

Managerial Labor Market Competition and Incentive Contracts

PhD Lunch Seminar, Erasmus University Rotterdam

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Introduction

Competition and Compensation

- What is the impact of **competition** on executive **compensation**?

total pay = salary	+	performance-based pay
		(bonus, stocks, options, etc.)
30%		70%

The Model

- A dynamic moral hazard problem
 - requires incentives to motivate executive effort
 - outside value — competition from a frictional labor market
 - possibly pay-for-luck
- A job ladder for executives
 - on-the-job executives are poached by outside firms
 - use outside firm to renegotiate with the present firm — Bertrand
 - larger firms are capable of bidding more (Gabaix and Landier, 2008)
- The effects of poaching offers
 - on pay level: compensation growth
 - on the incentive: labor market incentives
 1. poaching firm bids higher for a more productive executive
 2. an executive takes effort to be productive

The Model

- The effects differentiate across firm size
 - on pay levels
 1. larger firms are able to bid higher
 2. compensation growth is higher in larger firms
 - labor market incentives decrease in firm size
 1. executives in larger firms are higher on the job ladder
 2. executives in larger firms expect to be wealthier (wealth effect)
 - performance-based incentives increase in firm size
- Speaks to the stylized facts

Stylized Facts

1. Firm-size pay-growth premium

- Starting with the same total pay, pay-growth is higher in larger firms.
- A 1% increase in firm size leads to 10% increase in pay-growth rate.
- Firm size measured by market capitalization.

2. Firm-size incentive premium

- Performance-based incentives are higher in larger firms, controlling for total compensation.

$$\text{delta} = \frac{\Delta \text{Wealth (in dollars)}}{\Delta \text{Firm Value (in percentage)}}$$

- A 1% increase in firm size leads to a 0.35% increase in delta.

Data: Top 5 executives in U.S. publicly listed firms (S&P 1500), 1992 to 2016.

Road Map

Questions

- What is the impact of competition on compensation?
- Why size pay-growth premium?
- Why size incentive premium?

1. Model
2. Data & Reduced-form Evidence
3. Structural Estimation
4. Policy Implications

Related Literature

- Assignment models
 - on compensation level: Tervio (2008), Gabaix and Landier (2008)
 - on incentives: Edmans et al. (2009), Edmans and Gabaix (2011)
- Moral hazard models
 - Gayle and Miller (2009), Gayle et al. (2015): moral hazard is more severe / the quality of signal (about effort) is poorer in larger firms
- Dynamic contract literature
 - moral hazard: Spear and Srivastava (1987), etc.
 - limited commitment: Thomas Worrall (1988, 1990), etc.
- Labour search literature
 - sequential auction: Postel-Vinay and Robin (2002), etc.

The Model

Set Up: Moral Hazard

Discrete time and infinite periods

Executives:

- risk averse, $u(w) - c(e)$, $e \in \{0, 1\}$, $c(1) = c$, $c(0) = 0$,

$$u(w) = \frac{w^{1-\sigma}}{1-\sigma}$$

- effort e stochastically increases executive productivity $z \in \mathcal{Z}$
- z is persistent, follows a discrete Markov Chain process
 - $\Gamma(z'|z)$ when take the effort, $\Gamma^s(z'|z)$ when shirk
- die with $\eta \in (0, 1)$, the match breaks up, the job disappears

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Firms:

- firm size $s \in \mathcal{S}$, exogenous and permanent
- production (cash flow) $y(s, z) = \alpha_0 s^{\alpha_1} z$, $\alpha_0, \alpha_1 \in (0, 1]$.

Set Up: Managerial Labor Market

Managerial Labor Market:

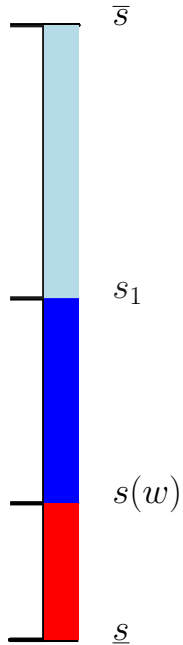
- *search frictional* and allows *on-the-job search*
- with $\lambda_1 \in (0, 1)$ sample an outside firm s' from $F(s')$

Sequential Auction:

- Bertrand competition between current firm s and outside firm s'
- Each firm has a **bidding frontier**, $\overline{W}(z, s)$, the maximum value firm s is willing to bid for executive z defined by

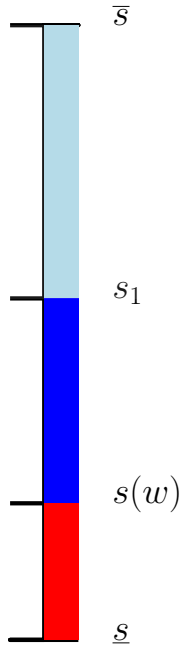
$$\Pi(z, s, \overline{W}(z, s)) = 0$$

- $\overline{W}(z, s)$ increases in z and s



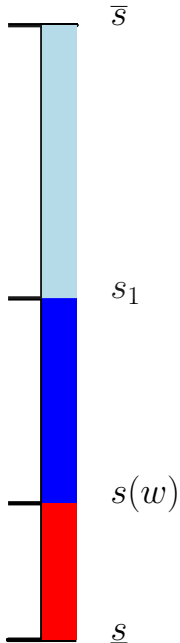
$$\mathcal{M}_1 : s' > s$$

job-to-job transitions



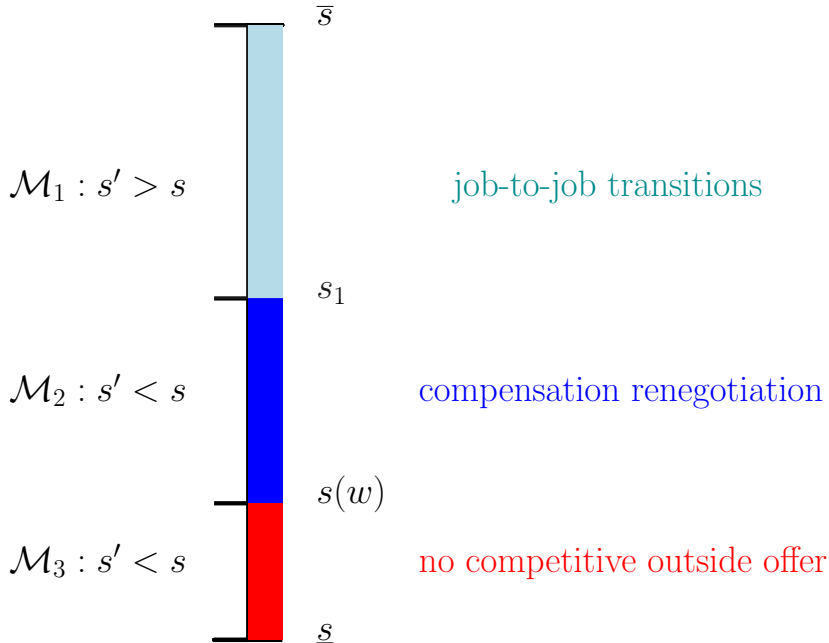
$\mathcal{M}_1 : s' > s$

$\mathcal{M}_2 : s' < s$



job-to-job transitions

compensation renegotiation



Set Up: Poaching firms

Three sets of outside firms s' :

$\mathcal{M}_1 : s' \geq s$, lead to job turnovers

$\mathcal{M}_2 : s' < s$, improve compensation, no job turnovers

\mathcal{M}_3 : other or no outside firms

The continuation value of an executive is

$$\underbrace{\sum_{s' \in \mathcal{M}_1} F(s') \mathbb{E}[\overline{W}(z', s)] + \sum_{s' \in \mathcal{M}_2} \mathbb{E}[\overline{W}(z', s')] F(s')}_{\text{labor market driven}} + \underbrace{\sum_{s' \in \mathcal{M}_3} F(s') \mathbb{E}[W(z')]}_{\text{promise driven}}$$

Contracting Problem

Firms choose $\{w, W(z', s')\}$ to maximize profits

$$\Pi(z, s, V)$$

subject to

Promise-keeping Constraint, (PKC)

Incentive Compatibility Constraint, (IC)

Participation Constraint of the Executive, (PC-Executive)

Participation Constraint of the Firm, (PC-Firm)

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$$\mathbb{E}_{z', s'} [W(z', s') | e = 1] - \mathbb{E}_{z', s'} [W(z', s') | e = 0] \geq c/\tilde{\beta}, \quad (\text{IC})$$

