0.000)	(0.542)		(0.333)	(0.227)
Observation	6,183	6,139	6,137	5,946	4,866	4,865
R-squared	0.679	0.773	0.868	0.063	0.208	0.329
Year FE	Yes	n/a	n/a	Yes	n/a	n/a
State × Year FE	No	Yes	Yes	No	Yes	Yes
Industry × Year FE	No	Yes	Yes	No	Yes	Yes
Firm FE	No	No	Yes	No	No	Yes

This table documents compensation changes following weak say on pay votes. The dependent variable in models 1–3 is the logarithm of total CEO compensation and in models 4–6 it is the change in total CEO compensation between t and $t-1$. *Weak-vote* equals 1 for firms that receive low say on pay vote support, and *Primary* equals 1 for firms with weak-vote peers. *Post* equals 1 in years following the say on pay event year. In models 4–6, all control variables are the first differences thereof (except stock return and indicator variables). Table A.1 describes the construction of all variables. Standard errors are clustered at the industry level, and p-values are shown in parentheses. *p<0.10; **p<0.05; ***p<0.01.

recommendation, and vote frequency reflect changes in levels relative to the previous year. Thus, we directly control in these specifications for the change in pay in the prior year. While the negative coefficient on the control variable *Change in lagged compensation* supports 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 say on pay event. This indicates that the documented changes in compensation among primary and weak-vote firms following say on pay events are in excess of those due to general mean reversion in compensation.

2.2 Falsification tests

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 them and to members of their respective peer groups, rather than to the low support received by some peers. We undertake several falsification tests to address this concern.

In our first test, we replace each firm's actual compensation peer with a randomly drawn pseudo compensation peer that is in the same GICS4 industry as the actual compensation peer and has similar assets and sales values. Industry, size, and sales are among the most commonly mentioned selection criteria for compensation peer selection in CD&A sections (Equilar 2019). The result is a pseudo peer group for each firm that is observationally similar to its actual peer group. We identify pseudo primary and pseudo control firms based on the say on pay vote outcomes of the pseudo peers and rerun model 2 of Table 3. We repeat this procedure 10,000 times and obtain the empirical distribution of the coefficient on the variable *Primary* × *Post* and its t-statistic. A similar test to corroborate peer effects in financial misconduct appears in Dimmock, Gerken, and Graham (2018). If the relative reductions in primary firm compensation documented in Table 3 are driven by unobserved shocks they share with their compensation peer groups, we expect to observe similar pay reductions among pseudo primary firms. We repeat the above procedure by randomly drawing firms with similar assets and sales from the product market competitors of the primary firms' actual peers, as classified by Hoberg and Phillips (2010, 2016). This allows us to test whether such unobserved shocks might occur in shared product markets.

Figure 2 shows the empirical distributions of the coefficient and t-statistic on the variable *Primary* × *Post*. We find that the coefficient on *Primary* × *Post* observed in model 2 of Table 3 is below even the most negative pseudo coefficient in both empirical distributions. It lies 5.0 (3.9) standard deviations below the means of the respective distributions when sampling peers from the same GICS4-industry (same product market). This is inconsistent with the existence of compensation shocks in the compensation peers' industries and reduces the likelihood that a shock to an unobserved peer group characteristic is

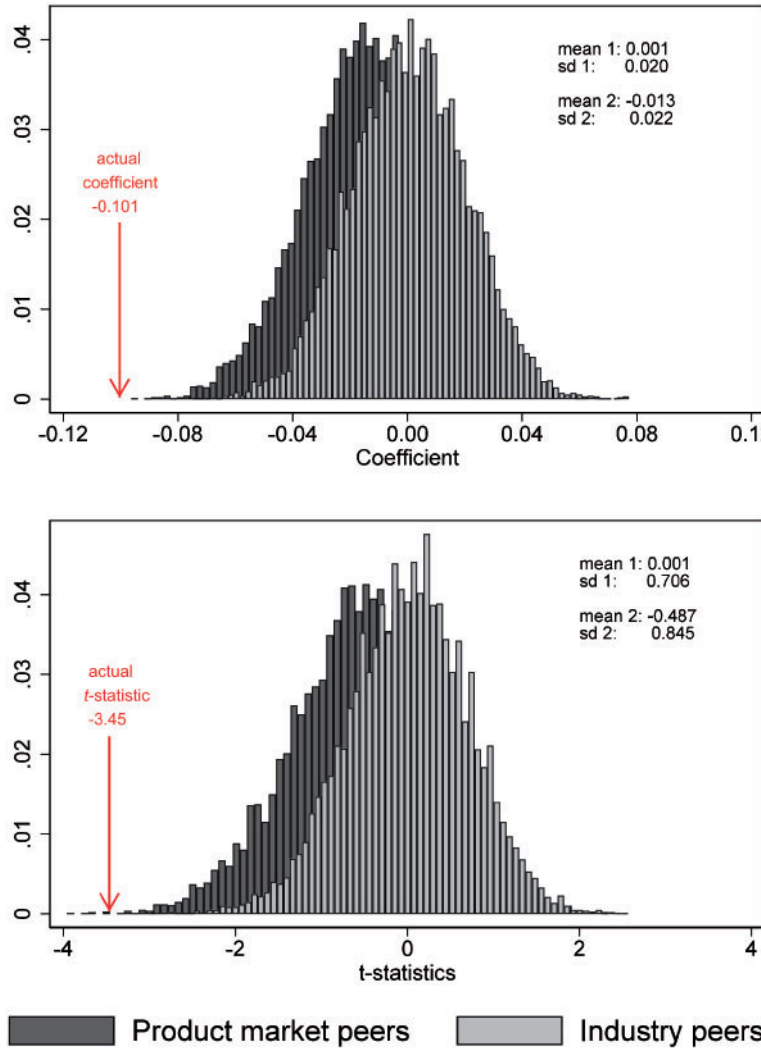

Figure 2
Falsification test using pseudo compensation peers: Empirical distributions of coefficients and *t*-statistics of *Primary* × *Post*
Distribution of coefficients and *t*-statistics on the variable *Primary* × *Post* based on 10,000 runs of model 2 of Table 3. In each run, in the light-shaded (dark-shaded) distribution, each of a firm's actual compensation peers is replaced with a pseudo compensation peer randomly drawn from the same GICS 4-digit industry (from a firm's product market peers as classified by Hoberg and Phillips (2010, 2016)) and that has assets and sales similar to those of the actual compensation peer (± 50%). Firms are classified as primary and control firms based on the say on pay vote outcomes of their pseudo compensation peers. Arrows indicate the locations of the coefficient and *t*-statistic from model 2 of Table 3.

responsible for primary firms' pay reactions. Figure IA.1 shows similar results when using GICS2 or GICS6 industry definitions and when using pseudo peers drawn from among the compensation peers of the primary firms' actual peers.

Table 4 documents the results of two additional falsification tests. In panel A, we make use of the fact that compensation peer groups are directed networks and test whether spillovers occur in the direction opposite that of the peer referencing. While common shocks would affect firms on either side of a compensation peer relationship, weak-vote induced pay changes that propagate via compensation benchmarking should spread only in the direction of the peer referencing.

We divide our control firms into two sets: those referenced by weak-vote peers but that do not reference them back (the pseudo primary firms) and those that neither reference nor are referenced by any weak-vote firms (the pseudo control firms). The latter group serves as the new benchmark for capturing general pay changes. If primary firms' pay changes are due to information that propagates via compensation benchmarking, we do not expect to observe relative pay changes among the pseudo primary firms. If, however, pay changes are due to common unobserved shocks, pseudo primary firms should also undertake relative pay reductions. The results in Columns 1–3 of Table 4 indicate that the coefficients on *Primary* × *Post* are insignificant and close to zero in all specifications. This indicates that spillover effects occur only in the direction of peer referencing, consistent with propagation through compensation benchmarking.

Panel B of Table 4 reports the results of a falsification test borrowed from the literature on the propagation of production shocks in customer-supplier networks (e.g., Barrot and Sauvagnat 2016). In this test, pseudo primary firms are control firms that, until recently, benchmarked to a weak-vote firm but do not do so in the event year. Control firms that never benchmarked to any of the weak-vote firms are the pseudo control firms. We define "recently" as within the last 2 years before the former peer's weak vote. Our findings are robust to using 1, 3, or 4 years. If spillovers occur through an unobserved channel or shared characteristic rather than through the benchmarking channel, we expect to see spillovers when former compensation peers experience a weak say on pay vote. Columns 4–6 provide no such evidence, indicating that spillovers require a currently active compensation peer reference.

