Online Appendix: Are Energy Executives Rewarded For Luck?

Data

As we describe in the paper, our analyses are based on executive compensation data from Compustat. These data have been widely used and are described in detail elsewhere:

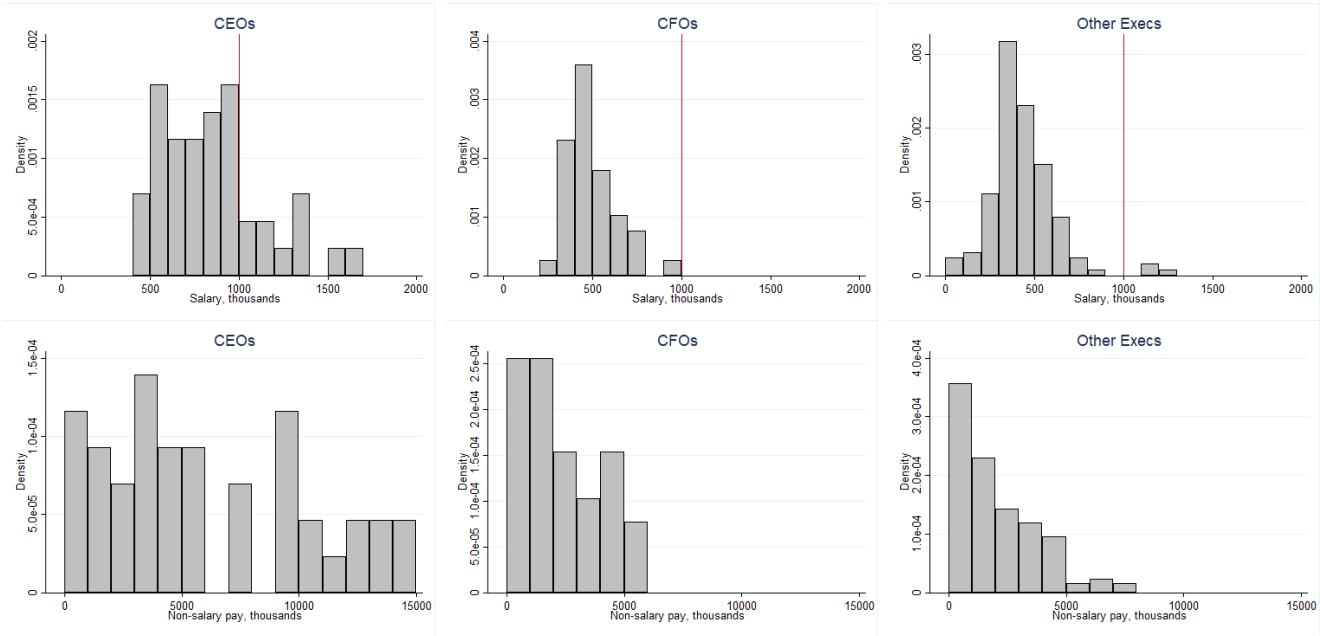
- Gine, Mireia. "WRDS E-Learning Session" [Pdf of slides]. 18 September 2009. Available at https://wrds-web.wharton.upenn.edu/wrds/E-Learning/_000Course%20Materials/ExecutiveCompensationChanges.pdf.cfm?.
- "ExecuComp Data Definitions in Alphabetical Order." https://wrds-web.wharton.upenn.edu/wrds/support/Data/_001Manuals%20and%20Overviews/_001Compustat/_007Execucomp/_005ExecuComp%20Data%20Definitions.cfm. Accessed 5 June 2018.
- "RiskMetrics Directors Definitions." https://wrds-web.wharton.upenn.edu/wrds/support/Data/_001Manuals%20and%20Overviews/_037ISS%20(formerly%20RiskMetrics)/ISS %20(formerly%20RiskMetrics)%20Directors%20Definitions.cfm

The Compustat data include S&P 1500 firms, as well as other firms. Some of the additional firms included were at one time on the S&P 1500; they continue to be included in Compustat as long as they are still trading.

