

# CEO Compensation and Real Estate Prices: Pay for Luck or Pay for Action?

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# Introduction

- ▶ Pay for luck: compensation driven by observable lucky events that are not under the control of the CEO.
- ▶ Evidence shows that CEOs are often rewarded for luck [Bertrand and Mullainathan (2001), Garvey and Milbourn (2006)].
- ▶ Common interpretation of pay for luck: rent-extraction
- ▶ However, recent agency models suggest that pay for luck can be optimal if the board wants to incentivize the CEO to forecast or respond to the lucky event [e.g., Axelson and Baliga (2008), Gopalan et al. (2010)]:
  - ▶ Evidence of pay for luck can be rationalized as the CEO being ex-post compensated for responding to a lucky event (pay for action).
  - ▶ The empirical approaches in prior studies do not distinguish between pay for responses to luck from pay for “pure luck”.
- ▶ In this paper, we use real estate price shocks to try to disentangle pay for action from pay for luck.

# Motivation

Sotheby's announced that it has entered into an agreement to sell its York Avenue headquarters to RFR Holding, LLC. The Company will lease back the building from RFR Holding for a period of up to 40 years, which includes renewals.

"This is an outstanding opportunity for Sotheby's," said Bill Ruprecht, Sotheby's President and CEO. "We decided to enter into a sale-leaseback transaction as a means of financing to provide long-term liquidity for our business. It will also allow Sotheby's to pay down \$100 million in short-term debt ..." Mr. Ruprecht added: "Sotheby's expects to report a gain on the sale of the building in the range of \$25 million."

Dec. 17, 2002, Press Release



# Motivation

Shareholder activists often push firms to “monetize” the increase in value of their real estate by engaging in sale and leaseback transactions, which allows firms to generate cash for stock buybacks, paying dividends, investing in valuable projects or decreasing debt.

Ronald Orol (August 19, 2016).



# What do we do?

- ▶ Are CEOs paid for real estate luck?
  - ▶ We run “pay for luck” tests (Bertrand and Mullainathan, 2001) using real estate prices instead of oil prices as the luck variable. Most firms have RE assets.
- ▶ Are CEOs paid for action or responses to real estate luck?
  - ▶ Real estate shocks allow us to identify responses to luck. Accounting performance and market performance are affected differently by a real estate shock.
  - ▶ We also examine specific actions such as selling real estate property and issuance of debt.
- ▶ Do these actions (responses) add value to shareholders?
  - ▶ Abnormal returns of sale-lease back transactions
  - ▶ Relaxation of financing constraints
  - ▶ Strong vs. weak corporate governance

# Main findings

- ▶ CEOs are rewarded for (real estate) luck:
  - ▶ Effect is economically significant.
  - ▶ Mostly driven by changes in equity compensation.
- ▶ CEOs are rewarded for responding to real estate price shocks :
  - ▶ Use real estate sales, debt issues and changes in ROA as proxies for managerial response.
  - ▶ Evidence of pay for luck becomes much weaker - economic magnitudes are significantly smaller and mostly not significant.
  - ▶ Pay for luck is mainly explained by CEO responses to luck, which suggests that, in the case of real estate shocks, pay for luck is mostly pay for action.
- ▶ Real estate sale-and-leaseback transactions are associated with significant positive CARs on the announcement date.
- ▶ Results stronger in more financially constrained and “well-governed” firms.

# Accounting treatment of long-lived assets under US GAAP

- ▶ Real estate assets are typically recognized in the balance sheet as property plant and equipment, at acquisition cost, not at market value.
- ▶ Shocks to the value of firm real estate are reflected in its market and accounting performance in *different* ways.
  - ▶ Stock market performance (assuming market efficiency) reflects changes in the market value of the assets of the firm, and the impact of managerial actions.
  - ▶ Accounting performance (under US GAAP) is not affected by changes in the market value of real estate assets unless the CEO takes some action, for instance selling real estate, issues debt (collateral channel) or leases back.
  - ▶ The US GAAP historical-cost principle thus allows us to estimate the sensitivity of CEO pay to responses to luck because accounting performance is not affected by real estate shocks unless there is an action taken by the CEO.