Falsification tests cannot provide conclusive evidence that our results reflect the spillover effects of peers' weak say on pay votes. However, the combined findings of the three falsification tests help to rule out the alternative explanation that they are instead due to common compensation shocks.

2.3 Shareholder pressure and primary firms' pay responses

Another potential concern about our findings is that primary firms are responding to the possibility of pressure from their own shareholders, rather than to the low say on pay vote support received by their compensation peers.

Table 4
Falsification tests

Falsification test	*A. Using reverse direction*			*B. Using inactive connections*		
Dependent variable	*log of total compensation*			*log of total compensation*		
Model	(1)	(2)	(3)	(4)	(5)	(6)
Primary	0.096***	0.040		−0.038	−0.007	
	(0.001)	(0274)		(0.314)	(0.858)	
Primary × *Post*	−0.008	−0.021	−0.005	0.045	0.042	0.040
	(0.777)	(0.550)	(0.003)	(0.409)	(0.401)	(0.562)
Observation	2,279	2,279	2,279	2,868	2,868	2,868
R-squared	0.750	0.830	0.906	0.743	0.821	0.901
Firm controls	No	Yes	Yes	No	Yes	Yes
Year FE	Yes	n/a	n/a	Yes	n/a	n/a
State × Year FE	No	Yes	Yes	No	Yes	Yes
Industry × Year FE	No	Yes	Yes	No	Yes	Yes
Firm FE	No	No	Yes	No	No	Yes
# Pseudo primary firms	273	273	273	38	38	38
# Pseudo control firms	132	132	132	472	472	472

This table shows the results of two falsification tests. In panel A, we subdivide our control firms into firms referenced by weak-vote firms but that do not reference them back (pseudo primary firms) and firms that neither reference nor are referenced by weak-vote firms (pseudo control firms). In panel B, we subdivide our control firms into firms that reference weak-vote firms in the 2 years prior to the peers' weak vote but no longer do so in the year of the peer's weak vote (pseudo primary firms) and firms that never reference a weak-vote firm (pseudo control firms). The dependent variable is the logarithm of total CEO compensation. Firm controls are identical to those used in Table 3. Table A.1 describes the construction of all variables. Standard errors are clustered at the industry level, and p-values are shown in parentheses. *p<0.10; **p<0.05; ***p<0.01.

Brunarski et al. (2017) provide evidence that directors of firms with low shareholder say on pay support experience reductions in external directorships, compensation committee positions, and director compensation. To the extent that peers' weak say on pay votes indicate a higher likelihood of a similar outcome for primary firms, directors might actively seek to avoid such a fate. We explore whether the level of shareholder or activist pressure to which primary firms are potentially exposed affects their responses. Table 5 reports the results.

Shareholder pressure is difficult to measure because activist shareholders may engage with primary firm boards behind the scenes (McCahery, Sautner, and Starks 2016). We use poor performance and low say on pay vote support as proxies for shareholder pressure, as these variables are reliable predictors of the likelihood that activists will target a firm (Ertimur, Ferri, and Muslu 2011). We also examine whether large institutional holdings, the presence of activist hedge funds in the shareholder base, and the threat of a future "against" vote recommendation by ISS affect primary firm responses.

In model 1, we measure weak performance with an indicator variable for below-median industry-adjusted stock performance and use a triple interaction term to capture the pay responses of primary firms with weak performance. The coefficient on *Primary* × *Post* is significantly negative and similar in magnitude to earlier results in Table 3; however, the coefficient on *Primary* × *Low performance* × *Post* is positive and insignificant. This indicates that primary

Table 5
Shareholder pressure

Dependent variable	*log of total compensation*							
Sample	Full sample	Top tercile ind. adj. stock performance only	Above-median say on pay vote support only	Top tercile ind. adj. stock performance and above-median say on pay vote only	Full sample		Full sample	
Interaction variable	*Low ind. adj. stock performance*				*Above-median institutional holdings*	*Activist hedge fund presence*	*CEO pay above ISS peer group*	*Low peer overlap with ISS peer group*
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Primary	0.098***	0.124***	0.123***	0.157***	0.091**	0.162***	0.078**	0.097***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.022)	(0.000)	(0.011)	(0.002)
Primary × *Post*	−0.115***	−0.111**	−0.118***	−0.152***	−0.090**	−0.039	−0.066*	−0.099**
	(0.001)	(0.032)	(0.005)	(0.006)	(0.019)	(0.450)	(0.056)	(0.015)
Weak-vote	0.171***	0.207***			0.189***	0.310***	0.124**	0.206***
	(0.000)	(0.000)			(0.000)	(0.000)	(0.011)	(0.000)
Weak-vote × *Post*	−0.144**	−0.156*			−0.136**	−0.222***	−0.013	−0.157***
	(0.015)	(0.087)			(0.029)	(0.001)	(0.834)	(0.002)
Primary × *Interaction var.*	0.026				−0.001	−0.089**	0.032	−0.009
	(0.579)				(0.982)	(0.013)	(0.464)	(0.807)
Primary × *Interaction var.* × *Post*	0.039				−0.021	−0.062	−0.050	0.022
	(0.485)				(0.683)	(0.178)	(0.290)	(0.673)
Weak-vote × *Interaction var.*	0.074				−0.005	−0.135***	0.032	−0.030
	(0.111)				(0.916)	(0.000)	(0.450)	(0.399)
Weak-vote × *Interaction var.* × *Post*	−0.029				−0.066	0.058	−0.171**	−0.013
	(0.692)				(0.290)	(0.373)	(0.022)	(0.815)
Interaction var.	−0.073				0.159***	0.128***	0.175***	−0.049
	(0.128)				(0.000)	(0.001)	(0.000)	(0.206)
Observations	6,003	2,575	2,601	1,295	5,495	5,672	6,003	6,003
R-squared	0.777	0.826	0.789	0.832	0.796	0.788	0.775	0.764
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interaction var. × Year FE	Yes	n/a	n/a	n/a	Yes	Yes	Yes	Yes

This table documents the effects of shareholder and ISS pressure on firms' responses to weak say on pay votes. The dependent variable is the logarithm of total CEO compensation. *Weak-vote* equals 1 for firms that receive low say on pay vote support, and *Primary* equals 1 for firms with weak-vote peers. *Post* equals 1 in years following the say on pay event year (2012 for control firms). In model 1, the interaction variable equals 1 for firms that had a below-median industry-adjusted stock return in the say on pay event year. Model 2 restricts the sample to firms with stock performance in the top tercile of their industry in the say on pay event year. Model 3 includes only firms that had above-median say on pay vote support in the say on pay event year. Model 4 includes only firms that satisfy both criteria. In model 5, the interaction variable equals 1 if a firm has above-median institutional shareholdings in the say on pay event year. In model 6, the interaction variable equals 1 if a firm has an activist hedge fund as a disclosed owner in the say on pay event year. The dependent variable in model 7 equals 1 if CEO pay is above the ISS peer group median in the say on pay event year. The dependent variable in model 8 equals 1 if a firm has below-median overlap with its ISS peer group. Firm controls are identical to those used in Table 3. Table A.1 describes the construction of all variables. Standard errors are clustered at the industry level, and *p*-values are shown in parentheses. *$p<0.10$; **$p<0.05$; ***$p<0.01$

firms with weak performance, which are more likely to experience shareholder pressure, make pay reductions similar to those made by well-performing primary firms.

To further limit the scope for shareholder pressure, we keep only those firms whose stock performance is in the top industry tercile (model 2), those firms that had above-median (>96%) shareholder support on their most recent say on pay vote (model 3), and those firms that meet both of these requirements (model 4). We find that even high-performing primary firms and those with strong shareholder support make compensation changes in line with those documented in Table 3.

We further explore whether CEO pay changes are related to the presence of institutional investors and activist hedge funds among a firm's shareholder base. Specifically, we analyze whether above-median holdings by institutional investors (model 5) and the presence of activist hedge funds (model 6) affect relative changes in compensation in primary and weak-vote firms. The estimated coefficients on the triple interaction variables indicate that larger holdings by institutional investors and the presence of activist hedge funds are not associated with increased pay changes.[9]

In models 7 and 8, we build on the notion that proxy advisers have a strong influence on shareholder votes (Malenko and Shen 2016) and investigate whether primary firms' boards are more responsive if they are more likely to receive future ISS criticism. We focus on ISS because they are the largest proxy advisory firm and because their peer group selection methodology is publicly available. For each firm in our sample, we use the ISS "Multiple of Median Test" and create the event-year peer group that ISS would assign to the firm. We then test whether firms are more likely to react to their peers' weak say on pay votes when their CEO pay is above the median of their ISS peer groups (model 7) or when their actual peer groups have below-median overlap with their ISS peer groups (model 8). We do not find evidence that post-say on pay-event compensation changes are related to how they compare to these ISS metrics.