Beginning in 2006, reporting for some of the variables changes. This was driven by regulatory requirements on what firms report in their annual proxy statements. The tdc1 variable, total compensation, has good continuity across time, albeit with some changes to its subcomponents.

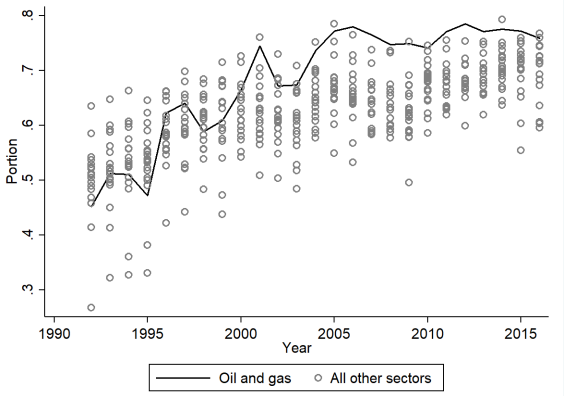
The variables we use are listed and defined in Table A1.

Figure A1: Impact of the $1 Million Deduction Limit



Note: This figure shows histograms of nominal executive pay in 2016 for CEOs, CFOs, and other executives. The top row shows salary pay and the bottom row shows non-salary pay, in thousands of dollars. In the top row, a vertical red line at $1 million (the deduction limit) is shown.

Figure A2: Non-Salary Portion of Pay



Note: This figure plots, by sector, the average portion of compensation coming from bonuses, stock and options awards, and other non-salary components of pay. Each sector is defined by a two-digit NAICS code; sector 21 has been broken down into "Oil & Gas Extraction" versus other firms in sector 21, including mining and quarrying and support activities for oil and gas. One outlier for sector 71 has been dropped.

Table A1: Variables Used

Variable	Compustat name(s)	Notes
Total compensation	tdc1	"Total Compensation."
Salary	salary	"The dollar value of the base salary earned by the named executive officer during the fiscal year."
Bonus	bonus	"The dollar value of a bonus earned by the named executive officer during the fiscal year."
Stocks and options	rstkgrnt, option_awards_blk_value, stock_awards_fv, option_awards_fv	We sum across the stock variable and the options variables in Compustat. Prior to 2006, we use **rstkgrnt** ("The value of restricted stock granted during the year (determined as of the date of the grant).") + **option_awards_blk_value** ("The aggregate value of stock options granted to the executive during the year as valued using Standard & Poor's Black-Scholes methodology.") After 2006 we use **stock_awards_fv** ("Fair value of all stock awards during the year as detailed in the Plan Based Awards table. Valuation is based upon the grant-date fair value as detailed in FAS 123R.") + **option_awards_fv** ("Fair value of all options awarded during the year as detailed in the Plan Based Awards table. Valuation is based upon the grant-date fair value as detailed in FAS 123R.")
Incentives	ltip, noneq_incent	Prior to 2006, we use **ltip** ("This is the amount paid out to the executive under the company's long-term incentive plan. These plans measure company performance over a period of more than one year (generally three years)."). After 2006 we use **noneq_incent** ("Value of amounts earned during the year pursuant to non-equity incentive plans. The amount is disclosed in the year that the performance criteria was satisfied and the compensation was earned.") As described in Hopkins and Lazonick (2016), some elements of "bonus" moved to "noneq_incent" in 2006. Also, "ltip" in some cases includes stock units, which are excluded from "noneq_incent." Since our oil price effects results are comparable across the various non-salary components of pay, and since we include a dummy for the reporting changes, we are reassured that these changes do not explain our oil price effect results.
Other compensation	othann, allothtot, defer_rpt_as_comp_tot, othcomp	Prior to 2006, we use **othann** ("The dollar value of other annual compensation not properly categorized as salary or bonus. This includes items such as: Perquisites and other personal benefits ... Tax reimbursements ...") + **allothtot** ("This is the amount listed under 'All Other Compensation' in the Summary Compensation Table. This is compensation that does not belong under other columns, which includes items such as: Severance payments, Debt forgiveness, ... Payment for unused vacation, Tax reimbursements, Signing bonuses..."). After 2006, we use **defer_rpt_as_comp_tot** ("Amount of deferred compensation earnings that were reported as compensation in the Summary Compensation Table.") + **othcomp** ("Other compensation received by the executive including perquisites and other personal benefits, termination or change-in-control payments, contributions to defined contribution plans (e.g. 401K plans), life insurance premiums, gross-ups and other tax reimbursements, discounted share purchases etc.")
Market value	mktval	"The Close Price for the fiscal year multiplied by the company's Common Shares Outstanding."
Book value	seq, txdb, itcb, pstkrv, pstkl, pstk	We use **seq+txdb+itcb-pstkrv**: the sum of "Stockholders Equity," "Deferred Taxes," and "Investment Tax Credit," subtracting "Preferred Stock." Where **pstkrv** is missing, we use **pstkl** or **pstk**. This constructed book value has a correlation of 0.996 with **seq**.
Net income	ni	"Net Income (After EI and DO)."
Assets	assets	"Total Assets"
Return on assets	roa	"Return on Assets"
Return on equity	roeper	"Return on Equity"
Employees	empl	"Employees (## Thous)"
Capital expenditures	capx	"Capital Expenditures"
Executives not on the board	execdir	We take the average across the top five executives of one minus **execdir**, "Flag to indicate that the executive served as director during the year."
Board members not insiders	classification	We use the portion of the board members with **classification**, "Independent Outsiders (I)." Thus excluded categories are "Insiders / Employees (E)" and "Affiliated Outsiders / Linked (L)."