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Promise-keeping Constraint, (PKC)

$$\mathbb{E}_{z', s'} [W(z', s') | e = 1] - \mathbb{E}_{z', s'} [W(z', s') | e = 0] \geq c / \tilde{\beta}, \quad (\text{IC})$$

$$W(z', s') \geq \min\{\overline{W}(z', s'), \overline{W}(z', s)\}, \quad (\text{PC-Executive})$$

$$W(z', s') \leq \overline{W}(z', s), \quad (\text{PC-Firm})$$

Details

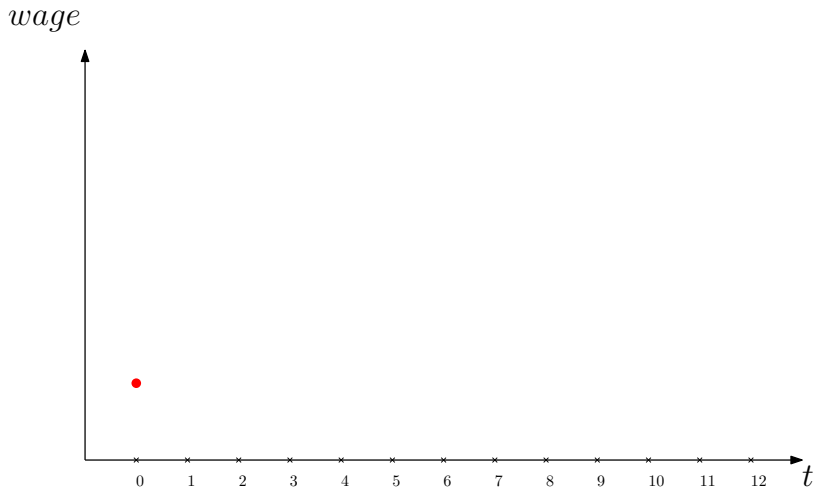
The Equilibrium

An stationary equilibrium is defined by

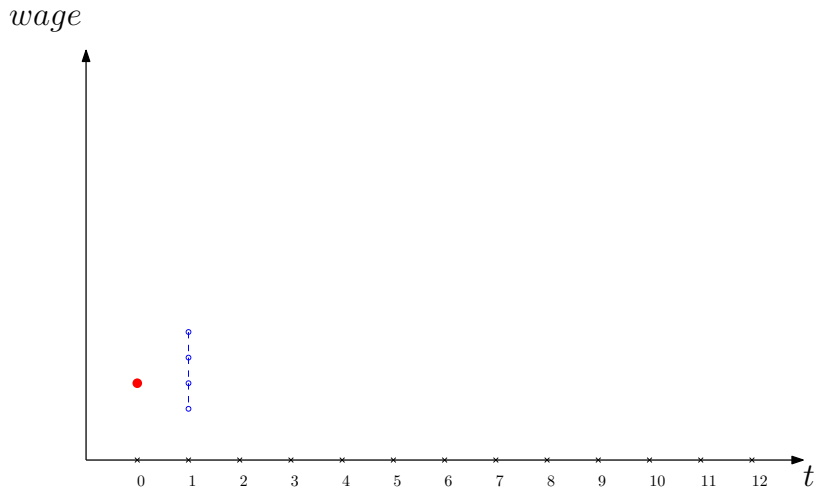
- value functions $\{W^0, W, \Pi\}$;
- optimal contracts $\sigma = \{w, W(z', s')\}$ for $z' \in \mathbb{Z}$ and $s' \in \mathbb{S}$;
- $\Gamma(z'|z)$ follows the optimal effort choice;
- a distribution of executives across employment states evolving according to flow equations.