Finally, in Appendix Table IA.5, we exploit variation in the say on pay vote schedule of primary firms to examine whether the prospect of imminent shareholder scrutiny affects primary firms' pay responses. We do not find such evidence.

Taken together, the evidence in Table 5 suggests that it is unlikely that concerns about pressure from their own shareholders drive primary firm boards to make CEO pay changes following their compensation peers' weak say on pay votes. We conclude from the evidence in Tables 3–5 that changes in the compensation of primary firm CEOs are responses to their peers' weak votes. In

[9] In unreported results, we also examine governance measures previously shown to be associated with opportunistic peer selection: the fraction of independent directors, CEO-chairman duality, CEO pay slice, and board co-option. We do not find evidence that these measures affect post-event compensation changes.

the following section, we explore two potential channels through which these responses occur: a learning channel and a compensation targeting channel.

3. Channels

3.1 Learning channel evidence

To the extent that boards choose as compensation peers firms with which they compete for top executive talent, peers' weak votes should provide primary firm boards with information that is potentially relevant to pay design for their own CEOs. If changes in primary firm CEO pay reflect learning by primary firm boards, we expect to see that primary firm boards receive information about their peers' weak votes and post-vote CEO compensation and respond to that information in a deliberate way.

3.1.1 Information about peers' votes and responses. Chu, Faasse, and Rau (2018) report that over 90% of public U.S. firms engage compensation consultants during our sample period. We explore the extent to which these consultants inform the primary firms about their peers' compensation-related information. Firms are required to report the identity of their compensation consultants and to provide details on the nature and scope of their assignment (17 CFR § 229.407(e) 3(iii)). We collect information from the CD&A sections of our sample firms' proxy filings. Panel A of Table 6 reports the results.

We find that 95% of our sample firms hire a compensation consultant in the say on pay event year. Moreover, 945 (88% of the 1,073 firms) provide at least some form of disclosure about the services that consultants provide. The majority of disclosing firms state that they receive information about their peers' pay levels and composition (70.4%), the position of their own pay relative to their benchmark/target percentile (55.0%), and other information about peer groups (49.9%). However, the CD&A sections do not provide information about whether consultants provide their clients with information about the outcomes of peers' say on pay votes.

We seek further information by conducting a survey of compensation consultants employed by our primary firms in the event-years. We contact the 13 largest consulting firms, which jointly advise 90% of our sample firms. We receive responses from eight firms that jointly advise 46.5% of our sample firms and report the responses in panel B of Table 6.

Compensation consultants' responses indicate that they provide their clients with detailed information about their compensation peers. All respondents state that they "almost always" report the CEO pay level of their compensation peers, the CEO pay composition of compensation peers, and the firm's pay percentile relative to its compensation peers. Six of eight consulting firms report compensation peers' say on pay vote outcomes "almost always" or "often." One of the remaining two firms "never" report vote outcomes and the other

Table 6
Role of compensation consultants in the compensation-setting process

A. Consultant services disclosed in CD&A sections	N	%
Compensation		
- Reviewed and/or helped revise executive pay levels, incentive plans or performance targets	861	91.4
- Reviewed and/or helped revise pay for performance alignment or assessed pay competitiveness	347	36.8
- Reviewed and/or helped revise director pay	340	36.1
Peer groups		
- Provided information on peers' pay levels and/or pay composition	663	70.4
- Reviewed and/or helped revise peer group	608	64.5
- Reviewed and/or helped set target/benchmark levels of pay	518	55.0
- Provided information on other pay practices by peers and/or provided other general peer group analysis	470	49.9
Other services		
- Advised on market trends, best practices, legal and regulatory requirements	478	50.7
- Attended compensation committee meetings	297	31.5
- Reviewed and/or advised on company's pay philosophy and/or analyzed risk of compensation program	279	29.6
- Reviewed and/or advised on general employment agreements (such as severance pay, stock ownership guidelines)	157	16.7
- Reviewed and/or helped prepare disclosures for SEC filings	83	8.8
Total reporting	945	88.1
Total nonreporting	79	7.4
No consultant	49	4.6
Overall	1,073	100.0

B. Compensation consultancy survey

How often do you provide information to boards or compensation committees on ...	Almost always	Often	Rarely	Almost never
...the pay level of CEOs at compensation peers?	100%	0%	0%	0%
...the pay composition of CEOs at compensation peers?	100%	0%	0%	0%
...the percentile relative to compensation peers at which firm pays CEO?	100%	0%	0%	0%
...say on pay vote outcomes of compensation peers?	62.5%	12.5%	12.5%	12.5%
...proxy adviser vote recommendations for compensation peers?	50.0%	12.5%	25.0%	12.5%
...compensation-related shareholder proposals among compensation peers?	12.5%	25.0%	50.0%	12.5%

Panel A reports information on the services obtained by compensation committees from compensation consultants according to firms' disclosures in the Compensation Discussion and Analysis (CD&A) sections of proxy filings in the say on pay event year (2012 for control firms). Panel B reports survey responses from eight compensation consultants that jointly advised 498 (46.5%) of our sample firms. Respondents' titles were Partner (4×), Principal (2×), Managing director (1×), and Senior Adviser (1×), and respondents had an average of 18 years of experience in compensation consulting.

does so "rarely." Five consulting firms "almost always" or "often" report proxy advisers' recommendations with respect to their compensation peers, two do so "rarely," and one "never" does so. We interpret the survey results as evidence that compensation consultants are likely conduits of information for primary firm compensation committees.

If primary firm compensation changes are reactions to the information in their peers' weak say on pay votes, they should be more likely to change the type of compensation that was problematic for their peer firms. Table 2 indicates that 83.2% of the weak-vote firms in our sample receive negative say on pay vote recommendations from ISS in their event years. ISS organizes its compensation analysis into several categories and provides a summary "concern level" (low, medium, or high concern) for each category. As there is no category labeled "no concern," we treat "low concern" as a lack of ISS concern regarding the corresponding category. This assumption is consistent with the tone and content of the narrative for low concern verdicts.

We obtain from ISS detailed proxy research reports for the weak-vote firms and document the reasons that ISS provides for their negative recommendations. We are specifically interested in the ISS summary concern levels for the nonperformance pay category, which includes components such as nonqualified pay, CEO perquisites, and accumulated pension benefits, and the performance pay category, which consists of short- and long-term incentive pay. ISS compares these individual components to those of a set of ISS-chosen peer firms to decide whether these pay components warrant concern. We find that 94% of "against" say on pay vote recommendations include either a medium or a high concern about performance pay and 28% include a medium or high concern about nonperformance pay.

For each primary firm we compute the fraction of weak-vote peers that receive a medium or high concern on each of the two pay component categories (*Fraction of weak-vote peers with ISS criticism on nonperformance pay* and *Fraction of weak-vote peers with ISS criticism on performance pay*). We regress primary firms' changes in performance and nonperformance pay on the fractions of their weak-vote peers that receive ISS criticism regarding those pay components. Table 7 reports the results.

Models 1–4 in Table 7 indicate that primary and weak-vote firms provide significantly more performance pay than control firms do prior to their say on pay event years. Weak-vote firms provide higher nonperformance pay as well, though the premium is of much smaller magnitude. Following the event, both groups of firms revert to a level of performance pay that is similar to that of the control firms.