Note: All variables are from Compustat, with the exception of "Board members not insiders," which is constructed using Institutional Shareholder Services (ISS) data.

Table A2: Company List

Company	Total executive-by-year observations	Mean compensation, millions	Market value, billions
ANADARKO PETROLEUM CORP	145	6.59	21.63
APACHE CORP	142	4.32	17.47
APPROACH RESOURCES INC	49	1.60	0.48
BARRETT RESOURCES CORP	42	0.93	1.30
BILL BARRETT CORP	53	1.79	1.26
BONANZA CREEK ENERGY INC	44	1.41	0.85
BROWN (TOM) INC	36	1.44	1.17
BURLINGTON RESOURCES INC	64	3.96	10.94
CABOT OIL & GAS CORP	128	1.91	3.81
CALIFORNIA RESOURCES CORP	19	3.88	1.34
CALLON PETROLEUM CO/DE	53	1.45	0.50
CARRIZO OIL & GAS INC	52	1.37	1.53
CHESAPEAKE ENERGY CORP	78	11.54	13.66
CIMAREX ENERGY CO	80	3.39	5.51
COMSTOCK RESOURCES INC	57	2.90	1.13
CONCHO RESOURCES INC	56	3.74	9.15
CONOCOPHILLIPS	147	7.97	62.39
CONTANGO OIL & GAS CO	52	1.30	0.70
DENBURY RESOURCES INC	78	2.60	4.07
DEVON ENERGY CORP	133	4.23	18.12
ENCORE ACQUISITION CO	20	2.00	2.05
ENERGEN CORP	127	1.45	2.41
EOG RESOURCES INC	124	4.44	19.54
EVERGREEN RESOURCES	19	1.46	0.94
FOREST OIL CORP -OLD	91	2.08	2.25
FREEPORT MCMRN OIL&GAS -REDH	50	7.63	
GEORESOURCES INC	25	0.35	0.37
GULFPORT ENERGY CORP	40	1.66	2.62
HARVEST NATURAL RESOURCES	130	1.05	0.33
HESS CORP	132	5.27	13.84
HS RESOURCES INC	44	0.66	0.40
KCS ENERGY INC	56	0.76	0.38
KERR-MCGEE CORP	71	2.33	6.04
KEY PRODUCTION CO INC	22	0.54	0.28
LOUIS DREYFUS NAT GAS CORP	20	1.22	1.43
MARATHON OIL CORP	132	4.75	17.54
MARINER ENERGY INC	21	3.50	1.70
MATADOR RESOURCES CO	36	1.50	1.52
MURPHY OIL CORP	132	2.72	7.22
NEWFIELD EXPLORATION CO	128	2.47	4.13
NOBLE ENERGY INC	129	2.87	8.52
NORTHERN OIL & GAS INC	42	2.73	0.75
NUEVO ENERGY CO	32	1.63	0.44
OCCIDENTAL PETROLEUM CORP	133	11.72	38.31
OCEAN ENERGY INC	52	2.25	2.17
ORYX ENERGY CO	31	1.09	2.91
PATINA OIL & GAS CORP	35	2.04	1.23
PDC ENERGY INC	80	1.76	1.20
PENN VIRGINIA CORP	73	1.30	0.73
PENNZENERGY CO	46	1.26	3.32
PETROHAWK ENERGY CORP	28	2.46	
PETROQUEST ENERGY INC	56	1.48	0.39
PIONEER NATURAL RESOURCES CO	140	3.00	6.98
PLAINS RESOURCES INC	62	1.64	0.37
POGO PRODUCING CO	80	1.54	2.06
PRIMA ENERGY CORP	25	0.64	0.38
QEP RESOURCES INC	45	3.00	5.00
QUICKSILVER RESOURCES INC	63	2.15	2.10
RANGE RESOURCES CORP	56	4.82	8.64
RANGER OIL LTD	39	0.51	0.98
REMINGTON OIL&GAS CP -CL B	68	0.57	0.39
REX ENERGY CORP	55	0.93	0.45
ROSETTA RESOURCES INC	45	2.03	1.77
SANTA FE SNYDER CORP	39	1.34	1.50
SILVERBOW RESOURCES INC	100	1.26	0.43
SM ENERGY CO	135	1.58	1.73
SNYDER OIL CORP	30	0.94	0.68
SOUTHWESTERN ENERGY CO	135	2.28	5.72
SPINNAKER EXPLORATION CO	12	1.20	1.34
SRC ENERGY INC	34	0.82	0.81
STONE ENERGY CORP	109	1.27	0.72
UNION PACIFIC RESOURCES GRP	28	3.36	7.15
UNIT CORP	93	1.23	1.72
UNITED MERIDIAN CORP	24	0.83	1.08
UNOCAL CORP	73	2.30	12.01
VASTAR RESOURCES INC	23	1.28	5.38
VINTAGE PETROLEUM INC	77	0.79	1.04
WISER OIL CO	53	0.45	0.13
WPX ENERGY INC	45	3.14	2.71
XTO ENERGY INC	94	11.34	8.42