## Empirical strategy

Step 1: test whether CEOs are paid for Real Estate luck:

$$\ln TotalComp_{i,t} = \alpha + \beta_1 HPI_{m,t-1} + \beta_2 RE(92) + \beta_3 RE(92)HPI_{m,t-1} + \sum_x \beta_X X_{i,t} + \delta_{m,t} + \gamma_{i,c} + \mu_{j,t} + \varepsilon_{i,t}$$

- ▶ RE(92) is defined as exposure to the value of real estate assets (Plant, Property, & Equipment less Plant, Property, & Equipment Machinery, Equipment and Leases, divided by total assets) in 1992.

The coefficient of interest is  $\beta_3$ , which captures the general sensitivity of pay to (real estate) luck relative to other CEO-firm pairs that operate in the same industry.



## Empirical strategy

Step 2: test whether CEOs are paid for responses to Real Estate luck:

$$\ln TotalComp_{i,t} = \alpha + \beta_1 HPI_{m,t-1} + \beta_2 RE(92) + \beta_3 RESales_{i,t} + \beta_4 RE(92)HPI_{m,t-1} + \beta_5 RESales_{i,t}HPI_{m,t-1} + \beta_6 RESales_{i,t}RE(92) + \beta_7 RESales_{i,t}HPI_{m,t-1}RE(92) + \sum_x \beta_X X_{i,t} + \delta_{m,t} + \gamma_{i,c} + \mu_{j,t} + \varepsilon_{i,t}$$

- ▶  $RESales = REValue_t - REValue_{t-1}$ , where  
 $REValue = (PPENT - PPENLS - PPENME)/AT$
- ▶ Look at the cases when the difference in the book values of RE assets is negative, indicating real estate asset sales.

The coefficient of interest is  $\beta_7$ , which captures the sensitivity of CEO pay to reactions to luck, as proxied by real estate sales.

- ▶ Final sample: 14,310 CEO-firm year observations from 1992-2016
- ▶ Execucomp - compensation and executive data.
- ▶ CRSP and Compustat – stock return and accounting data
- ▶ Federal Housing Finance Association's database (FHFA) – house price data at the level of a Core Based Statistical Area (CBSA)
  - ▶ HUD provides HUD-USPS crosswalk files which allocate zip codes to CBSAs.
- ▶ Excluding financial, real estate, utilities and REITs.

# Summary statistics

	Mean	P25	P50	P75	SD	N
Total Comp	4,820.768	1,317.205	2,804.967	5,931.761	5,674.892	14,310
Cash Comp	1,263.698	628.750	950.000	1,488.077	1,074.674	14,310
Equity Comp	3,522.720	468.160	1,610.834	4,388.759	5,027.625	14,310
Assets	7,992.812	620.546	1,731.958	5,640.000	28,557.960	14,310
Log(Assets)	7.570	6.431	7.457	8.638	1.577	14,310
Tobin's Q	1.891	1.186	1.509	2.137	1.162	14,310
Log(Revenue)	7.472	6.424	7.386	8.527	1.549	14,310
MVE	7,376.903	581.763	1,681.075	5,533.326	16,561.560	14,310
Debt	2,349.712	70.288	381.834	1,445.000	13,649.010	14,310
Log(Net Debt)	5.464	4.267	5.948	7.277	2.642	14,310
ROA	0.056	0.028	0.062	0.105	0.103	14,310
EBIT	679.015	45.996	151.125	534.967	1,564.841	14,228
Volatility	0.111	0.067	0.095	0.136	0.063	14,310
Return	0.146	-0.138	0.089	0.329	0.524	14,310
RE(92)	0.250	0.101	0.160	0.259	0.242	14,310
RE Assets	0.324	0.138	0.258	0.481	0.233	14,310
HPI	16.231	11.832	15.253	19.263	5.071	14,310
RE Sales	0.015	0.000	0.003	0.019	0.026	14,310
CEO Age	56.180	52.000	56.000	61.000	7.149	14,310
Firm Age	25.785	14.808	25.477	36.400	12.628	14,281
SAI	-4.070	-4.594	-4.196	-3.655	0.538	11,700
Block Ownership	0.205	0.112	0.184	0.275	0.143	10,184
Payout Ratio	0.015	0.000	0.008	0.022	0.043	14,310

