

Pay for Performance across the Corporation: Relative Performance and Governance

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MOTIVATION

- Lots of discussion of inequality & especially income at the top. CEO pay often a focus of attention.....

ED FISHER

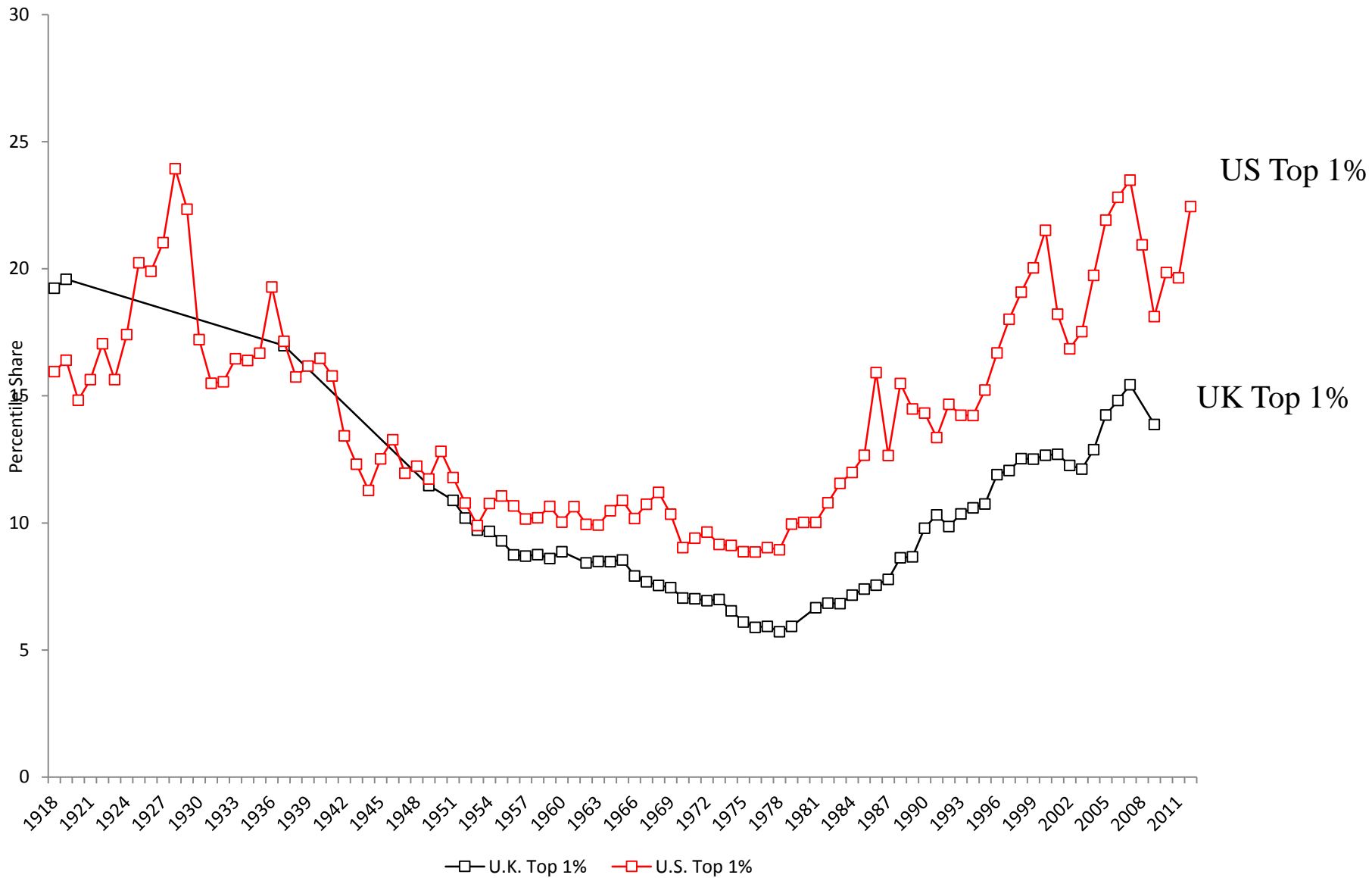


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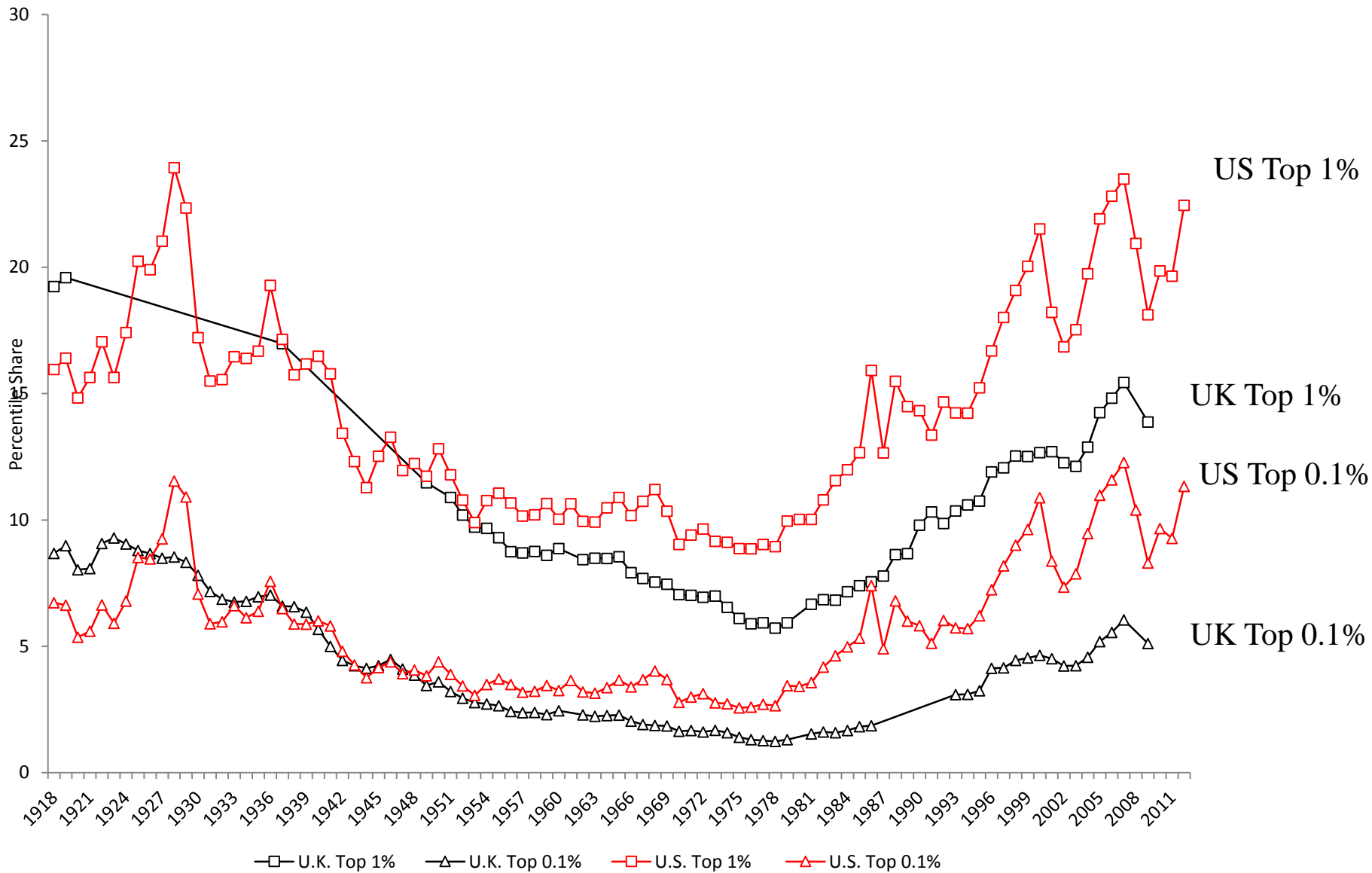
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FIG 1: INCOME SHARES AT THE VERY TOP IN US & UK