Note: Compensation and market value are the mean values across all years in the sample. All variables have been normalized to reflect year 2016 dollars using the CPI-All Urban Less Energy.

Table A3: Summary Statistics

	N	Mean	Std. Dev.	Median
Executives:				
Total compensation, $000	5,045	3,258	5,959	1,639
Salary, $000	5,045	497	330	396
Bonuses, $000	5,045	402	1,935	130
Stock and option awards, $000	5,045	1,815	3,660	717
Other incentives, $000	5,045	333	1,190	0
Other, $000	5,045	211	2,173	40
CEO	5,045	0.19	0.39	0.00
Firms, financials:				
Market value, $000,000	4,679	8,486	15,950	2,587
Book value, $000,000	4,791	5,785	12,334	1,449
Net income, $000,000	5,039	267	2,110	58
Assets, $000,000	5,039	10,377	20,986	2,983
Return on assets	5,039	-0.54	25.88	3.41
Return on equity	4,888	-5.95	138.10	8.44
Employees, thousands	4,977	2.86	6.04	0.66
Capital expenditures, $000,000	4,969	1,608	2,724	627
Firms, governance:				
Executives not on the board	5,045	0.64	0.12	0.67
Board members not insiders	3,597	0.75	0.11	0.77

Note: A unit of observation is an executive in a firm in a year. The sample includes the top five executives at oil and gas extraction companies (NAICS 211111) during the period 1992-2016, a total of 934 different executives at 78 different companies (unbalanced). The return on assets (equity) is the income to assets (equity) ratio, multiplied by 100. All governance measures are time-invariant: the simple mean for a firm across years. All variables have been normalized to reflect year 2016 dollars using the CPI-All Urban Less Energy.