In models 5–8, we relate primary firm changes in performance and nonperformance pay to the fraction of their weak-vote peers that receive ISS criticism on the respective pay component. Because we are interested in the

Table 7
Compensation structure

Dependent variable	*log of non performance pay*		*log of performance pay*		*log of non performance pay*		*log of performance pay*	
Sample	Full sample				Primary firms only			
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Primary	0.006	0.008	0.185***	0.118**				
	(0.479)	(0.415)	(0.001)	(0.016)				
Primary × *Post*	0.001	−0.003	−0.118**	−0.133***				
	(0.909)	(0.807)	(0.021)	(0.006)				
Weak-vote	0.035**	0.047***	0.230***	0.248***				
	(0.016)	(0.005)	(0.000)	(0.000)				
Weak-vote × *Post*	−0.049**	−0.032*	−0.243***	−0.160**				
	(0.022)	(0.098)	(0.000)	(0.017)				
Frac. of weak-vote peers with ISS criticism on nonperf. pay					0.048***	0.003		
					(0.009)	(0.890)		
Frac. of weak-vote peers with ISS criticism on nonperf. pay × *Post*					0.001	−0.060*		
					(0.978)	(0.079)		
Frac. of weak-vote peers with ISS criticism on perf. pay							0.363**	0.158
							(0.010)	(0.351)
Frac. of weak-vote peers with ISS criticism on perf. pay × *Post*							−0.248**	−0.261*
							(0.037)	(0.080)
Observations	6,183	6,139	6,183	6,139	1,578	1,495	1,578	1,495
R-squared	0.743	0.790	0.527	0.669	0.707	0.822	0.478	0.696
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	n/a	Yes	n/a	Yes	No	Yes	No
State × Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Industry × Year FE	No	Yes	No	Yes	No	Yes	No	Yes

This table documents changes in pay composition following weak say on pay votes. The dependent variable in models 1, 2, 5, and 6 is the log of one plus the sum of salary and annual bonus (nonperformance pay). In models 3, 4, 7, and 8 the dependent variable is the log of one plus the sum of stock, option, and nonequity grants (performance pay). Models 5–8 use the sample of primary firms only. The interaction variable in models 5 and 6 (7 and 8) is the fraction of weak-vote peers of the primary firm that received a "medium" or "high" concern rating on nonperformance pay (on performance pay). Firm controls are identical to those used in Table 3. Table A.1 describes the construction of all variables. Standard errors are clustered at the industry level, and *p*-values are shown in parentheses. *p<0.10; **p<0.05; ***p<0.01.

intensive margin, the sample in models 5–8 consists only of primary firms. Controlling for firm characteristics and fixed effects, we find that primary firms' performance and nonperformance pay reductions are significantly related to the fraction of their weak-vote peers that received relevant ISS criticism. The 6% (26.1%) reduction in model 6 (model 8) corresponds to a $52,900 ($742,800) reduction in nonperformance (performance) pay for a primary firm whose weak-vote peers all receive relevant ISS criticism. These results indicate that primary firms make changes to pay components that proxy advisers identify as areas of concern for their weak-vote peers.

3.1.2 Relevance of peers' weak say on pay votes. If relevant information drives boards' responses to peers' weak votes, we expect to see that primary firm boards analyze the information content of their peers' say on pay votes before deciding whether and how to react to them. We hypothesize that peers' weak votes are more relevant—and therefore primary firms are more likely to respond—when primary firms pay excess CEO compensation, when weak-vote firm performance is high, when the two firms closely compete in the executive labor market, and when primary firm CEOs have fewer outside options.

We examine the impact of primary firms' pre-vote compensation levels on the extent to which they respond to peers' weak votes and present our findings in Table 8. We use two alternative measures to classify CEO compensation in our sample firms as excessive. The first measure classifies CEO pay as excessive if the firm has above-median residuals in CEO pay regressions in the say on pay event year (or 2011 and 2012 for control firms). Models 1–3 present results based on this measure. The coefficients in model 1 indicate that firms with below-median residuals do not alter CEO pay relative to control firms following a say on pay event. This result holds for both primary and weak-vote firms. Model 2, however, indicates that firms whose pre-say on pay-event pay is excessive undertake strong and highly significant reductions in relative CEO compensation: -15.1% following peers' weak votes and -25.3% 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 pay reductions in the post-period are concentrated among firms with excess compensation.

Our alternative measure of excess compensation classifies CEO pay as excessive if it exceeds the median CEO pay of its compensation 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 coefficient estimates in models 4–6 confirm the earlier findings: only those primary and weak-vote firms with excess pay make significant relative pay reductions.

The insignificant coefficients on *Primary* in models 2 and 5 indicate that primary and control firms exhibit similar excess compensation in these

Table 8
Excess compensation

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.*			*Above peer group median comp.*
Model	(1)	(2)	(3)	(4)	(5)	(6)
Primary	−0.003	0.009	0.026	0.048	0.019	0.020
	(0.913)	(0.759)	(0.368)	(0.122)	(0.612)	(0.509)
Primary × *Post*	−0.009	−0.151***	−0.041	−0.042	−0.123***	−0.011
	(0.794)	(0.001)	(0.205)	(0.159)	(0.005)	(0.716)
Weak-vote	−0.062	0.109**	−0.025	0.078	0.115***	0.077*
	(0.259)	(0.017)	(0.643)	(0.124)	(0.004)	(0.084)
Weak-vote × *Post*	0.024	−0.253***	0.109*	−0.089	−0.168***	−0.027
	(0.745)	(0.000)	(0.073)	(0.189)	(0.005)	(0.698)
Primary × *Interaction var.*			0.016			0.148**
			(0.702)			(0.015)
Primary × *Interaction var.* × *Post*			−0.119**			−0.194***
			(0.017)			(0.000)
Weak-vote × *Interaction var.*			0.147**			0.186***
			(0.018)			(0.005)
Weak-vote × *Interaction var.* × *Post*			−0.358***			−0.236***
			(0.000)			(0.003)
Interaction var.			0.195***			0.121**
			(0.002)			(0.015)
Observations	3,124	2,877	6,139	3,273	1,913	5,424
R-squared	0.811	0.770	0.790	0.768	0.824	0.784
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
State × Year 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

This table documents the effects of excess compensation on primary and weak-vote firms' compensation responses following weak say on pay votes. The dependent variable is the logarithm of total CEO compensation. *Weak-vote* equals 1 for firms that receive low say on pay vote support, and *Primary* equals 1 for firms with weak-vote peers. *Post* equals 1 in years following the say on pay event year. *Above-median excess compensation* equals 1 for firms whose residual in a cross-sectional regression of log total compensation on current and lagged firm characteristics, industry and location fixed effects is above median. *Above peer group median compensation* is an indicator variable that equals 1 for firms whose pay is above the median pay in their compensation peer group. Firm controls are identical to those used in Table 3. Table A.1 describes the construction of all variables. Standard errors are clustered at the industry level, and *p*-values are shown in parentheses. *p<0.10; **p<0.05; ***p<0.01.

subsamples. Despite this, primary firms make significant pay reductions relative to the control firms in the post-period. This is additional evidence that primary firms' pay changes stem from their peers' weak votes, rather than from other factors that affect high-paying firms in general.[10]

Prior evidence suggests that low say on pay vote support can reflect shareholder discontent with general firm performance (Ferri and Maber 2013; Fisch, Palia, and Solomon 2018). To the extent that a peer's weak say on pay vote is accompanied by poor peer performance, its shareholders may be more concerned with performance than with compensation design. The descriptive statistics in Table 2 suggest that primary firms are less likely than weak-vote firms to suffer from poor performance; thus, weak votes for poorly performing peers may be less relevant for them. We explore this prediction and report results in Table 9, models 1–4.

We restrict our sample to primary firms and interact the *Post* indicator variable with either the average ROA (models 1 and 2) or the average stock performance (models 3 and 4) of weak-vote peers. We find that primary firms make larger pay reductions when their weak-vote peers have higher operating or stock performance. Model 2 indicates that a one standard deviation increase in weak-vote peers' average ROA is associated with a (exp(0.058*(-1.255))-1=) 7.0% larger relative pay reduction by primary firms. Similarly, in model 4, a one standard deviation increase in weak-vote peers' average stock performance is associated with a (exp(0.196*(-0.232))-1=) 4.4% larger relative pay reduction by primary firms.

The relevance of a peer's compensation plan should also relate positively to the extent to which the two firms compete in the executive labor market. In models 5 and 6, we interact the *Post* indicator variable with *Talent flow with weak-vote peers*, computed as the number of weak-vote peers that are from industries from/to which the primary firm gained/lost executives in the 5 years prior to the say on pay event year. The coefficient estimate on the interaction term is significantly negative, indicating that primary firms undertake larger pay reductions when the say on pay vote signal originates from peers with whom they compete more closely. A one standard deviation increase in the number of weak-vote peers from industries with prior executive talent flow in model 6 is associated with an additional (exp(0.564*(-0.071))-1=) -3.9% relative pay change by primary firms in the post-period.

In models 7 and 8, we examine whether peers' weak votes carry more weight when the two firms' CEOs' managerial skillsets are more similar. We use the CEO general ability index of Custódio, Ferreira, and Matos (2013), which ranks CEOs along a continuous generalist vs. specialist spectrum based on experience across positions, firms, and industries. We create the variable

[10] Table IA.7 reports that primary firm pay responses are unrelated to the number of weak-vote peers. This finding is also consistent with primary firms learning from peers' weak votes, as additional weak votes are unlikely to contribute to learning on the margin.

