Internet Appendix
Relative versus Absolute Performance Evaluation and CEO Decision-Making

This Internet Appendix presents additional analyses and related findings for our paper "Relative versus Absolute Performance Evaluation and CEO Decision-Making."

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Internet Appendix A
Variable Definitions

Variable Name	Definition
TOTAL_CEO_COMP.	Used in Internet Appendix D. CEO compensation is Execucomp code TDC2.
OWN_FIRM_RETURN	Used in Internet Appendix D. Own firm return is the firm's total annual stock return (including dividends).
RPE_PERFORMANCE_PEER_RETURN	Used in Internet Appendix D. The equally-weighted annual stock return to the portfolio of the firm's RPE performance peers as specified in the compensation plan. The analogous value-weighted return is used in robustness checks.
COMPENSATION_PEER_RETURN	Used in Internet Appendix D. The equally-weighted annual stock return to the portfolio of the firm's compensation peers as specified in the proxy statement. Value-weighted return is used in robustness checks.
PRODUCT_MARKET_PEER_RETURN	Used in Internet Appendix D. The equally-weighted annual stock return to the portfolio of firms in the quartile of closest product market similarity based on text-based network industry classifications (TNIC) (Hoberg and Phillips (2016)). Value-weighted return is used in robustness checks.
IND.-SIZE-BM_PEER_RETURN	Used in Internet Appendix D. The equally-weighted annual stock return to a matched industry-size-bm quartile portfolio formed based on Fama-French (1997) 48-industry classifications. Annual portfolios are formed based on industry codes using all firms in the merged CRSP-Compustat database. Firms (including sample firms) are then ranked using size (market capitalization). Firms are also ranked based on book-to-market (BM). Ranks are then divided by the number of firms in each 48-industry-year (ranks range from 0 to 1). Then the pairwise distance (the square root of [(size rank of the focal firm – size rank of the peer firm)^2 + (BM rank of the focal firm – BM rank of the peer firm)^2]) is computed. Industry peers are defined as firms in the quartile of industry-size-bm closest to the sample firm. Ind.-size-bm peer returns are computed excluding sample firms' own return. Value-weighted return is used in robustness checks.
Δlog_ASSETS	Used in Internet Appendix D. The change in the log of annual total assets from year t-1 to year t.
ΔTOBIN'S_Q	Used in Internet Appendix D. The change in the ratio of market-to-book value of assets from year t-1 to year t.
SALES_GROWTH	The firm's annual sale growth
IDIOSYNCRATIC_VARIANCE	Used in Internet Appendix D. The variance of the firm-specific monthly stock return measured relative to the Fama-French (1997) value-weighted using 36 months of returns beginning with the return immediately prior to the last month of the current fiscal year (Albuquerque (2009)).
CEO_OWNERSHIP	Used in Internet Appendix D. The percentage of the firm's common stock owned by the CEO.
RPE_INITIAL_ADOPTION	Used in Internet Appendix E. A binary variable equal to one in the first year a firm grants an RPE plan to its CEO during the sample period and zero for all years for firms APE plans.

Internet Appendix A (continued)

Variable Name	Definition
APE_INITIAL_ADOPTION	Used in Internet Appendix E. A binary variable equal to one in the first year a firm grants an APE plan to its CEO during the sample period and zero for fall years for firms with using RPE plans.
APE Plan	Used in Internet Appendix F. A firm-year is classified as an APE firm-year if the CEO's performance-based compensation plan in that year relies exclusively on a target or targets defined in absolute terms.
ln(SALES)	Used in Internet Appendix F. The natural logarithm of the firm's annual sales.
ln(FIRM_AGE)	Used in Internet Appendix F. The natural log of the number of years since the year of listing.
TOBIN'S_Q	Used in Internet Appendix F. The ratio of market-to-book value of assets.
PP&E	Used in Internet Appendix F. The firm's net property, plant and equipment scaled by total assets.
IND._ADJ_ROA	Used in Internet Appendix F. Operating income before depreciation scaled by total assets adjusted for the equally-weighted ROA of the Fama French (1997) 48 industry to which the firm belongs.
IND._ADJ_STOCK_RETURN	Used in Internet Appendix F. Firm stock return adjusted for the equally weighted return on the Fama-French (1997) 48 industry to which the firm belongs.
IDIOSYNCRATIC_RISK	Used in Internet Appendix F. The square root of the residual variance from an expanded index model regressing a firm's returns on the CRSP value-weighted daily market index returns and its Fama-French (1997) value-weighted daily industry index returns.
LEVERAGE	Used in Internet Appendix F. Leverage is the book value of total long-term debt scaled by total assets.
ln(#PRODUCT_PEERS)	Used in Internet Appendix F. The natural logarithm of the number of firms in the quartile of closest product market similarity based on text-based network industry classifications (TNIC) (Hoberg and Phillips (2016)).
IND._INDEX_CORRELATION	Used in Internet Appendix F. Industry index correlation gauges the firm's exposure to sector performance. It is measured as the correlation between the firm's daily stock returns and returns to its Fama-French (1997) value-weighted daily industry index.
ln(1+CEO_TENURE)	Used in Internet Appendix F. The natural log of one plus the number of years the current CEO has held her position.
NEW_AND_OUTSIDE_CEO	Used in Internet Appendix F. A binary variable that equals one if the current CEO has been in his or her position and has joined the firm no more than two years prior and zero otherwise (Gopalan, Milbourn, and Song (2010)).
CEO_EMPL._CONTRACT	Used in Internet Appendix F. A binary variable that equals one if the CEO has an explicit employment agreement and zero otherwise. CEO employment agreement data are obtained from Equilar Consultants.
FOUNDER	Used in Internet Appendix F. A binary variable that equals one if the current CEO founded the firm and zero otherwise. The CEOs' founder status is obtained from Equilar Consultants.

Internet Appendix A (continued)

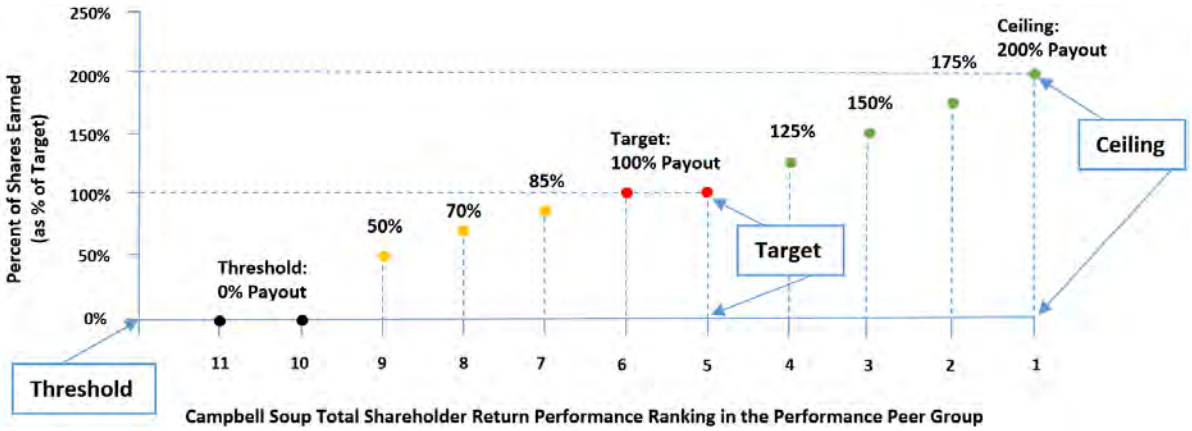
Variable Name	Definition
CEO_DUALITY	Used in Internet Appendix F. A binary variable that equals one if the CEO also holds the title of chairman of the board of directors, and zero otherwise. CEO duality data are obtained from Risk Metrics.
COMP._CONSULTANT	Used in Internet Appendix F. An indicator variable that equals one if the firm hires compensation consultant to assist it in designing pay packages for the CEOs and zero otherwise. Compensation consultant data are obtained from Incentive Lab database.
RPE_PLAN_SWITCH_INDICATOR	Used in Appendix G. A binary variable that equals one for switching to RPE in year t and zero for remain with APE in year t.
IDD_ADOPTION^{-1}	Used in Appendix G. A binary variable that equals one if the firm is headquartered in a state that will adopt the Inevitable Disclosure Doctrine (IDD) the following year and zero otherwise.
IDD_ADOPTION^{0}	Used in Appendix G. A binary variable that equals one if the firm is headquartered in a state that adopts the Inevitable Disclosure Doctrine (IDD) in the current year and zero otherwise.
IDD_ADOPTION^{+1}	Used in Appendix G. A binary variable that equals one if the firm is headquartered in a state that adopted the Inevitable Disclosure Doctrine (IDD) in the preceding year and zero otherwise.
UNIONIZATION_RATE	Used in Internet Appendix H. The percentage of employees who are union members for each census industry code (CIC) in each sample year. From 1998 through 2002, CICs are based on SIC codes. After 2002, CICs are based on the North American Industry Classification System (NAICS).
EARNINGS_CONVEXITY	Used in Internet Appendix H. The estimated coefficient on the squared earnings surprise term from firm-level regressions of earnings announcement day abnormal returns on earnings surprise and squared earnings surprise. Earnings announcement day and earnings surprise data are obtained from I/B/E/S. See Grullon, Lyandres, and Zhdanov (2012) for details on estimation of earnings convexity.
CEO_CURRENT_VEGA	Used in Internet Appendix I. Black-Scholes vega from option grants during the pre-treatment period (year t-1, Time = 0) and during the post-treatment period (year t, Time = 0). Grants include both time-based vesting and performance-based vesting grants.
CEO_CURRENT_DELTA	Used in Internet Appendix I. Black-Scholes delta from stock and option grants during the pre-treatment period (year t-1, Time = 0) and during the post-treatment period (year t, Time = 0). The grants include both time-based vesting and performance-based vesting grants.
CEO_CURRENT_NON-PV_VEGA	Used in Internet Appendix I. Black-Scholes vega from option grants during the pre-treatment period (year t-1, Time = 0) and during the post-treatment period (year t, Time = 0). The grants include only time-based vesting grants.
CEO_CURRENT_NON-PV_DELTA	Used in Internet Appendix I. Black-Scholes delta from stock and option grants during the pre-treatment period (year t-1, Time = 0) and during the post-treatment period (year t, Time = 0). The grants include only time-based vesting grants.

B. Examples of How RPE Performance Targets Are Set and of the Use of Performance Measures That Are Not Stock-Based or Accounting Based.