Table A4: Pay for Performance: Robustness to Including Variance of Returns

	(1)
Log market value	0.23***
	(0.05)
Log market value X CDF(Variance of returns)	0.02
	(0.07)
CDF(Variance of returns)	-0.36
	(0.56)
Observations	3,979
Within R^2	0.52

Note: This table recreates the results from Column 1 of Table 1, adding as explanatory variables the CDF of the variance of firm returns, and the interaction between that and log market value. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A5: First Stage: The Effect of Oil Prices on Market Value

	(1)
	Log market value
Log crude oil price	0.99***
	(0.10)
Observations	4,673
Within R^2	0.52

Note: This table reports results from a regression of log market value on log crude oil prices, i.e. the first stage regression for Column 2 of Table 1. Consistent with the main regression (Table 1), we estimate this first stage at the executive-by-year level, even though the variable of interest varies only at the firm-by-year level. The regression includes the same controls as in the main regression. Standard errors are two-way clustered by firm and by year. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A6: Oil Price Effect: Robustness to Alternative Measures of Firm Value

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log market value	0.29***	0.19***	0.31***									
	(0.04)	(0.05)	(0.09)									
Log book value				0.28***	0.28***	0.28***						
				(0.04)	(0.08)	(0.05)						
ROE							0.17***	0.39**	0.52***			
							(0.05)	(0.16)	(0.18)			
ROA										0.62***	1.13**	1.61***
										(0.19)	(0.43)	(0.55)
First-stage F-statistic		90.59	15.04		22.70	55.53		14.33	17.94		14.10	14.17
Observations	4,673	4,673	4,673	4,304	4,304	4,304	4,547	4,547	4,547	4,673	4,673	4,673
Within R^2	0.52	0.51	0.52	0.51	0.51	0.51	0.47	0.46	0.45	0.46	0.46	0.44

Note: This table reports estimates and standard errors from 4 separate OLS and 8 separate IV estimates, aimed at assessing the robustness of the results across alternative specifications. Column 1 recreates the OLS results from Table 1, which uses market value as the firm performance measure. Column 2 recreates the results from Column 2 of Table 1, which uses market value as the firm performance measure and the December oil price as the instrument. Columns 3-12 use alternative measures of firm performance, and either OLS specifications (Columns 4, 7, 10), IV specifications using the December oil price (Columns 5, 8, 11), or IV specifications using the annual average oil price (columns 3, 6, 9, 12). *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A7: The Effect of Oil Prices on Executive Compensation, Other Industries

	(1)	(2)	(3)	(4)
Log crude oil price	0.19***			
	(0.06)			
Log oil price X I(oilgasextract)		0.19***	0.19***	0.19***
		(0.06)	(0.06)	(0.06)
Log oil price X I(other manufacturing)		0.01		0.01
		(0.04)		(0.04)
Log oil price X I(services)			0.04	0.03
			(0.04)	(0.04)
Log oil price X I(oilgassupport)				0.03
				(0.11)
Log oil price X I(refining)				0.15
				(0.11)
Log oil price X I(chemicals)				0.05
				(0.05)
Log oil price X I(utilities)				0.13**
				(0.06)
Log oil price X I(other industries)				0.05
				(0.09)
Observations	4,673	86,499	106,010	211,563
Within R^2	0.46	0.32	0.25	0.29

Note: Column 1 is identical to Column 3 of Table 1, including as controls a CEO indicator, a linear trend, the GDP growth rate, the unemployment rate, and firm fixed effects (controls not shown for space). Column 2 compares oil and gas results to non-energy related manufacturing, by including sector-specific oil price coefficients and sector-specific macroeconomic controls (the trend, GDP growth rate, and unemployment rate). Column 3 similarly compares oil and gas to services. Column 4 similarly compares oil and gas to all industries. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A8: Additional Robustness, Alternative Controls: Oil Price Effect