Table 9
Information content of peers' weak say on pay votes

Dependent variable	*log of total compensation*							
Variation	Firm performance of weak-vote peers				Labor market commonality with weak-vote peers			
Sample	Primary firms				Primary firms			
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Operating perf. by weak-vote peers	1.756***	1.045*						
	(0.000)	(0.055)						
Operating perf. by weak-vote peers × Post	−1.434***	−1.255***						
	(0.001)	(0.009)						
Stock perf. by weak-vote peers			0.274***	0.090				
			(0.000)	(0.514)				
Stock perf. by weak-vote peers × Post			−0.159**	−0.232*				
			(0.034)	(0.077)				
Talent flow with weak-vote peers					0.025	0.073***		
					(0.118)	(0.007)		
Talent flow with weak-vote peers × Post					−0.038*	−0.071***		
					(0.056)	(0.000)		
CEO type similarity with weak-vote peers							0.009	−0.025
							(0.731)	(0.441)
CEO type similarity with weak-vote peers × Post							−0.056***	−0.056*
							(0.009)	(0.061)
Observations	1,948	1,948	1,743	1,743	1,946	1,946	1,560	1,560
R-squared	0.622	0.778	0.637	0.785	0.619	0.779	0.605	0.784
Firm controls	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Year FE	Yes	n/a	Yes	n/a	Yes	n/a	Yes	n/a
State × Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Industry × Year FE	No	Yes	No	Yes	No	Yes	No	Yes

This table analyzes the sensitivity of primary firm pay changes to the information content of peers' weak say on pay votes. In models 1 and 2, *Operating performance by weak-vote peers* measures the average ROA of primary firms' weak-vote peers in the say on pay event year. In models 3 and 4, *Stock performance by weak-vote peers* measures the average stock return of primary firms' weak-vote peers in the say on pay event year. In models 5 and 6, the variable *Talent flow with weak-vote peers* is the number of weak-vote peers that are from industries from/to which the primary firm has gained/lost executives in the 5 years prior to the say on pay event year. In models 7 and 8, the variable *CEO type similarity with weak-vote peers* measures the historic average closeness between the primary firm CEO's general ability index (Custódio, Ferreira, and Matos 2013) and that of its weak-vote peers' CEOs. Firm controls are identical to those used in Table 3. Table A.1 describes the construction of all variables. Standard errors are clustered at the industry level, and *p*-values are shown in parentheses. *$p<0.10$; **$p<0.05$; ***$p<0.01$.

Table 10
Labor market mobility

Dependent variable	*log of total compensation*			
Sample	Primary and control firms			
Model	(1)	(2)	(3)	(4)
Primary	0.070***	0.067**	0.076***	0.077***
	(0.009)	(0.025)	(0.003)	(0.008)
Primary × *Post*	−0.037	−0.053	−0.048	−0.069*
	(0.236)	(0.113)	(0.132)	(0.059)
New CEO	−0.160	−0.197**		
	(0.106)	(0.013)		
Primary × *New CEO*	0.196*	0.261***		
	(0.089)	(0.008)		
Primary × *New CEO* × *Post*	−0.279	−0.320**		
	(0.146)	(0.032)		
Retirement-age CEO			−0.019	−0.044
			(0.896)	(0.704)
Primary × *Retirement-age CEO*			0.124	0.192*
			(0.250)	(0.092)
Primary × *Retirement-age CEO* × *Post*			−0.272*	−0.245*
			(0.097)	(0.091)
Observations	4,799	4,742	4,799	4,742
R-squared	0.703	0.787	0.703	0.786
Firm controls	No	Yes	No	Yes
Year FE	Yes	n/a	Yes	n/a
State × Year FE	No	Yes	No	Yes
Industry × Year FE	No	Yes	No	Yes
Interaction var. × Year FE	Yes	Yes	Yes	Yes

This table analyzes compensation changes under different degrees of CEO labor market mobility. In models 1 and 2, primary and control firm CEOs are separated by whether they have arrived within the past year at the firm (*New CEO*). In models 3 and 4, CEOs are separated by whether they are past the retirement age (*Retirement-age CEO*). Firm controls are identical to those used in Table 3, except that we exclude the CEO turnover event indicator variable. Table A.1 describes the construction of all variables. Standard errors are clustered at the industry level, and p-values are shown in parentheses. * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

CEO type similarity with weak-vote peers, which captures the historic average closeness between the CEO types of primary firms and their weak-vote peers. The coefficients on the interaction terms in models 7 and 8 are significantly negative, consistent with say on pay vote signals being more relevant when they originate from peers that have historically employed CEOs with skillsets more similar to those of their own CEOs. A one standard deviation increase in *CEO type similarity with weak-vote peers* in model 8 corresponds to an additional (exp(0.631*(-0.056))-1=) −3.5% relative pay change by primary firms in the post-period.

Finally, primary firm boards are likely to consider their CEOs' outside options when determining whether to respond to peers' weak votes with relative pay reductions. Coles, Li, and Wang (2018) suggest that newly hired CEOs and CEOs who are close to retirement have fewer outside options and, therefore, lower labor market mobility. We explore the effect of labor market mobility on primary firms' pay responses. Table 10 reports the results.

The results of model 2 indicate that primary firms offer new CEOs who they hire during the post-period 32% less than control firms offer newly hired CEOs during the same period. Similarly, model 4 indicates that primary firms reduce the pay of CEOs who are near retirement by 24.5% in the post-period relative to near-retirement CEOs in control firms. These findings indicate that boards take the labor market mobility of their CEOs into account when reducing relative CEO compensation.

Newly hired CEOs may also lack the power to influence the board's compensation setting process in their own favor (Faulkender and Yang 2013). Thus, larger relative pay reductions for new CEOs could also reflect reduced power to influence compensation decisions at the board level. We note, however, that CEOs near retirement age should be less subject to power-related pay reductions.[11]

3.2 Compensation targeting

Bizjak, Lemmon, and Nguyen (2011) indicate that many firms target a specific range or percentile of their peers' pay levels when setting CEO compensation. If the compensation reductions that weak-vote firms make in response to their weak say on pay votes lead to downward shifts in primary firms' peer pay distributions, such targeting behavior could lead to primary firm pay reductions. If this is the case, we should observe a relationship between primary firms' compensation changes and the distance to their respective target pay percentiles. Furthermore, we expect that weak-vote induced pay reductions by peers would not occur until pay changes by the weak-vote firms become public knowledge. We explore the role of compensation targeting in the propagation of weak say on pay votes and present results in this section.

If primary firm compensation changes occur via their compensation targeting policies, we expect the timing of primary firm pay changes to be related to the timing of their weak-vote peers' pay change disclosures. If compensation targeting does not play any role in the propagation of pay reductions, primary firm boards should alter CEO compensation at the first compensation review at which they are aware of their peers' weak votes.

We use variation in the differences between the fiscal year ends of primary firms and their weak-vote peers to explore whether compensation targeting plays a role in primary firm compensation changes. Differences in fiscal year ends are useful for a timing test for two reasons. First, compensation committees usually obtain information about peers' pay levels and say on pay votes approximately two quarters prior to the end of their fiscal year (Pearl Meyer and Partners 2014; Meridian 2015; Resch 2019). This raises the possibility that

[11] We also investigate a number of potential links between primary and weak-vote firms through which primary firm boards may learn about their peers' weak say on pay votes. These include shared compensation consultants, common institutional asset managers, shared board connections, and informal networks as proxied by the geographic distance between firms' headquarters. We do not find evidence that these information channels are related to the observed changes in compensation. Table IA.8 reports the results.

