

Benchmarking of Pay Components in CEO Compensation Design



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1 | What is Compensation Benchmarking?

Compensation benchmarking (CB) is the process of comparing senior executives' compensation with the compensation standards at a set of peer companies.



Peer firms are typically selected based on three main characteristics: size, industry and talent flows.



CB is usually assisted by compensation consulting firms.



Pay below the median is usually considered as “below market”.



1 Compensation Benchmarking

Original purpose and adverse effects

Pros

- Quantifiable and objective (?) way to gauge the market wage
- Assists compensation committee to determine if pay arrangements are adequate to attract, retain and motivate executives.

Cons

- Can potentially distort the optimal pay-performance relation and the efficient compensation structure that maximizes shareholder value.
- Might lead to ratcheting of pay levels



Research objective:

To extend research to the benchmarking of compensation components by addressing three questions:

1. Are the different components of CEO pay benchmarked separately? Is there any variation across pay components in the magnitude of the adjustment to peer pay? Is pay components' benchmarking a direct (pro-rata) consequence of total pay benchmarking?

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Research Questions

Some anecdotal justifications from firms' proxy statements

1. Separate benchmarking of pay components

- ✓ “The Compensation Committee uses the following percentiles of peer group and survey data as a reference point for assessing appropriate base salary, target total cash compensation and equity compensation for our executive officers” (*Align Technology, 2018*)

Element of Compensation	Target Percentile
Base salary	50 th percentile
Target total cash compensation	65 th to 75 th percentile
Equity compensation	50 th to 75 th percentile

- ✓ “For each Named Executive Officer, the Committee generally tries to set such amounts between 80 and 120 percent of the median for the corresponding items of compensation provided to similarly situated executives in the executive peer group.” (*3M Company, 2018*)



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2. Is CB employed also with respect to the structure of CEO pay (weight of each pay component in total pay)?

Research Questions

Some anecdotal justifications from firms' proxy statements

2. Benchmarking of pay structure

- ✓ “The peer group is used for establishing compensation structure, policies and practices” (*The Walt Disney Company, 2018*);
- ✓ “In analyzing the pay mix and various elements of compensation for each NEO, the Compensation Committee annually considers competitive market data” (*Woodward, 2018*)
- ✓ “The Committee uses the survey data and peer group information to assess the competitiveness of target compensation levels and pay mix for the CEO, CFO and other executives”

“FW Cook reports directly to the Committee and provides advice to the Committee on the structure and amounts of executive and non- employee director compensation”
(*Valmont, 2018*)



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3. Is CEO pay also adjusted to the contemporaneous changes in peers' pay?

Previous findings concern primarily total compensation

✓ A CEO whose total pay is below (above) the median receives a higher (lower) total pay increase than that of a CEO whose total pay equals the total pay median.

Bizjak et al. (2008), Bizjak et al. (2011)

✓ Firms tend to pick larger firms and firms with higher CEO pay as their compensation peers. The choice of peers may also reveal CEO talent.

Faulkender & Yang (2010), Bizjak et al. (2011), Laschever (2013), Albuquerque et al. (2013)

✓ The effect of peers' compensation on CEO pay is considerably larger than the effect of established economic factors shown to predict CEO compensation

Faulkender & Yang (2010), Albuquerque et al. (2013)

- ❑ We start with all **S&P Composite 1500 index** firms over the period **2007-2013**
- ❑ The first year of the sample is 2007 because of the changes in SEC disclosure rules and reporting format effective December 2006. (We need comparable previous year data for the analysis.)
- ❑ Databases used:
 - ✓ Names of compensation peers - ISS' ExecComp Analytics and hand-collected data by Ana Albuquerque and her co-authors
 - ✓ Compensation data – ExecuComp, Morningstar and ISS' ExecComp Analytics
 - ✓ Additional databases – Compustat and CRSP

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Sample and Data Examples: Disclosure of peer groups

Align Technology, 2018:

ABIOMED	Insulet
Bio-Techne	Integra LifeSciences
Dentsply Sirona*	Intuitive Surgical
DexCom	Masimo*
Edwards Lifesciences	NuVasive
Globus Medical	Resmed
Hologic*	The Cooper Companies
IDEXX Labs*	Varian Medical Systems*
Illumina	Wright Medical Group *

* Indicates new additions to the peer group.