	(1)	(2)	(3)	(4)	(5)	(6)
Log market value	0.13**	0.12**	0.11*	0.11*	0.12**	0.03
	(0.05)	(0.06)	(0.05)	(0.06)	(0.06)	(0.05)
First-stage F-statistic	76.13	39.42	85.82	79.40	76.69	100.18
Observations	4,553	4,553	4,380	4,553	4,553	4,553
Within R^2	0.52	0.52	0.46	0.52	0.52	0.51

Note: This table reports estimates and standard errors from six separate IV estimates, aimed at assessing the robustness of the results across alternative specifications. Unless stated otherwise, all columns include controls for a linear trend, GDP growth, the national unemployment rate, the firm's capital expenditures and number of employees, and a CEO dummy. Column 1 replicates Table 2, Column 4. Column 2 does not control for cyclicality. Column 3 includes person effects. Column 4 controls for the national median compensation for industries other than oil and gas. Column 5 controls for the national median compensation for industries other than oil and gas, net of firm effects. Column 6 controls for a quadratic rather than simply linear trend. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A9: Additional Robustness, Alternative Sub-Samples and Variable Definitions: Oil Price Effect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log market value	0.10	0.27***	0.15**	0.33**	0.13**	0.10*	0.11**	0.07	0.14**	0.48***	0.12**	0.08
	(0.07)	(0.08)	(0.06)	(0.12)	(0.06)	(0.05)	(0.05)	(0.04)	(0.05)	(0.09)	(0.05)	(0.05)
First-stage F-statistic	50.63	61.88	74.73	157.70	72.77	75.28	85.91	91.84	78.19	74.60	56.23	52.44
Observations	2,702	1,912	4,398	4,553	4,920	3,406	4,117	3,133	4,357	5,307	4,553	3,791
Within R^2	0.60	0.65	0.50	0.56	0.43	0.55	0.55	0.59	0.52	0.45	0.52	0.46

Note: This table reports estimates and standard errors from eight separate IV estimates, aimed at assessing the robustness of the results across alternative specifications. Unless stated otherwise, all columns include controls for a linear trend, GDP growth, the national unemployment rate, the firm's capital expenditures and number of employees, and a CEO dummy. Column 1 limits the sample to firms on the S&P 1500. Column 2 limits the sample to a balanced panel. Column 3 uses SIC sector definitions, rather than NAICS definitions. Column 4 weights by time-invariant firm size (assets). Column 5 uses all reported executives, rather than the top 5. Column 6 limits the sample to observations for which the governance variable relating to non-insider status is not missing, matching Table 4. Column 7 limits the sample to observations for which the bonuses and cash incentives variable used in Table 4 is non-zero, matching Table 4. Column 8 limits the sample to observations for which the non-insider variable is non-missing and the bonuses and cash incentives variable is non-zero, matching Table 4. Column 9 limits the sample to 1993-2016, to match Table 5. Column 10 uses TDC2 rather than TDC1; this alternative compensation variable from Compustat uses the value of options exercised, rather than options granted. Column 11 uses Brent rather than WTI. Column 12 adds the log of the natural gas price as a second instrument. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A10: CEOs vs Non-CEOS

	(1)	(2)	(3)
Log market value	0.13**	0.15*	0.13**
	(0.05)	(0.08)	(0.06)
First-stage F-statistic	76.13	75.83	75.59
Observations	4,553	853	3,696
Within R^2	0.52	0.48	0.39

Note: This table reports estimates and standard errors from three separate IV estimates, aimed at assessing the robustness of the results across CEO versus non-CEO status. Unless stated otherwise, all columns include controls for a linear trend, GDP growth, the national unemployment rate, the firm's capital expenditures and number of employees, and a CEO dummy. Column 1 replicates Table 2, Column 4. Column 2 limits to CEOs. Column 3 limits to non-CEOs. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A11: Components of Pay, Inverse Hyperbolic Sine Transformation

	(1) Salary	(2) Stocks & options	(3) Bonuses	(4) Other incentives	(5) Other pay
Market value, transformed	-0.11**	-0.23	2.02***	0.25	0.11
	(0.05)	(0.17)	(0.33)	(0.35)	(0.11)
First-stage F-statistic	82.57	82.57	82.57	82.57	82.57
Observations	4,554	4,554	4,554	4,554	4,554