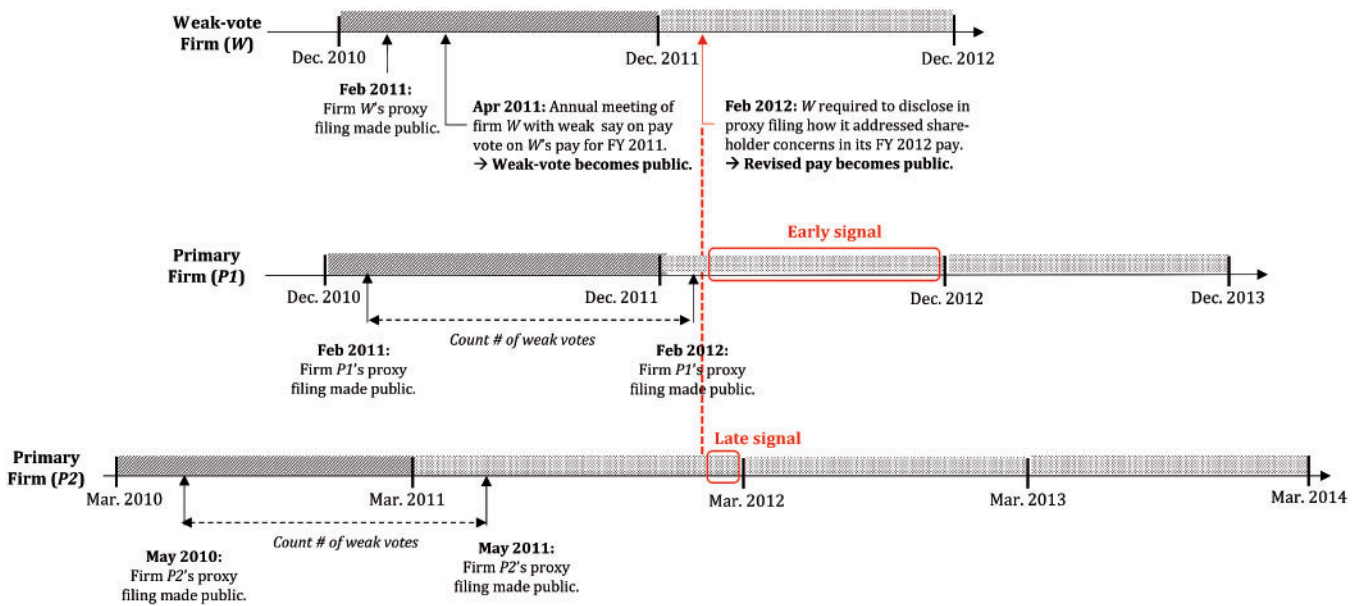

Figure 3
Timing of say on pay votes and disclosure of compensation changes
Hypothetical illustration of the timing of say on pay votes, the disclosure of subsequent pay changes, and their observation by peer firms. Weak-vote firm *W* and primary firm *P1* both have a December fiscal year end, whereas the primary firm *P2* has a March fiscal year end.

a primary firm does not receive information about the revised pay of its weak-vote peers in time for its compensation committee to consider that information when determining CEO compensation for the first year following the say on pay event. Second, fiscal year ends are typically set many years in advance and should be unrelated to contemporaneous firm variables. Furthermore, primary firms cannot modify the fiscal year ends of their weak-vote peers. Thus, primary firms' fiscal year ends are likely exogenous to their peers' weak votes.

Figure 3 illustrates this intuition using time lines for three hypothetical firms: a weak-vote firm (*W*) and two primary firms (*P1* and *P2*) that include *W* in their compensation peer groups. In this example, *W* and *P1* have December fiscal year ends, whereas *P2* has a March fiscal year end. *W* files a proxy statement in February of 2011, in which it reports executive compensation for the 2010 fiscal year. Based on this compensation, *W* experiences a weak say on pay vote at its annual meeting in April 2011 and must disclose its response to this weak vote when it reports its FY 2011 compensation in its February 2012 proxy statement.

Because of the differences in their fiscal year ends, *P1* and *P2* will observe *W*'s compensation changes at different times relative to their own compensation setting processes. At the time of *W*'s disclosure of its revised pay in February 2012, *P1*'s fiscal year has just begun in January 2012, giving it sufficient time to deliberate *W*'s revised pay and incorporate it into its own CEO pay package. In contrast, when *W* discloses its revised pay in February 2012, *P2*'s fiscal year is about to end in March 2012. Because peer data are typically reviewed in the middle of the fiscal year, information about *W*'s revised pay arrives too late for *P2* to consider for the following fiscal year. Instead, *P2* can only incorporate *W*'s revised pay into its own CEO compensation package for the fiscal year starting in March 2013.[12]

To explore these timing differences we first split our primary firms according to whether their peers' weak-vote signals arrive, on average, more than 6 months (indicator variable *Early signal*) or less than 6 months (indicator variable *Late signal*) prior to primary firms' fiscal year ends. We then subdivide the post-event period into the first and second fiscal years after weak votes arrive (*Post-year 1* and *Post-year 2*) to consider the precise post-event fiscal year during which the primary firms' compensation changes occur. Table 11 reports the results.

The results in Table 11 indicate that early- and late-signal primary firms have similarly high relative compensation prior to their say on pay event years (see coefficients on *Primary* × *Early signal* and *Primary* × *Late signal*) and both reduce relative compensation in the post-event period.[13] However, the

[12] To the extent that *P1* and *P2* are able to learn about *W*'s revised pay earlier, *P2* would already have knowledge of *W*'s revised pay at the time of its peer review. Hence, we would not expect to find any difference in the timing of their pay responses.

[13] In untabulated results, we find that the two sets of primary firms are also similar along firm, performance, governance, and peer group characteristics, as well as shareholder and proxy adviser support, and exhibit similar trends in wage growth in the years prior to the say on pay event.

Table 11
Timing of weak-vote signals

Dependent variable	*log of total compensation*		
	Early vs. late arrival of new information on peers' weak votes		
Model	(1)	(2)	(3)
Primary × *Early signal*	0.119***	0.097***	
	(0.000)	(0.001)	
Primary × *Early signal* × *Post-year 1*	−0.102**	−0.134***	−0.112***
	(0.020)	(0.002)	(0.001)
Primary × *Early signal* × *Post-year 2*	−0.025	−0.079**	−0.086**
	(0.479)	(0.038)	(0.015)
Primary × *Late signal*	0.121***	0.099**	
	(0.002)	(0.025)	
Primary × *Late signal* × *Post-year 1*	−0.033	−0.061	−0.029
	(0.668)	(0.490)	(0.786)
Primary × *Late signal* × *Post-year 2*	−0.129**	−0.129**	−0.080
	(0.014)	(0.025)	(0.387)
Observations	5,792	5,792	5,792
R-squared	0.733	0.765	0.874
Firm controls	Yes	Yes	Yes
Year FE	Yes	n/a	n/a
Industry × Year FE	No	Yes	Yes
State × Year FE	No	Yes	Yes
Firm FE	No	No	Yes

This table documents the relative timing of information arrival and compensation changes. The dependent variable is the logarithm of total CEO compensation. *Early signal* equals 1 for primary firms whose peers' weak votes occur on average more than 6 months prior to their own fiscal year ends. *Late signal* equals 1 for primary firms whose peers' weak votes occur on average 6 months or less prior to their own fiscal year end. *Post-year 1 (Post-year 2)* equals 1 for the first (second) fiscal year following the say on pay event year. Firm controls are identical to those used in Table 3. Table A.1 describes the construction of all variables. Standard errors are clustered at the industry level, and p-values are shown in parentheses. * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

coefficients on the triple interaction terms indicate that early signal primary firms reduce relative CEO pay in the first post-event fiscal year, while late signal primary firms reduce pay in the second post-event fiscal year. These results suggest that, on average, primary firms reduce relative CEO compensation after they observe their peers' responses to their weak votes.

We provide evidence on the relationship between primary firms' compensation changes and the distance to their respective target pay percentiles in Table 12. We collect the target percentiles in the event year from firms' CD&A sections. If firms disclose a target range, we follow Bizjak, Lemmon, and Nguyen (2011) and take the midpoint of the target range. We find target disclosures for 72% (65%) of primary (control) firms. The mean (median) target percentile is 54 (50) for primary firms and 53 (50) for control firms. For firms without any disclosures, we estimate target percentiles as their pay percentile in the say on pay event year.[14]

[14] Results are unchanged if we use estimated target percentiles for all firms or if we consider only the compensation targets that firms disclose in their CD&A filings.