The average (median) peer group includes 18 (16) firms.

PepsiCo, 2018:

PepsiCo 2018 Compensation Peer Group

The 3M Company
Anheuser-Busch InBev SA/NV
Apple, Inc.
The Coca-Cola Company
Colgate-Palmolive Company
Danone S.A.
General Electric Company
General Mills, Inc.

International Business Machines Corp.
Johnson & Johnson
The Kraft Heinz Company
McDonald's Corporation
Microsoft Corporation
Mondelēz International, Inc.
Nestlé S.A.
Nike, Inc.

Pfizer Inc.
The Procter & Gamble Company
Starbucks Corporation
Unilever PLC
United Parcel Service, Inc.
Walmart Inc.
The Walt Disney Company



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Sample and Data

sample selection process

Exclusion criteria	Number of firm-year observations
Initial sample	10,481
missing compensation data	93
zero values for total compensation	35
CEOs in their first or last year of service	2,000
Subtotal	8,353
The company did not specify peers	1,830
peer group comprises only 1-2 firms	33
missing compensation data for 50% or more of the disclosed peers	396
Co-CEOs	34
firms in the financial services industry	1,168
Final sample	4,892

Final sample: 4,892 firm-year observations on 1,251 unique disclosing firms; 70,347 peer firm-year observations.

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Descriptive statistics

CEO's actual and target pay levels (in thousands of Dollars)

	Mean	Std Dev	Median	N	Mean	Std Dev	Median	N
	Pay level among disclosing firms				Target pay based on peers' compensation			
Total compensation	6,964	5,654	5,260	4,869	6,850	4,474	5,617	4,869
Salary	884	320	850	4,892	875	257	863	4,892
Bonus	110	367	0	4,892	27	160	0	4,892
Option awards	1,258	1,663	653	4,891	1,161	1,159	836	4,891
Stock awards	2,343	2,528	1,500	4,887	1,936	1,680	1,475	4,887
Non-equity incentive plan compensation	1,296	1,420	881	4,891	1,129	871	941	4,891
Change in pension value and nonqualified deferred compensation earnings	524	1,060	0	4,876	365	696	0	4,876
All other compensation	184	275	79	4,891	140	136	103	4,891
<u>Aggregate pay components</u>								
Performance pay	5,232	4,568	3,869	4,886	5,073	3,518	4,129	4,886
Equity pay	3,692	3,435	2,651	4,887	3,505	2,580	2,845	4,887
Non-equity performance pay	1,436	1,490	984	4,891	1,345	999	1,100	4,891
Other pay	778	1,271	206	4,697	618	825	263	4,697



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Univariate Tests of Pay Components' Benchmarking

Mean and median changes in Ln(pay) for CEOs above and below the

Pay measure	Group	Number of observations	Mean change in pay	Median change in pay	p-Values for difference (one sided test)	
					t-Test	Wilcoxon test
Total compensation	Above target	1,853	-0.087	-0.027	<.0001	<.0001
	Below target	3,006	0.19	0.14		
Salary	Above target	2,012	0.025	0.020	<.0001	<.0001
	Below target	2,854	0.053	0.039		
Performance Pay	Above target	1,909	-0.11	-0.027	<.0001	<.0001
	Below target	2,860	0.25	0.18		
Non-equity performance pay	Above target	2,077	-0.12	-0.041	<.0001	<.0001
	Below target	2,023	0.19	0.15		
Equity pay	Above target	1,934	-0.090	-0.0040	<.0001	<.0001
	Below target	2,399	0.25	0.17		
Stock awards	Above target	2,023	-0.030	0.026	<.0001	<.0001
	Below target	1,659	0.32	0.19		
Option awards	Above target	1,891	-0.064	-0.000020	<.0001	<.0001
	Below target	899	0.19	0.11		
Other pay	Above target	2,060	-0.16	-0.0039	<.0001	<.0001
	Below target	2,637	0.16	0.067		