Source: Atkinson, Piketty & Saez; High Income Database

INCOME SHARES AT THE VERY TOP IN US & UK

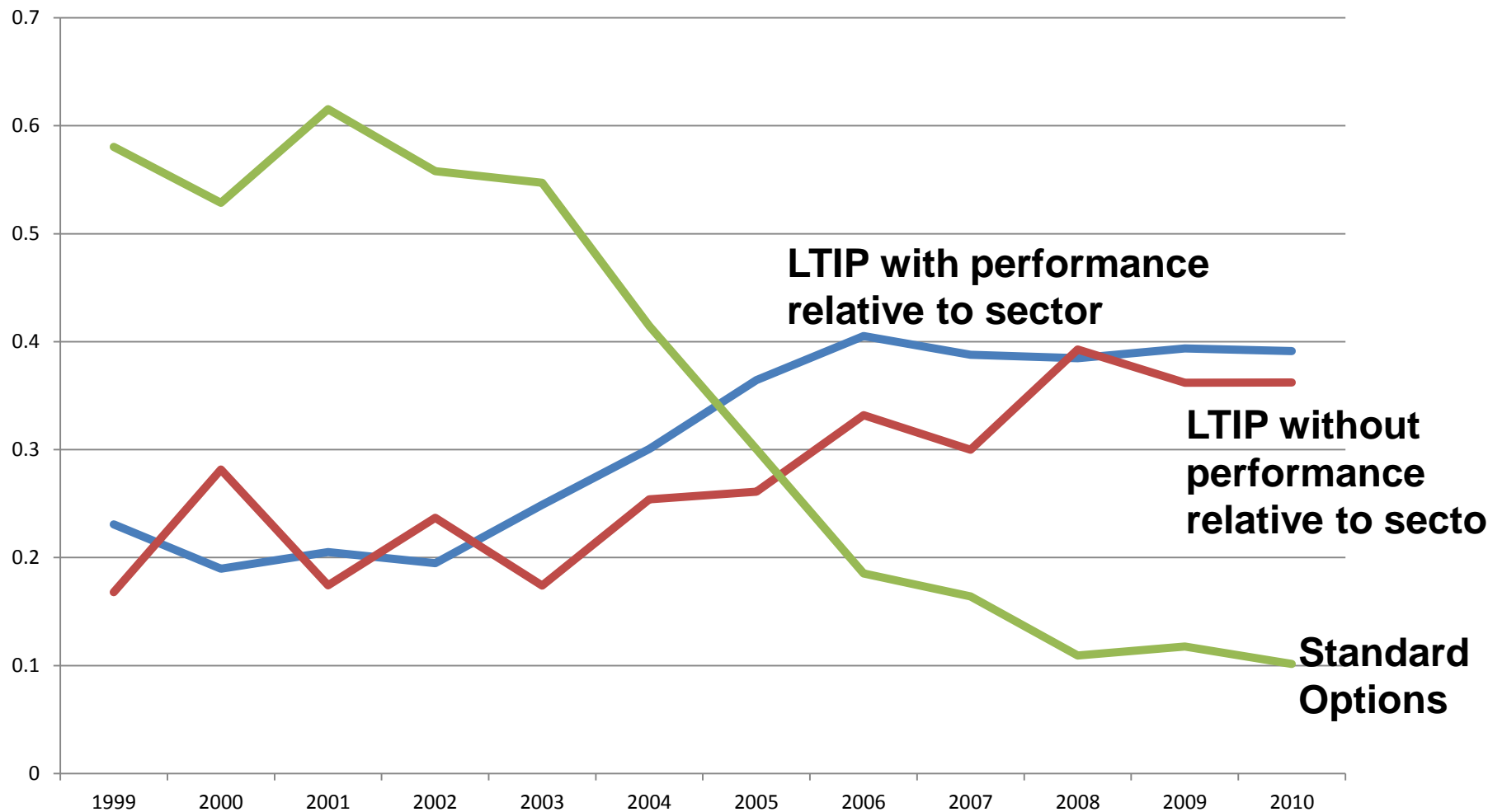


Source: Atkinson, Piketty & Saez; High Income Database

MOTIVATION

- Median CEO total compensation cf to median worker
 - FTSE100 CEO 11x median worker in 1980; 115x in 2010
 - S&P500 CEO 26x median worker in 1970; 240x in 2008
- How closely tied is pay to firm performance?
- New employer-employee matched panel dataset on pay of all workers from CEOs to janitors 1999-2010 (476 firms; 1,046 CEOs; 90% of UK market capitalization)
- UK interesting because big increase of relative performance plans for CEOs (e.g. “sector LTIPS”)
 - Shift from stock options to performance related equity incentives; CEO pay tied to firm performance relative to peers
 - Recommendation from high-level government commissioned reports in late 1990s (e.g. Greenbury Report)
 - US slower to adopt these (de Angelis & Grinstein, 2013)
 - Puzzle over why relative compensation plans so rare (e.g. Gibbons & Murphy, 1992)

FIG 2: % OF NEW EQUITY RELATED PAY IN REGULAR OPTIONS & LONG-TERM INCENTIVE PLANS (LTIP), UK



Notes: LTIPS are Long-Term Incentive Plans. Sector LTIPS are those with explicit benchmarking relative to peer firms in same sector, (Boardex sample). Unweighted averages across firms.

OUR FINDINGS

- Close link between CEO pay & firm performance
 - Elasticity is ~ 0.20 (larger than previous UK estimates, especially when pay properly measured)
 - Link weakens down hierarchy: small for workers (~ 0.02)
- Pay-performance link via flexible pay, not salaries
- Some of CEO pay appears to be non-market forces:
 - Pay does go **down** when firm performance is weak, but not as much as it goes **up** when performance is strong.
 - This asymmetry driven by firms with weaker governance
 - “Pay for industry luck” remains strong even with relative performance contracts (like sector LTIPs)
 - Reason is that when CEO failing to reach relative performance benchmark, s/he negotiates “compensating” new pay increase
 - Again, this effect is stronger when governance weaker

SOME RELATED LITERATURE

- **CEOs**

- Early literature found CEO pay-performance elasticities small (e.g. Jensen & Murphy, 1990) CEOs “paid like bureaucrats”. UK similar
- As equity-linked pay became more common elasticities rose substantially (e.g. Hall and Liebman, 1998).
- Question remains over efficiency or partly rent-skimming? (Bertrand, 2009 survey)

- **Employees more generally**

- Matched employer-employee data show firm specific effects matter a lot for wages (e.g. Abowd et al, 1999; Card et al, 2013, 2014a,b; Barth et al, 2014)
- Part of firm effect is profits/market value (see Manning, 2011; Van Reenen, 1996)

OUTLINE

1. Data

2. Empirical Model

3. Results

4. Extensions

DATA (1999 to 2010)

- **Managerial compensation**
 - Boardex (like Execucomp) + own collection. Largest sample
 - HR Consultancy Towers-Watson survey of 1,000s of CEOs & senior managers. Detailed info on options, shares, long-term incentive plans (LTIPs), bonuses, etc. (do an *ex ante* calculation of their value)
- **Worker pay** for same firms from social security records (ASHE individual panel 1% sample)
- Publicly listed company accounts (top 300 stock market firms in each year) & shareholder returns
- 476 public firms; 1,046 CEOs; 5,683 managers; 24,301 workers; ~90% of UK stock market
 - Matched panel of firms & employees

CONSTRUCTION OF PAY VARIABLES

- Main outcome variable: $\text{New Pay} = \text{Cash} + \text{New Equity}$
- $\text{Cash} = \text{Salary} + \text{Bonus}$
- **New Equity**
 - Standard Options (valued via Black-Scholes)
 - **LTIPs (Long-Term Incentive Plans)**
 - Equity (or options) granted at a point in the future if CEO achieves an explicit & objective **performance benchmark**
 - Usually over multiple years (typically 3 years)
 - Performance usually in terms of Total Shareholder Return (TSR), but sometimes accounting measure (Earnings/Share)
 - Benchmark often now a peer group (rather than absolute), usually other large firms in the same sector (**Sector LTIPs**), but also sometimes market index (like FTSE-100)
 - Typically get most shares if in top quartile; a fraction if median to top quartile and zero if below median

OTHER ASPECTS OF REMUNERATION

- **Total Pay** = New Pay + Change in value of previous LTIPS
 - Depends on change in share price, time until vesting & probability of vesting
- **CEO Wealth** = Voluntary holdings of firm stock (Hall and Leibman, 1988)
- We construct these measures & show results, but focus on new pay and its composition

TABLE 1: AVERAGE NEW PAY ACROSS THE FIRM

- **CEOs:**

Total Compensation = £1,079k (US \$1,780k)

Salary = £411k (38% of total)

- **Level 2 (reporting to CEO):**

Total Compensation = £668k

Salary = £282k (42% of total)

- **All Managers:**

Total Compensation = £50k

Salary = £42k (84% of total)

- **Workers:**

Total Pay = £21k

Salary = £20k (95% of total)

Notes: Boardex data on 1,046 CEOs; ASHE (24,301 workers; 5,683 managers); in 476 publicly listed UK firms (means). Using 1.65 \$/£ exchange rate