Table 12
Compensation targeting

Dependent variable	*log of total compensation*			
Sample	Primary and control firms			
Model	(1)	(2)	(3)	(4)
Primary	0.071***	0.033	0.083***	0.045
	(0.004)	(0.305)	(0.001)	(0.186)
Primary × *Post*	−0.008	−0.011	−0.044	−0.060*
	(0.736)	(0.716)	(0.122)	(0.055)
Pay above target percentile	0.048**	0.063***		
	(0.016)	(0.006)		
Primary × *Pay above target percentile*	0.032	0.040		
	(0.318)	(0.309)		
Primary × *Pay above target percentile* × *Post*	−0.074***	−0.104***		
	(0.008)	(0.002)		
Distance to target percentile			0.001***	0.002***
			(0.002)	(0.000)
Primary × *Distance to target percentile*			0.000	0.000
			(0.824)	(0.943)
Primary × *Distance to target percentile* × *Post*			−0.001*	−0.002***
			(0.067)	(0.008)
Observations	3,118	3,034	3,118	3,034
R-squared	0.782	0.831	0.782	0.831
Firm controls	Yes	Yes	Yes	Yes
Year FE	Yes	n/a	Yes	n/a
State × Year FE	No	Yes	No	Yes
Industry × Year FE	No	Yes	No	Yes

This table documents the effect of primary firm compensation targeting on compensation changes following peers' weak say on pay votes. The dependent variable is the logarithm of total CEO compensation. In models 1 and 2, the interaction variable *Pay above target percentile* equals 1 for primary firms if their pay is above their target pay percentile. In models 3 and 4, *Distance to target percentile* is the difference between the pay percentile in the event year and the firm's target percentile. Firm controls are identical to those used in Table 3. Table A.1 describes the construction of all variables. Standard errors are clustered at the industry level, and *p*-values are shown in parentheses. **p*<0.10; ***p*<0.05; ****p*<0.01.

In models 1 and 2, we use an indicator term *Pay above target percentile* that equals one if maintaining pay at the prior year level would result in pay that is above the targeted pay percentile. Under this scenario, compensation targeting would call for a pay reduction. We find a negative relationship for the triple-difference term *Primary* × *Pay above target percentile* × *Post*, which indicates that primary firms for which pay would be above target do in fact reduce pay following peers' weak votes. In models 3 and 4, we repeat the analysis using the continuous variable *Distance to target percentile*. We find a negative relationship on the triple interaction term, which suggests that primary firms not only change their pay in the opposite direction from the deviation but that the pay change is also proportional to the distance from their target. These results indicate that the practice of compensation targeting contributes to the relative CEO pay cuts that we observe among primary firms and helps with retaining the relative pay position in their respective peer groups. We note, however, that this is at best a partial explanation, as it does not explain the relationship between post-event compensation changes by primary firms and the extent to which their peers' weak votes represent discontent with general

firm performance and to the pre-event compensation of their own CEOs. These findings are indicative instead of a learning channel, as discussed above.

4. Conclusions

We analyze firms' reactions to the weak say on pay votes of their compensation peers 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 role of peer effects in shareholder governance and the impact of shareholder advisory votes (say on pay).

We document that weak say on pay votes have significant spillover effects via compensation peer groups. When at least 10% of a firm's self-selected compensation peers experience a weak say on pay vote, the average firm responds by making significant reductions in its CEO compensation relative to control firms that do not benchmark themselves to such peers. This occurs despite the fact that these primary firms experience neither weak support for their own say on pay votes nor poor performance. Primary firms' relative reductions in CEO compensation reflect information about peers' weak votes, peers' responses to their weak-votes, and the extent to which this information is relevant to their own firms.

Overall, our evidence suggests that boards respond proactively to the arrival of peer information about the competitive market wages of their CEOs. The changes they make are deliberate in nature, proportional in size to those needed to retain their positions in their peer groups, and do not appear 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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Appendix.

Table A.1
Variable definitions

Variable	Definition	Source
A. Classification of firms and say-on-pay-related variables		
Weak-vote firm	Indicator variable that equals 1 if a firm receives less than 72.5% vote support (which is the 10th percentile of Russell 3000 firms' vote support) on its say on pay advisory vote in fiscal years 2011 or 2012 and 0 otherwise.	Equilar
Primary firm	Indicator variable that equals 1 if at least two of a firm's compensation peers, representing at least 10% of its compensation peer group, qualify as weak-vote firms in fiscal years 2011 or 2012 and 0 otherwise.	Equilar
Control firm	All S&P 1500 firms that do not qualify as either a weak-vote firm or a primary firm in any fiscal year between 2011 and 2013.	Equilar; Execucomp
Post	Indicator variable that equals 1 for weak-vote firms and primary firms in years following a firm's say on pay event year and 0 otherwise. The say on pay event year for a weak-vote firm is the first fiscal year in which its compensation plan received less than 72.5% vote support. The say on pay event year for a primary firm is the first fiscal year in which at least two peers representing at least 10% of its compensation peer group qualify as weak-vote firms.	Equilar
Early (Late) signal	Indicator variable that equals 1 for a primary firm whose weak-vote compensation peers' next fiscal year starts, on average, more than 6 months (6 months or less) from the primary firm's next fiscal year end. (E.g., the distance for a primary firm with a December FY end is 3 months [12 months] if its average weak-vote peer has a March FY end [a December FY end]; thus, the *early signal* indicator variables equals 0 [1], and the *late signal* indicator equals 1 [0].)	Equilar; ISS Voting Analytics; Compustat
Fraction of weak-vote peers with ISS criticism on nonperformance pay (performance pay)	For a given primary firm, the fraction of its weak-vote compensation peers that have an ISS say on pay "against"-vote recommendation and which receive a "median" or "high" concern verdict from ISS on the nonperformance pay category (performance pay category) in its event-year proxy research report.	Equilar; ISS proxy research reports.
Annual say on pay vote frequency	Indicator variable that equals 1 if a firm has an annual say on pay vote frequency.	Equilar
Say on pay vote support (on most recent vote)	Support received by a firm in its most recent say on pay advisory vote.	Equilar
B. Compensation variables		
log of total compensation	Logarithm of one plus the CEO's total compensation (Execucomp data item tdc1) in a fiscal year. Total compensation is the sum of salary, bonus, stock awards (fair value), option awards (Black-Scholes value), nonequity incentives, and other compensation (perquisites).	Execucomp
Excess compensation	The residual from fiscal-year regressions of log of total compensation on current and lagged firm characteristics (market value of assets, log sales, market leverage, market-to-book value of equity), performance measures (industry-adjusted ROA, industry-adjusted stock performance) and industry and location fixed effects.	Execucomp; Compustat; CRSP

(Continued)

Table A.1
(Continued)

Variable	Definition	Source
Above-median excess compensation	Indicator variable that equals 1 for firms that have above median excess compensation in the say on pay event year (for control firms in fiscal years 2011 and 2012) and 0 otherwise.	Execucomp
log of nonperformance pay	Logarithm of one plus the sum of salary and annual bonus. (Bonus in the Summary Compensation Table is defined as annual payouts with no substantial uncertainty or for which there are no targets communicated to the executive. Any awards with communicated 1-year or multi-year performance targets or with substantial uncertainty need reporting as nonequity award, stock or options award; see, e.g., Goodwin 2018:12.)	Execucomp
log of performance pay	Logarithm of one plus the sum of stock awards (fair value), option awards (Black-Scholes value), and nonequity awards.	Execucomp
Existence of golden parachute	Indicator variable that equals 1 if a firm has a golden parachute.	ISS RiskMetrics
Value of golden parachute	The value of any golden parachute as disclosed in firms' event-year proxy filing.	DEF14A filings
Number of stocks and options granted	The number of newly awarded stocks and options (in thousands of units) granted to the CEO in a fiscal year.	Execucomp
C. Peer group variables		
Pay above target percentile	Indicator variable that equals 1 (0) if keeping a firm's CEO pay level from the previous year would results in pay above (equal to or below) the firm's target percentile in the say on pay event year (2012 for control firms). A firm's target percentile is obtained from the CD&A section of its event-year proxy filing. If a firm provides a target range, we take the midpoint. For firms that do not disclose their target percentile, we estimate the target percentile from the level it pays relative to its peers in the years prior to its say on pay event (before 2012 for control firms).	DEF 14A filings; Equilar; Execucomp
Distance to target percentile	The distance between a firm's prior year CEO pay level and its target percentile in the say on pay event year (2012 for control firms). A firm's target percentile is obtained from the CD&A section of its event-year proxy filing. If a firm provides a target range, we take the midpoint. For firms that do not disclose their target percentile, we estimate the target percentile from the level it pays relative to its peers in the years prior to its say on pay event (before 2012 for control firms).	DEF14A filings; Equilar; Execucomp
Fraction of same-industry peers	The number of compensation peers that are from the same GICS6 industry as the base firm, scaled by the total number of peers.	Equilar; Compustat
Fraction of similar-sales peers	The number of compensation peers that have sales within ± 50% of the base firm, scaled by the total number of peers.	Equilar; Compustat
Fraction of similar-sized peers	The number of compensation peers that have total book value of assets within ± 50% of the base firm, scaled by the total number of peers.	Equilar; Compustat
Peer group size	Number of peers disclosed by the firm in its compensation peer group.	Equilar
CEO pay above the ISS peer group median	Indicator variable that equals 1 if the CEO pay in the say on pay event year (2012 for control firms) exceeds the median pay of the peer group that ISS uses for its multiple-of-median test and 0 otherwise. The ISS peer group construction methodology for the multiple-of-median test is described in ISS (2012, pp.14–16).	Equilar; Execucomp; ISS