Example 1: Rank Relative to Peer Firms — Campbell Soup Company's RPE Plan for the 2007-2009. Under this plan, the company's total stock return (TSR) is ranked relative to the TSR of ten peer firms. The form of payout is restricted stock. The performance target is a rank of fifth or sixth out of eleven firms (the ten peer firms plus Campbell Soup) and 100% of the target shares are paid to the CEO if the firm achieves its target rank. If the firm ranks first of eleven then the CEO receives 200% of the target shares and if it ranks tenth or eleventh of eleven then the CEO receives no shares. The *ex ante* payout function is a step function that specifies the CEO's payout as a percentage of the number of target shares according to the following table:

Rank	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Awards	200%	175%	150%	125%	100%	100%	85%	70%	50%	0%	0%

The *ex ante* payout function can be graphically depicted as follows:



Data source: https://www.sec.gov/Archives/edgar/data/16732/000095012309049220/w75629def14a.htm

Example 2: Performance Relative to Peer Firms — Dow Inc.'s RPE Plan for the 2006-2008 performance period. Under this plan, the company's TSR is assessed relative to the average TSR for 14 peer firms. If performance is below 5% of the peer average (performance threshold), the CEO receives no shares. For performance ranging from 5% below the peer average to the peer average (performance target), the CEO receives between 35% and 100% of target shares on a linear schedule. For performance ranging from the peer average to 5% above the peer average (performance ceiling), the CEO receives between 100% and 200% of target shares on a linear schedule. For performance greater than 5% above the peer average, no additional shares are awarded. The following table summarizes the plan's payouts:

	Threshold	Target	Ceiling
Relative Return	5 Percentage Points Below Peers	Equal to Peers	5 Percentage Points Above Peers
Awards	35%	100%	200%

The *ex ante* payout function is convex in TSR relative to peer average in the incentive zone, which can be graphically depicted as follows:

Data source:
https://www.sec.gov/Archives/edgar/data/29915/000104746907002103/a2176636zdef14a.htm

Example 3: Performance Relative to a Published Index — International Flavors & Fragrances Inc's RPE plan for the 2007-2009 performance period. Under this plan, the company's TSR is assessed as a percentile of the S&P 500. The form of payout is shares of the company's common stock. The performance target is the 55th percentile of the S&P 500 and 100% of target shares are paid to the CEO if the firm achieves this. If performance is below the 40th percentile of the S&P 500 (performance threshold), the CEO receives no shares. For performance ranging from the 40th to the 55th percentile of the S&P 500 (performance target), the CEO receives between 25% and 100% of target shares on a linear schedule. For performance ranging from the 55th percentile to the 75th percentile of the S&P 500 (performance ceiling), the CEO receives between 100% and 200% of target shares on a linear schedule. The following table summarizes the plan's payouts:

	Threshold	Target	Ceiling
Relative Return	40th Percentile	55th Percentile	75th Percentile
Payout	25%	100%	200%

Example 4: Use of Performance Measures That Are Not Stock-Price or Accounting-Based. Other performance metrics include measures such as productivity, ethics, customer satisfaction (loyalty), employee work safety (health, safety and environmental performance), success in damage prevention, etc. Specific examples of other performance metrics included in our sample APE plans are summarized below.

A. Harrah's Entertainment, a gaming corporation, used customer satisfaction as a performance goal. It was measured weekly through surveys of a broad spectrum of customers conducted by a third party. Customers were asked to rate the performance of Harrah's casinos using an A-B-C-D-F rating scale. For 2010, the target (minimum) was set at a 3% (1%) improvement from non-A to A scores.

B. Clean Harbors, a provider of environmental, energy and industrial services, based its CEO incentive bonus plan for 2010 on achieving improvements in health, safety and compliance ("HSC") statistics using the Company's total recordable incident rate ("TRIR"). The TRIR target was set at 2.0. However, the actual TRIR turned out to be 2.13, and thus the CEO did not receive his 2010 bonus pay.

C. DISH Network, a direct-broadcast satellite service provider, based its CEO incentive bonus plan for 2008 upon whether or not it achieved a target of 800,000 net subscribers. The target was not met, so the CEO did not receive his bonus pay.

C. Information on Performance Peers and Performance Benchmarks Used in RPE Plans for CEOs

Panel A of Table C presents data on performance peers used in CEO RPE plans. Such plans most commonly use self-selected performance peers to benchmark firm performance (62.5% of RPE firm-years). The second most common RPE benchmark is a published index. In 9.1% of RPE firm-years, the S&P 500 index is used. In 20.2% of RPE firm-years, another published market, industry, or sector index is used. In 0.9% of RPE firm-years, performance peers are not disclosed. In the remaining 7.3% of RPE firm-years, a combination of self-selected peers, the S&P 500 index, and other published indices are used.

Panel B of Table C compares the characteristics of performance, compensation and product market peers for RPE plans that use self-selected peers to benchmark performance. Compensation peers are used to benchmark the level of CEO compensation, rather than to assess CEO performance. Product market peers are defined as firms in the closest quartile of product market similarity based on text-based network industry classifications (TNIC) (Hoberg and Phillips (2016)).

Panel B of Table C shows that RPE firms select significantly fewer performance peers than compensation peers (see also, De Angelis and Grinstein (2020)). Perhaps not surprisingly, the total CEO pay of compensation peers (median of $6.9 million) is statistically significantly higher than that of performance peers ($5.9 million). CEO compensation of product market peers is significantly lower than that of performance peers, with a mean (median) of $4.8 ($3.6) million. Compared to performance peers, compensation (product market) peers are closer (weaker) size matches for RPE firms in terms of assets, sales, and market capitalization, and are more (less) frequently included in stock indices in which the focal RPE firm is also included. Additionally, compensation (product market) peers tend to have higher (lower) ROA than performance peers. This is consistent with prior studies, which find that firms tend to pick compensation peers with superior performance and higher compensation. A measure of CEO ability, based on an updated version of Demerjian, Lev, and McVay (2012), allows us to compare CEO ability across firms. This measure suggests that compensation peers have higher quality CEOs than performance peers.

In addition, perhaps not surprisingly, RPE performance peers tend to be better industry matches than compensation peers. At the median, 92.3% of performance peers are in the focal RPE firm's Fama-French 48 industry classification. The corresponding median percentage for compensation peers is 66.7%. For product market peers, that median is 83.3%. The correlation between RPE firms' annual stock return and the annual return to a portfolio of peer firms is somewhat higher for performance peers than for compensation peers (median correlation of 0.76 versus 0.74, the difference is statistically significant). The correlation between RPE firms' EPS (EPSPXQ/AJEXQ in Compustat) and the EPS of a portfolio of peer firms is also larger for performance peers than for compensation peers (median correlation of 0.50 versus 0.45, again the difference is statistically significant).

TABLE C

Performance Benchmarks and Peer Groups for CEO RPE Plans

Panel A of Table C summarizes the composition of performance peer firm groups. Compensation data are from Institutional Shareholder Services *Incentive Lab* database for years 1998 to 2014 and proxy statements. Self-selected peers are peer firms approved by the Board of Directors. Other index only includes RPE plans where a published index, other than the S&P 500 index, is used as a benchmark (e.g., industry, sector, or market cap indices). Panel B compares performance, compensation and product market peers for RPE plans that use self-selected peer firms. Detailed variable definitions are in Internet Appendix A. Tests of differences in means (medians) are 2 sample t-tests (2 sample Kruskal-Wallis tests) and one of the two samples is the performance peers sample. ∗∗∗, ∗∗, and ∗ denote a significance difference at the 1%, 5%, and 10% levels, respectively.

Panel A: Performance Benchmark Used in RPE Plans

	Performance Peers
Self-selected peers only	2,975
	(62.5%)
S&P 500 Index only	431
	(9.1%)
Other Index only	961
	(20.2%)
Self-selected peers and S&P 500	101
	(2.1%)
Self-selected peers and Other Index	154
	(3.2%)
S&P 500 and Other Index	68
	(1.4%)
Self-selected Peers, S&P 500, and Other Index	26
	(0.5%)
Not available	45
	(0.9%)

Panel B: Comparison of Performance, Compensation and Product Market Peers for RPE Firm-Years

Peer Group:	Performance		Compensation		Product Market †	
	Mean	Median	Mean	Median	Mean	Median
Number of peers	16.4	13.0	21.8***	17.0***	24.0***	15.0**
Median total pay for peer firms ($ millions)	$7.3	$5.9	$7.8***	$6.9***	$4.8***	$3.6***
Size and Index Membership						
Percentage of peers with:						
Book assets within 50%–200%	47.8%	47.1%	55.4%***	56.0%***	24.0%***	20.8%***
Sales within 50%–200%	49.0%	48.5%	60.2%***	61.9%***	24.8%***	22.2%***
Market cap within 50%–200%	45.3%	45.2%	51.2%***	50.0%***	23.5%***	21.1%***
Are in S&P 500 if firm is	63.6%	64.1%	72.5%***	77.8%***	31.4%***	28.0%***
Are in S&P MidCap 400 if firm is	29.5%	29.4%	34.3%***	33.3%***	16.0%***	13.9%***
Performance						
Percentage of peers with:						
ROA within one std dev & lower than firm's	37.6%	40.0%	36.1%*	35.7%	39.6%**	42.9%**
ROA within one std dev & higher than firm's	32.9%	31.3%	37.4%***	37.5%***	31.7%	29.0%
Annual stock return within one std dev & lower than firm's	36.4%	36.8%	35.3%	33.3%	36.7%	38.1%
Annual stock return within one std dev & higher than firm's	35.6%	33.3%	35.7%	34.4%	36.9%*	37.5%
CEO Ability ††						
Percentage of peers with:						
CEO quality within one std dev & lower than firm's	33.6%	30.6%	34.8%	33.3%	27.5%***	18.2%***
CEO quality within one std dev & higher than firm's	33.6%	30.0%	37.1%***	35.9%***	27.7%***	20.0%***
Industry Match and Performance Correlation						
Percentage of peers that match firm at:						
Hoberg and Phillips TNIC	56.3%	63.6%	44.6%***	41.7%***	86.1%***	93.3%***
Three-digit industry	54.7%	52.4%	42.8%***	33.3%***	50.3%***	50.0%***
Two-digit industry	72.8%	89.5%	60.3%***	63.2%***	67.7%***	81.0%***
Fama-French 48 industry	75.0%	92.3%	61.5%***	66.7%***	69.8%***	83.3%***
Median correlation between firm and peer returns †††	0.72	0.76	0.70***	0.74***	0.62***	0.66***
Median correlation between firm and peer EPS ††††	0.45	0.50	0.41***	0.45***	0.35***	0.37***

† Product market peers are firms in the quartile of closest product market similarity based on TNIC classifications (text-based network industry classifications (Hoberg and Phillips (2016)). Variables for peer firms are measured with a one-year lag.