FIG 1: PAY GROWTH: CEO, TOP 0.1% & AVERAGE WORKER

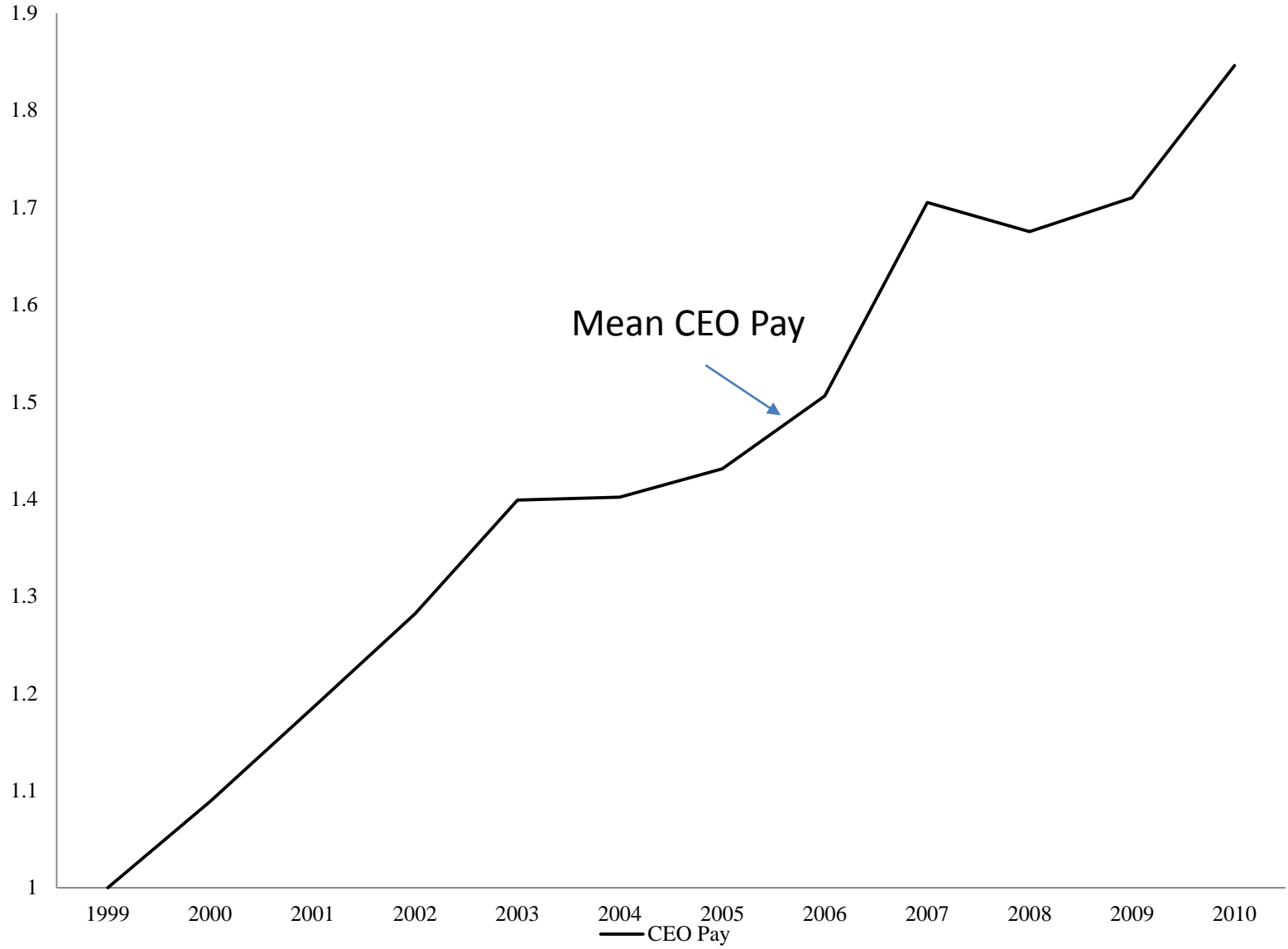


FIG 1: PAY GROWTH: CEO, TOP 0.1% & AVERAGE WORKER

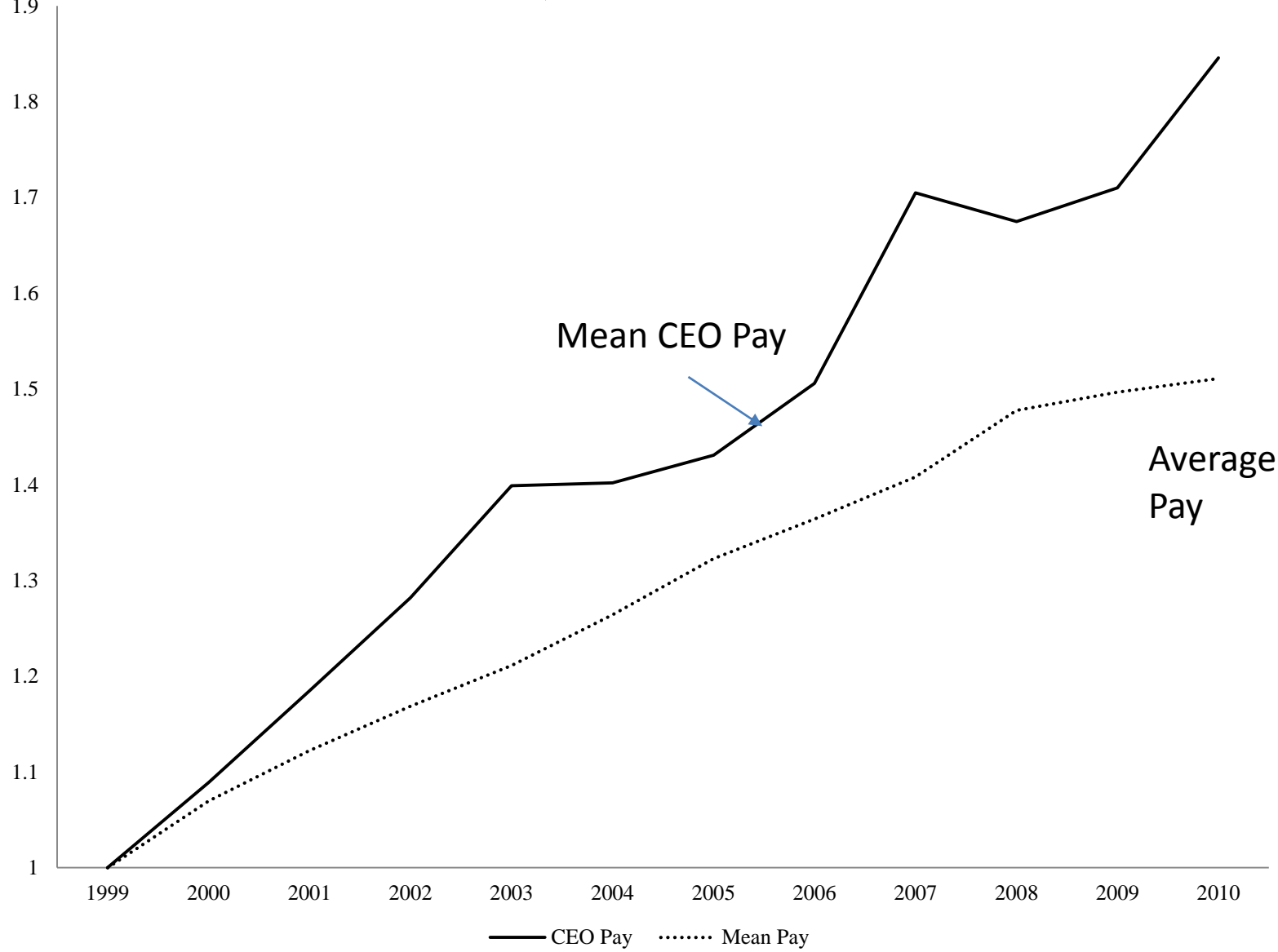
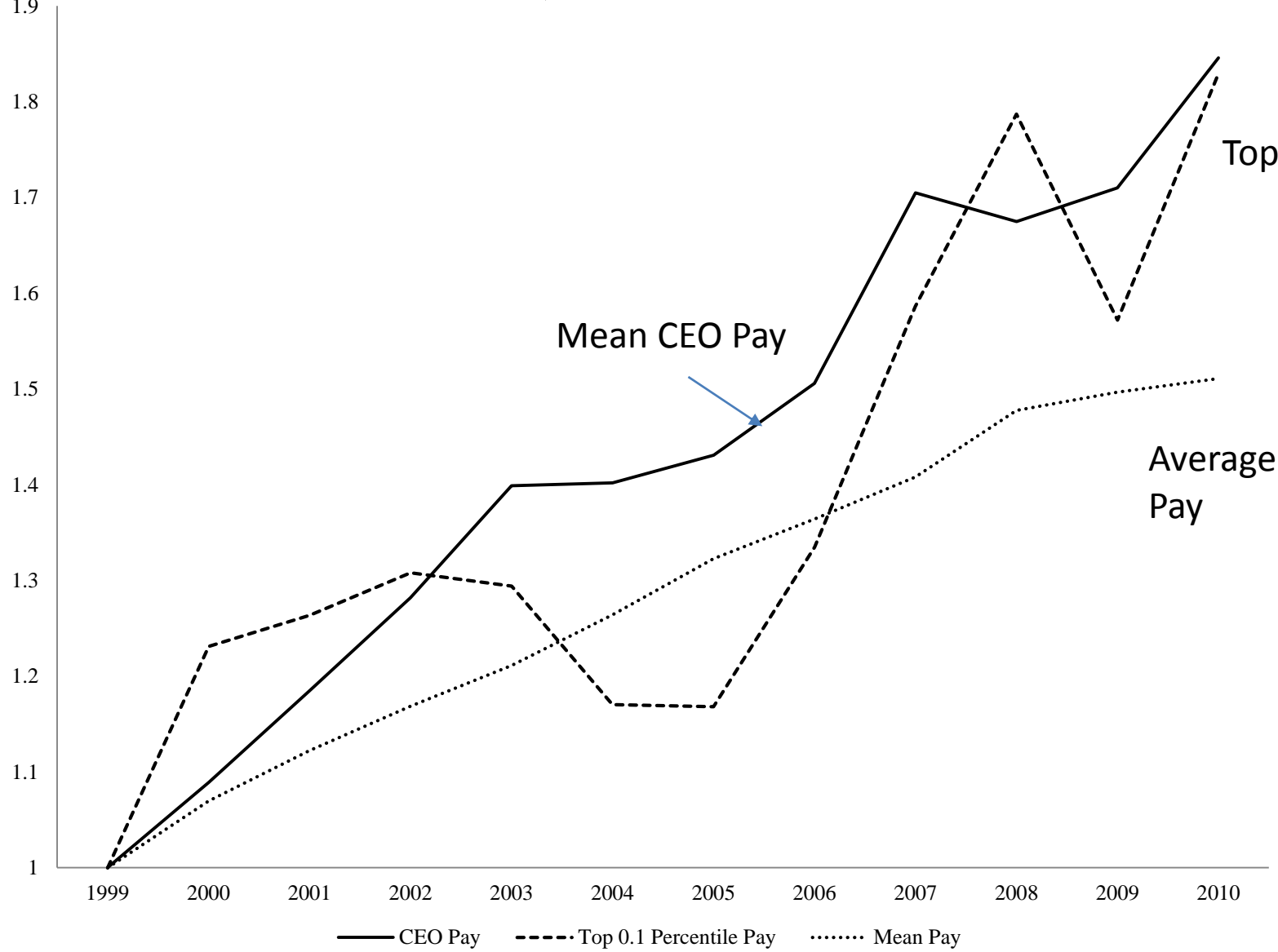