Note: This table matches Table 3, but the variables have been transformed with an inverse hyperbolic sine function, to allow for zeroes. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A12: Components of Pay, Using Annual Average Oil Price

	(1) Salary	(2) Stocks & options	(3) Bonuses	(4) Other incentives	(5) Other pay
Log crude oil price, annual average	-0.02	0.17**	0.14	0.35**	0.30
	(0.03)	(0.08)	(0.11)	(0.13)	(0.23)
Log crude oil price, December	-0.03	-0.02	0.38***	0.40***	0.02
	(0.02)	(0.09)	(0.08)	(0.11)	(0.08)
Observations	4,546	3,934	3,083	1,729	4,443

Note: This table matches Table A13, but including both the annual average oil price and the December price. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A13: Components of Pay, OLS

	(1) Salary	(2) Stocks & options	(3) Bonuses	(4) Other incentives	(5) Other pay
Log market value	0.01	0.25***	0.39***	0.49***	0.06
	(0.02)	(0.07)	(0.08)	(0.11)	(0.05)
Observations	4,546	3,934	3,083	1,729	4,443

Note: This table matches Table 3, but with OLS specifications rather than IV. Standard errors are two-way clustered by firm and by year. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A14: Time-Varying Governance Measures

	(1)	(2)	(3)	(4)
	Panel A: All Compensation		Panel B: Bonuses & Cash Incentives	
Log market value	0.09	0.15	0.86***	1.07***
	(0.21)	(0.10)	(0.20)	(0.24)
Log m.v. X Portion of execs not on board	0.03		-0.39	
	(0.29)		(0.24)	
Log m.v. X Portion of board non-insiders		-0.06		-0.75*
		(0.10)		(0.36)
First-stage F-statistic	3.90	41.88	4.48	26.54
Observations	4,553	2,428	4,117	2,279
Within R^2	0.52	0.52	0.44	0.45

Note: This table matches Table 4 in the main text, but we use time-varying governance measures rather than firm-level averages across time. The sample size drops in Columns 2 and 4 because the insider variables do not cover the years 1992-1996. Standard errors are two-way clustered by firm and by year. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A15: Governance, OLS

	(1)	(2)	(3)	(4)
	Panel A: All Compensation		Panel B: Bonuses & Cash Incent.	
Log market value	0.47**	0.68***	0.61***	1.12***
	(0.17)	(0.16)	(0.21)	(0.18)
Log m.v. X Portion of execs not on board	-0.39		-0.37	
	(0.24)		(0.31)	
Log m.v. X Portion of board non-insiders		-0.62***		-0.99***
		(0.20)		(0.23)
Observations	4,553	3,406	4,117	3,133
Within R^2	0.52	0.56	0.45	0.51

Note: This table matches Table 4 in the main text, but using OLS rather than 2SLS. Standard errors are two-way clustered by firm and by year. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A16: Governance Results are Robust to Controlling for Size

	(1)	(2)	(3)	(4)
	Panel A: All Compensation		Panel B: Bonuses & Cash Incent.	
Log market value	0.17	0.44*	1.07***	1.37***
	(0.21)	(0.23)	(0.22)	(0.36)
Log m.v. X Portion of execs not on board	-0.07		-0.71**	
	(0.30)		(0.34)	
Log m.v. X Portion of board non-insiders		-0.45		-1.09**
		(0.29)		(0.44)
Log m.v. X Log employees	-0.00	-0.04	-0.46	0.05
	(0.20)	(0.17)	(0.55)	(0.40)
First-stage F-statistic	9.76	25.27	20.67	47.81
Observations	4,553	3,406	4,117	3,133
Within R^2	0.52	0.56	0.43	0.50

Note: This Table matches Table 4, but with an additional regressor to allow for heterogeneity by size. In addition to the governance interactions included in Table 4, interactions with a time-invariant measures of size (log employees) is included. The size variable has been re-scaled to have a standard deviation of a magnitude comparable to the governance variables. Standard errors are two-way clustered by firm and by year. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A17: Above and Below Median