## Pay for Luck - Total Compensation

	(1)	(2)	(3)	(4)
RE(92) x HPI(t-1)	0.026**	0.032***	0.043***	0.047***
	[2.124]	[2.631]	[2.742]	[2.812]
HPI(t-1)	-0.005		-0.010	
	[-0.412]		[-0.477]	
ROA(t)	0.331***	0.359***	0.381***	0.373***
	[3.469]	[3.359]	[5.123]	[4.211]
Stock Return(t)	0.052***	0.054***	0.050***	0.051**
	[3.158]	[2.882]	[2.785]	[2.274]
Observations	14,310	13,370	13,838	12,876
R-squared	0.774	0.794	0.828	0.847
Firm FE	Y	Y		
Firm-CEO FE			Y	Y
Ind-year FE	Y	Y	Y	Y
MSA FE	Y		Y	
MSA-year FE		Y		Y

- ▶  $\beta_3$  is positive and significant and consistent with pay for real estate luck.
- ▶ Additional controls include: Size, q, ROA, ROA(t-1), Stock volatility, Stock return(t-1), CEO age, CEO age squared, CEO tenure, CEO tenure squared.

## Alternative measure of RE assets

- ▶ Define real estate assets as buildings, land and improvement, and construction in progress (Compustat variables FATB, FATC, and FATP).
- ▶ To estimate their market value, we measure the ratio of the accumulated depreciation of buildings (in 1993) to the historic cost of buildings, which gives us the relative proportion of the original value of a building that has been depreciated.
- ▶ Based on a depreciable life of 40 years, we compute the average age of buildings for each firm.
- ▶ Infer market value of a firm's real estate assets for each year in the sample period (1993 to 2016) by inflating their historical cost with MSA-level residential real estate inflation after 1975, and CPI inflation before 1975.

## Pay for Luck - measuring RE assets using data from 1993

	(1)	(2)	(3)	(4)
RE Value	0.033*** [3.668]	0.028** [2.266]	0.049*** [5.320]	0.058*** [3.954]
HPI(t-1)	-0.014 [-0.445]		0.010 [0.274]	
ROA(t)	0.079*** [3.808]	0.083*** [3.018]	0.059*** [2.809]	0.078*** [2.832]
Stock Return(t)	0.011*** [3.594]	0.011*** [2.729]	0.007** [2.328]	0.011*** [2.641]
Observations	5,551	5,050	5,364	4,855
R-squared	0.780	0.841	0.854	0.900
Firm FE	Y	Y		
Firm-CEO FE			Y	Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE	Y		Y	
MSA-Yr FE		Y		Y

- ▶  $\beta_3$  is positive and significant and consistent with pay for real estate luck.

## Pay for Action - RE Sales

	(1)	(2)	(3)	(4)
RE Sales x HPI(t-1) x RE(92)	0.003***	0.002***	0.003***	0.002***
	[3.609]	[2.799]	[3.916]	[3.186]
RE Sales x HPI(t-1)	-0.000	-0.000	-0.000**	-0.000***
	[-1.497]	[-0.807]	[-5.624]	[-3.251]
RE Sales x RE(92)	-0.000	-0.000	0.000**	0.000
	[-0.583]	[-0.905]	[2.071]	[1.368]
RE(92) x HPI(t-1)	0.007	-0.002	0.009	0.011
	[0.464]	[-0.123]	[0.555]	[0.635]
RE Sales	0.012	0.016	0.034	0.033
	[0.460]	[0.549]	[1.412]	[1.275]
HPI(t-1)	-0.000		-0.002	
	[0.044]		[-0.868]	
Observations	14,310	13,370	13,838	12,876
R-squared	0.790	0.813	0.849	0.867
Other Controls	Y	Y	Y	Y
Firm FE	Y	Y		
Firm-CEO FE			Y	Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE	Y		Y	
MSA-Yr FE		Y		Y