FIG 1: PAY GROWTH: CEO, TOP 0.1% & AVERAGE WORKER



— CEO Pay - - - Top 0.1 Percentile Pay ····· Mean Pay

Mean CEO Pay

Top 0.1%

Average Pay

OUTLINE

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EMPIRICAL MODEL

- Relate pay (w) to firm performance (p)

$$w = \alpha + \beta p$$

- β could be outcome of a constrained **optimal contract** (depends on risk aversion, volatility of firm performance, effort function, etc. as in Holmstrom & Milgrom, 1987)
- β could also represent ability of agent to **extract rents/skim** from the firm (Bertrand & Mullainathan, 2001)
- Or maybe just the market value of talent (e.g. p correlated with average firm size/value of talent – Gabaix & Landier, 2008)

PAY-PERFORMANCE LINK

- Pay of employee i in firm j at time t

$$\ln(\text{pay})_{ijt} = \alpha_{ij} + \sum_{k=0}^K \beta_k \text{PERF}_{jt-k} + \tau_t + \varepsilon_{ijt}$$

- Show simple “impact” spec with $K=0$ & “long-run” $K=2$, etc.
- New Pay is total ex-ante expected compensation
- Firm performance (**Perf**)
 - Total Shareholder Returns (**TSR**)
 - Proxies for quasi-rents (**QRM**) $\ln(\text{sales/worker})$ controlling for outside wage (e.g. average occupational wage in & average industry wage in worker pay equation)
- **Controls:** match-specific effects, α_{ij} ; time dummies
- Estimated for different rungs of corporate hierarchy
- Look at asymmetries; interactions with proxies for weak corporate governance; Instrumental Variables

OUTLINE

1. Data

2. Empirical Model

3. Results

- **Basic**
- Interpretation

4. Extensions

TAB 2A: PERFORMANCE = TOTAL SHAREHOLDER RETURNS, *ln*TSR

Dependent variable:
ln(New Pay)

Towers Watson

	(1) Impact	(2) Long Run Effect	#obs	#workers	#firms
CEO	0.248 (0.055)	0.295 (0.061)	595	163	126
Level 2	0.173 (0.042)	0.151 (0.040)	3,700	1,605	156
Level 3+	0.121 (0.026)	0.116 (0.033)	8,889	4,531	149

Notes: **Bold** is significant at 5%. Dependent variable is *ln*(New Pay). Column (1) has *ln*TSR as the right hand side measure of firm performance, col (2) allows for two extra lags of *ln*TSR. All regressions include worker-firm match fixed-effects, *ln*(firm employment) & time dummies. Standard errors are clustered at the firm level. Coefficients in bold are significant at the 5% level. ASHE regressions have average *ln*wage in 2 digit industry & 2 digit occupation.

TAB 2A: PERFORMANCE = TOTAL SHAREHOLDER RETURNS (TSR)

Dependent variable:
ln(New Pay)

	(1) Impact	(2) Long Run Effect	#obs	#workers	#firms
Towers Watson					
CEO	0.248 (0.055)	0.295 (0.061)	595	163	126
Level 2	0.173 (0.042)	0.151 (0.040)	3,700	1,605	156
Level 3+	0.121 (0.026)	0.116 (0.033)	8,889	4,531	149
Boardex					
CEO	0.163 (0.021)	0.159 (0.026)	4,822	1,046	476
Level 2 (Top 5)	0.207 (0.025)	0.137 (0.028)	10,462	2,335	432

Notes: Bold is significant at 5%. Dependent variable is $\ln(\text{New Pay})$. Column (1) has $\ln\text{TSR}$ as the right hand side measure of firm performance, col (2) allows for two extra lags of $\ln\text{TSR}$. All regressions include worker-firm match fixed-effects, $\ln(\text{firm employment})$ & time dummies. Standard errors are clustered at the firm level. Coefficients in bold are significant at the 5% level. ASHE regressions have average $\ln\text{wage}$ in 2 digit industry & 2 digit occupation.

TAB 2A: PERFORMANCE = TOTAL SHAREHOLDER RETURNS (TSR)

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Level 2 (Top 5)	0.207 (0.025)	0.137 (0.028)	10,462	2,335	432
ASHE					
Managers	0.023 (0.006)	0.051 (0.008)	21,052	5,683	300
Workers	0.011 (0.004)	0.019 (0.009)	95,663	24,301	327

Notes: Bold is significant at 5%. Dependent variable is $\ln(\text{New Pay})$. Column (1) has $\ln\text{TSR}$ as the right hand side measure of firm performance, col (2) allows for two extra lags of $\ln\text{TSR}$. All regressions include worker-firm match fixed-effects, $\ln(\text{firm employment})$ & time dummies. Standard errors are clustered at the firm level. Coefficients in bold are significant at the 5% level. ASHE regressions have average $\ln\text{wage}$ in 2 digit industry & 2 digit occupation.

TABLE 2B: PERFORMANCE = QUASI-RENTS PER EMPLOYEE

Dependent variable: ln(New Pay)	Impact	LR Effect	#obs	#workers	#firms
Towers Watson					
CEO	0.235 (0.105)	0.374 (0.129)	601	166	127
Level 2	0.172 (0.087)	0.219 (0.129)	3,689	1,598	156
Level 3+	0.038 (0.038)	0.037 (0.073)	8,820	4,486	149
Boardex					
CEO	0.275 (0.032)	0.276 (0.039)	4,634	1,017	469
Level 2 (Top 5)	0.243 (0.040)	0.230 (0.050)	10,475	2,340	434
ASHE					
Managers	0.037 (0.018)	0.047 (0.026)	21,052	5,683	300
Workers	0.019 (0.012)	0.021 (0.017)	95,663	24,301	327

Notes: Dependent variable is *ln(New Pay)*. The first column uses *lnQRN* as the right hand side measure of firm performance, col (2) allows for two extra lags of *lnQRN*. All regressions include worker-firm match fixed-effects, *ln(firm employment)* & time dummies. Standard errors are clustered at the firm level. Coefficients in bold are significant at the 5% level. ASHE regressions have average *lnwage* in 2 digit industry & 2 digit occupation.