(Continued)

Table A.1
(Continued)

Variable	Definition	Source
Below-median overlap with the ISS peer group	Indicator variable that equals 1 if a firm's peer group in the say on pay event year (2012 for control firms) has a below-median level of overlap with the peer group that ISS uses for its multiple-of-median test and 0 otherwise. The degree of overlap is the fraction of a firm's own peers that also appear in the ISS peer group. The ISS peer group construction methodology for the multiple-of-median test is described in ISS (2012, pp. 14–16).	Equilar; ISS
D. Moderation variables		
Operating performance by weak-vote peers	Equally weighted average ROA of a firms' weak-vote peers in the say on pay event year.	Equilar; Compustat
Stock performance by weak-vote peers	Equally weighted average annual stock performance of a firm's weak-vote peers in the say on pay event year.	Equilar; CRSP
Talent flow with weak-vote peers	The number of weak-vote compensation peers that are from 4-digit SIC industries from/to which the focal primary firm gained/lost executives in the 5 years prior to the say on pay event year.	Execucomp; Compustat; Equilar
CEO type similarity with weak-vote peers	The average historic closeness between the CEO types of primary firms and their weak-vote peers. CEO types are based on the CEO general ability index introduced by Custódio, Ferreira, and Matos (2013), which measures general managerial skills based on executives' résumés and ranks CEOs along a continuous generalist versus specialist spectrum based on their experiences across positions, firms, and industries. The data set covers S&P 1500 firms between 1993 and 2007. We compute each primary firm's median general ability index based on its available history, and then compute the median absolute distance between a given primary firm and all its S&P 1500 weak-vote peers. For ease of interpretation, we multiply the measure by minus one such that a larger number implies a smaller distance/greater similarity between primary and weak-vote firm CEOs.	Web site of Cláudia Custódio; Execucomp; Equilar
New CEO	Indicator variable that equals 1 if a CEO's tenure is 1 year or less, and 0 otherwise.	Execucomp
Retirement-age CEO	Indicator variable that equals 1 if the CEO is 68 or older, and 0 otherwise.	Execucomp
E. Governance variables		
Classified board	Indicator variable that equals 1 if a firm has a classified board and 0 otherwise.	ISS RiskMetrics
CEO-chairman duality	Indicator variable that equals 1 if a firm's CEO also serves as the chairman of the board and 0 otherwise.	Execucomp
Fraction of independent directors	Number of directors classified as independent divided by board size.	ISS RiskMetrics
CEO ownership	Number of shares owned by a firm's CEO divided by the number of shares outstanding.	Execucomp; Compustat
CEO pay slice	The CEO's share of the total compensation paid to the top-five executive officers of the company (Bebchuk, Cremers, and Peyer 2011).	Execucomp
CEO tenure	Years since the current CEO took office.	Execucomp
CEO age	Age of the CEO.	Execucomp
CEO turnover event	Indicator variable that equals 1 in the fiscal year of and the fiscal year after a CEO turnover and 0 otherwise.	Execucomp

(Continued)

Table A.1
(Continued)

Variable	Definition	Source
E-index	Sum of six governance provisions, like in Bebchuk, Cohen, and Ferrell (2009).	ISS RiskMetrics
Average director vote support (comp. committee)	The average shareholder vote support of all directors (of the members on the compensation committee). Shareholder vote support is computed as the number of "For" votes divided by the sum of "For," "Against," and "Abstain" votes.	ISS Voting Analytics; ISS RiskMetrics
Fraction of directors on compensation committee with ISS "against" vote recommendation	Fraction of the compensation committee members that receive an "against" vote recommendation by ISS in a given fiscal year.	ISS Voting Analytics; ISS RiskMetrics
Firm with ISS say on pay "against" vote recommendation	Indicator variable that equals 1 if a firm receives an "against" vote recommendation by ISS for its advisory say on pay vote and 0 otherwise.	ISS Voting Analytics; ISS RiskMetrics
Fraction of board that is co-opted	Fraction of the board composed of directors who were appointed after the CEO assumed office (Coles, Daniel, and Naveen 2014).	Web site of Lalitha Naveen
Above-median institutional holdings	Indicator variable that equals 1 for firms with above-median institutional ownership in the say on pay event year (2012 for control firms); 0 otherwise. Institutional holdings in a firm is the sum of reported holdings by institutional investors as disclosed in 13F filings.	Thomson Reuters Institutional Holdings
Activist hedge fund presence	Indicator variable that equals 1 for firms with one or more activist hedge funds in their shareholder base in the say on pay event year (in 2012 for control firms) and 0 otherwise.	Thomson Reuters Institutional Holdings; Activist hedge funds lists[a]
F. Other variables		
Market value of assets	Total market value of equity plus the sum of short- and long-term debt.	Compustat
log of sales	Logarithm of 1 plus net sales.	Compustat
Market-to-book value of equity	Total market value of equity divided by book value of equity.	Compustat
Market leverage	Short- plus long-term debt divided by market value of equity.	Compustat
Industry-adjusted ROA	A firm's return on assets minus its 6-digit GICS industry average return on assets. Return on assets is income before extraordinary items divided by lagged total book assets.	Compustat
Industry-adjusted stock performance	Buy-and-hold return of the firm minus buy-and-hold 6-digit GICS industry return over a firm's fiscal year.	CRSP; Compustat
Idiosyncratic (mkt.-adj.) volatility	The standard deviation of residuals of a firm's daily stock returns over its fiscal year estimated from the Fama-French 3-factor model.	CRSP; FF daily factors
Has compensation consultant	Indicator variable that equals 1 if a firm employs a compensation consultant and 0 otherwise.	Equilar
Shared compensation consultant with weak-vote peers	Indicator variable that equals 1 if a firm employs at least one compensation consultant that is also employed by one of its weak-vote peers and 0 otherwise.	Equilar
Fraction of compensation consultants shared with weak-vote peers	The number of shared compensation consultants with weak-vote peers divided by the number of compensation consultants that are hired by the weak-vote peers and the base firm.	Equilar

(Continued)

[a] http://www.hedgetracker.com/top_shareholder_activist_investors.php and https://www.carriedin.com/activist-investors/.

Table A.1
(Continued)

Variable	Definition	Source
Fraction of shares commonly owned with weak-vote peers	The fraction of a firm's shares outstanding owned by institutional investors that hold at least 0.1% of stocks in both the base firm and the weak-vote peer.	Equilar; Thomson Reuters Institutional Holdings; Compustat
# of common institutional asset managers with weak-vote peers	The number of asset managers that hold at least 0.1% of stocks in both the base firm and the weak-vote peer.	Equilar; Thomson Reuters Institutional Holdings; Compustat
Median distance to weak-vote peers	Median distance (in thousands of miles) between a firm and its weak-vote compensation peers in the say on pay event year. The distance between any two firms is computed using the Haversine formula with coordinates based on each firm's headquarters ZIP code as recorded in Compustat.	Equilar; Compustat
Minimum distance to weak-vote peers	Minimum distance (in thousands of miles) between a firm and its weak-vote compensation peers. The distance between any two firms is computed using the Haversine formula with coordinates based on each firm's headquarters ZIP code as recorded in Compustat.	Equilar; Compustat
# of directors sitting on the boards of weak-vote peers	Number of a firm's directors that also serve on boards of weak-vote compensation peers. Data on S&P 1500 directors (non-S&P 1500 directors) comes from ISS RiskMetrics (BoardEx and Capital IQ).	Equilar; ISS RiskMetrics; BoardEx; Capital IQ
# of directors sitting on boards of weak-vote peers and on at least one comp. committee	Number of a firm's directors that also serve on boards of weak-vote compensation peers and who serve on at least one compensation committee. Director data and compensation committee membership of S&P 1500 firms (non-S&P 1500 firms) comes from ISS Riskmetrics (BoardEx and Capital IQ).	Equilar; ISS RiskMetrics; BoardEx; Capital IQ