†† CEO ability is based on the ranked managerial ability measure constructed by Demerjian, Lev, and McVay (2012) that is estimated including year, but not industry, fixed effects. This allows us to compare CEO ability across industries.

††† Stock return correlations are Pearson correlation coefficients between the RPE firm returns and returns to the portfolio of peers using daily returns from the prior year.

†††† Correlations for EPS are Pearson correlation coefficients between the RPE firm's EPS and the portfolio of its peers' EPS using data from the previous 39 quarters (EPSPXQ/AJEXQ in Compustat).

D. Weak-Form Tests for the Use of RPE

An important stream of contract design literature finds evidence supporting the weak-form use of RPE. More specifically, these weak-form tests of RPE regress total CEO compensation (or changes in the log of total compensation) on own firm stock return and peer firm stock return, along with various control variables. If firms use RPE, the coefficient on peer firm return will be significantly negative, reflecting the fact that RPE nets out peer firm performance in assessing CEO performance (See, for example, Albuquerque (2009), Garvey and Milbourn (2006), Gong, Li and Shin (2011), and Jayaraman, Milbourn, Peters, and Seo (2020)).

We run similar analyses and estimate the following model:

$$\Delta \ln(\text{total CEO compensation})_{i,\,t\text{-}1\text{ to }t} = \beta_0 + \beta_1\,\text{OWN\_FIRM\_RETURN}_{i,t} + \beta_2\,\text{PEER\_RETURN}_{i,t} + \gamma\,\text{control variables}_{i,t} + \Sigma\,\text{year and firm fixed effects} + \varepsilon_{i,t}.$$

We use seemingly unrelated regressions (SUR) to separately, but simultaneously, estimate models for RPE and APE firm-years and conduct tests for differences in β_1 and β_2 across models. We use up to four measures of peer firm stock return. For RPE firm-years, we use the average annual stock return of i) performance peers as specified in the RPE plan (model 1), ii) compensation peers as selected by the firm's board (model 2), iii) product market peers (firms in the closest quartile of product market similarity based on text-based network industry classifications) (model 3), and iv) a portfolio of firms matched to the sample firm based on Fama-French 48 industry, size (market cap) and book-to-market (model 4). The latter three measures are also used for APE firm-years. Control variables are firm and CEO characteristics as defined in Internet Appendix A. All models include year and firm fixed effects.

Table D presents results from models based on equally-weighted peer returns; results for the models based on value-weighted peer returns (not tabulated) are similar. Results show that both RPE and APE firms reward CEOs for higher own firm returns; for all models, own firm return is significantly and positively related to changes in the log of total CEO compensation. However, coefficient estimates are larger for RPE firms (ranging from 0.3972 to 0.5306) than for APE firms (ranging from 0.1391 to 0.2512). A statistical comparison of β_1 for RPE versus APE models (models 2 v. 5, 3 v. 6, and 4 v. 7) confirms a significantly larger own firm return effect for RPE plans than for APE plans.

Turning to β_2, regressions show evidence of weak-form RPE *only* by RPE firms and *only* when actual performance peer return is used as the performance benchmark. Specifically, β_2 for RPE performance peer return is negative and significantly different from zero for RPE firms (model 1, β_2= -0.2739). However, other proxies for peer performance (compensation, product market, and industry-size-bm matched peer returns) are marginally significant at best (models 2, 3 and 4, respectively). For APE firm-years, β_2 for compensation, product market, and industry-size-bm peer returns are insignificant (models 5, 6 and 7, respectively). This confirms that APE firms do not net out peer performance in assessing CEO performance.

As to the impact of control variables on changes in the log of total compensation, the results are consistent with the literature (e.g., De Angelis and Grinstein (2020)). For RPE firms, we show that CEOs with longer tenure, and firms with higher growth in sales are paid more. For APE firms, we show that CEOs of firms with increased firm size, CEOs with longer tenure, and firms with positive changes in Tobin's Q are paid more.

Overall, our analysis shows evidence supporting the use of weak-form RPE only for our sample firms that actually have RPE plans in place and no evidence of weak-form RPE by firms that exclusively use APE

plans. This may help explain the mixed results in the literature testing for the implicit use of RPE, which pools together firm-years using RPE, APE and non-performance-based compensation plans.[1]

[1] In Albuquerque's (2009) models, returns to a peer group of industry and firm size matched firms are negatively associated with changes in total CEO compensation. However, returns to a peer group of industry matched firms do not provide evidence consistent with the use of RPE. As we do here, Gong et. al. (2011) find evidence of RPE use by RPE firms only when actual performance peer firms are used to construct the peer return benchmark. However, while our results are consistent with Gong et. al. (2011), our findings are more definitive because of the longitudinal nature of our sample which spans 17 years.

TABLE D

Weak-Form Tests for the Use of RPE

The dependent variable in Table D is change in the natural logarithm of total CEO compensation (Δln (TOTAL_CEO_COMP.). Details of variable definitions are in Internet Appendix A. All models include year and firm fixed effects. t-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Chow tests examine whether the coefficients for Own firm return and Peer return differ significantly across analogous RPE and APE models. — = not applicable.

Dependent variable:	RPE Firm-Years				APE Firm-Years		
Δln (TOTAL_CEO_COMP.)	1	2	3	4	5	6	7
Measure of Peer Return:	RPE	Comp.	Prod. Mkt.	Ind.-Size-Bm.	Comp.	Prod. Mkt.	Ind.-Size-Bm.
OWN_FIRM_RETURN	0.4715***	0.3972***	0.5306***	0.4978***	0.1391***	0.2444***	0.2512***
	(7.22)	(4.85)	(8.39)	(8.27)	(5.10)	(10.89)	(11.44)
PEER_RETURN	-0.2739***	-0.1623	-0.1146*	-0.1647*	-0.0386	0.0176	-0.0567
	(-3.35)	(-1.33)	(-1.82)	(-1.83)	(-0.49)	(0.64)	(-1.26)
Δlog_ASSETS	0.0285	-0.1654	-0.0314	-0.0177	0.3100***	0.3326***	0.3070***
	(0.25)	(-1.24)	(-0.30)	(-0.18)	(3.62)	(5.23)	(5.13)
ΔTOBIN'S_Q	0.1005*	0.1036	0.0459	0.0897*	0.2092***	0.0390***	0.0469***
	(1.87)	(1.49)	(0.85)	(1.82)	(6.88)	(3.19)	(3.94)
SALES_GROWTH	0.3445***	0.5034***	0.3325***	0.3339***	-0.0016	0.0129	0.0125
	(4.44)	(5.06)	(4.85)	(5.15)	(-0.15)	(1.21)	(1.19)
IDIOSYNCRATIC_VARIANCE	1.338	4.7790	1.9253	1.0669	7.7007**	2.3717	3.7167*
	(0.37)	(1.02)	(0.55)	(0.33)	(2.28)	(1.18)	(1.66)
CEO_OWNERSHIP	-0.6092**	-0.5604*	-0.5645**	-0.5331**	-0.2905	-0.7211***	-0.3385*
	(-2.18)	(-1.92)	(-2.02)	(-1.96)	(-1.47)	(-2.94)	(-1.92)
ln(1+CEO_TENURE)	0.1485***	0.1391***	0.1447***	0.1318***	0.2002***	0.1671***	0.1537***
	(4.67)	(3.48)	(4.65)	(4.74)	(6.28)	(7.02)	(6.99)
CEO_DUALITY	0.0848	0.0843	0.0591	0.0727	0.0269	-0.0213	-0.0002
	(1.54)	(1.19)	(1.11)	(1.51)	(0.48)	(-0.52)	(-0.00)
NEW_AND_OUTSIDE_CEO	-0.0414	0.0001	-0.0265	-0.0150	0.0338	0.0496	0.0451
	(-0.66)	(0.00)	(-0.41)	(-0.27)	(0.53)	(1.13)	(1.11)
CEO_EMPL._CONTRACT	0.0147	-0.0016	0.0280	0.0281	0.0255	0.0208	0.0183
	(0.30)	(-0.03)	(0.57)	(0.63)	(0.56)	(0.55)	(0.53)
FOUNDER	-0.4794**	-0.5554**	-0.4921**	-0.4860**	-0.4682***	-0.2941***	-0.3155***
	(-2.22)	(-2.10)	(-1.97)	(-2.31)	(-3.37)	(-2.92)	(-3.47)
Constant	-0.1175	-0.2382	-0.2255	-0.2101	-0.3746	-0.3497	-0.3826
	(-0.72)	(-1.41)	(-1.64)	(-1.60)	(-1.10)	(-0.98)	(-1.15)
Year and firm fixed effects included in all models.							
Observations	3,420	2,649	3,415	3,954	6,196	8,783	9,776
R-squared	0.2642	0.2619	0.2638	0.2428	0.1442	0.1359	0.1232
					(2) v (5)	(3) v (6)	(4) v (7)
[p-value]							
Test of coefficient for own firm return, RPE = APE					[0.0012]	[0.0001]	[0.0007]
Test of coefficient for compensation peer return RPE = APE					[0.2363]	—	—
Test of coefficient for product market peer return RPE = APE					—	[0.0691]	—
Test of coefficient for industry-size-bm peer return RPE = APE					—	—	[0.6914]

E. Analysis of RPE and APE Initial Adoption Samples

First-time RPE and APE adoptions could provide a stronger "treatment" effect because they are not contaminated by prior, possibly overlapping performance-based compensation plans. Following Bettis, Bizjak, Coles, and Young (2014), we define RPE initial adoption as an indicator variable that equals one in the first year a firm grants an RPE plan to its CEO and zero for all APE firm-years. To reduce duplication in our panel data, for APE firm-year observations, we keep only one randomly selected firm-year for use in our RPE initial adoption analysis. Similarly, we define APE initial adoption as an indicator variable that equals one in the first year a firm grants an APE to its CEO and zero for all RPE firm-years. Again, to reduce duplication in our panel data, for RPE firm-year observations, we keep only one randomly selected firm-year for use in our APE initial adoption analysis. The number of observations for which RPE initial adoption equals one (zero) is 808 (1,099) and the number of observations for which APE initial adoption equals one (zero) is 1,463 (788).

Table E, Panel A presents results for our baseline DID models using the RPE (APE) initial adoption samples. Panel B presents results after including the same controls used in Panel D of Table 2. Findings are consistent with our main results. Specifically, subsequent industry index return correlation is lower for firms after the initial adoption of RPE and is higher after the initial adoption of APE; for firms adopting RPE (APE), subsequent idiosyncratic risk and idiosyncratic risk as a proportion of total risk are higher (lower).