WHAT PART OF PAY RESPONDS TO FIRM PERFORMANCE?

- Decompose new pay into:
 - Salary
 - Cash Bonus
 - New Equity: Options + Long-Term Incentive Plan (LTIP)
- For senior executives, salary does not respond to performance. The strongest effects are for bonuses & LTIPs. So pay-performance link is driven by flexible pay.
- Also true for workers– cash bonuses respond significantly to firm performance. But bonuses make up only ~5% of worker pay so overall effect negligible.

TABLE 3: ASSOCIATION OF PAY COMPONENTS WITH TSR

	Ln(SALARY)	Ln(BONUS)	Ln(NEW EQUITY)
Towers Watson			
CEO	0.026 (0.014)		
Level 2	0.019 (0.014)		
Level 3+	0.010 (0.007)		
Boardex			
CEO	0.007 (0.014)		
Level 2 (Top 5)	-0.005 (0.014)		
ASHE			
Managers	-0.012 (0.014)		
Workers	-0.001 (0.009)		

Notes: Each cell reports the results from a separate regression where the dependent variable is $\ln(\text{Base Salary})$ in col (1), $\ln(1+\text{Bonus})$ in col (2) and $\ln(1+\text{LTIP})$ in col (3). All regressions include worker-firm match fixed-effects, $\ln\text{Employment}$, outside wage and time dummies. SE clustered at the firm level. Coefficients in bold are significant at the 5% level. ASHE regressions have average $\ln\text{wage}$ in 2 digit industry & 2 digit occupation.

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SUMMARY OF BASIC RESULTS

- Strong pay-performance relationship
- Biggest for CEOs and smallest for ordinary workers
- Due to importance of flexible pay
- But is this all market forces?
 - **Asymmetry & Governance**
 - Pay for Luck
 - Sector LTIPs

ASYMMETRY, GOVERNANCE & CEO PAY

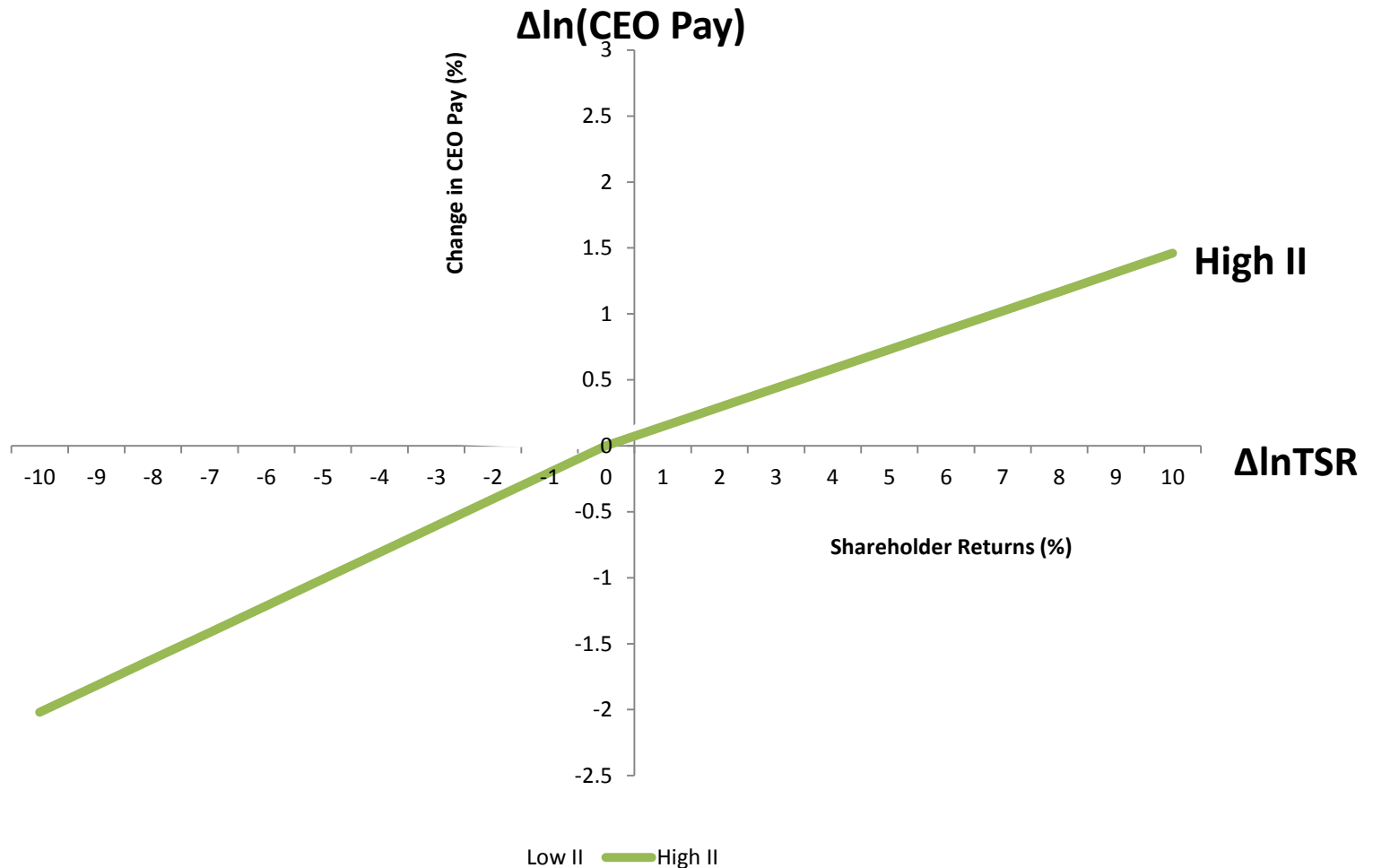
- Questions of asymmetry of rewards
 - Are CEOs rewarded more on upside (change in TSR positive, $\Delta \ln \text{TSR (+)}$), than on the downside (change in TSR negative)?
 - Is this asymmetry stronger when firms have governance problems?
Use two proxies:
- Evidence that active **institutional investors (II)** like pension funds aid corporate governance (e.g. Aghion, Van Reenen & Zingales, 2013, AER)
 - II like have stronger incentives & ability to monitor than individuals
 - Split firms into “low II” (bottom quartile) vs. “high II” based on lagged II share
- Direct measure of corporate governance problems from Institutional Voting Information Service (IVIS)
 - Issue warnings (red/amber/blue) over Board votes. CEO pay most common warning
- Note: Positive correlation of low II with IVIS measures (& IRRC/ABI corporate governance measures in US)

TAB 4: CEO GETS MORE ON UPSIDE WHEN GOVERNANCE WEAK

Method:	Within Groups	First Differences	First Differences	First Differences
In TSR	0.146 (0.023)			
$\Delta \ln$ TSR		0.138 (0.027)	0.188 (0.022)	
$\Delta \ln$ TSR (+) Positive TSR growth			0.043 (0.060)	
$\Delta \ln$ TSR * High II (strong governance)				0.213 (0.032)
$\Delta \ln$ TSR(+) * High II (strong governance)				-0.066 (0.097)
$\Delta \ln$ TSR * Low II (weak governance)				-0.061 (0.057)
$\Delta \ln$ TSR(+) * Low II (weak governance)				0.302 (0.146)
# obs	4,301	3,659	3,659	3,659