The Optimal Contract

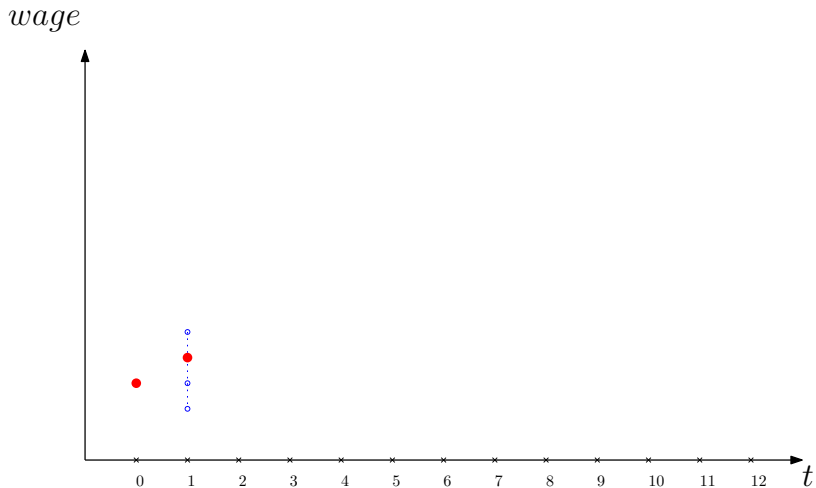
The Optimal Contract



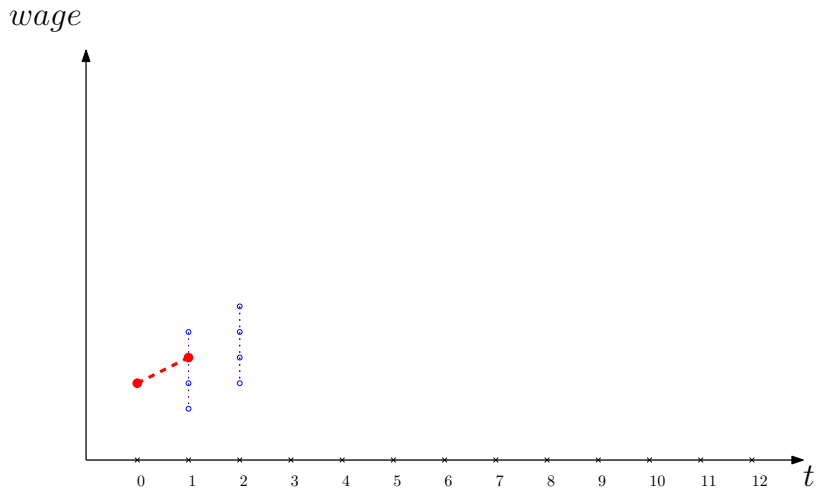
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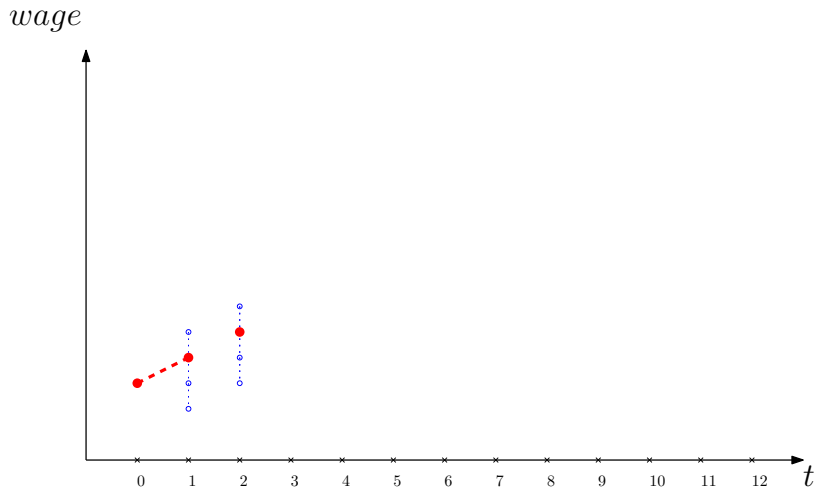
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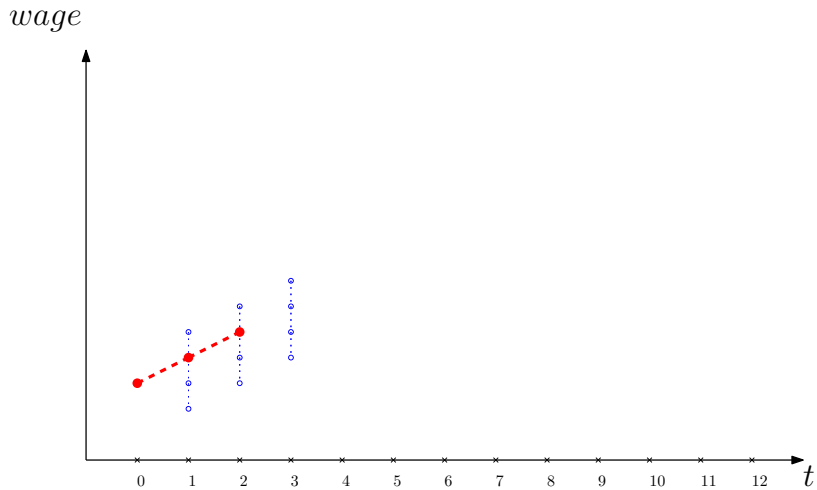
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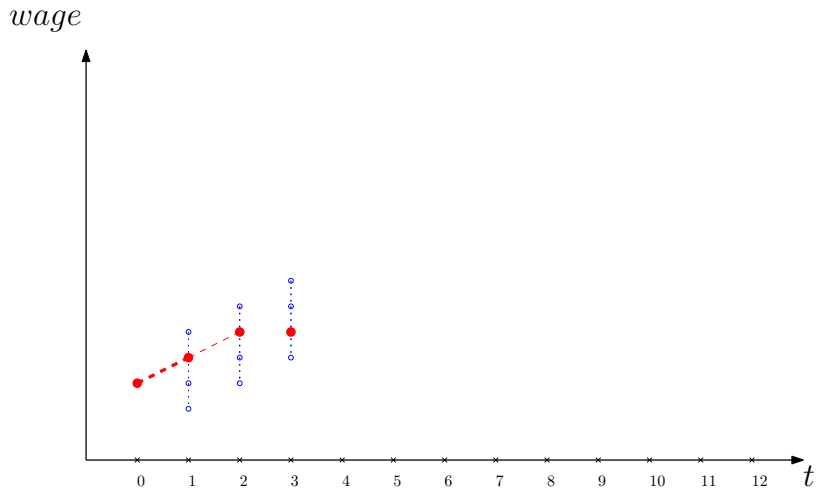
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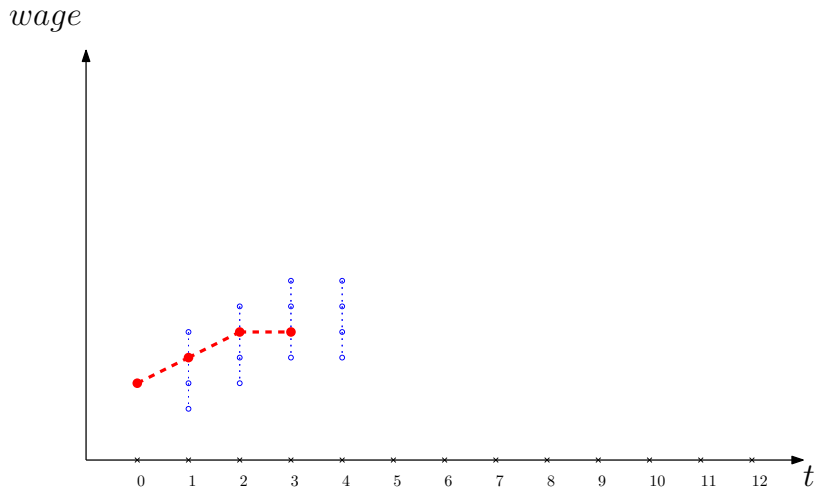
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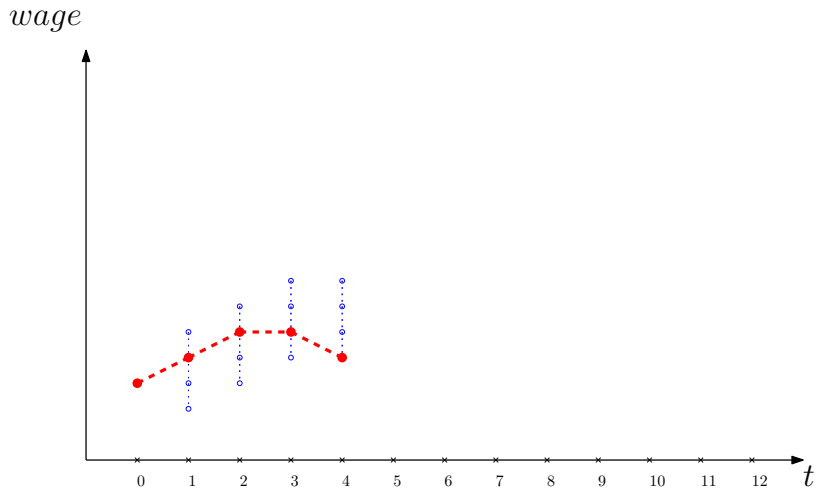
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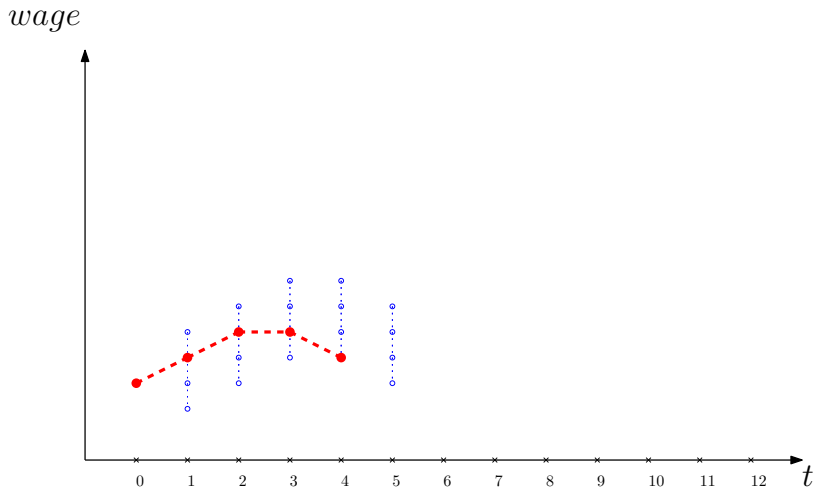
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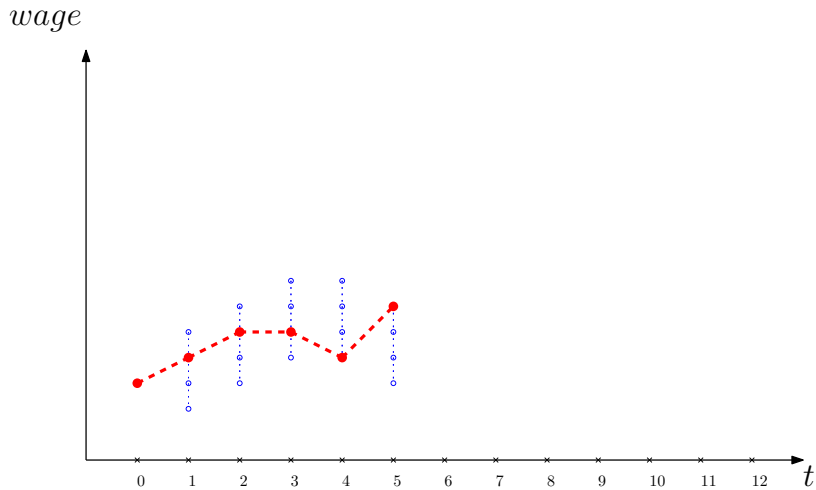
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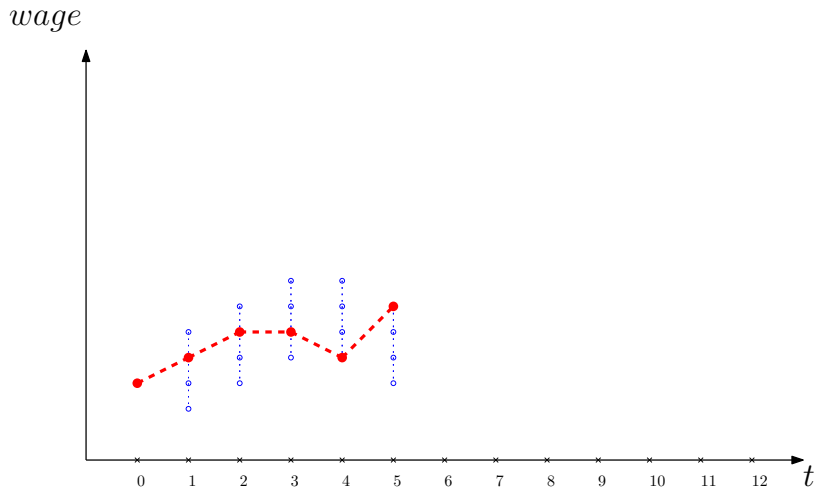
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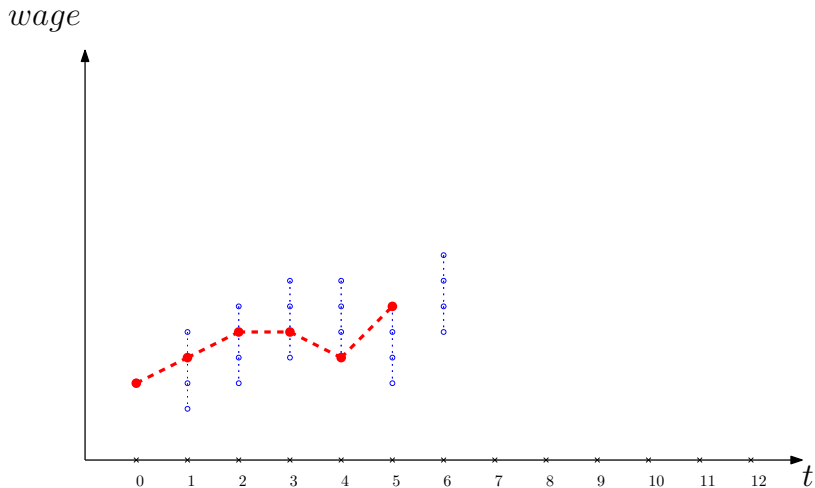
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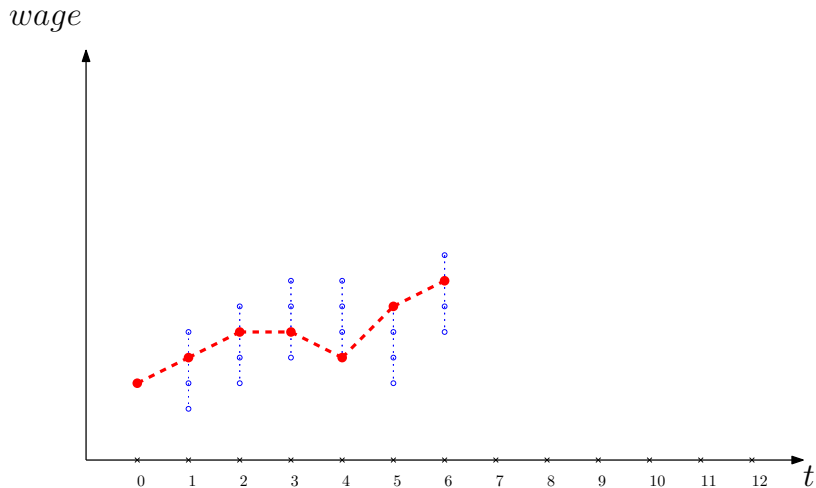
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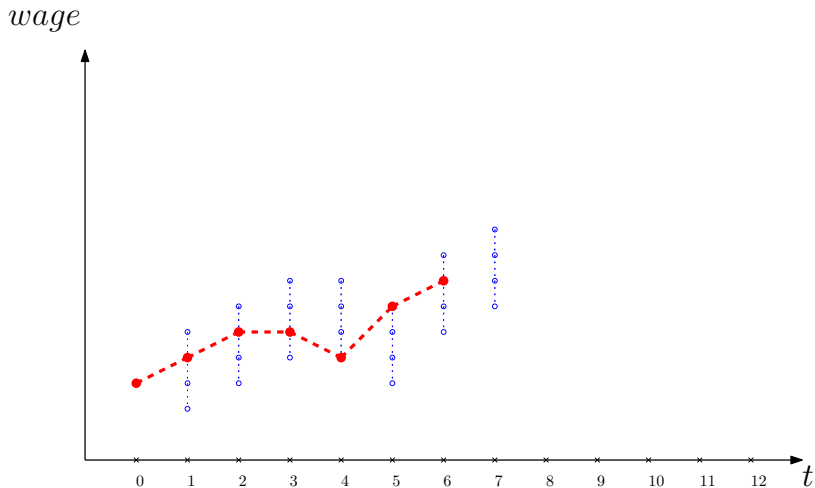
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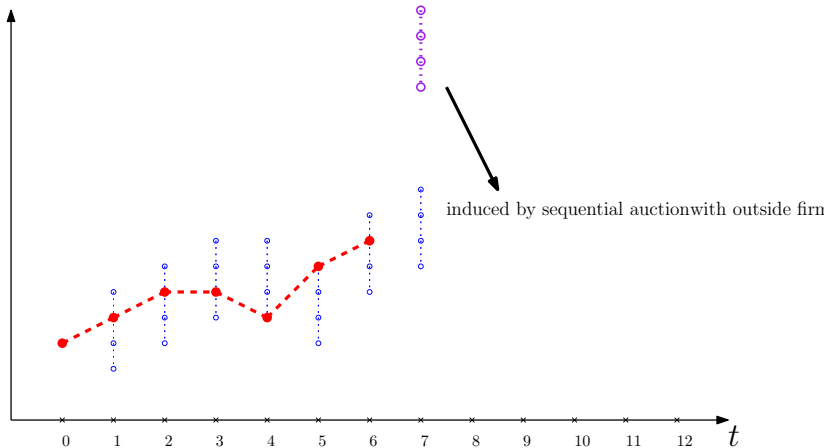