TABLE E

Robustness Test Using RPE Initial Adoption and APE Initial Adoption Samples

Dependent variables in Table E are Industry index return correlation (IND._INDEX_CORRELATION), IDIOSYNCRATIC_RISK, and IDIOSYNCRATIC/TOTAL_RISK for year t+1. RPE_INITIAL_ADOPTION variable equals one in the first year a firm grants an RPE plan to its CEO during the sample period and zero for all years for firms with APE observations. For APE firm-year observations, we keep only one randomly selected firm-year for each firm where RPE initial adoption equals zero. APE_INITIAL_ADOPTION variable equals one in the first year a firm grants an APE plan to its CEO and zero for all years for firms with RPE observations. For RPE firm-year observations, we keep only one randomly selected firm-year for each firm where APE initial adoption equals zero. Variables are defined in Internet Appendix A. t-values are based on robust standard errors clustered by firm and are reported in parentheses. Chow tests examine whether the coefficient for RPE initial adoption variable differs significantly from that for APE initial adoption variable. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Baseline Models

	IND._INDEX_CORRELATION$_{t+1}$		IDIOSYNCRATIC_RISK$_{t+1}$		IDIOSYNCRATIC/TOTAL_RISK$_{t+1}$	
	1	2	3	4	5	6
	RPE_INITIAL_ ADOPTION	APE_INITIAL_ ADOPTION	RPE_INITIAL_ ADOPTION	APE_INITIAL_ ADOPTION	RPE_INITIAL_ ADOPTION	APE_INITIAL_ ADOPTION
RPE_INITIAL_ADOPTION	-0.0276***		0.0121***		0.0353***	
	(-3.01)		(2.64)		(3.52)	
APE_INITIAL_ADOPTION		0.0326***		-0.0562***		-0.0260***
		(3.44)		(-12.98)		(-2.63)
Constant	0.3956***	0.4463***	0.0999***	0.1070***	0.8110***	0.7452***
	(22.23)	(29.60)	(19.92)	(22.52)	(43.00)	(46.76)
Firm fixed effects included in all models.						
R-squared	0.8144	0.7860	0.7756	0.7697	0.8045	0.7743
Observations	1,907	2,251	1,907	2,251	1,907	2,251
Test of coeff. for RPE vs. APE_INITIAL_ADOPTION [p-value]		(1) v (2) [0.000]		(3) v (4) [0.000]		(5) v (6) [0.000]

Panel B: Models Including Controls for Other Plan Features and Characteristics of CEOs and Firms

	IND._INDEX_CORRELATION$_{t+1}$		IDIOSYNCRATIC_RISK$_{t+1}$		IDIOSYNCRATIC/TOTAL_RISK$_{t+1}$	
	1	2	3	4	5	6
	RPE_INITIAL_ ADOPTION	APE_INITIAL_ ADOPTION	RPE_INITIAL_ ADOPTION	APE_INITIAL_ ADOPTION	RPE_INITIAL_ ADOPTION	APE_INITIAL_ ADOPTION
RPE_INITIAL_ADOPTION	-0.0248*		0.0130*		0.0314*	
	(-1.84)		(1.74)		(1.92)	
APE_INITIAL_ADOPTION		0.0376**		-0.0171*		-0.0397**
		(2.06)		(-1.86)		(-1.97)
Controls and firm fixed effects included in all models.						
R-squared	0.8852	0.8645	0.8581	0.8534	0.8742	0.8624
Observations	784	822	784	822	784	822
Test of coeff. for RPE vs. APE_INITIAL_ADOPTION [p-value]		(1) v (2) [0.058]		(3) v (4) [0.067]		(5) v (6) [0.025]

F. Logistic Models of the Determinants of Switching, the Choice of RPE Versus APE, and the Construction of Matched Pair Samples

Table F1 presents logistic regression models of the propensity to switch from an APE to an RPE plan (model 1) and from an RPE to an APE plan (model 2). The dependent variable equals one for firms that switch plan type in year t and zero otherwise. Table F2 presents a logistic regression model of the propensity to adopt RPE versus APE plans. Here, the dependent variable equals one for RPE firm-years and zero for APE firm-years. The explanatory variables are lagged (measured in year t-1) and fall into three categories: firm characteristics, industry and product market characteristics, and CEO and governance characteristics. Variable definitions can be found in Internet Appendix A.

Importantly, all models control for lagged industry index correlation and idiosyncratic risk. This allows us to address the potential reverse causality concern that switchers from an APE to an RPE plan (an RPE to an APE plan) have significantly lower (higher) industry index return correlation and higher (lower) idiosyncratic risk in the pre-switching period. Specifically, we examine whether *ex ante* risk differences influence the decision to switch performance plan type or to adopt RPE versus APE in a way that negates our findings. We find that this is not the case. Coefficients for industry index correlation and idiosyncratic risk are the opposite of those that would suggest a potential reverse causality problem. Specifically, Table F1 shows that firms with higher (lower) *ex ante* industry index return correlation and lower (higher) idiosyncratic risk are more likely to switch from APE to RPE (RPE to APE) plans. Table F2 shows that firms with higher *ex ante* industry index return correlation and lower idiosyncratic risk are more likely to choose RPE over APE plans.

In addition, to address the potential concern that CEO turnover or CEO risk-taking characteristics drive our findings, we include an indicator variable for whether or not the CEO joined the firm no more than two years earlier (NEW_AND_OUTSIDE_CEO) as an explanatory variable in the logistic models. Importantly, the lack of significance of the NEW_AND_OUTSIDE_CEO rules out the possibility that switches between RPE and APE plans are correlated with CEO turnover.

Firm characteristic variables are ln(SALES), ln(FIRM_AGE), two measures of growth opportunities (TOBIN'S_Q and PP&E), industry-adjusted return on assets (IND._ADJ_ROA), industry-adjusted stock return (IND._ADJ_STOCK_RETURN), IDIOSYNCRATIC_RISK, and LEVERAGE (long-term debt/total assets). Across models, switching from APE to RPE plans or choosing RPE over APE plans is positively associated with lagged ln(Sales). Moscarini and Postel-Vinay (2012) find that large firms are more sensitive to common exogenous shocks. Since RPE filters out the effect of such shocks, it may be more advantageous for large firms. Also, across models, there is a negative association between lagged growth opportunities and switching from APE to RPE plans or choosing RPE over APE plans. This is consistent with Albuquerque (2014) who argues that high growth opportunity firms are less likely to adopt RPE because it is difficult for such firms to identify relevant performance peers. Finally, lagged idiosyncratic risk is negatively (positively) associated with switches to RPE (switches to APE) and the choice of RPE over APE.

Industry and product market characteristic variables are ln(#PRODUCT_PEERS) (Hoberg and Phillips (2016)) and IND._INDEX_CORRELATION. Lagged ln(#PRODUCT_PEERS) is positively related to switching from APE to RPE plans or choosing RPE over APE plans. This is consistent with DeFond and Park (1999) who document greater use of RPE in more competitive industries.[2] Also, lagged industry index correlation is positively (negatively) associated with switches to RPE (switches to APE) and the choice of RPE over APE.

[2] This finding is in contrast to Aggarwal and Samwick (1999) who predict less RPE use in more competitive industries because, they argue, RPE plans create counter-productive tournament competition.

CEO and governance characteristic variables are ln(1+CEO_TENURE), NEW_AND_OUTSIDE_CEO, CEO_EMPL._CONTRACT, Founder-CEOs indicator (FOUNDER), CEO duality indicator (CEO_DUALITY), and Compensation consultant indicator (COMP._CONSULTANT). The results show that switching from APE to RPE plans or choosing RPE over APE plans is consistently positively associated with the use of a compensation consultant.

For our matched pair sample design, we construct a total of six samples. More specifically, we construct two matched pairs for switches from APE to RPE, two matched pairs for switches from RPE to APE, and two matched pairs for the propensity to choose RPE over APE. Our matching methods are Mahalanobis distance covariate matching and nearest neighbor propensity score matching (Austin (2014), and Imbens (2000)). For example, for Mahalanobis distance matching, each firm-year observation of a switch from APE to RPE (RPE to APE) is matched with a firm-year observation continuing with APE (continuing with RPE) taking correlations across the covariates used in model 1 (model 2) of Table F1 into account. For nearest neighbor propensity score matching, each firm-year observation of a switch from APE to RPE (RPE to APE) is matched with a firm-year observation continuing with APE (continuing with RPE) based on the *ex ante* propensity of switching performance plan type as estimated in Table F1. To obtain the largest possible sample, we perform matching with replacement using a 0.01 caliper width matching algorithm.[3] The resulting matched samples contain 605 matched pairs (1,210 firm-years) for potential switches from APE to RPE plans, 322 matched pairs for potential switches from RPE to APE plans, and 3,980 matched pairs for the propensity to choose RPE versus APE.

Tables F3 and F4 evaluate the efficacy of our matching algorithms. For our matched samples, covariate balance is achieved if pairs are similar with respect to covariates. For each matched pair, we present mean and median covariate values. We conduct two sample t-tests for differences in means and Kruskal-Wallis tests for differences in medians between matched pairs. For Mahalanobis metric matched samples presented in Table F3, we find only one significant difference across covariates at the 5% significance level. Specifically, firms switching to APE have higher idiosyncratic risk than firms that do not switch at the median. For the propensity score matched samples presented in Table F3, there are no significant differences between matched pairs in means or medians at the 5% significance level. For both Mahalanobis metric and propensity score matched samples presented in Table F4, we find that firms choosing RPE have marginally higher industry-adjusted stock return than firms choosing APE plans.

[3] Austin (2014) shows that caliper matching performs best among 12 matching algorithms he examines, assessed using mean squared error. He further demonstrates that the percentage of treated subjects successfully matched to a control subject is highest using caliper matching with replacement.

TABLE F1

Logistic Regressions of the Propensity to Switch Between RPE and APE Plans

The dependent variable in model 1 of Table F1 equals one for firms switching from APE plans in year *t-1* to RPE plans in year *t* and zero for firms continuing with APE plans in year *t*. The dependent variable in model 2 equals one for firms switching from RPE plans in year *t-1* to APE plans in year *t* and zero for firms continuing with RPE plans in year *t*. Variables are defined in the Internet Appendix A. Z-values are based on robust standard errors clustered by firm and by year (two-way) and are reported in parentheses. Marginal effects are evaluated at the means. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. — = not applicable.