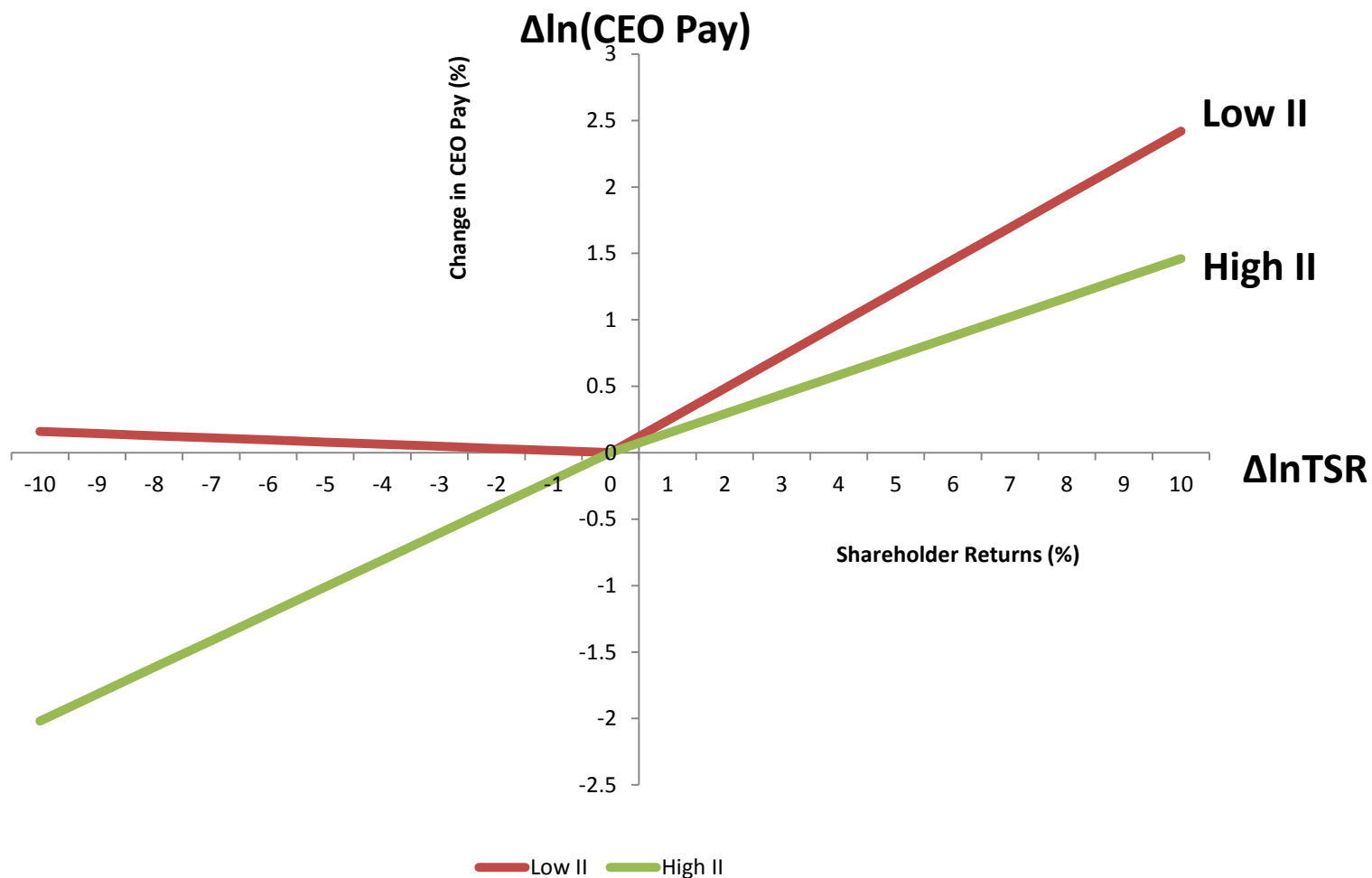
Notes: Dependent variable is $\Delta \ln(\text{New Pay})$. Asymmetry allowed for by including $\Delta \ln \text{TSR}$ when positive as an additional regressor ($\Delta \ln \text{TSR}+$). All regressions include time dummies (interacted with II in col (1) and (2)). SE clustered at firm level. Coefficients in bold significant at the 5% level. 455 firms in col (1); 451 firms in columns (2)-(4) & 472 in column (5).

ASYMMETRY IN CEO PAY-PERFORMANCE? SYMMETRY FOR FIRMS WITH HIGH II (INSTITUTIONAL INVESTORS)



Notes: These are the implied marginal responses of CEO pay to changes in TSR for firms where Institutional Investors have a low (under 40%) share of equity (“II low”) vs. a high share (“II high”)

ASYMMETRY IN CEO PAY-PERFORMANCE. SYMMETRY FOR FIRMS WITH HIGH II (INSTITUTIONAL INVESTORS), ASYMMETRY FOR THOSE WITH LOW II: CEO REWARDS MORE ON UPSIDE & PUNISHED LESS ON DOWNSIDE



Notes: These are the implied marginal responses of CEO pay to changes in TSR for firms where Institutional Investors have a large share of equity (II low) vs. a high share (II high)

TAB 4: CEO GETS MORE ON UPSIDE WHEN GOVERNANCE WEAK

Method:	Within Groups	First Differences	First Differences	First Differences	First Differences
In TSR	0.146 (0.023)				
Δ In TSR		0.138 (0.027)	0.188 (0.022)		
Δ In TSR (+) Positive TSR growth			0.043 (0.060)		
Δ In TSR * High IVIS (strong governance)				0.213 (0.032)	0.195 (0.040)
Δ In TSR(+) * High IVIS (strong governance)				-0.066 (0.097)	-0.068 (0.040)
Δ In TSR * Low IVIS (weak governance)				-0.061 (0.057)	0.047 (0.070)
Δ In TSR(+) * Low IVIS (weak governance)				0.302 (0.146)	0.204 (0.103)
# obs	4,301	3,659	3,659	3,659	4,082

Notes: Dependent variable is $\Delta \ln(\text{New Pay})$. Asymmetry allowed for by including $\Delta \ln \text{TSR}$ when positive as an additional regressor ($\Delta \ln \text{TSR}+$). All regressions include time dummies (interacted with II in col (1) and (2)). SE clustered at firm level. Coefficients in bold significant at the 5% level. 399 firms in columns (2)-(4) and 403 in column (1).

SUMMARY OF BASIC RESULTS

- But is CEO Pay-performance all market forces?
 - Asymmetry & Governance
 - **Pay for Luck**
 - Sector LTIPs

PAY FOR LUCK? IV RESULTS

- A component of firm performance driven by exogenous shocks (e.g. oil price for Exxon). Are CEOs rewarded for this kind of “luck”? (Bertrand & Mullainathan, 2001)
 - Use only firm *PERF* predicted from industry *PERF*
- Instrument firm-level shareholder returns with the returns in the global industry (excluding the UK). For the 476 firms, we have 92 industries
- For quasi-rents, we follow Card et al (2014) and use quasi-rents at the three digit industry level in all other listed UK-firms as an IV

TABLE 5: EVIDENCE OF PAY FOR LUCK? INSTRUMENTING FIRM TSR WITH (EX-UK) GLOBAL INDUSTRY TSR GIVES SIMILAR RESULTS TO OLS

Dependent variable:	OLS	IV
Ln(Cash)	0.141 (0.020)	0.165 (0.050)
Ln(New Pay)	0.151 (0.021)	0.200 (0.049)
Ln(Total Pay)	0.545 (0.042)	0.729 (0.079)
Observations	4,644	4,644

Notes: *ln*(Total Pay) is *ln*(New Pay + Change in Value of LTIPs & options). *ln*TSR measure of firm performance. All regressions include CEO-firm match fixed-effects & time dummies. Standard errors clustered at the industry level (92 clusters). Coefficients in bold are significant at the 5% level. Cash is salary plus bonus. **F-Stat in first stage = 183**

WHY STILL SOME PAY FOR LUCK?

- Summary of IV results
 - IV coefficients similar to OLS implies CEOs get rewarded for exogenous industry performance shocks
- So why have UK's relative performance LTIPS ("sector LTIPs") not dealt with asymmetry & pay for luck?
 - Perform a plan-level analysis of probability & amount of vesting
 - Is there *less* pay for luck when CEOs subject to sector LTIPs? Dependent variables:
 - Vesting probability
 - Amount of pay

TABLE 6 - CONT: PLAN LEVEL ANALYSIS - SECTOR LTIPS DO REDUCE PROBABILITY OF VESTING (& AMOUNT PAID OUT) WHEN FIRM TSR RISES DUE TO INDUSTRY SHOCK

	Relative Sector LTIP		No Relative Sector LTIPS	
	<u>OLS</u>	<u>IV</u>	OLS	IV
A. Dependent variable: Vesting Percentage				
$\Delta \ln(\text{TSR})$	0.351 (0.023)	0.117 (0.059)	0.258 (0.022)	0.225 (0.064)

Notes: Standard errors are clustered at the firm level. Coefficients in bold are significant at the 10% level. Long differences between grant date and potential vest date (usually 3 years). 1038 observations in columns (1) and (2) and 932 observations in columns (3) and (4)

TABLE 6: PLAN LEVEL ANALYSIS - SECTOR LTIPS DO REDUCE PROBABILITY OF VESTING (& AMOUNT PAID OUT) WHEN PERFORMANCE IS POOR (3 YEAR DIFF OF TSR)

	Relative Sector LTIP		No Relative Sector LTIPS	
	OLS	IV	OLS	IV
A. Dependent variable: Vesting Percentage				
$\Delta \ln(\text{TSR})$	0.351 (0.023)	0.117 (0.059)	0.258 (0.022)	0.225 (0.064)
B. Dependent variable: Change in value of LTIP pay				
$\Delta \ln(\text{TSR})$	535.98 (27.07)	388.29 (64.71)	449.45 (36.25)	493.02 (102.71)
Observations	1,038	1,038	932	932

Notes: Standard errors are clustered at the industry level. Coefficients in bold are significant at the 5% level. Long differences between grant date and potential vest date (usually 3 years)

WHY STILL SOME PAY FOR LUCK?