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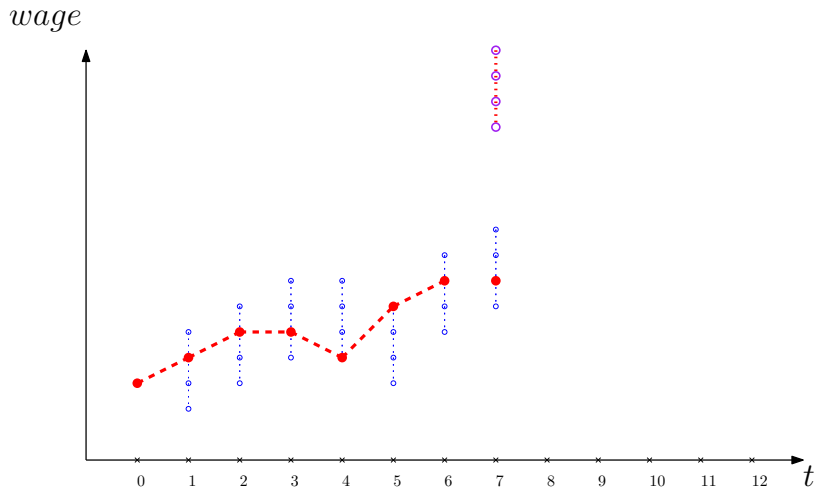


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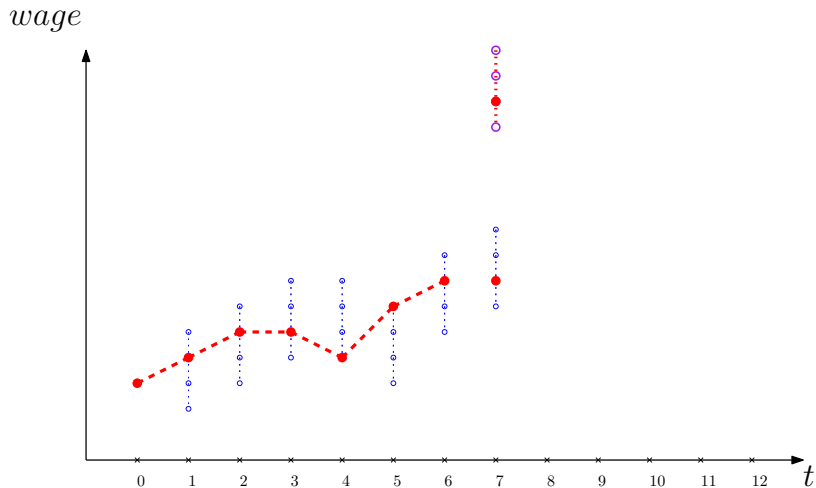
wage



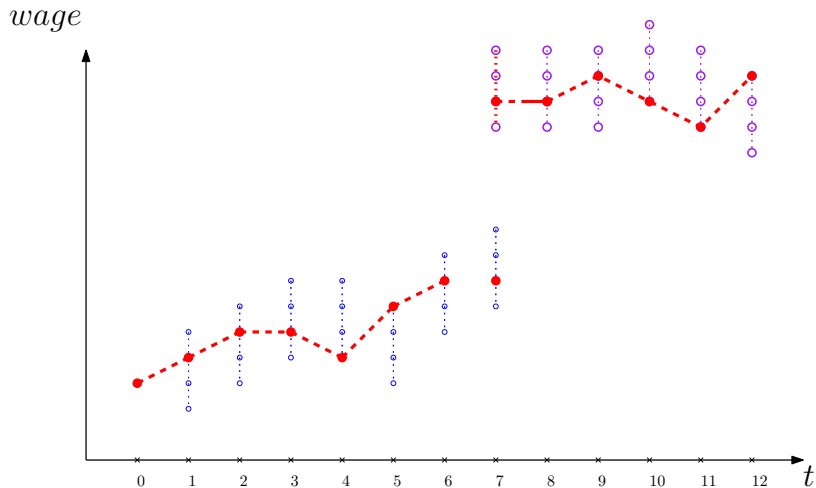
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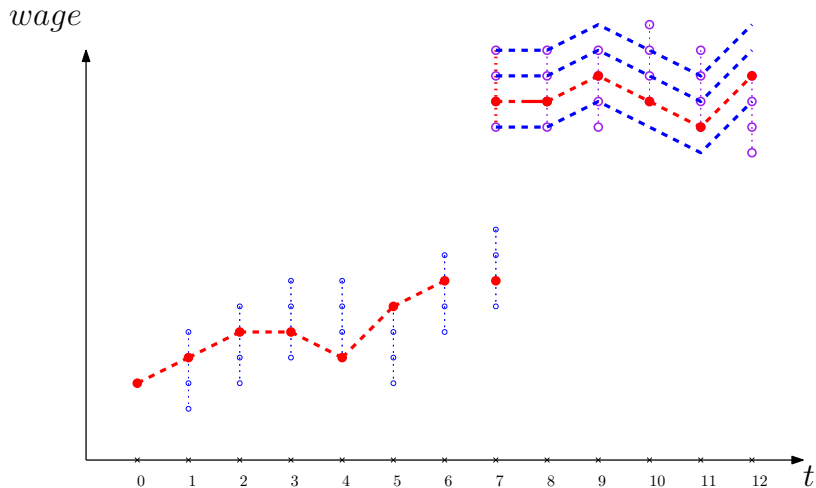
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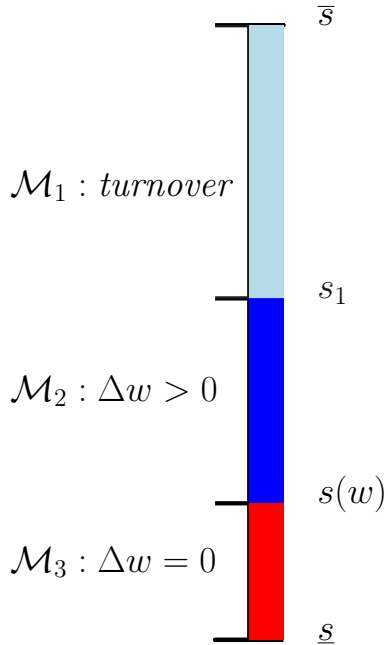
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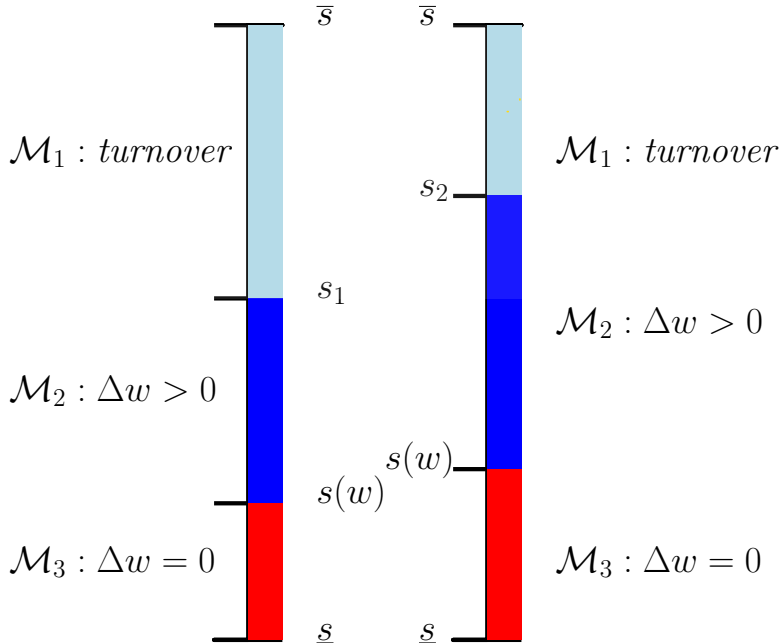