	$APE_{t-1} \rightarrow RPE_t$		$RPE_{t-1} \rightarrow APE_t$	
	1 if Switching to RPE in Year t 0 if Remain with APE in Year t		1 if Switching to APE in Year t 0 if Remain with RPE in Year t	
	1		2	
	Coeff.	Marginal Effect	Coeff.	Marginal Effect
Firm Characteristics				
$\ln(SALES)_{t-1}$	0.1055***	0.0072***	0.0230	0.0018
	(3.07)	(3.08)	(0.44)	(0.44)
$\ln(FIRM\_AGE)_{t-1}$	0.0700	0.0048	-0.0767	-0.0061
	(1.34)	(1.34)	(-1.12)	(-1.12)
$TOBIN'S\_Q_{t-1}$	-0.1266***	-0.0086***	0.1779***	0.0098***
	(-2.68)	(-2.71)	(2.80)	(2.80)
$PP\&E_{t-1}$	0.8262***	0.0563***	-0.9621***	-0.0765***
	(4.23)	(4.23)	(-3.64)	(-3.70)
$IND.\_ADJ\_ROA_{t-1}$	-0.2006	-0.0137	-0.2896	-0.0230
	(-0.99)	(-0.99)	(-0.91)	(-0.91)
$IND.\_ADJ\_STOCK\_RETURN_{t-1}$	-0.0053	-0.0004	-0.2474***	-0.0197***
	(-0.35)	(-0.35)	(-2.81)	(-2.84)
$IDIOSYNCRATIC\_RISK_{t-1}$	-2.2132**	-0.1508**	5.1120***	0.4063***
	(-2.18)	(-2.18)	(3.44)	(3.44)
$LEVERAGE_{t-1}$	0.5542*	0.0378*	0.3704	0.0294
	(1.89)	(1.89)	(0.82)	(0.82)
Industry and Product Market Characteristics				
$\ln(\#PRODUCT\_PEERS)_{t-1}$	0.18493***	0.0126***	-0.0457	-0.0036
	(5.05)	(5.09)	(-0.90)	(-0.90)
$IND.\_INDEX\_CORRELATION_{t-1}$	0.9165***	0.0625***	-1.4741***	-0.1172***
	(3.40)	(3.41)	(-3.95)	(-4.00)
CEO and Governance Characteristics				
$\ln(\#PRODUCT\_PEERS)_{t-1}$	0.2195***	-0.0150***	-0.0003	-0.0000
	(-3.10)	(-3.10)	(-0.00)	(-0.00)
$NEW\_AND\_OUTSIDE\_CEO_{t-1}$	0.2137	0.0146	0.3836	0.0305
	(1.24)	(1.25)	(1.53)	(1.54)
$CEO\_EMPL.\_CONTRACT_{t-1}$	-0.1359	-0.0093	0.2792**	0.0222**
	(-1.41)	(-1.41)	(2.08)	(2.09)
$FOUNDER_{t-1}$	-0.2293	-0.0156	0.1644	0.0131
	(-1.14)	(-1.14)	(0.48)	(0.48)
$CEO\_DUALITY_{t-1}$	0.1036	0.0071	0.1148	0.0091
	(1.07)	(1.07)	(0.84)	(0.84)
$COMP.\_CONSULTANT_{t-1}$	0.7256***	0.0494***	-0.1787	-0.0142
	(4.76)	(4.90)	(-0.91)	(-0.91)
Constant	-4.8551***	—	-0.8486	—
	(-9.38)		(-1.19)	
Year fixed effects	Yes		Yes	
Observations	6,887		3,267	
Pseudo R^2	0.0600		0.0762	

TABLE F2

Logistic Regressions of the Propensity to Adopt RPE Versus APE

The dependent variable in Table F2 equals one if the firm uses relative performance evaluation (RPE) in year t and is zero if the firm uses absolute performance evaluation (APE) in year t. Variables are defined in Internet Appendix A. Z-values are based on robust standard errors clustered by firm and by year (two-way) and are reported in parentheses. Marginal effects are evaluated at the means. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. — = not applicable.

	1 if RPE Used in Year t; 0 if APE Used in Year t	
	Coeff.	Marginal Effect
Firm Characteristics		
$\ln(SALES)_{t-1}$	0.0927***	0.0169***
	(5.67)	(5.68)
$\ln(FIRM\_AGE)_{t-1}$	0.1268***	0.0232***
	(5.36)	(5.36)
$TOBIN'S\_Q_{t-1}$	-0.1866***	-0.0341***
	(-7.91)	(-7.99)
$PP\&E_{t-1}$	1.0980***	0.2007***
	(13.26)	(13.26)
$IND.\_ADJ\_ROA_{t-1}$	-0.1680	-0.0307
	(-1.63)	(-1.63)
$IND.\_ADJ\_STOCK\_RETURN_{t-1}$	0.2199***	0.0402***
	(6.14)	(6.14)
$IDIOSYNCRATIC\_RISK_{t-1}$	-4.5289***	-0.8278***
	(-8.38)	(-8.44)
$LEVERAGE_{t-1}$	0.1264	0.0231
	(0.85)	(0.87)
Industry and Product Market Characteristics		
$\ln(\#PRODUCT\_PEERS)_{t-1}$	0.1738***	0.0318***
	(10.29)	(10.33)
$IND.\_INDEX\_CORRELATION_{t-1}$	0.9469***	0.1731***
	(7.60)	(7.58)
CEO and Governance Characteristics		
$\ln(1+CEO\_TENURE)_{t-1}$	-0.0681**	-0.0124**
	(-2.11)	(-2.11)
$NEW\_AND\_OUTSIDE\_CEO_{t-1}$	0.0285	0.0052
	(0.32)	(0.32)
$CEO\_EMPL.\_CONTRACT_{t-1}$	-0.1165***	-0.0213***
	(-2.82)	(-2.82)
$FOUNDER_{t-1}$	-0.5014***	-0.0912***
	(-4.66)	(-4.67)
$CEO\_DUALITY_{t-1}$	0.1803***	0.0330***
	(4.12)	(4.12)
$COMP.\_CONSULTANT_{t-1}$	0.3082***	0.0563***
	(4.88)	(4.89)
Constant	-3.1128***	—
	(-9.70)	
Year fixed effects	Yes	
Observations	15,063	
Pseudo R^2	0.0936	

TABLE F3

Mahalanobis Metric and Propensity Scored Matched Pairs for Plan Switches

Matches for models 1 and 2 of Table F3 are made based on the Mahalanobis metric and nearest neighbor propensity-scores matching, respectively, using covariate values from Internet Appendix Table F1, model 1. These models have 605 matched pairs. Matches for models 3 and 4 are made based on the Mahalanobis metric and nearest neighbor propensity-scores matching, respectively, using covariate values from Internet Appendix Table F1, model 2. These models have 322 matched pairs. Variables are defined in Internet Appendix A. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, for the tests of differences in means (medians) between matched pairs using 2 sample t-tests (2 sample Kruskal-Wallis tests).

	$APE_{t-1} \rightarrow RPE_t$ 1 if Switching to RPE in Year t 0 if Remain with APE in Year t				$RPE_{t-1} \rightarrow APE_t$ 1 if Switching to APE in Year t 0 if Remain with RPE in Year t			
	Mahalanobis Metric		Propensity Score		Mahalanobis Metric		Propensity Score	
	1		2		3		4	
	Treated Mean (Median)	Control Mean (Median)	Treated Mean (Median)	Control Mean (Median)	Treated Mean (Median)	Control Mean (Median)	Treated Mean (Median)	Control Mean (Median)
Matching Variables: Firm Characteristics								
$\ln(SALES)_{t-1}$	8.2945 (8.2030)	8.2406 (8.1487)	8.2945 (8.2030)	8.2789 (8.1996)	8.3761 (8.3333)	8.5653 (8.5767)	8.3761 (8.3333)	8.3941 (8.3591)
$\ln(FIRM\_AGE)_{t-1}$	2.9860 (3.1427)	2.9566 (3.0986)	2.9860 (3.1427)	3.0185 (3.1427)	3.0571 (3.3005)	3.2284 (3.4683)	3.0571 (3.3005)	3.0440 (3.2021)
$TOBIN'S\_Q_{t-1}$	1.7225 (1.3723)	1.7347 (1.4512)	1.7225 (1.3723)	1.7844 (1.4531)	1.6659 (1.3454)	1.6428 (1.3743)	1.6659 (1.3454)	1.6996 (1.3973)
$PP\&E_{t-1}$	0.2846 (0.2081)	0.2703 (0.1858)	0.2846 (0.2081)	0.2722 (0.2075)	0.3050 (0.2329)	0.3104 (0.2435)	0.3050 (0.2329)	0.2979 (0.2264)
$IND.\_ADJ\_ROA_{t-1}$	-0.0267 (-0.0165)	-0.0170 (-0.0109)	-0.0267 (-0.0165)	-0.0256 (-0.0158)	-0.0219 (-0.0146)	-0.0176 (-0.0123)	-0.0219 (-0.0146)	-0.0248 (-0.0206)
$IND.\_ADJ\_STOCK\_RETURN_{t-1}$	0.0967 (0.0390)	0.0923 (0.0680)	0.0967 (0.0390)	0.0955 (0.0520)	0.0486 (0.0323)	0.0886 (0.0297)	0.0486 (0.0323)	0.0338 (0.0109)
$IDIOSYNCRATIC\_RISK_{t-1}$	0.0720 (0.0615)	0.0707 (0.0624)	0.0720 (0.0615)	0.0727 (0.0614)	0.0745 (0.0626)	0.0655* (0.0549)**	0.0745 (0.0626)	0.0746 (0.0663)
$LEVERAGE_{t-1}$	0.2220 (0.2068)	0.2121 (0.1917)	0.2220 (0.2068)	0.2139 (0.1943)	0.2247 (0.2082)	0.2178 (0.2062)	0.2247 (0.2082)	0.2233 (0.2077)
Matching Variables: Industry and Product Market Characteristics								
$\ln(\#PRODUCT\_PEERS)_{t-1}$	2.4324 (2.3979)	2.4163 (2.3979)	2.4324 (2.3979)	2.4097 (2.4849)	2.4255 (2.4849)	2.5118 (2.5649)	2.4255 (2.4849)	2.3981 (2.3979)
$IND.\_INDEX\_CORRELATION_{t-1}$	0.6257 (0.6461)	0.6277 (0.6394)	0.6257 (0.6461)	0.6172 (0.6402)	0.6016 (0.6215)	0.6318* (0.6437)*	0.6016 (0.6215)	0.6007 (0.6288)
Matching Variables: CEO and Governance Characteristic								
$\ln(1+CEO\_TENURE)_{t-1}$	1.7423 (1.7492)	1.7443 (1.7492)	1.7423 (1.7492)	1.7408 (1.7778)	1.7753 (1.8494)	1.7186 (1.7123)	1.7753 (1.8494)	1.7465 (1.7778)
$NEW\_AND\_OUTSIDE\_CEO_{t-1}$	0.0876 (0.000)	0.0823 (0.000)	0.0876 (0.000)	0.0826 (0.000)	0.0839 (0.000)	0.0764 (0.000)	0.0839 (0.000)	0.0640 (0.000)
$CEO\_EMPL.\_CONTRACT_{t-1}$	0.6711 (1.000)	0.6744 (1.000)	0.6711 (1.000)	0.6661 (1.000)	0.7050 (1.000)	0.7049 (1.000)	0.7050 (1.000)	0.6633 (1.000)
$FOUNDER_{t-1}$	0.0529 (0.000)	0.0573 (0.000)	0.0529 (0.000)	0.0642 (0.000)	0.0404 (0.000)	0.0313 (0.000)	0.0404 (0.000)	0.0572 (0.000)
$CEO\_DUALITY_{t-1}$	0.5851 (1.000)	0.5850 (1.000)	0.5851 (1.000)	0.5982 (1.000)	0.6677 (1.000)	0.6736 (1.000)	0.6677 (1.000)	0.6397 (1.000)
$COMP.\_CONSULTANT_{t-1}$	0.9124 (1.000)	0.9123 (1.000)	0.9124 (1.000)	0.9284 (1.000)	0.8758 (1.000)	0.8819 (1.000)	0.8758 (1.000)	0.8956 (1.000)