- What happens to pay negotiations when LTIPs fail?
- Look at the response to new pay deals when CEO doesn't meet performance standards as specified in LTIPs
- “Lagged LTIP fail”
 - Look at stock of lagged LTIPs and calculate what proportion of face value CEO is likely to receive (simplest measure of failure is if below 100%)
 - Do CEOs get “compensated” when their LTIPs are doing badly?

TABLE 7: CEO GET COMPENSATED IN NEW EQUITY PAY AWARDS WHEN THEIR LTIP VALUE FALLS

Dependent Variable:	Ln(New Pay)	New Equity Awards	Ln(New Pay)	New Equity Awards
Lagged LTIP Fails	0.032 (0.047)	129,872 (71,140)		
Lagged LTIP Fails *Low II (weak governance)			0.084 (0.054)	167,541 (69,518)
Lagged LTIP Fails *High II (strong governance)			-0.041 (0.023)	-17,983 (44,844)
Lagged InTSR	0.151 (0.022)	71,493 (28,604)	0.145 (0.027)	50,649 (28,663)
P-value of test that II effects are symmetric			0.037	0.012
# obs	4,301	4,301	4,301	4,301

Notes: SE clustered at firm level. Coefficients in bold significant at the 5% level. All columns include controls for CEO-firm match fixed-effects, lagged TSR and time dummies. Final two columns have interactions between II and time dummies

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EXTENSIONS AND ROBUSTNESS

1. **Magnitudes**
2. Evidence of fall in worker rent-sharing
3. CEO Exit
4. More accurate measures of total CEO rewards
5. Is it II or something correlated with institutional ownership?
6. What Happened to CEOs as bureaucrats?

MAGNITUDES AND MACRO EFFECTS

- For our 476 firms CEO pay rose ~75% relative to average worker between 2000 & 2010
- Aggregate real TSR rose by 25%, so with elasticity of 0.3 performance would predict only 7.5% increase, ~10% of aggregate change
- CEO pay growth looks like growth of top 0.1% - similar factors? Technology, globalization, superstars or norms?
- CEOs cannot account for more than 3% of the labour income of top 1%. In UK growth of top 1% more likely to be finance related (~2/3 of the increase in share of income to top 1% 1999-2009 was finance-related: Bell and Van Reenen, 2014)

EXTENSIONS AND ROBUSTNESS

1. Magnitudes
2. **Evidence of fall in worker rent-sharing**
3. CEO Exit
4. More accurate measures of total CEO rewards
5. Is it II or something correlated with institutional ownership?
6. What Happened to CEOs as bureaucrats?

WHAT HAPPENED TO WORKER RENT-SHARING?

- In 1970s & 1980s data found significant rent-sharing for workers (e.g. Van Reenen, 1996, QJE)
- We estimate manufacturing industry panels of wages & rents from the 1960s to 2000s a la Blanchflower et al (1996, QJE)
 - Evidence that the rent-sharing parameter has declined toward zero

DECLINE IN WORKER RENT SHARING IN US?

Dep var: ln(wage)	EARLY US: 1964-1985	LATE US: 1986-2005
In wage(-1)	0.7602**	0.6584**
Rents(-1)	0.0023**	0.0011**
Rents(-2)	0.0004	-0.0009*
Rents(-3)	0.0022**	-0.0002
Long-run Elasticity	0.054	0.000
p-value	0.000	0.944
# Obs	10,098	9,103

Notes: US data from NBER Productivity Database, UK data from NES/KLEMS. Ln(wage)= compensation per worker & rents = profits per worker for US & ln(value-added per worker) for UK. Controls are time & industry dummies. SE clustered by industry (459 in US and 22 in UK). Elasticities calculated at sample means.

TAB A1: DECLINE IN WORKER RENT SHARING IN UK & US?

Dep var: ln(wage)	US: 1964-1985	US: 1986-2005	EARLY UK: 1975-1985	MIDDLE UK: 1986-1997	LATE UK: 1998-2007
In wage(-1)	0.7602**	0.6584**	0.6492**	0.7051**	0.4096**
Rents(-1)	0.0023**	0.0011**	0.0173	0.0289*	-0.0139
Rents(-2)	0.0004	-0.0009*	0.0073	-0.0116	0.0346
Rents(-3)	0.0022**	-0.0002	0.0163	-0.0062	0.0036
Long-run Elasticity	0.054	0.000	0.117	0.038	0.041
p-value	0.000	0.944	0.005	0.177	0.390

Notes: US data from NBER Productivity Database, UK data from NES/KLEMS. Ln(wage)= compensation per worker & rents = profits per worker for US & ln(value-added per worker) for UK. Controls are time & industry dummies. SE clustered by industry (459 in US and 22 in UK). Elasticities calculated at sample means.

EXTENSIONS AND ROBUSTNESS

1. Magnitudes
2. Evidence of fall in worker rent-sharing
- 3. CEO Exit**
4. More accurate measures of total CEO rewards
5. Is it II or something correlated with institutional ownership?
6. What Happened to CEOs as bureaucrats?

TAB A9: PROBABILITY OF CEO EXIT FALLS WITH BETTER FIRM PERFORMANCE

	Boardex CEO	Boardex Level 2	ASHE Workers
$\Delta \ln \text{TSR}$	-0.071** (0.012)	-0.052** (0.009)	-0.029 (0.020)
Obs	3,155	9,307	164,725
#Firms	419	420	372
#Workers	845	3,531	60,339

Notes: The coefficients are marginal effects from a probit model of job-exit with time dummies. Standard errors are clustered at the firm level.

- No asymmetry in dismissal probability for positive and negative TSR
- No asymmetry from II interactions

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PAY-PERFORMANCE ELASTICITIES FOR ALTERNATIVE CEO PAY MEASURES (WEALTH INCLUDES CEO OWN PORTFOLIO)

Dependent Variable:	ln(Cash Pay)	ln(New Pay)	ln(Total Pay)	ln(Total Wealth)
ln(TSR)	0.232 (0.032)	0.386 (0.068)	0.780 (0.074)	1.213 (0.116)

Notes: Successive columns use increasingly complete measures of CEO pay. All regressions include CEO-firm match fixed-effects and time dummies. Standard errors are clustered at the firm level. Coefficients in bold significant at the 5% level.

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IS IT REALLY II OR SOMETHING CORRELATED WITH II? HIGH IV VS. LOW II FIRMS LOOK SIMILAR ON OBSERVABLES

	Mean	Mean (Low II)	Mean (High II)	t-Test of Means
Market Capitalization (£m)	4,202	4,736	4,042	1.30
Sales (£m)	3,656	3,891	3,584	0.62
Employment	18,751	18,272	18,900	0.37
Average Wage (£)	41,473	44,074	40,686	1.77
TSR (%)	3.9	3.3	4.1	0.33
CEO Pay, £1000s	1,232	1,209	1,240	0.50