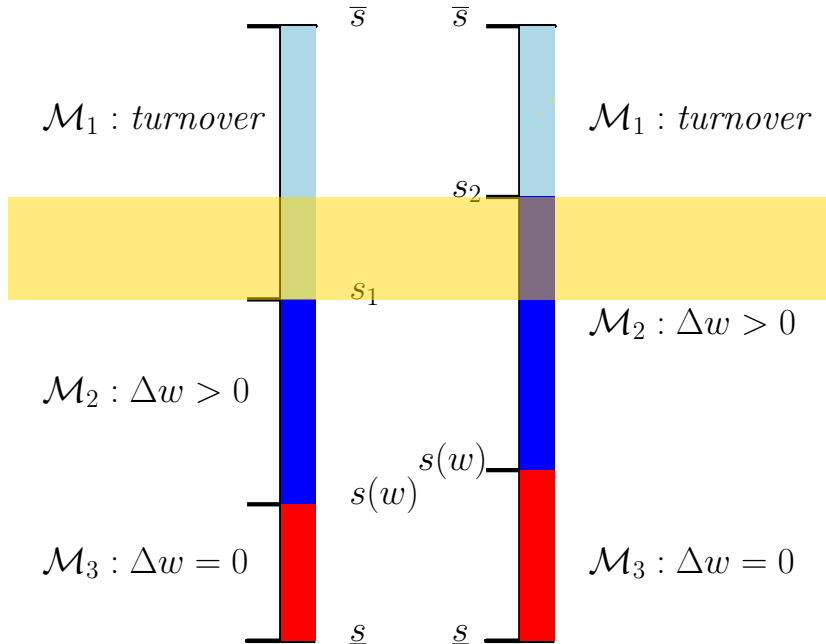
The Optimal Contract



Size pay-growth premium







Size incentive premium

Incentive Compatibility Constraint

What is the incentive out of $W(z')$?

$$\mathcal{I}[W(z')] \equiv \left\{ \sum_{z'} W(z') \Gamma(z'|z) - \sum_{z'} W(z') \Gamma^s(z'|z) \right\}.$$

The incentive compatibility constraint is

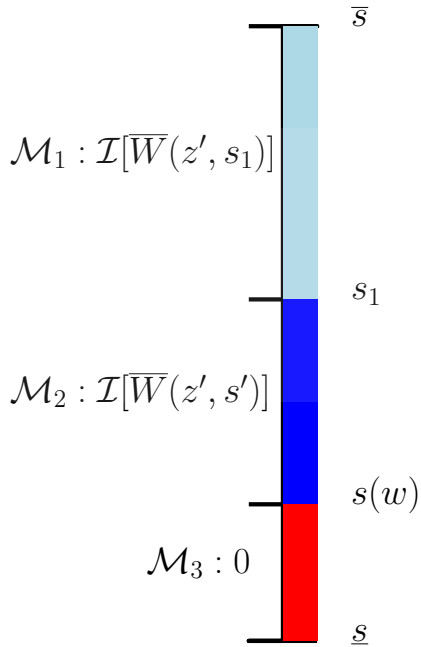
$$\underbrace{\sum_{s' \in \mathcal{M}_1} F(s') \mathcal{I}[\overline{W}(z', s)] + \sum_{s' \in \mathcal{M}_2} \mathcal{I}[\overline{W}(z', s')] F(s')}_{\text{Labor Market Incentives}} + \underbrace{\sum_{s' \in \mathcal{M}_3} F(s') \mathcal{I}[W(z')]}_{\text{Performance-based Incentives}} \geq \tilde{c},$$

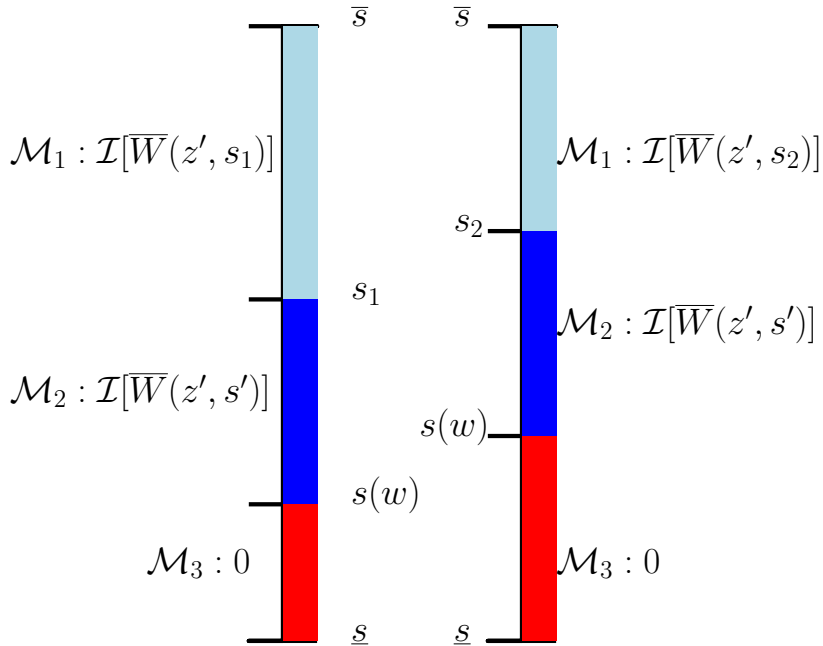
where

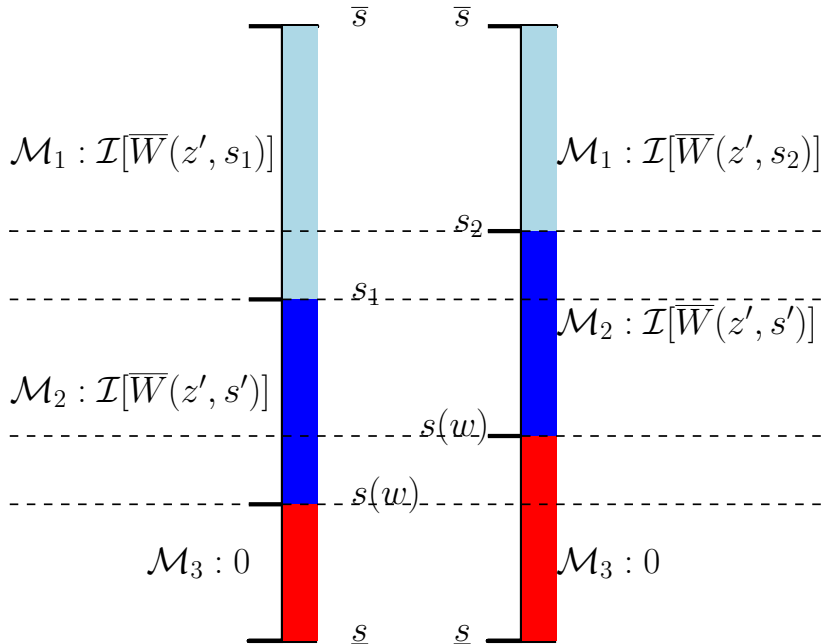
$\mathcal{M}_1 : s' \geq s$, lead to job turnovers

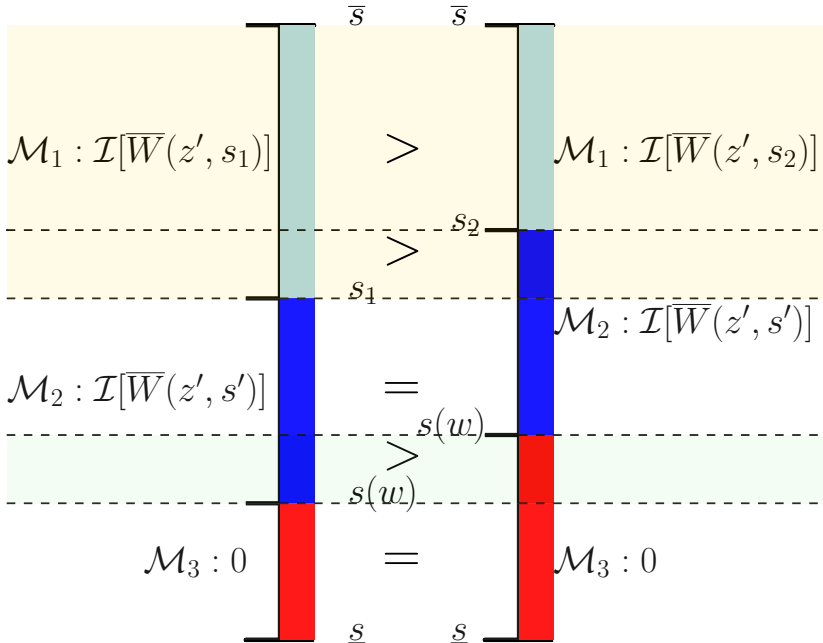
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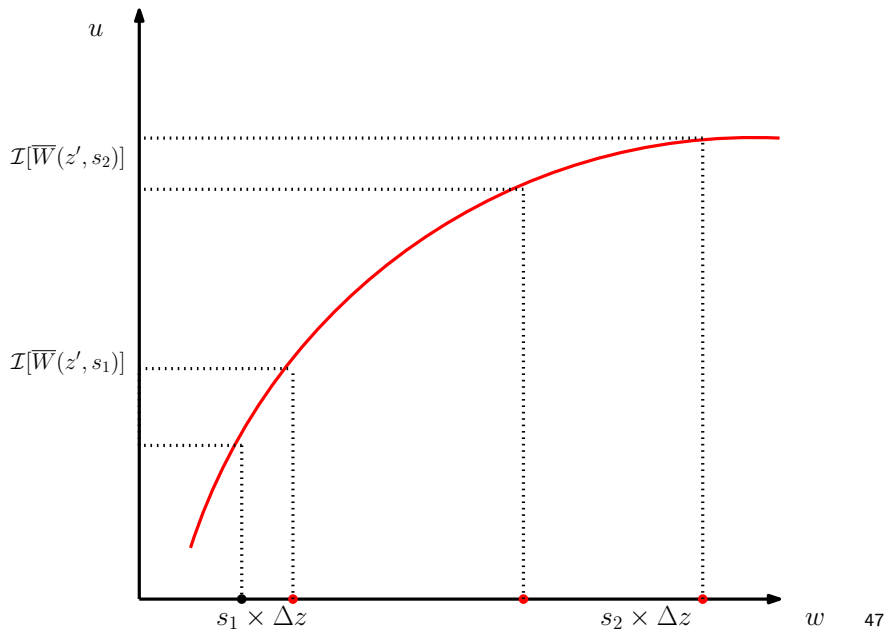








Incentives from $\overline{W}(z', s)$ decrease in s



Summary

- How does the managerial labor market competition impact the incentive contracts?