The average pay raise gaps range from 0.03 (in salary) to 0.36 (performance pay)



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Univariate Tests of Pay Components' Benchmarking

Preliminary evidence on benchmarking of the structure of CEO pay

Pay component	Group	Number of observations	Mean weight of pay component in total compensation in year t-1	Mean change in the weight of the pay component	p-value of the change (based on one sided t- test)
Salary	Above median	2,798	0.26	-0.037	<.0001
	Below median	2,061	0.13	0.025	
Performance pay	Above median	2,409	0.80	-0.036	<.0001
	Below median	2,450	0.59	0.063	
Non-equity performance pay	Above median	2,555	0.32	-0.073	<.0001
	Below median	2,304	0.12	0.051	
Equity pay	Above median	2,357	0.62	-0.053	<.0001
	Below median	2,502	0.32	0.10	
Stock awards	Above median	2,403	0.44	-0.031	<.0001
	Below median	2,456	0.13	0.094	
Option awards	Above median	2,269	0.33	-0.059	<.0001
	Below median	2,590	0.050	0.042	
Other pay	Above median	2,322	0.16	-0.022	<.0001
	Below median	2,537	0.033	0.014	

The mean weight gaps range from 0.13 for salary to about 0.3 for equity pay and its components (option and stock awards)



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Univariate Tests of Pay Components' Benchmarking

A univariate test of the benchmarking in the structure of CEO pay

	Change in the weight of pay component X in total compensation					
	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Salary</i>	<i>Performance pay</i>	<i>Non-equity performance pay</i>	<i>Equity pay</i>	<i>Stock awards</i>	<i>Option awards</i>
Distance in the proportion of pay component X from peer group median	0.50***	0.49***	0.54***	0.5***	0.34***	0.34***
	(0.027)	(0.020)	(0.02)	(0.02)	(0.015)	(0.016)
Year × Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,859	4,859	4,859	4,859	4,859	4,859
Adjusted R²	0.32	0.32	0.34	0.31	0.18	0.22

Distance in the proportion of pay component X from peer group median

$$= \left[\left(\frac{\text{peer pay measure X}}{\text{peer total compensation}} \right)_{i,t-1} - \left(\frac{\text{pay measure X}}{\text{CEO total compensation}} \right)_{i,t-1} \right]$$



6 Pay Components' Benchmarking

Stage 1: The baseline model for each pay component

$$\begin{aligned} & \text{Ln}(\text{CEO compensation component } X_{i,t}) \\ &= \alpha_0 + \alpha_1 \text{Ln}(\text{Sales}_{i,t-1}) + \alpha_2 \text{Ln}(\text{Sales}_{i,t}) + \alpha_3 (\text{Stock return}_{i,t}) \\ &+ \alpha_4 (\text{Stock return}_{i,t-1}) + \alpha_5 (\text{ROA}_{i,t}) + \alpha_6 (\text{ROA}_{i,t-1}) + \alpha_7 \text{Ln}(\text{Risk}_{i,t-1}) \\ &+ \alpha_8 \text{Ln}(\text{Risk}_{i,t}) + \alpha_9 (\text{MTB}_{i,t-1}) + \alpha_{10} (\text{MTB}_{i,t}) + \alpha_{11} (\text{Leverage}_{i,t-1}) \\ &+ \alpha_{12} (\text{Leverage}_{i,t}) + \alpha_{13} (\text{CEO Age}_{i,t}) + \alpha_{14} (\text{CEO Duality Dum}_{i,t}) \\ &+ \alpha_{15} (\text{IndustryDum}_{i,t}) \times (\text{YearDum}_t) + e_{i,t}, \end{aligned}$$

- This model includes contemporaneous and lagged values of economic determinants. The addition of contemporaneous variables is an innovation inspired by the fact that information dissemination became faster.