TABLE F4

Mahalanobis Metric and Propensity Scored Matched Pairs of the Propensity to Choose RPE

Matches for models 1 and 2 of Table F4 are made based on the Mahalanobis metric and nearest neighbor propensity score matching, respectively, using covariate values from Internet Appendix Table F2. There are 3,980 matched pairs of RPE and APE firm-years (a total of 7,960 firm-years). Variables are defined in Internet Appendix A. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, for the tests of differences in means (medians) between matched pairs using 2 sample t-tests (2 sample Kruskal-Wallis tests).

1 if RPE Used in Year t; 0 if APE Used in Year t

	Mahalanobis Metric Matching 1		Propensity Score Matching 2	
	Treated Mean (Median)	Control Mean (Median)	Treated Mean (Median)	Control Mean (Median)
Matching Variables: Firm Characteristics				
$\ln(SALES)_{t-1}$	8.5711 (8.5294)	8.5592 (8.5178)	8.5711 (8.5294)	8.5827 (8.5142)
$\ln(FIRM\_AGE)_{t-1}$	3.2929 (3.5159)	3.2542 (3.4990)	3.2929 (3.5159)	3.2791 (3.5015)
$TOBIN'S\_Q_{t-1}$	1.5916 (1.3150)	1.5927 (1.3201)	1.5916 (1.3150)	1.5938 (1.3055)
$PP\&E_{t-1}$	0.3545 (0.3098)	0.3397* (0.2901)	0.3545 (0.3098)	0.3457 (0.3018)
$IND.\_ADJ\_ROA_{t-1}$	-0.0213 (-0.0112)	-0.0198 (-0.0102)	-0.0213 (-0.0112)	-0.0204 (-0.0106)
$IND.\_ADJ\_STOCK\_RETURN_{t-1}$	0.0027 (-0.0068)	-0.0029* (-0.0130)*	0.0027 (-0.0068)	-0.0018* (-0.0114)*
$IDIOSYNCRATIC\_RISK_{t-1}$	0.0570 (0.0493)	0.0584 (0.0498)	0.0570 (0.0493)	0.0578 (0.0504)
$LEVERAGE_{t-1}$	0.2264 (0.2201)	0.2226 (0.2182)	0.2264 (0.2201)	0.2222 (0.2193)
Matching Variables: Industry and Product Market Characteristics				
$\ln(\#PRODUCT\_PEERS)_{t-1}$	2.5608 (2.4949)	2.5282 (2.4849)	2.5608 (2.4949)	2.5449 (2.4849)
$IND.\_INDEX\_CORRELATION_{t-1}$	0.6786 (0.7075)	0.6735 (0.7025)	0.6786 (0.7075)	0.6745 (0.6915)
Matching Variables: CEO and Governance Characteristics				
$\ln(1+CEO\_TENURE)_{t-1}$	1.8023 (1.7999)	1.8044 (1.8026)	1.8023 (1.7999)	1.8019 (1.7961)
$NEW\_AND\_OUTSIDE\_CEO_{t-1}$	0.0498 (0.000)	0.0499 (0.000)	0.0498 (0.000)	0.0509 (0.000)
$CEO\_EMPL.\_CONTRACT_{t-1}$	0.5787 (1.000)	0.5688 (1.000)	0.5787 (1.000)	0.5733 (1.000)
$FOUNDER_{t-1}$	0.0303 (0.000)	0.0233 (0.000)	0.0303 (0.000)	0.0289 (0.000)
$CEO\_DUALITY_{t-1}$	0.6565 (1.000)	0.6452 (1.000)	0.6565 (1.000)	0.6406 (1.000)
$COMP.\_CONSULTANT_{t-1}$	0.9464 (1.000)	0.9450 (1.000)	0.9464 (1.000)	0.9244 (1.000)

G. Staggered State Adoption of the Inevitable Disclosure Doctrine (IDD) and the Use of RPE Plans

In this analysis, we use the staggered adoption of the Inevitable Disclosure Doctrine (IDD) by U.S. states as a natural experiment that facilitates the staggered adoption of CEO RPE plans both across firms and over time. The staggered adoption of IDD by U.S. states increases the protection of a firm's trade secrets by stating that an employee can be prevented from working for peer firms if this would inevitably lead the employee to divulge the trade secrets. Klasa, Ortiz-Molina, Serfling, and Srinivasan (2018) show that IDD reduces the mobility of top executives relative to other employees. One explanation for the lack of widespread use of RPE is that not indexing CEO compensation to market or industry performance allows CEO pay to vary with the value of his/her outside employment options, which helps with CEO retention (e.g., Rajgopal, Shevlin, and Zamora (2006)). Once a CEO's mobility is reduced following the adoption of IDD in the firm's headquarters state, the firm could find RPE plans more feasible. Table G1presents a list of IDD adopting states along with their adoption dates and a list of states that rejected IDD after previously adopting it along with their rejection dates. By 2016, there were 18 IDD adopting states and 3 states that adopted IDD and subsequently rejected it.

To conduct our analysis, in a given year, we pair firms headquartered in IDD states (treated firms) with firms headquartered in non-IDD states (control firms). We perform matching based on Mahalanobis distance covariate matching and nearest-neighbor propensity score matching using models of the propensity to switch from APE to RPE (see Internet Appendix F, model 1 of Table F1). The validity of our natural experiment relies on the existence of a differential change in the propensity to switch from APE to RPE for firms subject to IDD (treated firms) relative to their matches (control firms) after IDD adoption.

Table G2 presents the results of estimating the two-stage least squares/instrumental variable (2SLS/IV) models. First-stage results are presented in Panel A and second-stage results are presented in Panel B. The potential switch from APE to RPE (RPE_PLAN_SWITCH_INDICATOR) is treated as endogenous in the first-stage model. Our IV is IDD_ADOPTION^{+1}, which equals one if the firm is headquartered in a state that adopted the IDD one year ago (year 0) and zero otherwise. The IV is likely to satisfy the exclusion restriction as it provides exogenous variation in the decision to switch a firm's CEO from an APE to an RPE plan. Indeed, results of the first-stage estimation presented in models 1 and 3 of Panel A show that coefficient for IDD_ADOPTION^{+1} is positive and statistically significant, which suggests that it is a valid IV. In addition, models 2 and 4 of Panel A show that firms in IDD states relative to their matches switch to RPE rather than continuing with APE only after IDD adoption (IDD_ADOPTION^{+1}), but not in the IDD adoption year (IDD_ADOPTION^{0}) or one year prior to the IDD adoption (IDD_ADOPTION^{-1}).

The predicted values of the endogenous variable from first-stage models 1 and 3 are then used as explanatory variables in the corresponding second-stage models presented in Panel B. Consistent with our main findings, second-stage results show that PREDICTED_RPE_PLAN_SWITCH_INDICATOR is negatively related to industry correlation and positively related to idiosyncratic risk measures. The battery of weak-identification tests (WID), specifically the Anderson-Rubin (1949) Wald F-statistic and the Cragg-Donald (1993) Wald F-statistic, strongly reject the null hypothesis that the endogenous variable is equal to zero at the 1% level and provide comfort that the relationship between our IV and the endogenous variable is sufficiently strong to justify causal inferences.

TABLE G1

Staggered Adoption of the Inevitable Disclosure Doctrine (IDD) by U.S. State Courts as an Exogenous Shock that Facilitates the Use of RPE

Panel A of Table G1 lists the date that a state court adopted the IDD. Panel B lists the date that a state court rejected the IDD after previously adopting it.