Competition impacts both compensation level and incentives.

- Why does compensation grow faster in larger firms?

Larger firms are more capable of countering outside offers.

- Why do performance-based incentives increase in firm size?

Poaching offers generate labor market incentives that substitute for performance-based incentives.

Data & Reduced-form Evidence

Data

Assemble a new dataset

- merge ExecuComp and BoardEX + hand-collected data in LinkedIn
- ExecuComp: annual records on top executives' compensation
- BoardEX: detailed executive employment history
- Final sample: 35,088 executives, 218,168 executive-year obs., spanning the period 1992 to 2016.

Define job turnovers

- Job-to-job transition: leaves the current firm, and starts to work in another firm within 180 days.
- Exit: otherwise.

Reduced-form Evidence

1. Managerial labor market is active. [Details](#)

- job-to-job transition rate 5%
- stable over years and across industries

2. Executives climb job ladders towards larger firms. [Details](#)

- about 60% of job-to-job transitions are towards larger firms
- for the rest, 20% of them are promotions from non-CEO to CEO

3. Executives in larger firms have less job-to-job transitions. [Details](#)

- Cox model, a 1% increase in firm size leads a 8.3% lower hazard of job-to-job transitions.

Reduced-form Evidence

4. Firm-size growth premium is higher in industries where managerial labor market is more active. Growth Premium

- job-to-job transition rate (industry-year level)
- general ability index (Custódio et al. 2013)
- fraction of insider CEO (Martijn Cremers and Grinstein 2013)

5. Firm-size incentive premium is higher in industries where managerial labor market is more active. Incentive Premium

Estimation

Model Specifications

- utility function of CRRA form

$$u(w) = \frac{w^{1-\sigma}}{1-\sigma}$$

- production function (cash flows)

$$y(s, z) = e^{\alpha_0} s^{\alpha_1} z$$

- productivity process by $AR(1)$, discretized by Tauchen (1989)

$$z_t = \rho_0(e) + \rho_z z_{t-1} + \epsilon_t$$

- poaching firm distribution by truncated log-normal $F(s)$

Parameters

Parameters	Description
η	the death probability
λ_1	the offer arrival probability
ρ_z	the AR(1) coefficient of productivity shocks
μ_z	the mean of productivity shocks for $e = 1$
σ_z	the standard deviation of productivity shocks
μ_s	the mean of $F(s)$
σ_s	the standard deviation of $F(s)$
c	cost of efforts
σ	relative risk aversion
α_0, α_1	production function parameters

Moments on turnovers and productivity

Moments	Data	Model	Estimates	Standard Error
Exit Rate	0.0691	0.0691	$\eta = 0.0695$	0.0127
J-J Transition Rate	0.0498	0.0473	$\lambda_1 = 0.3164$	0.0325
$\hat{\rho}_{profit}$	0.7683	0.6299	$\rho_z = 0.8004$	0.0366
$Mean(profit)$	0.1260	0.1144	$\mu_z = 0.0279$	0.0014
$Var(profit)$	0.0144	0.0160	$\sigma_z^2 = 0.1198$	0.0044

- Data:

$$profit_t = \rho_0(e) + \rho_z profit_{t-1} + \epsilon_t$$

- Model:

$$z_t = \rho_0(e) + \rho_z z_{t-1} + \epsilon_t$$

Moments on firm size and total compensation

Moments	Data	Model	Estimates	Standard Error
$Mean(\log(size))$	7.4515	7.4806	$\mu_s = 1.2356$	0.0365
$Var(\log(size))$	2.3060	2.1610	$\sigma_s = 2.5795$	0.1211
$Mean(\log(tdc1))$	7.2408	7.2665	$\alpha_0 = -1.5534$	0.0147
$Var(\log(tdc1))$	1.1846	0.8960	$\alpha_1 = 0.5270$	0.0217
$\beta_{tdc1-size}$	0.3830	0.2822		

- Data:

$$\log(tdc1_{it}) = \beta_1 + \beta_{tdc1-size} \log(size_{it}) + \epsilon_{it,1}.$$

- Model:

$$\log(w_{it}) = \beta_1 + \beta_{tdc1-size} \log(s_{it}) + \epsilon_{it,1}.$$

Moments on incentives

Moments	Data	Model	Estimates	Standard Error
$\beta_{\text{delta}-\text{tdc1}}$	1.1063	1.1997	$\sigma = 1.1038$	0.0030
$\text{Mean}(\log(\text{delta}))$	8.4994	8.478	$c = 0.0814$	0.0259
$\text{Var}(\log(\text{delta}))$	3.4438	3.35872		

- Data:

$$\log(\text{delta}_{it}) = \beta_2 + \beta_{\text{delta}-\text{tdc1}} \log(\text{tdc1}_{it}) + \epsilon_{it,2}$$

- Model:

$$w_{it} = \beta_3 + \text{delta} \times z_{it} + \epsilon_{it,3},$$

$$\log(\text{delta}_{it}) = \beta_2 + \beta_{\text{delta}-\text{tdc1}} \log(w_{it}) + \epsilon_{it,2}$$

Moments and Estimation

A. Targeted Moments

Moments	Data	Model	Estimates	Standard Error
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$Mean(\log(wage))$	7.2408	7.2665	$\alpha_0 = -1.5534$	0.0147
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Predictions on the size premiums

- Firm-size pay-growth premium

$$\Delta \log(\text{tdc1}_{it}) = \beta_3 + \beta_{\Delta \text{tdc1-size}} \log(\text{size}_{it}) + \beta_4 \log(\text{tdc1}_{it}) + \epsilon_{it,3}$$

- Firm-size incentive premium

$$\log(\text{delta}_{it}) = \beta_5 + \beta_{\text{delta-size}} \log(\text{size}_{it}) + \beta_6 \log(\text{tdc1}_{it}) + \epsilon_{it,4}$$

	Benchmark		Variants		
	Data (1)	Model (2)	Ignore mkt (3)	More offers (4)	Less offers (5)
Size premiums					
pay-growth	0.1542	0.1450	0.1481	0.1624	0.0411
incentives	0.3473	0.3122	-0.0444	0.4299	0.1964
incentives (w/o tdc1)	0.6044	0.6507	0.4202	0.7093	0.4076

Long-run trends

Long-run trends in executive compensation

Frydman and Saks (2010) document that since the mid-1970s:

1. sharp increase in total compensation and performance-based incentives
2. more inequality among executives
3. higher correlation between compensation and firm size

These facts can be accounted for with an exogenous increase in higher job arrival rate.

Long-run trends in executive compensation

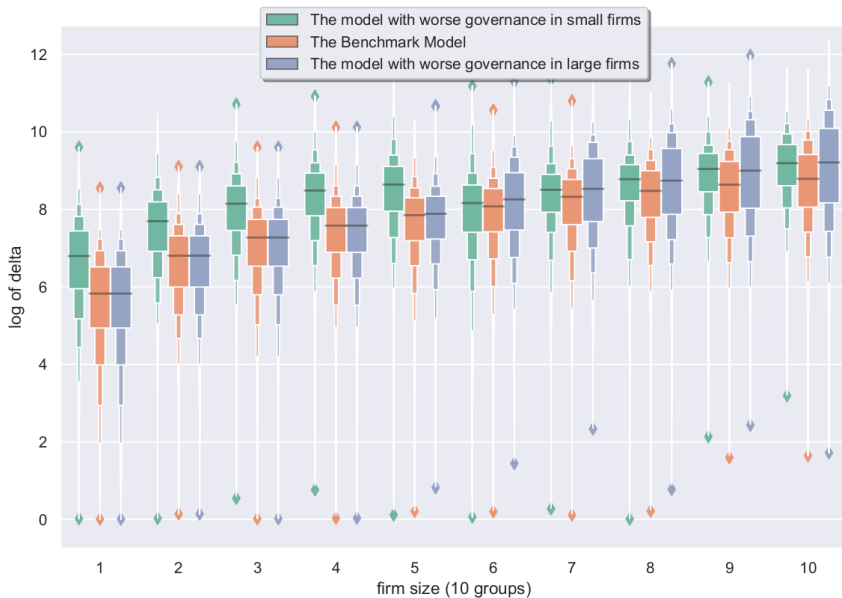
Moments (dollar value in year 2000)	Data		Model	
	1970s	1990s	$\lambda_1 = 0.05$	$\lambda_1 = 0.4$
Mean tdc1 (thousand)	1090	4350	985	4296
Mean size (million)	-	-	2426	5710
Mean delta (thousand)	21.743	120.342	24.972	125.310
$\beta_{tdc1-size}$	0.199	0.264	0.175	0.240
Percentiles of tdc1 (thousand)				
25th percentile	640	1350	109	1217
50th percentile	930	2360	478	2957
75th percentile	1310	4430	1596	5860

Policy Implication

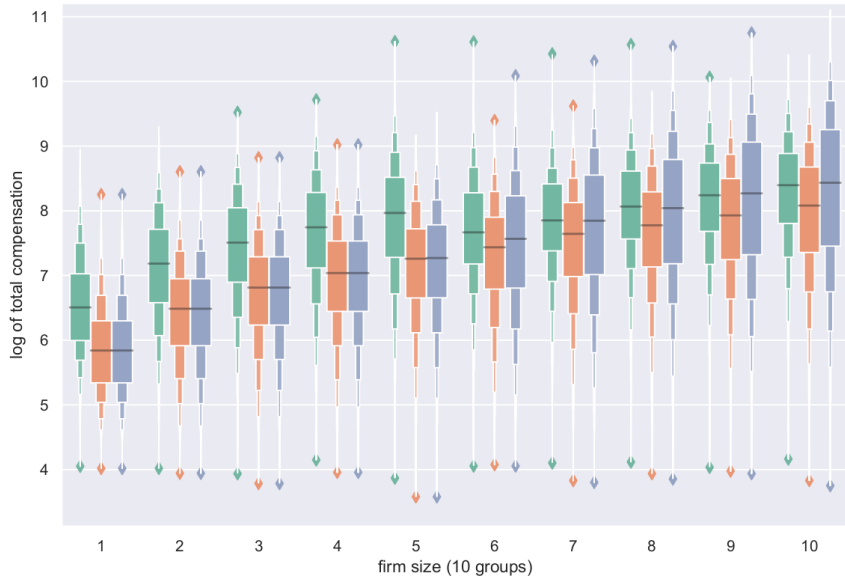
Policy: Spillover effect

- Spillover effect: more fierce bids from a group of firms
 1. boosts the executive pay in those firms
 2. increases the pay in all firms that are higher on the job ladder
- Instead of focusing on large firms, more effective: lower the willingness to bid in small and medium firms
- possible ways (has been proposed or implemented)
 - more independent compensation committee
 - greater mandatory pay (or pay ratio) disclosure
 - say-on-pay legislation, etc.