6 Pay Components' Benchmarking

Stage 2: Setting up the benchmarking model

$$\begin{aligned} & \Delta \text{Ln}(\text{CEO compensation component } X_{i,t}) \\ &= \beta_0 + \beta_1 \text{Ln}(\text{Relative compensation component } X_{i,t-1}) + \beta_2 \Delta \text{Ln}(\text{Target pay } X_{i,t}) \\ &+ \beta_3 \left[\left(\frac{\text{peer pay measure } X}{\text{peer total compensation}} \right)_{i,t-1} - \left(\frac{\text{pay measure } X}{\text{CEO total compensation}} \right)_{i,t-1} \right] \\ &+ \beta_4 \Delta \text{Ln}(\text{Sales}_{i,t-1}) + \beta_5 \Delta \text{Ln}(\text{Sales}_{i,t}) + \beta_6 \Delta(\text{Stock return}_{i,t}) + \beta_7 \Delta(\text{Stock return}_{i,t-1}) \\ &+ \beta_8 \Delta(\text{ROA}_{i,t}) + \beta_9 \Delta(\text{ROA}_{i,t-1}) + \beta_{10} \Delta \text{Ln}(\text{Risk}_{i,t-1}) + \beta_{11} \Delta \text{Ln}(\text{Risk}_{i,t}) + \beta_{12} \Delta(\text{MTB}_{i,t-1}) \\ &+ \beta_{13} \Delta(\text{MTB}_{i,t}) + \beta_{14} \Delta(\text{Leverage}_{i,t-1}) + \beta_{15} \Delta(\text{Leverage}_{i,t}) \\ &+ \beta_{16} (\text{IndustryDum}_{i,t}) \times (\text{YearDum}_t) + \varepsilon_{i,t} \end{aligned}$$

6 Pay Components' Benchmarking

Stage 2 (cont'd): Setting up the benchmarking model:

Our benchmarking measures are:

- $\text{Ln}(\text{Relative compensation component } X_{i,t-1}) = \text{Ln} \left(\frac{\text{peer-based target pay}_{i,t-1}}{\text{CEO pay}_{i,t-1}} \right)$ – the natural logarithm of the peer CEOs–based target pay of component X (for example, median pay component X at peers) divided by the level X in firm's CEO compensation, both at year t–1.
- $\Delta \text{Ln}(\text{Target pay } X_{i,t})$ – the current year logarithmic change in the level of peer–based target for pay component X.
- $\left(\frac{\text{peer pay measure } X}{\text{peer total compensation}} \right)_{i,t-1} - \left(\frac{\text{pay measure } X}{\text{CEO total compensation}} \right)_{i,t-1}$ – the difference between the median weight of pay component X in total compensation among the chosen peers and the corresponding weight at a sample firm, both at year t–1.



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Pay Components' Benchmarking

	Change in Ln (CEO compensation component X)					
	(1)	(2)	(3)	(4)	(5)	(6)
	Salary	Performance pay	Non-equity performance pay	Equity pay	Stock awards	Option awards
Intercept	0.049 (0.033)	-0.046 (0.19)	0.19 (0.32)	-0.22 (0.27)	-0.10 (0.22)	0.048*** (0.014)
Ln(relative compensation of X)	0.069*** (0.0071)	0.33*** (0.022)	0.24*** (0.025)	0.26*** (0.022)	0.26*** (0.022)	0.18*** (0.021)
Change in Ln(peer-based target pay of X)	0.026* (0.015)	0.19*** (0.033)	0.18*** (0.033)	0.20*** (0.025)	0.16*** (0.023)	0.15*** (0.022)
Distance in the proportion of pay component X from peer group median	0.027*** (0.0076)	0.23*** (0.073)	0.18** (0.091)	0.33*** (0.072)	0.10 (0.080)	0.21** (0.099)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year × Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,749	4,454	3,923	3,715	3,443	2,010
Adjusted R²	0.18	0.30	0.29	0.25	0.21	0.16