Panel A: List of Inevitable Disclosure Doctrine (IDD) Adopting States and Date of Adoption

Adopting State	Adoption Date
Arkansas	03/18/1997
Connecticut	02/28/1996
Delaware	05/05/1964
Florida	07/11/1960
Georgia	06/29/1998
Illinois	02/09/1989
Indiana	07/12/1995
Iowa	04/01/1996
Kansas	02/02/2006
Massachusetts	10/13/1994
Michigan	02/17/1966
Minnesota	10/10/1986
Missouri	11/02/2000
New Jersey	04/27/1987
New York	12/05/1919
North Carolina	06/17/1976
Ohio	09/29/2000
Pennsylvania	02/19/1982
Texas	05/28/1993
Utah	01/30/1998
Washington	12/30/1997

Panel B: List of Inevitable Disclosure Doctrine (IDD) Rejecting States and Date of Rejection

Rejecting State	Rejection Date
Florida	05/21/2001
Michigan	04/30/2002
Texas	04/03/2003

TABLE G2

Two-Stage Least Squares/Instrumental Variables Analysis: Staggered Adoption of the Inevitable Disclosure Doctrine (IDD) by U.S. States as an Exogenous Shock that Facilitates the Adoption of RPE

Panel A of Table G2 presents the first-stage of the 2SLS/IV regression which treats potential switches from APE to RPE (RPE_PLAN_SWITCH_INDICATOR) as endogenous. The IV is *IDD_ADOPTION*$^{+1}$. *IDD_ADOPTION*$^{-1}$, *IDD_ADOPTION*^{0}, and *IDD_ADOPTION*$^{+1}$ are equal to one if the firm is headquartered in a state that will adopt the IDD in a year, adopts the IDD in the current year, or adopted the IDD in the prior year, respectively. Models 1 and 2 of Panel A are based on a Mahalanobis distance covariate metric matched sample, while models 3 and 4 of Panel A are based on a *nearest* neighbor propensity score matched sample (See Internet Appendix F, Table F1). Predicted values of the endogenous variable from first-stage models 1 and 3 are used as explanatory variables in second-stage models presented in Panel B. We use Anderson-Rubin (1949) Wald F-statistics and Cragg-Donald (1993) Wald F-statistic to perform weak-identification tests (WID). Variables are defined in Internet Appendix A. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: First-Stage Regressions of IDD_ADOPTION and Switches from APE to RPE Plans

	RPE_PLAN_SWITCH_INDICATOR 1 if Switching to RPE in Year t 0 if Remain with APE in Year t			
	Mahalanobis Metric Matching		Propensity Score Matching	
	1	2	3	4
IDD_ADOPTION^{-1}		-0.5886		-0.7575
		(-0.96)		(-0.86)
IDD_ADOPTION^{0}		1.1579		1.5863
		(0.90)		(1.19)
IDD_ADOPTION^{+1}	2.2874***	2.2864***	2.1893***	2.1942***
	(4.05)	(4.07)	(3.54)	(3.56)
Constant	-0.7926	-0.7228	-0.5489	-0.4417
	(-0.50)	(-0.45)	(-0.34)	(-0.27)
Industry and year fixed effects included in all models				
Pseudo R^2	0.0573	0.0633	0.0624	0.0633
Observations	1,210	1,210	1,210	1,210

Panel B: Second-Stage Regressions of Firm Risk Measures on Predicted RPE Plan Switch Indicator

	IND._INDEX_CORRELATION$_{t+1}$		IDIOSYNCRATIC_RISK$_{t+1}$		IDIOSYNCRATIC/TOTAL_RISK$_{t+1}$	
	1	2	3	4	5	6
	Mahalanobis Metric Matching	Propensity Score Matching	Mahalanobis Metric Matching	Propensity Score Matching	Mahalanobis Metric Matching	Propensity Score Matching
PREDICTED_RPE_PLAN_SWITCH_INDICATOR	-0.1414***	-0.1370***	0.0193***	0.0205***	0.1476***	0.1349***
	(-3.41)	(-3.38)	(5.61)	(6.02)	(3.19)	(3.00)
Constant	0.3002***	0.3397***	0.0151	0.0111	0.7818***	0.7536***
	(2.68)	(2.95)	(1.41)	(0.92)	(5.95)	(5.62)
Industry and year fixed effects included in all models						
R-squared	0.4800	0.4773	0.1655	0.1357	0.4316	0.4365
WID (Anderson-Rubin Wald F-statistic)	13.19***	12.93***	44.99***	54.00***	11.44***	9.93***
WID (Cragg-Donald Wald F-statistic)	103.788	107.476	103.788	107.476	103.788	107.476
Stock-Yogo WID 10% critical value	16.38	16.38	16.38	16.38	16.38	16.38
Observations	1,178	1,178	1,178	1,178	1,178	1,178

H. Subsample Analyses

In this analysis, we examine whether our findings are driven by hidden factors that simultaneously influence both a firm's idiosyncratic risk and the type of performance plan granted to its CEO. To do so, we conduct subsample analysis that focuses on two plausible hidden factors: i) market or industry downturns and ii) operating inflexibility. In a market or industry downturn, an RPE plan can help the CEO avoid lower compensation because it nets out poor performance due to common shocks. At the same time, an underperforming CEO is more likely to be dismissed during a downturn (Jenter and Kanaan (2015)). Thus, in market or industry downturns, the firm could both adopt an RPE plan and experience an increase in idiosyncratic risk as the CEO undertakes more idiosyncratic strategies relative to industry norms to avoid dismissal. To test this, we divide our sample into quartiles based on market (or industry) index performance in year t. We then estimate DID models separately for the bottom and the top market (or industry) index quartiles. Results presented in Table H, Panel A show that the significance of the DID interaction term is generally present in both upturns and downturns, so market and industry downturns do not seem to drive our results.

Our findings might also be driven by firms with limited operating flexibility. Firms with limited operating flexibility might find RPE plans attractive as the ability of CEOs to respond to exogenous shocks is truly limited (Gopalan et al. (2010)). At the same time, firms that lack operating flexibility may have higher idiosyncratic risk. To explore whether operating inflexibility is a plausible hidden factor, we divide our sample into quartiles based on two measures of operating inflexibility: union membership in a firm's industry and earnings convexity (Grullon et al. (2012)). Highly unionized firms are likely to have relatively limited operating flexibility. Earnings convexity is defined as the convexity of firm value with respect to its earnings. If a firm has operating flexibility and thus is able to expand operations during good times and contract operations during bad times, its value will be a more convex function of earnings. We then estimate DID models separately for the bottom and top operating flexibility quartiles. Results presented in Table H, Panel B show that the significance of the DID interaction term is almost indistinguishable for the top and bottom operating flexibility quartiles, so a lack of operating flexibility does not seem to explain our findings.

TABLE H

Subsample Analyses: Do Hidden Factors Drive Differences in Idiosyncratic Risk for RPE Versus APE Firms?

Panel A of Table H presents DID regression results for subsamples based on CRSP value-weighted market index return and Fama-French value-weighted 48 industry index return in year t. Panel B presents DID regression results for subsamples based on measures of operating flexibility (unionization rates and earnings convexity). All models include controls, firm and year fixed effects and a constant. Variables are defined in Internet Appendix A. t-values are based on robust standard errors clustered by firm and by year (two-way) and are reported in parentheses. Chow tests examine whether the coefficients for INTERACTION (Time period indicator*Plan switch indicator) differ significantly across analogous regression models for top and bottom quartiles. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Top and Bottom Market/Industry Index Quartiles

	IND._INDEX_CORRELATION$_{t+1}$		IDIOSYNCRATIC_RISK$_{t+1}$		IDIOSYNCRATIC/TOTAL_RISK$_{t+1}$	
	1	2	3	4	5	6
	$APE_{t-1}\rightarrow RPE_t$	$RPE_{t-1}\rightarrow APE_t$	$APE_{t-1}\rightarrow RPE_t$	$RPE_{t-1}\rightarrow APE_t$	$APE_{t-1}\rightarrow RPE_t$	$RPE_{t-1}\rightarrow APE_t$
Top Market Index Quartile						
INTERACTION	-0.0707**	0.0845***	0.0262***	-0.0342***	0.1100***	-0.0959***
(TIME*SWITCH)	(-2.41)	(3.02)	(3.65)	(-2.60)	(3.27)	(-2.84)
R-squared	0.8796	0.9098	0.9476	0.9819	0.8653	0.9030
Observations	2,292	1,373	2,292	1,373	2,292	1,373
Bottom Market Index Quartile						
INTERACTION	-0.0484**	-0.0235	0.0021	-0.0017	0.0624***	0.0199
(TIME*SWITCH)	(-2.49)	(-1.30)	(0.52)	(-0.52)	(2.98)	(0.95)
R-squared	0.7987	0.7852	0.8225	0.8975	0.8062	0.8017
Observations	2,322	1,451	2,322	1,451	2,322	1,451
Test of coeff. top = bottom [p-value]	[0.645]	[0.506]	[0.005]	[0.202]	[0.486]	[0.654]
Top Industry Index Quartile						
INTERACTION	-0.0782***	0.0617**	0.0393***	-0.0273*	0.0894***	-0.0814**
(TIME*SWITCH)	(-3.38)	(2.04)	(5.37)	(-1.95)	(3.60)	(-2.17)
R-squared	0.8987	0.8941	0.9054	0.9881	0.9001	0.8924
Observations	2,297	1,309	2,297	1,309	2,297	1,309
Bottom Industry Index Quartile						
INTERACTION	-0.0496**	0.0305	0.0140**	-0.0072	0.0591**	-0.0378
(TIME*SWITCH)	(-2.11)	(1.42)	(2.56)	(-0.84)	(2.25)	(-1.45)
R-squared	0.8494	0.8005	0.8440	0.9712	0.8182	0.8408
Observations	2,367	1,307	2,367	1307	2,367	1,307
Test of coeff. top = bottom [p-value]	[0.448]	[0.158]	[0.346]	[0.469]	[0.873]	[0.389]

Panel B: Top and Bottom Operating Flexibility Quartiles

	IND._INDEX_CORRELATION$_{t+1}$		IDIOSYNCRATIC_RISK$_{t+1}$		IDIOSYNCRATIC/TOTAL_RISK$_{t+1}$	
	1	2	3	4	5	6
	$APE_{t-1}\rightarrow RPE_t$	$RPE_{t-1}\rightarrow APE_t$	$APE_{t-1}\rightarrow RPE_t$	$RPE_{t-1}\rightarrow APE_t$	$APE_{t-1}\rightarrow RPE_t$	$RPE_{t-1}\rightarrow APE_t$
Bottom Unionization Quartile (High Operating Flexibility)						
INTERACTION	-0.1109***	0.1010**	0.0530***	-0.0277**	0.1389***	-0.0972***
(TIME*SWITCH)	(-2.94)	(2.44)	(3.74)	(-2.58)	(3.54)	(-2.76)
R-squared	0.7877	0.8779	0.9223	0.9856	0.7951	0.8528
Observations	2,423	1,323	2,423	1,323	2,423	1,323
Top Unionization Quartile (Low Operating Flexibility)						
INTERACTION	-0.0714	-0.0056	0.0128***	0.0037	0.0324	-0.0032
(TIME*SWITCH)	(-1.63)	(-0.10)	(2.81)	(0.97)	(1.22)	(-0.06)
R-squared	0.7898	0.8032	0.9338	0.9759	0.7771	0.7962
Observations	2,258	1,196	2,258	1,196	2,258	1,196
Test of coeff. top = bottom [p-value]	[0.890]	[0.024]	[0.876]	[0.741]	[0.048]	[0.042]
Top Earnings Convexity Quartile (High Operating Flexibility)						
INTERACTION	-0.0916***	0.0883***	0.0491***	-0.0263**	0.1087***	-0.0719**
(TIME*SWITCH)	(-2.57)	(2.80)	(3.66)	(-2.11)	(3.04)	(-2.09)
R-squared	0.8399	0.9001	0.9260	0.9723	0.8466	0.8596
Observations	2,018	1,204	2,018	1,204	2,018	1,204
Bottom Earnings Convexity Quartile (Low Operating Flexibility)						
INTERACTION	-0.0596	-0.0209	0.0392***	-0.0033	0.0201	-0.0100
(TIME*SWITCH)	(-0.61)	(-0.76)	(3.09)	(-0.23)	(0.55)	(-0.26)
R-squared	0.8272	0.8975	0.9429	0.9759	0.8229	0.8730
Observations	2,158	1,160	2,158	1,160	2,158	1,160
Test of coeff. top = bottom [p-value]	[0.022]	[0.067]	[0.423]	[0.344]	[0.027]	[0.242]

I. Triple Difference Regressions: Does Vega from Option Grants Surrounding Switches in the Type of Performance-Based Compensation Plans Influence DID Treatment Effects?