Spillover effect



Spillover effect



Conclusion

Conclusion

- Managerial labor market competition impacts the incentive contracts: level and incentives.
 - Larger firms are more capable of countering outside offers.
 - Poaching offers generate labor market incentives which decrease in firm size.
- Structure estimates show the model captures the firm size premium in compensation growth and performance-based incentives.

Thanks you for your attention.

`http://bohuecon.github.io`



Contracting Problem

Firms choose $\{w, W(z', s')\}$ to maximize profits

$$\Pi(z, s, V) = \max_{w, W(z', s')} \sum_{z' \in \mathbb{Z}} \sum_{s' \in \mathbb{S}} \left[y(s, z') - w + \tilde{\beta} \Pi(z', s, W(z', s')) \right] \tilde{F}(s') \Gamma(z'|z)$$

subject to

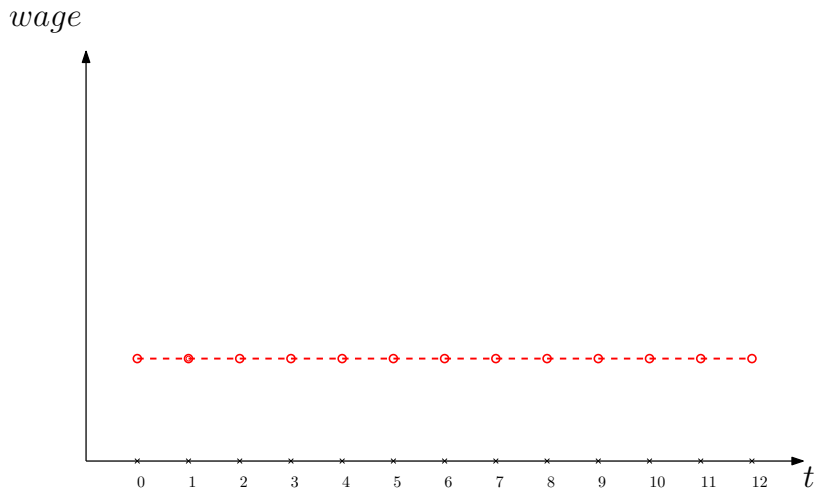
$$V = u(w) - c + \tilde{\beta} \sum_{z' \in \mathbb{Z}} \sum_{s' \in \mathbb{S}} W(z', s') \tilde{F}(s') \Gamma(z'|z), \quad (\text{PKC})$$

$$\tilde{\beta} \sum_{z' \in \mathbb{Z}} \sum_{s' \in \mathbb{S}} W(z', s') \tilde{F}(s') \left(\Gamma(z'|z) - \Gamma^s(z'|z) \right) \geq c, \quad (\text{IC})$$

$$W(z', s') \geq \min\{\overline{W}(z', s'), \overline{W}(z', s)\}, \quad (\text{PC-Executive})$$

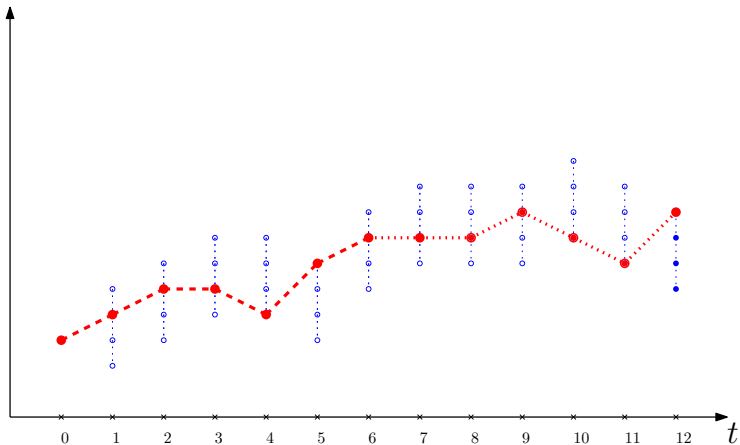
$$W(z', s') \leq \overline{W}(z', s). \quad (\text{PC-Firm})$$

No Moral Hazard, Full Commitment



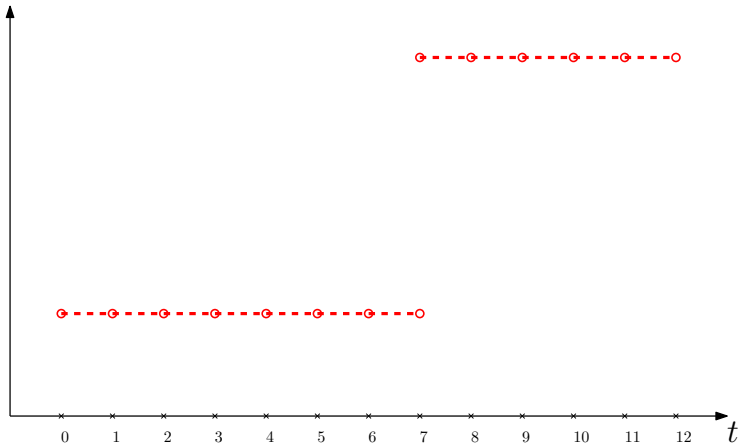
Only Moral Hazard

$wage$

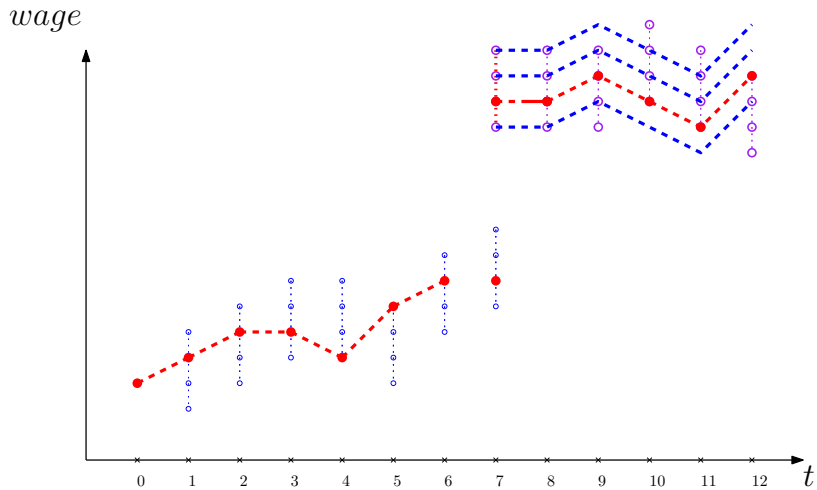


Only Limited Commitment

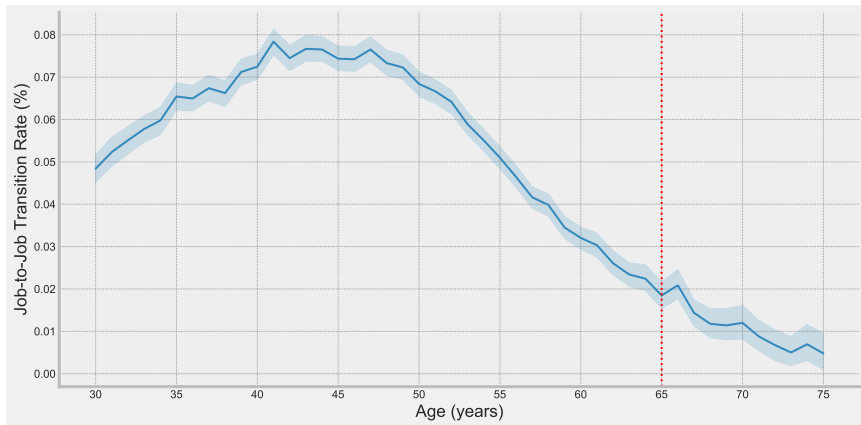
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Optimal Contract