- $\beta_7$ , which captures the sensitivity of CEO pay to reactions to luck, as proxied by real estate sales, is positive and significant.

## Pay for Action - using data from 1993

	(1)	(2)	(3)	(4)
RE Sales x RE Value	0.010*** [2.787]	0.006* [1.899]	0.008** [2.419]	0.001 [0.255]
RE Value	-0.002** [-2.083]	-0.004** [-2.533]	0.003 [1.458]	-0.003 [-1.006]
HPI(t-1)	-0.054* [-1.725]		-0.047 [-1.246]	
RE Sales	-0.000 [-0.742]	-0.000 [-0.987]	-0.000** [-2.226]	-0.000 [-0.720]
ROA(t)	0.058*** [3.426]	0.059*** [2.872]	0.047*** [2.718]	0.057*** [2.608]
Stock Return(t)	0.008*** [2.803]	0.007* [1.920]	0.004 [1.441]	0.004 [1.082]
Observations	5,551	5,050	5,364	4,855
R-squared	0.753	0.811	0.829	0.873
Firm FE	Y	Y		
Firm-CEO FE			Y	Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE	Y		Y	
MSA-Yr FE		Y		Y



## Pay for Action: ROA

	(1)	(2)	(3)	(4)
ROA x HPI(t-1) x RE(92)	0.279***	0.257***	0.227***	0.211***
	[3.326]	[3.271]	[2.919]	[2.366]
ROA x HPI(t-1)	-0.049***	-0.040**	-0.038**	-0.036**
	[-3.193]	[-2.505]	[-2.374]	[-2.154]
ROA x RE(92)	-3.028**	-2.637*	-2.410*	-1.926
	[-2.228]	[-1.953]	[-1.813]	[-1.229]
HPI(t-1) x RE(92)	0.010	0.018	0.029*	0.034*
	[0.902]	[1.612]	[1.868]	[1.932]
Observations	14,310	13,370	13,838	12,876
R-squared	0.774	0.795	0.828	0.847
Other Controls	Y	Y	Y	Y
Firm FE	Y	Y		
Firm-CEO FE			Y	Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE	Y		Y	
MSA-Yr FE		Y		Y

# Pay for Action: Debt Issuances

	(1)	(2)	(3)	(4)
Log(Debt) x HPI(t-1) x RE(92)	0.005**	0.006**	0.007***	0.010***
	[2.065]	[2.113]	[3.479]	[4.921]
Log(Debt) x HPI(t-1)	0.000	0.000	0.000	0.000
	[0.255]	[0.672]	[0.425]	[0.335]
Log(Debt) x RE(92)	-0.093*	-0.130**	-0.106**	-0.169***
	[-1.787]	[-2.242]	[-2.304]	[-3.109]
HPI(t-1) x RE(92)	-0.008	-0.010	-0.006	-0.030
	[-0.346]	[-0.349]	[-0.317]	[-1.372]
HPI(t-1)	0.001		-0.005	
	[0.088]		[-0.362]	
Observations	14,310	13,370	13,838	12,876
R-squared	0.774	0.795	0.828	0.848
Other Controls	Y	Y	Y	Y
Firm FE	Y	Y		
Firm-CEO FE			Y	Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE	Y		Y	
MSA-Yr FE		Y		Y