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Pay Components' Benchmarking

Results using seemingly unrelated regressions

	Change in Ln (CEO compensation component X)		
	(1)	(2)	(3)
	Salary	Non-equity performance pay	Equity pay
Intercept	0.054***	0.029	0.099***
	(0.0032)	(0.034)	(0.030)
Ln(relative compensation of X)	0.09***	0.26***	0.26***
	(0.0047)	(0.017)	(0.016)
Change in Ln(peer-based target pay of X)	0.042**	0.19***	0.21***
	(0.017)	(0.022)	(0.024)
Distance in the proportion of pay component X from peer group median	0.022*	0.23**	0.40***
	(0.012)	(0.11)	(0.073)
Controls	Yes	Yes	Yes
Year × Industry FE	Yes	Yes	Yes
Observations	3,150	3,150	3,150
System Weighted R²		0.31	



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Pay Components' Benchmarking

Examining differences in benchmarking across pay components

H0: The coefficients of Ln(relative compensation) are equal in the equations of		
	F- statistic	p-Value
Salary, non-equity performance pay and equity pay	91.77	0.0001
Non-equity performance pay and equity pay	0.03	0.87

H0: The coefficients of Change in Ln(target pay) are equal in the equations of		
	F- statistic	p-Value
Salary, non-equity performance pay and equity pay	23.72	0.0001
Non-equity performance pay and equity pay	0.32	0.57

H0: The coefficients of Distance in the proportion of pay measure X from peer group median are equal in the equations of		
	F- statistic	p-Value
Salary, non-equity performance pay and equity pay	14.89	0.0001
Non-equity performance pay and equity pay	1.63	0.2



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Are pay components benchmarked differently than total pay?

Change in Ln (CEO compensation)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Salary	Non-equity performance pay	Equity pay	Salary	Non-equity performance pay	Equity pay	Salary	Non-equity performance pay	Equity pay
Intercept	***0.053 (0.0032)	*0.060 (0.036)	***0.09 (0.03)	***0.053 (0.0032)	0.028 (0.034)	***0.083 (0.03)	***0.056 (0.0032)	0.019 (0.034)	***0.091 (0.03)
Ln(relative total compensation)	***0.017 (0.0021)	***0.21 (0.023)	***0.38 (0.019)				***0.013 (0.0020)	***0.18 (0.022)	***0.40 (0.018)
Change in Ln(target of total pay)	***0.019 (0.0049)	*0.098 (0.055)	***0.23 (0.045)				**0.0099 (0.0049)	0.035 (0.053)	***0.24 (0.045)
Ln(relative compensation of X)				***0.090 (0.0047)	***0.29 (0.013)	***0.32 (0.012)	***0.092 (0.0053)	***0.31 (0.015)	***0.31 (0.019)
Change in Ln(peer-based target pay of X)				**0.042 (0.017)	***0.20 (0.022)	***0.22 (0.024)	**0.038 (0.017)	***0.21 (0.023)	***0.22 (0.03)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year × Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150
System Weighted R²		0.2289			0.3034			0.3038	



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Robustness Tests

The conclusions remain intact in the following robustness tests:

- ❑ Excluding firms that do not use the median for benchmarking purposes (excluding 589 out of 4,892 observations);
- ❑ Confining the sample to observations where all pay components are non-zero;
- ❑ Estimation with firm fixed effects (instead of industry-year fixed effects);
- ❑ Creating industry-year fixed effects using two-digit SIC codes instead of the Fama and French (1997) 49 industry classification;
- ❑ Re-estimation with winsorized control variables.



Conclusions

Three key factors affect the benchmarking of CEO pay components:



The level of CEO's pay component relative to peers in the previous year;



Current year change in the level of the pay component at the selected firms;



The difference between the weight of a certain pay component in total CEO pay and the corresponding median weight of that pay component among the chosen peers