- Also include these as interactions in key tables as robustness

EXTENSIONS AND ROBUSTNESS

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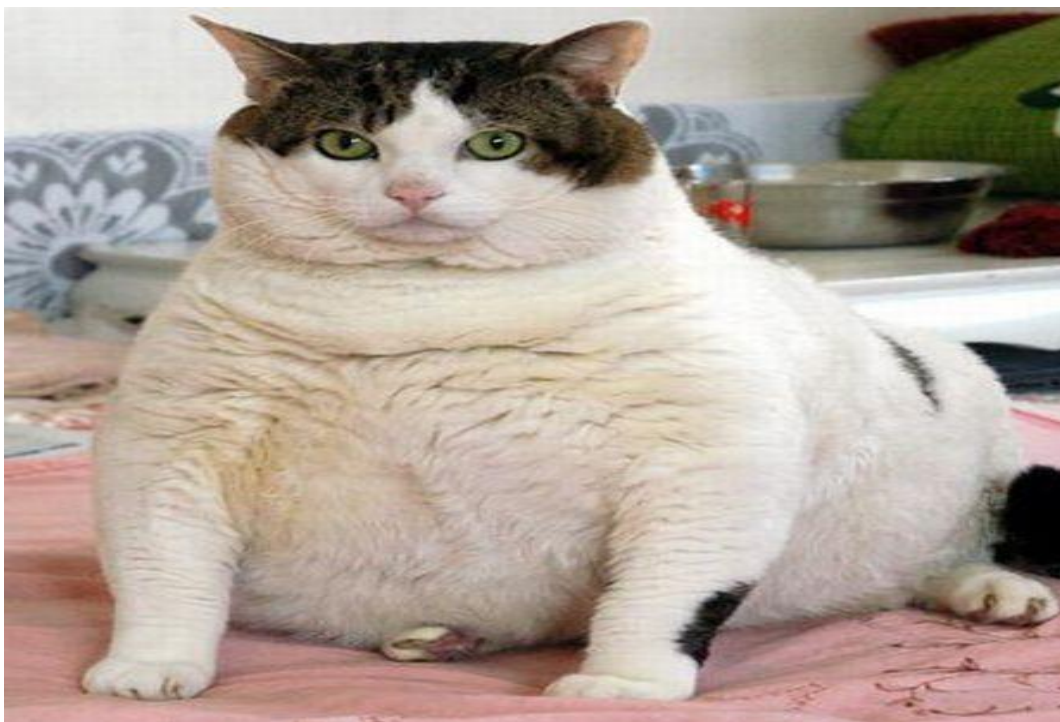
WHAT HAPPENED TO CEO BUREAUCRATS?

- Early evidence pointed to a weak CEO pay-performance link.
 - Revolution in pay structures in the 1990s and 2000s have generated a much stronger link for CEOs. When measured properly, pay moves strongly with performance
 - In our sample period the elasticity has increased over time

CONCLUSIONS

- Pay-performance link strong for CEOs; weak for workers
- CEO pay-performance link asymmetric: stronger on upside than downside & this more pronounced when corporate gov poor (II low and/or IVIS index)
- “Pay for luck” (industry shocks) remains strong & has not been much weakened by sector LTIPs
 - CEOs get themselves more generous incentive pay awards when existing LTIPs fail
- **Next steps**
 - Policy: governance improvements rather than formal pay structures matter more
 - Other indicators of corporate governance
 - Other country evidence (e.g. US, EU)

THANK YOU!



Back Up

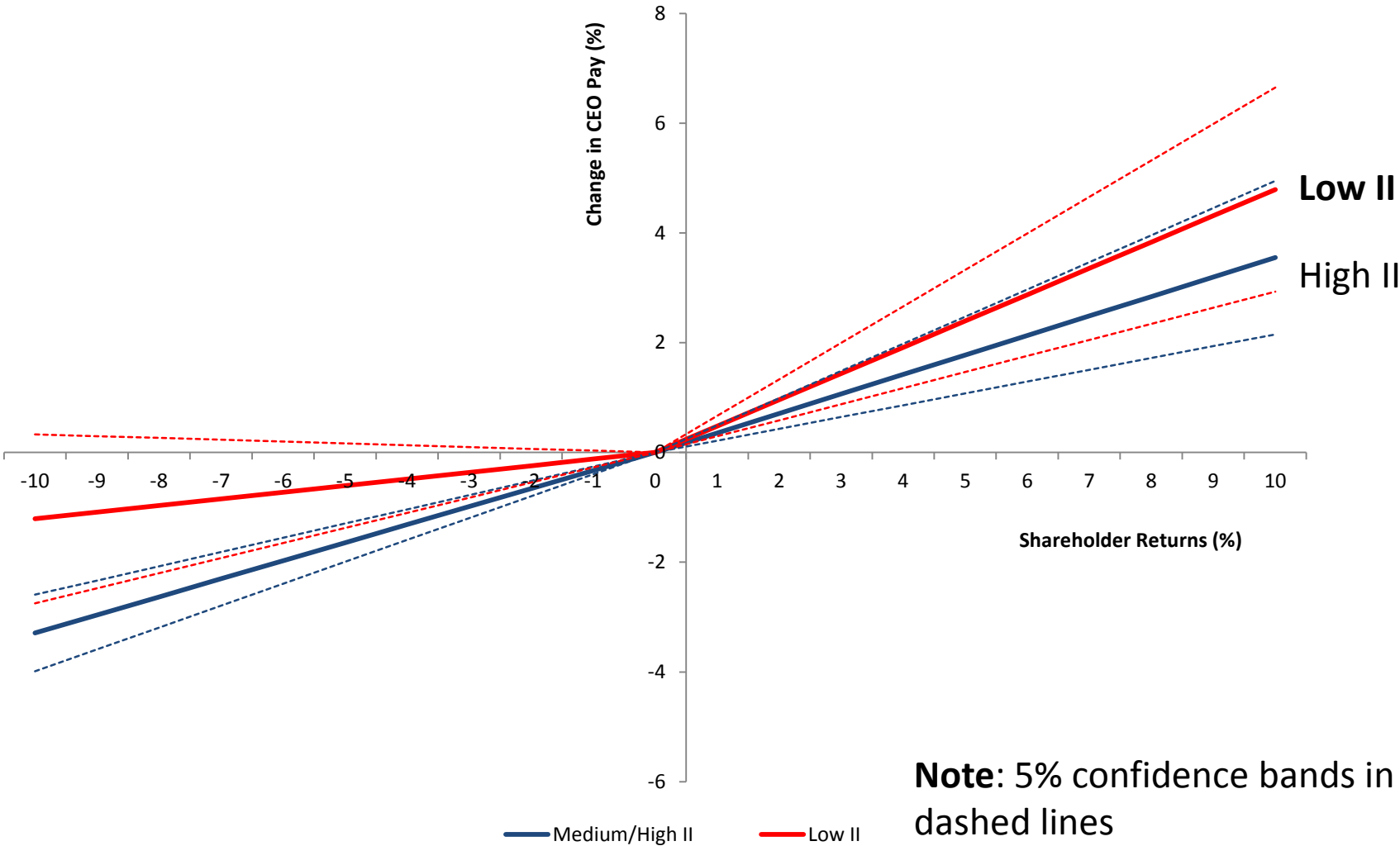
EMPIRICAL MODEL

- Typical regression of pay (w) on firm performance (p)

$$w = \alpha + \beta p \qquad \beta = \frac{1}{1 + r\sigma^2 c''}$$

- β could be outcome of optimal contract (depends on risk aversion, volatility of firm performance, effort function, etc. as in Holmstrom & Milgrom, 1987)
- β could represent ability of agent to extract rents from firm (e.g. a Nash bargain over the firm's value); Bertrand & Mullainathan (2001)
- Or maybe just the market value of ability (p correlated with average firm size – Gabaix & Landier, 2008)

ASYMMETRY IN CEO PAY-PERFORMANCE. SYMMETRY FOR FIRMS WITH HIGH INSTITUTIONAL INVESTORS (II), ASYMMETRY FOR THOSE WITH LOW II: CEO REWARDS MORE ON UPSIDE & PUNISHED LESS ON DOWNSIDE



THE MEASUREMENT OF PAY

- Newpay = Cash + New Equity (used in most regressions)
- Cash = Salary + Bonus
- New Equity = Regular Options + LTIP
- Total Pay = Cash + New Equity + Change in Old Pay
- LTIP = Expected {discounted* Pr(Vest)*Shares*price}

$$E_t\{LTIP_t\} = E_t\left\{\sum_k \phi(t, \tau) \omega_{k\tau} S_{k\tau} P_\tau\right\}$$

- Change in Old Pay $E_t\left\{\sum_k \phi(t, \tau) \omega_{k\tau} S_{k\tau} P_\tau\right\} - E_{t-1}\left\{\sum_k \phi(t-1, \tau) \omega_{k\tau} S_{k\tau} P_\tau\right\}$

- Depends on change in expectation of vesting.

$$E_{t+1}\{\omega_{k\tau}\} - E_t\{\omega_{k\tau}\}$$

- Assume this declines smoothly to final true vesting amount

PAY NOTES

- In UK and US almost all firms have some performance related rewards
- In US (in 2007) about 34% of these had some relative component; in UK ~100% had some relative component

AVERAGE NEW PAY ACROSS THE FIRM

- **CEOs:**

Total Compensation = \$1,947,000

Salary = \$650k (35% of total – 2/3 is bonuses, stock, etc)

- **Level 2 (just below CEO):**

Total Compensation = \$1,088,000

Salary = \$392k (36% of total)

- **All Managers:**

Total Compensation = \$78k

Salary = \$65k (84% of total)

- **Workers:**

Total Pay = \$33k

Salary = \$31k (95% of total)

Notes: Boardex data on 897 CEOs; ASHE (23,738 workers); in 476 publicly listed UK firms (means). Using 1.65 \$/£ exchange rate