# Pay for Luck - Cash and Equity Compensation

Panel A: Pay for Luck

	Cash		Equity	
	(1)	(2)	(3)	(4)
HPI(t-1) × RE(92)	0.005 [0.355]	0.012 [0.608]	0.070*** [3.018]	0.109*** [3.761]
HPI(t-1)		-0.066*** [3.823]		0.005 [0.122]
Observations	13,333	13,803	13,388	13,854
R-squared	0.663	0.741	0.666	0.715
Other Controls	Y	Y	Y	Y
Firm FE	Y		Y	
Firm-CEO FE		Y		Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE		Y		Y
MSA-Yr FE	Y		Y	

# Pay for Luck & Action - Cash and Equity Compensation

Panel B: Pay for Action

	Cash		Equity	
	(1)	(2)	(3)	(4)
RE Sales $\times$ HPI(t-1) $\times$ RE(92)	<b>0.023***</b> [3.348]	<b>0.016**</b> [2.292]	0.020 [1.121]	0.013 [0.890]
RE Sales $\times$ HPI(t-1)	-0.001 [-1.293]	0.001 [1.194]	0.002 [1.075]	0.003** [2.422]
RE Sales $\times$ RE92	0.028 [1.477]	-0.014 [-0.930]	-0.053 [-1.382]	-0.066*** [-2.779]
HPI(t-1) $\times$ RE 92	0.004 [0.258]	0.010 [0.516]	0.066*** [2.920]	0.108*** [3.745]
HPI(t-1)		0.625** [2.570]		-0.224 [-0.385]
Observations	13,319	13,792	13,374	13,843
R-squared	0.663	0.741	0.667	0.716
Other Controls	Y	Y	Y	Y
Firm FE	Y		Y	
Firm-CEO FE		Y		Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE		Y		Y
MSA-Yr FE	Y		Y	

# CARs at the announcement of sale-and-leasebacks

<b>Full Sample of Sale-Leasebacks (N = 358)</b>			
	Mean	Pos/Neg	Patell Z
CAR (-1,1)	0.0127	194/164	4.183***
CAR (-2,2)	0.0134	192/166	3.583***
CAR (-3,3)	0.0137	192/166	3.382***
<b>Sale-Leasebacks of Real Estate only (N = 206)</b>			
	Mean	Pos/Neg	Patell Z
CAR (-1,1)	0.0205	115/91	4.349***
CAR (-2,2)	0.0229	117/89	3.744***
CAR (-3,3)	0.0216	111/95	3.153***
<b>Sale-Leasebacks of Headquarters only (N = 69)</b>			
	Mean	Pos/Neg	Patell Z
CAR (-1,1)	0.0094	39/30	1.895**
CAR (-2,2)	0.0112	44/25	2.019**
CAR (-3,3)	0.0019	40/29	1.272
<b>Sale-Leasebacks following Positive Real Estate Shocks (N = 240)</b>			
	Mean	Pos/Neg	Patell Z
CAR (-1,1)	0.0185	127/113	3.525***
CAR (-2,2)	0.0204	126/114	2.777***
CAR (-3,3)	0.0187	122/118	2.519***

# Financial constraints

- ▶ We use the following proxies for financial constraints:
  - ▶ Hadlock-Pierce Size-Age index (SAI),
  - ▶ Previous year's payout ratio, and
  - ▶ Size.
- ▶ Hadlock-Pierce Size-Age index (SAI): calculate the beginning-of-year SA index value for every sample firm and place firms with index value above (below) the median within the year cohort in the constrained (unconstrained) category.
- ▶ Payout ratio: for each year in our sample, rank firms based on their payout ratio and assign to the financially constrained (unconstrained) group those firms below (above) the median of the annual payout distribution.
  - ▶ Calculate the payout ratio as the ratio of total distributions (dividends plus stock repurchases) to operating income.