	(1) OLS Below median	(2) OLS Above median
Log oil price, if rising	0.18*	0.34***
	(0.10)	(0.07)
Log oil price, if falling	0.03	0.21***
	(0.06)	(0.05)
p-value, rising versus falling	0.046	0.020
Observations	1,576	1,724
Within R^2	0.41	0.50

Note: This table reports estimates and standard errors from two least squares regressions. The specification is identical to Column 2 in Table 5, but with the sample split by whether the executive's pay is below (Column 1) or above (Column 2) the peer group median in the prior year. Thus the dependent variable is log total annual compensation. Compensation, market value, and oil prices are normalized to 2016 dollars. Standard errors are two-way clustered by firm and by year. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A18: Coefficients for Filtering Test

	(1) OLS
Log market value	0.31***
	(0.04)
Log crude oil price	-0.12**
	(0.06)
Observations	4,673
Within R^2	0.52

Note: This table is identical to Columns 1 and 3 of Table 1, but including both market value and oil prices as explanatory variables in the same regression. The dependent variable is log total annual compensation. Controls include company effects, macroeconomic variables (national GDP growth rate and unemployment rate) and a linear trend, as well as an indicator for whether the executive is the CEO. Compensation, market value, and oil prices are normalized to 2016 dollars. Standard errors are two-way clustered by firm and by year. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A19: Robustness of First Stage, for Optimal Filter

	(1)	(2)	(3)	(4)
Log crude oil price	0.99***	0.99***	0.93***	1.33***
	(0.10)	(0.10)	(0.11)	(0.12)
Observations	4,674	967	4,674	4,674
Within R^2	0.52	0.50	0.51	0.44

Note: The dependent variable is log market value. Column 1 is identical to Table A5. Column 2 runs the regression at the firm, rather than executive, level. Column 3 includes only firm effects and a linear trend as controls. Column 4 includes only firm effects as controls. Standard errors are two-way clustered by firm and by year. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A20: Robustness of Filtering Test

	(1)	(2)	(3)	(4)
Log crude oil price	-0.12**	-0.09	-0.10	-0.00
	(0.06)	(0.06)	(0.07)	(0.08)
Log market value	0.31***	0.23***	0.21***	0.19***
	(0.04)	(0.04)	(0.05)	(0.04)
Log book value			0.02	0.03
			(0.06)	(0.06)
Log assets			0.18***	0.19***
			(0.06)	(0.06)
Return on equity			-0.06	-0.05
			(0.13)	(0.12)
Return on assets			0.15	0.02
			(0.39)	(0.39)
Trend (national)	0.05***	0.04***	0.03***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
GDP growth rate (national)	-0.77	-0.96	-0.41	-0.50
	(1.50)	(1.25)	(1.28)	(1.53)
Unemployment rate (national)	0.00	-0.00	0.00	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Log employees		0.09***		
		(0.03)		
Log capital expenditures		0.07*		
		(0.03)		
CEO indicator	0.88***	0.88***	0.88***	0.88***
	(0.04)	(0.04)	(0.04)	(0.04)
Observations	4,673	4,553	4,299	4,299
Within R^2	0.52	0.52	0.53	0.53

Note: Column 1 is identical to Table A18. Column 2 adds labor and capital controls. Column 3 adds additional measures of firm value. Column 4 adds additional measures of firm value and uses the annual average oil price. *** Statistically significant at the 1% level; ** 5% level; * 10% level.

Table A21: Luck and Skill Variables Specification

	(1) OLS
Luck	0.19***
	(0.05)
Skill	0.31***
	(0.04)
Trend (national)	0.05***
	(0.01)
GDP growth rate (national)	-1.15
	(1.57)
Unemployment rate (national)	-0.00
	(0.01)
CEO indicator	0.88***
	(0.04)
Observations	4,673
Within R^2	0.52

Note: This table reports estimates and standard errors from a regressions of log total compensation on Luck and Skill, as defined in Garvey and Milbourn (2003). Compensation, market value, and oil prices are normalized to 2016 dollars. Standard errors are two-way clustered by firm and by year. *** Statistically significant at the 1% level; ** 5% level; * 10% level.