Standard CEO vega is defined as the change in the risk-neutral (Black-Scholes) value of a CEO's option portfolio in response to a 1% change in the standard deviation of the firm's stock returns. However, the standard vega has many shortcomings. It does not adjust for CEO risk aversion (See Bettis et al. (2014) on the comparison between risk-neutral versus risk-adjusted models), does not capture risk-taking incentives from CEOs' stock and inside debt holdings (i.e., unsecured pensions and deferred compensation), and does not reflect the fact that employee options are warrants (i.e., that exercising employee options results in the firm issuing new shares of stock and receiving the strike price). Anderson and Core (2018) measure CEO vega as the total sensitivity of the CEOs' stock, inside debt, and option holdings to firm volatility.

How to augment standard vega with measures that include the sensitivity of p-v awards to volatility is challenging. Bettis, Bizjak, Coles, and Kalpathy (2018) measure the grant date (*ex ante*) discounted expected value of the *ex post* realized payout associated with APE plans (which they term "economic value.") For plans using accounting-based performance metrics, they estimate both a marginal and aggregate "accounting vega." Marginal (aggregate) accounting vega is the change in economic value for a 0.01 change in the accounting metric's volatility (in both stock return volatility and the accounting metric's volatility). Based on their findings, they argue that convexity in an APE plan's p-v grant schedule can amplify risk-taking incentives by way of both the standard measure of CEO vega and their new vega measures.

Our data show that the vast majority of RPE plans use stock performance metrics, while the vast majority of APE plans use accounting metrics. Holden and Kim (2017) show that because each accounting performance metric has its own stochastic process, not to mention the joint stochastic processes between stock return and each accounting metric, the accuracy of marginal and aggregate accounting vegas depends on the assumed underlying stochastic process. While some studies report a positive relationship between accounting metrics and stock return, others report a negative or no relationship at all (Riffe and Thompson (1998), and Bushman, Lerman, and Zhang (2016)). Thus, even if the p-v schedule for an APE plan provides risk-taking incentives, those incentives may pertain primarily to the variability of the relevant accounting metric. They do not necessarily translate into greater stock return variability or greater firm-specific risk.

Ideally, one would investigate the vega of the CEO's option grants before and after switches in the type of performance-based compensation plan and then connect those vegas to the measures of idiosyncratic risk. In the absence of solutions to the above challenges, we use the DID research design. To examine whether the systematic risk-taking incentives provided by CEO vega (Armstrong and Vashishtha (2012)) are dampened following switches to RPE plans, we use CEO current vega which is the standard CEO vega from option grants during pre-treatment year t-1 (Time = 0) and during the post-treatment year t (Time = 1). It is worth noting that as only 0.8% of CEO RPE plans and 1.1% of CEO APE plans use options as the back-end instrument, these options are primarily due to grants from simple time-based vesting compensation plans.

Table I, Panel A estimates triple difference regressions in which the coefficient of interest is the coefficient on the triple interaction CEO_CURRENT_VEGA*TIME*SWITCH (or CEO_CURRENT_VEGA*INTERACTION). Consistent with Park and Vrettos (2015), Panel A shows that for firms switching to RPE (APE), larger CEO current vega during post-treatment period tends to result in greater (lower) subsequent idiosyncratic risk measures. The coefficient on CEO current vega*INTERACTION is positive and significant in models 3 and 5, while it is negative and significant in model 6. This is consistent with the interpretation that switching to an RPE plan dampens the incentives provided by CEO current vega to take on systematic risk. In contrast, switching to an APE plan, in which

the CEOs have no preference for idiosyncratic risk; does not moderate the incentive to take on systematic risk.

Panel B excludes the vega from option grants from performance-based compensation plan during pre-treatment year t-1 (Time = 0) and the post-treatment year t (Time = 1). Using vega from only time-based vesting plans, the results presented in Table I, Panel B are similar to those presented in Panel A.

TABLE I

Triple Difference Regressions

Dependent variables in Table I are Industry index return correlation index return correlation (IND._INDEX_CORRELATION), IDIOSYNCRATIC_RISK, and IDIOSYNCRATIC/TOTAL_RISK for year t+1. Variables are defined in Internet Appendix A. t-values are based on robust standard errors clustered by firm and by year (two-way) and are reported in parentheses. Chow tests examine whether the coefficients for triple difference estimate differ significantly across analogous regression models. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Does the Vega from Option Grants Surrounding the Treatment Affect DID Treatment Effects?

	IND._INDEX_CORRELATION$_{t+1}$		IDIOSYNCRATIC_RISK$_{t+1}$		IDIOSYNCRATIC/TOTAL_RISK$_{t+1}$	
	1	2	3	4	5	6
	$APE_{t-1}\rightarrow RPE_t$	$RPE_{t-1}\rightarrow APE_t$	$APE_{t-1}\rightarrow RPE_t$	$RPE_{t-1}\rightarrow APE_t$	$APE_{t-1}\rightarrow RPE_t$	$RPE_{t-1}\rightarrow APE_t$
INTERACTION (TIME*SWITCH)	-0.0630***	0.0160	0.0531***	-0.0122**	0.0882***	-0.0229*
	(-3.57)	(1.46)	(7.37)	(-2.17)	(4.49)	(-1.85)
CEO_CURRENT_VEGA	0.0134***	0.0154***	-0.0079***	-0.0121***	-0.0175***	-0.0204***
	(7.19)	(6.79)	(-10.41)	(-12.04)	(-8.43)	(-7.37)
CEO_CURRENT_VEGA* TIME	-0.0044***	-0.0069***	0.0031***	0.0057***	0.0052***	0.0094***
	(-3.87)	(-4.55)	(6.76)	(8.53)	(4.17)	(5.09)
CEO_CURRENT_VEGA* SWITCH	-0.0079***	0.0067*	0.0058***	-0.0001	0.0111***	-0.0062
	(-2.83)	(1.73)	(5.17)	(-0.08)	(3.59)	(-1.32)
CEO_CURRENT_VEGA* INTERACTION	-0.0032	0.0099***	0.0024**	-0.0021	0.0049*	-0.0097**
	(-1.32)	(3.00)	(2.39)	(-1.61)	(1.75)	(-2.48)
CEO_CURRENT_DELTA	-0.0136***	-0.0258***	0.0080***	0.0148***	0.0158***	0.0322***
	(-8.35)	(-10.18)	(11.97)	(13.20)	(8.74)	(10.45)
Constant	0.4817***	0.6113***	0.1027***	0.0794***	0.7255***	0.5964
	(24.52)	(35.17)	(28.80)	(22.79)	(50.45)	(29.75)
Firm and year fixed effects included in all models.						
R-squared	0.7309	0.7632	0.8588	0.9446	0.7366	0.7736
Observations	8,473	5,091	8,473	5,091	8,473	5,091
Test of coeff. for CEO_CURRENT_VEGA*INTERACTION		(1) v (2)		(3) v (4)		(5) v (6)
[p-value]		[0.347]		[0.329]		[0.291]

Panel B: Does the Vega from Time Vesting Option Grants Surrounding the Treatment Affect DID Treatment Effects?

	IND._INDEX_CORRELATION$_{t+1}$		IDIOSYNCRATIC_RISK$_{t+1}$		IDIOSYNCRATIC/TOTAL_RISK$_{t+1}$	
	1	2	3	4	5	6
	$APE_{t-1}\rightarrow RPE_t$	$RPE_{t-1}\rightarrow APE_t$	$APE_{t-1}\rightarrow RPE_t$	$RPE_{t-1}\rightarrow APE_t$	$APE_{t-1}\rightarrow RPE_t$	$RPE_{t-1}\rightarrow APE_t$
INTERACTION (TIME*SWITCH)	-0.0708***	0.0243**	0.0605***	-0.0179***	0.1006***	-0.0299**
	(-4.08)	(2.10)	(8.51)	(-3.31)	(5.21)	(-2.21)
CEO_CURRENT_NON-PV_VEGA	0.0082***	0.0129***	-0.0050***	-0.0109***	-0.0111***	-0.0179***
	(4.39)	(5.53)	(-6.56)	(-10.52)	(-5.33)	(-6.28)
CEO_CURRENT_NON-PV_VEGA*TIME	-0.0046***	-0.0073***	0.0032***	0.0060***	0.0055***	0.0099***
	(-4.03)	(-4.76)	(6.87)	(8.72)	(4.33)	(5.28)
CEO_CURRENT_NON-PV_VEGA*SWITCH	-0.0090***	0.0056***	0.0063***	0.0001	0.0123***	-.0059929
	(-3.20)	(1.38)	(5.44)	(0.04)	(3.93)	(-1.22)
CEO_CURRENT_NON-PV_VEGA *INTERACTION	-0.0037	0.0081**	0.0024**	-0.0016	0.0052*	-0.0087**
	(-1.49)	(2.31)	(2.28)	(-1.20)	(1.79)	(-2.11)
CEO_CURRENT_NON-PV_DELTA	0.0041***	-0.0023	0.0017***	0.0013	0.0047***	0.0003
	(3.05)	(-1.09)	(3.13)	(1.45)	(3.12)	(0.11)
Constant	0.4769***	0.6051***	0.1022***	0.0787***	0.7269***	0.5993***
	(36.98)	(37.02)	(29.72)	(24.03)	(52.45)	(31.78)
Firm and year fixed effects included in all models.						
R-squared	0.7315	0.7634	0.8589	0.9447	0.7369	0.7738
Observations	8,473	5,091	8,473	5,091	8,473	5,091
Test of coeff. for CEO_CURRENT_NON-PV_VEGA*INTERACTION		(1) v (2)		(3) v (4)		(5) v (6)
[p-value]		[0.336]		[0.326]		[0.329]

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