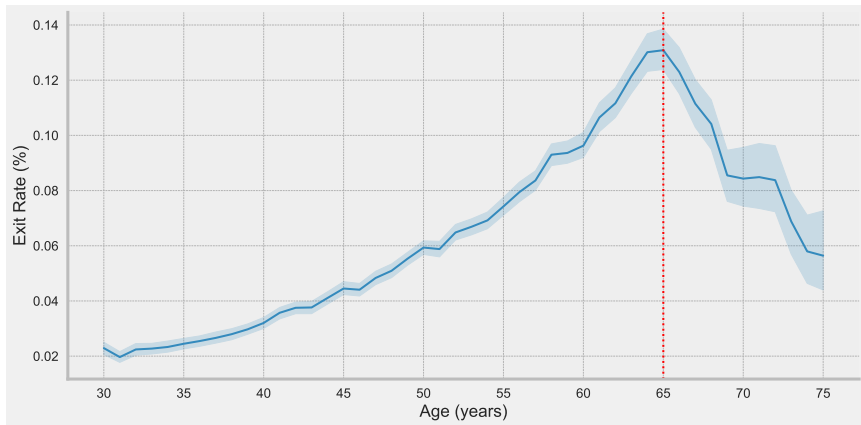


Job-to-job transition rate over age



[Back](#)

Exit rate over age



[Back](#)

Climb the Job Ladder

Table 3: Change of firm size upon job-to-job transitions

<i>Panel A: All executives</i>			
Firm size proxy	Total obs.	Firm size decrease obs. (%)	Firm size increase obs. (%)
Market Cap	2567	985 (39%)	1582 (61%)
Sales	2617	1051 (40%)	1566 (60%)
Book Assets	2616	1038 (40%)	1578 (60%)
<i>Panel B: Across age groups</i>			
Age groups	Total obs.	Firm size decrease obs. (%)	Firm size increase obs. (%)
≤ 40	100	34 (34%)	66 (66%)
[40, 45)	381	135 (35%)	246 (65%)
[45, 50)	701	262 (37%)	439 (63%)
[50, 55)	766	304 (40%)	462 (60%)
[55, 60)	261	179 (43%)	82 (67%)
[60, 65)	73	52 (39%)	21 (61%)
[65, 70)	30	7 (25%)	23 (75%)
≥ 70	6	1 (16%)	5 (84%)

Table 4: Job-to-Job Transitions and Firm Size

	Job-to-Job Transition	
	(1)	(2)
log(Firm Size)	0.917**** (0.0109)	0.972* (0.0139)
Age	0.985**** (0.00273)	0.967*** (0.0112)
log(tdc1)		0.830**** (0.0150)
Market-Book Ratio	0.942**** (0.0150)	0.939**** (0.0157)
Market Value Leverage	1.033** (0.0139)	1.035** (0.0142)
Profitability	0.913**** (0.0197)	0.905**** (0.0199)
Year FE	Yes	Yes
Industry FE	Yes	Yes
N	154635	118119
chi2	496.1	491.4

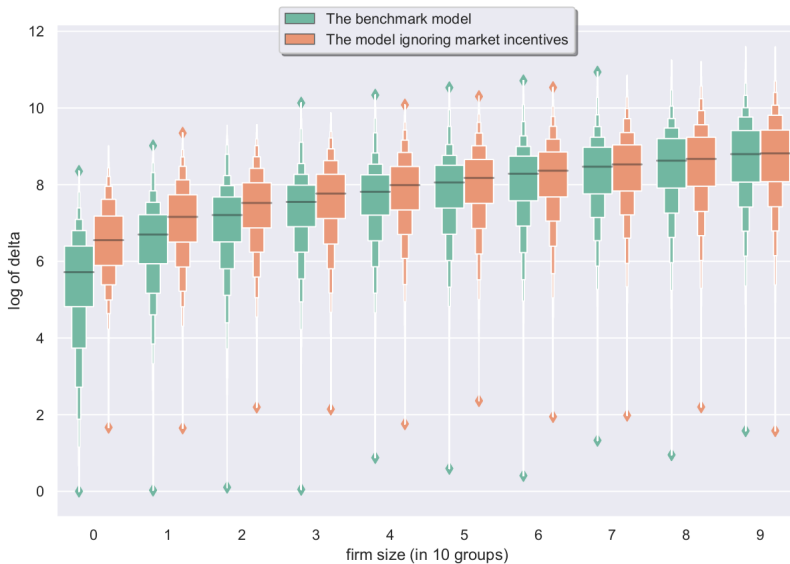
Table 1: Compensation growth increases with firm size

	$\Delta \log(tdc1)$					
	(1)	(2)	(3)	(4)	(5)	(6)
$\log(firm\ size)_{-1}$	0.112*** (0.00903)	0.154*** (0.0129)	0.108*** (0.00183)	0.107*** (0.00189)	0.141*** (0.00177)	0.127*** (0.00489)
$\log(firm\ size)_{-1}$ $\times EE90$			0.0711* (0.0403)			
$\log(firm\ size)_{-1}$ $\times EE190$				0.0759** (0.0353)		
$\log(firm\ size)_{-1}$ $\times gai$					0.0233*** (0.00546)	
$\log(firm\ size)_{-1}$ $\times inside\ CEO$						-0.000232*** (0.0000696)
$\log(tdc1)_{-1}$	-0.290*** (0.0200)	-0.390*** (0.0262)	-0.251*** (0.00173)	-0.251*** (0.00173)	-0.304*** (0.00267)	-0.253*** (0.00173)
Dummies	X	X	X	X	X	X
Other controls		X	X	X	X	X
Observations	129068	106819	106820	106820	58188	106820
adj. R^2	0.157	0.216	0.260	0.260	0.233	0.262

Table 2: Performance-based incentives increases with firm size

	log(<i>delta</i>)					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>log(firm size)</i>	0.604*** (0.0141)	0.347*** (0.0247)	0.525*** (0.00512)	0.529*** (0.00499)	0.561*** (0.00310)	0.571*** (0.0139)
<i>log(firm size)</i> × <i>EE90</i>			0.359* (0.118)			
<i>log(firm size)</i> × <i>EE190</i>				0.415** (0.101)		
<i>log(firm size)</i> × <i>gai</i>					0.0648*** (0.00156)	
<i>log(firm size)</i> × <i>inside CEO</i>						-0.000458* (0.000202)
<i>log(tdc1)</i>		0.609*** (0.0350)	-0.251*** (0.00173)	-0.251*** (0.00173)	-0.304*** (0.00267)	-0.253*** (0.00173)
<i>Dummies</i>	X	X	X	X	X	X
<i>Other controls</i>		X	X	X	X	X
Observations	146747	128006	125858	125858	75747	125858
adj. <i>R</i> ²	0.442	0.514	0.521	0.521	0.531	0.521

If labor market incentives are ignored ...



CEO's of "Small Firms" in S&P 500

tdc1: total compensation

delta: dollar-percentage incentive

	Company	Market Cap millions	tdc1 000's	delta 000's/%
	INCYTE CORP	446.408	2432.9734	60.939838
	WESTROCK CO	547.828	2800.668	130.96215
	ENVISION HEALTHCARE CORP	678.6906	1777.991	217.729
	PRICELINE GROUP INC	886.0817	1775.531	165.73476
	LKQ CORP	889.9763	2602.093	473.70974
	REGENERON PHARMACEUTICALS	897.3801	3094.134	566.14187
	SKYWORKS SOLUTIONS INC	1113.547	2638.243	128.10688
	CENTENE CORP	1130.155	4584.605	344.02299
	ALASKA AIR GROUP INC	1194.977	950.098	99.525198
	HOLOGIC INC	1276.448	2709.708	428.10996
	ACUITY BRANDS INC	1328.171	1102.528	133.42285
	ANSYS INC	1368.129	3738.803	431.01562
	GARTNER INC	1474.909	8945.338	158.65569

CEO's of "Large Firms" in S&P 500

tdc1: total compensation

delta: dollar-percentage incentives

	Company	Market Cap millions	tdc1 000's	delta 000's/%
	TIME WARNER INC	79965.89	18545.215	1212.9513
	CONOCOPHILLIPS	80163.26	35442.729	4520.5571
	UNITED PARCEL SERVICE INC	82439.55	3120.042	340.01132
	VERIZON COMMUNICATIONS INC	83233.88	19425	861.09722
	HOME DEPOT INC	86128.2	35750.103	2014.3633
	AT&T INC	94944.89	17283.529	1666.3201
	COCA-COLA CO	95494.39	12781.61	425.62199
	PEPSICO INC	97836.48	15268.415	2919.7995
	CISCO SYSTEMS INC	121238.6	16269.85	5981.3853
	CHEVRON CORP	126749.6	13125.882	1106.8351
	INTL BUSINESS MACHINES CORP	129381.2	21693.615	1298.8777
	INTEL CORP	147738.2	6101.835	1874.5755
	WAL-MART STORES INC	192048.2	16652.894	1465.7708
	EXXON MOBIL CORP	344490.6	48922.808	3843.027

References

- Custódio, Cláudia, Miguel A Ferreira, and Pedro Matos (2013),
“Generalists versus specialists: Lifetime work experience and chief
executive officer pay.” Journal of Financial Economics, 108, 471–492.
- Edmans, Alex and Xavier Gabaix (2011), “The effect of risk on the ceo
market.” The Review of Financial Studies, 24, 2822–2863.
- Edmans, Alex, Xavier Gabaix, and Augustin Landier (2009), “A
multiplicative model of optimal ceo incentives in market equilibrium.
review of financial studies.”
- Gabaix, Xavier and Augustin Landier (2008), “Why has ceo pay increased
so much?” The Quarterly Journal of Economics, 123, 49–100.

References ii

- Gayle, George-Levi, Limor Golan, and Robert A Miller (2015),
“Promotion, turnover, and compensation in the executive labor
market.” Econometrica, 83, 2293–2369.
- Gayle, George-Levi and Robert A Miller (2009), “Has moral hazard
become a more important factor in managerial compensation?”
American Economic Review, 99, 1740–69.
- Martijn Cremers, KJ and Yaniv Grinstein (2013), “Does the market for
ceo talent explain controversial ceo pay practices?” Review of Finance,
18, 921–960.
- Tervio, Marko (2008), “The difference that ceos make: An assignment
model approach.” American Economic Review, 98, 642–68.