# Pay for Action – Financial Constraints

Panel A: Hadlock-Pierce Size-Age Index (SAI)

	(1)	(2)	(3)	(4)
	Low SAI	Low SAI	High SAI	High SAI
RE Sales x HPI(t-1) x RE(92)	-0.007 [-1.173]	-0.006* [-1.769]	0.005** [2.284]	0.002* [1.683]
RE Sales x HPI(t-1)	0.001 [0.419]	-0.001 [-0.510]	0.000*** [3.847]	0.000 [0.259]
RE Sales x RE(92)	0.059 [1.172]	0.053 [1.571]	-0.000*** [-2.886]	
HPI(t-1) x RE(92)	0.004 [1.053]	0.004 [1.475]	-0.008 [-1.414]	0.003 [0.852]
RE Sales	0.002 [0.093]	0.019 [1.462]	-0.000*** [-3.836]	-0.000 [-0.291]
HPI(t-1)		-0.002 [-1.500]		-0.000 [-0.107]
Observations	3,318	3,909	4,372	4,630
R-squared	0.845	0.851	0.836	0.850
Other Controls	Y	Y	Y	Y
Firm FE	Y		Y	
Firm-CEO FE		Y		Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE		Y		Y
MSA-Yr FE	Y		Y	

# Pay for Action – Financial Constraints (contd.)

Panel B: Dividend Payout

Dividend payout	(1) Yes	(2) Yes	(3) No	(4) No
RE Sales x HPI(t-1) x RE(92)	0.014 [1.602]	0.008 [1.074]	0.031** [2.075]	0.025* [1.849]
RE Sales x HPI(t-1)	0.004* [1.939]	0.002 [1.146]	0.000** [2.056]	0.000* [1.823]
RE Sales x RE(92)	-0.020** [-2.256]	-0.029*** [-4.377]	0.000 [0.230]	
HPI(t-1) x RE(92)	0.008 [0.423]	0.014 [0.652]	0.001 [0.018]	0.055** [2.157]
RE Sales	-0.036* [-1.674]	-0.012 [-0.608]	-0.000** [-2.066]	-0.000* [-1.876]
HPI(t-1)		-0.001 [-0.077]		-0.008 [-1.015]
Observations	8,347	8,990	4,922	5,446
R-squared	0.846	0.873	0.740	0.765
Other Controls	Y	Y	Y	Y
Firm FE	Y		Y	
Firm-CEO FE		Y		Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE		Y		Y
MSA-Yr FE	Y		Y	



# Pay for Action – Governance

Panel A: Herfindahl Index

Group	(1) Low HHI	(2) Low HHI	(3) High HHI	(4) High HHI
RE Sales x HPI(t-1)*RE(92)	0.003* [1.930]	0.004*** [2.663]	0.001 [0.435]	0.000 [0.125]
RE Sales x HPI(t-1)	0.000 [0.039]	-0.002 [-1.605]	0.000 [-1.363]	-0.001*** [-2.689]
RE Sales x RE(92)	-0.007 [-0.801]	-0.015 [-1.187]	0.040*** [2.882]	0.040** [2.374]
HPI(t-1) x RE(92)	0.003 [0.779]	0.007 [1.079]	-0.005 [-0.916]	0.004 [0.739]
RE Sales	0.003 [0.290]	0.025 [1.619]	0.008 [1.245]	0.018*** [2.948]
HPI(t-1)		0.005 [1.571]		-0.008 [-0.798]
Observations	6,468	7,046	4,130	4,495
R-squared	0.811	0.819	0.836	0.837
Other Controls	Y	Y	Y	Y
Firm FE	Y		Y	
Firm-CEO FE		Y		Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE		Y		Y
MSA-Yr FE	Y		Y	

# Pay for Action – Governance

Panel B: Blockholder Ownership

Subset	(1) High BlockOw	(2) High BlockOw	(3) Low BlockOw	(4) Low BlockOw
RE Sales x HPI(t-1) x RE(92)	-0.060 [-1.479]	-0.010 [-0.333]	<b>0.026**</b> [2.060]	<b>0.021*</b> [1.901]
RE Sales x HPI(t-1)	0.001 [0.794]	0.002 [1.237]	0.003 [1.449]	0.003** [2.216]
RE Sales x RE(92)	0.583** [2.165]	0.135 [0.531]	-0.065* [-1.712]	-0.084** [-2.531]
HPI(t-1) x RE(92)	0.037 [1.083]	0.036 [1.432]	0.014 [0.399]	0.037 [1.563]
RE Sales	-0.505 [-1.080]	-0.031 [-0.079]	0.977 [1.510]	0.482 [1.368]
HPI(t-1)		0.006 [0.250]		-0.044*** [-3.378]
Observations	4,129	4,568	5,253	5,565
R-squared	0.855	0.866	0.840	0.854
Other Controls	Y	Y	Y	Y
Firm FE	Y		Y	
Firm-CEO FE		Y		Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE		Y		Y
MSA-Yr FE	Y		Y	

# Real Estate Exposure and Pay for Action

	(1)	(2)	(3)	(4)
RE92	Low	Low	Hi	Hi
RE Sales x HPI(t-1) x RE(92)	0.001	0.003	0.002***	0.002***
	[0.318]	[0.704]	[2.440]	[2.380]
RE Sales x HPI(t-1)	0.000	-0.001	-0.001	-0.001
	[0.142]	[-0.672]	[-0.607]	[-1.219]
RE Sales x RE(92)	-0.001	-0.001**	0.009	0.009
	[-0.452]	[2.315]	[0.809]	[0.953]
HPI(t-1) x RE(92)	-0.004	0.018	-0.001	-0.001
	[-0.273]	[2.522]	[-0.130]	[-0.054]
RE Sales	0.001	0.008	-0.003	-0.002
	[0.074]	[0.883]	[-0.337]	[-0.339]
HPI(t-1)		-0.002*		0.000
		[-1.448]		[0.201]
Observations	6,772	7,193	6,682	7,493
R-squared	0.795	0.832	0.825	0.844
Firm FE	Y		Y	
Firm-CEO FE		Y		Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE		Y		Y
MSA-Yr FE	Y		Y	

## Geographical Variation in RE exposure

- ▶ Compustat does not contain data on the location of each piece of firm's real estate holdings.
- ▶ We use state-level data on firms' operations obtained from Garcia and Norli (2012), who extract state name counts from annual reports filed with the SEC on Form 10-K.
  - ▶ The authors parse of all 10-Ks filed with the SEC during the period 1994 through 2008, which gives them information on the firm's real estate holdings, such as factories, warehouses, and sales offices.
  - ▶ Based on the state name counts, we construct a relative exposure of each firm to local, state level real estate market.

## State Level HPI - Pay for Luck/Action

	(1)	(2)	(3)	(4)
RE Sales x HPI(t-1) x RE(92)			0.017*	0.031***
			[1.913]	[2.793]
RE Sales x HPI(t-1)			-0.016	-0.015*
			[-1.642]	[-1.867]
RE Sales x RE(92)			-0.022	-0.040
			[-0.833]	[-1.642]
HPI(t-1) x RE(92)	0.033	0.080***	0.029	0.075***
	[1.315]	[3.047]	[1.183]	[2.893]
RE Sales	-0.001**	0.000	0.017	0.020
	[-2.414]	[-1.101]	[1.268]	[1.641]
HPI(t-1)		-0.066***		-0.063***
		[-3.397]		[-3.302]
Observations	8,007	7,409	8,007	7,409
R-squared	0.797	0.826	0.797	0.826
Other Controls	Y	Y	Y	Y
Firm FE	Y		Y	
Firm-CEO FE		Y		Y
Ind-Yr FE	Y	Y	Y	Y
MSA FE		Y		Y
MSA-Yr FE	Y		Y	

# Endogeneity of real estate prices

1. Real estate prices might not be exogenous to the performance of firms, and hence CEO compensation.
  - ▶ There might be an unobservable variable that is driving both location specific real estate prices and CEO compensation, which would then in turn affect our results.
  - ▶ To address this issue, we run a 2SLS specification, with the following first-stage regression for house prices at the MSA level:

$$\text{HPI}_t^m = \beta_1 P_t^{\text{US}} e_0^m + \delta_t + \mu_m + \varepsilon_t^i$$

2. Real estate ownership decision: firms that are more likely to own their real estate can also be more likely to compensate their CEOs for responses to luck.
  - ▶ To address this concern, we follow the standard procedure in the literature (Chaney et al., 2012) by including the interactions between firms' initial characteristics and the HPI: in particular, we include five quintiles of firm age, firm size, ROA, as well as two-digit SIC industry dummies and MSA dummies.

# Exogenous variation in real estate prices

	(1) HPI	(2) Total Comp	(3) Total Comp	(4) Total Comp	(5) Total Comp
Stage	1st	2nd	2nd	2nd	2nd
Case-Shiller Inelasticity	0.009*** [7.415]				
HPI Predicted x RE Sales x RE(92)		0.002** [2.168]	0.002 [1.650]	0.002*** [2.775]	0.003*** [3.404]
HPI Predicted x RE Sales		-0.001 [-1.559]	-0.001 [-1.510]	-0.001*** [-3.602]	-0.002*** [-3.931]
HPI Predicted x RE(92)		0.002 [1.502]	0.004* [1.746]	0.004* [1.821]	0.006* [1.714]
Observations	11,490	11,446	10,820	8,247	7,739
R-squared	0.998	0.768	0.787	0.818	0.834
Initial Controls x HPI	Y	Y	Y	Y	Y
Other Controls	Y	Y	Y	Y	Y
Firm FE	Y	Y			
Firm-CEO FE			Y	Y	Y
Ind-Yr FE	Y	Y	Y	Y	Y
MSA FE	Y	Y	Y	Y	
MSA-Yr FE	Y	Y	Y		Y

# Summary

- ▶ CEOs are paid for luck when luck is driven by real estate shocks
  - ▶ Consistent with previous result that CEOs are paid for luck due to oil prices or exchange rates
- ▶ CEOs are also paid for action as response to RE shocks
  - ▶ Measure action using real estate assets sales and debt issues
  - ▶ Accounting performance (ROA) captures action in a comprehensive way
  - ▶ Pay for action mostly explains pay for luck
- ▶ Other Evidence
  - ▶ Positive CAR for SLB transactions
  - ▶ Pay for responses to luck more pronounced for financially constrained firms and in good governance firms
- ▶ Contribution
  - ▶ The distinction between pay for luck/reactions to luck
  - ▶ Evidence of responses to luck – explains pay luck in the RE setting
  - ▶ Cross sectional variation results in line with the interpretation that part of pay for luck is pay for action



# Reactions to Real Estate Price Changes: sale and leaseback transactions, and real estate sales

- ▶ SLB transaction: an asset is sold to a third party and then simultaneously leased back with little or no impact to the daily operations of the firm and the use of that asset.
  - ▶ Ben-David (2005): the most common assets involved in SLB transactions were the company's headquarters followed by retail locations.
- ▶ Real estate sales: in our sample on average 5.2% of companies changed their headquarter location.

HQ changes

HQ changes figure

## Percent of firms changing headquarter location

Year	% Change HQ	No of Firms Change HQ	Total No of firms
1997	7.30%	77	1052
1998	6.70%	70	1038
1999	4.50%	45	1002
2000	2.50%	24	975
2001	4.40%	42	953
2002	3.60%	34	932
2003	5.80%	53	921
2004	8.00%	73	912
2005	5.20%	46	880
2006	5.40%	46	859
2007	4.10%	35	859
2008	6.50%	58	886
2009	7.40%	64	863
2010	4.00%	34	848
2011	2.70%	22	818

# Number of firms changing headquarter location

