

Online Appendix to

The Effect of Competition on Executive Compensation and Incentives: Evidence from a Quasi-natural Experiment

(Not for publication)

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Appendix Tables

Appendix Table 1: SIC 2-digit industries

15	Manuf. of food, beverages & tobacco	5.77
17	Manuf. of textiles	4.95
18	Manuf. of wearing apparel; dressing and dyeing of fur	5.85
19	Tanning and dressing of leather; Manuf. of luggage, handbags, saddlery, harness & footwear	2.93
20	Manuf. of wood & prods of wood & cork, except furniture; Manuf. of straw & plaiting materials	1.98
21	Manuf. of pulp, paper and paper products	0.73
22	Publishing, printing and reproduction of recorded media	1.39
24	Manuf. of chemicals & chemical prods; Manuf. of coke, refined petroleum prods & nuclear fuel	1.56
25	Manuf. of rubber and plastic products	1.61
26	Manuf. of other non-metallic mineral products	3.33
27	Manuf. of basic metals	0.70
28	Manuf. of fabricated metal products, except machinery and equipment	3.93
29	Manuf. of machinery and equipment n.e.c	2.31
31	Manuf. of electrical machinery and apparatus n.e.c.	1.15
32	Manuf. of radio, television and communication equipment and apparatus	0.89
33	Manuf. of medical, precision and optical instruments, watches and clocks	0.32
34	Manuf. of motor vehicles, trailers and semi-trailers	2.21
35	Manuf. of other transport equipment	0.61
36	Manuf. of furniture; others manufacturing activities, n.e.c.	2.17
37	Recycling	0.22
40	Electricity, gas & water	0.23
41	Water collection, treatment and distribution	0.29
45	Construction	14.84
50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of fuel	0.86
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles	10.10
52	Retail trade, except of motor vehicles and motorcycles; repair of personal and HH goods	11.28
55	Hotels and restaurants	4.79
60	Land transport; transport via pipelines	0.07
62	Air transport	0.00
63	Supporting & auxiliary transport activities; travel agencies and other tourist assistance	0.46
64	Post and telecommunications	1.09
65	Financial intermediation, except insurance and pension funding	0.00
70	Real estate activities	0.22
71	Renting of machinery and equipment without operator and of personal and HH goods	0.15
72	Computer and related activities	1.36
73	Research and development	0.01
74	Other business activities	6.02
80	Education	0.04
85	Health and social work	2.57
90	Sewage and refuse disposal, sanitation and similar activities	0.32
91	Activities of membership organizations n.e.c.	0.01
92	Recreational, cultural and sporting activities	0.29
93	Other service activities	0.40

Notes: Estimation sample size: 8,489,026 worker-year observations. Own calculations based on Portugal's linked employer-employee data, MTSS (2002-2009)

Appendix Table 2: Summary statistics by workers' occupational group, and firm-level

Panel A: Worker-level			
	CEOs	Department managers	Other workers
ln(monthly real pay)	8.198	7.703	6.639
Spot	0.360	0.404	0.390
Female	0.175	0.269	0.435
Age	46.898	42.987	37.573
Age>=60	0.112	0.070	0.027
Age>=55	0.234	0.150	0.076
Tenure	11.171	10.167	8.113
Closed-end contract	0.129	0.117	0.273
Education (baseline: ISCED 1)			
ISCED 2	0.070	0.120	0.219
ISCED 3	0.113	0.222	0.192
ISCED 5/6	0.736	0.495	0.084
Exporter	0.718	0.646	0.614
Multi-establishment	0.355	0.398	0.382
Profit (real, in millions)	1.072	0.411	0.140
Ownership (baseline: private national)			
Public	0.026	0.015	0.026
Foreign	0.186	0.158	0.140
Nb. Obs.	20,000	181,913	8,287,113

Panel B: Firm-level				
	Mean	Median	Std.dev.	Nb. Obs.
ln(size)	2.866	2.639	0.926	292,756
Profit (real, in millions)	0.140	0.012	1.639	292,756
ln(sales) (real, in millions)	13.749	13.589	1.476	276,795
Firm age	15.466	13.000	12.258	290,806

Notes: Means (proportions) are computed using the estimation sample. Average profits in Panel A are calculated from firm-year observations for the sample of firms that employ CEOs, department managers and other workers. Own calculations based on Portugal's linked employer-employee data, MTSS (2002- 2009).

Appendix Table 3: Summary statistics of pre-reform business creation, by "On the Spot Firm" adoption year

"On the Spot Firm" adoption year	Nb. New firms/Nb. incumbents	Nb. New firms/100K inhabitants
2005	0.075	143.946
	[0.075]	[137.123]
	(0.015)	(44.349)
2006	0.075	145.604
	[0.076]	[142.816]
	(0.011)	(36.195)
2007	0.076	141.068
	[0.074]	[130.515]
	(0.014)	(34.808)
2008	0.070	123.489
	[0.071]	[116.93]
	(0.013)	(38.326)
2009	0.074	125.944
	[0.073]	[121.995]
	(0.018)	(38.499)

Notes: The table reports average pre-reform firm entry (between 2002 and 2004), Nb. New firms/Nb. incumbents and Nb. New firms/100K inhabitants, as well as median and standard errors in squared brackets and parentheses, respectively.

Appendix Table 4: Pre-reform trends of outcome variables, alternative cut-off for early adoption; municipality-level

	Late adopters	Early adopters	Difference	P-value	Nb. Obs.
	(1)	(2)	(3)	(4)	(5)
Total monthly pay					
Overall	0.044 (0.005)	0.041 (0.002)	0.003 (0.006)	0.540	981
CEOs	0.098 (0.022)	0.096 (0.025)	0.002 (0.035)	0.964	416
Department managers	0.069 (0.010)	0.073 (0.009)	-0.004 (0.013)	0.752	801
Other workers	0.043 (0.005)	0.040 (0.002)	0.003 (0.006)	0.600	981
Regular pay					
Overall	0.037 (0.004)	0.034 (0.002)	0.002 (0.005)	0.637	981
CEOs	0.076 (0.017)	0.061 (0.022)	0.015 (0.030)	0.629	416
Department managers	0.066 (0.009)	0.066 (0.005)	0.000 (0.010)	0.991	801
Other workers	0.036 (0.004)	0.034 (0.002)	0.002 (0.005)	0.686	981
Bonuses					
Overall	0.063 (0.034)	0.046 (0.021)	0.017 (0.043)	0.693	981
CEOs	0.211 (0.155)	0.322 (0.103)	-0.111 (0.178)	0.533	416
Department managers	0.044 (0.072)	0.073 (0.050)	-0.029 (0.087)	0.741	801
Other workers	0.062 (0.034)	0.046 (0.021)	0.016 (0.042)	0.703	981
New firm creation	0.067 (0.002)	0.069 (0.001)	-0.002 (0.002)	0.255	1,138
Profits	0.183 (0.201)	0.151 (0.111)	0.032 (0.245)	0.896	981
CEO pay-performance elasticity	0.0005 (0.005)	0.0012 (0.0004)	-0.0007 (0.005)	0.874	4,349,651

Notes: The table reports average pre-reform growth trends (between 1996 and 2004) of total monthly pay, regular pay and bonuses, profits and average industry ratios of new firms to incumbents, at the municipality level. Early adopters are municipalities that adopted the reform between 2005 and 2007 and late adopters are municipalities that adopted between 2008 and 2009. Those that do not adopt the reform over our sample period are not considered in this table. Observations are by municipality-year, except for the performance-pay elasticity. Standard errors are reported in parentheses. The p-value is for the test of the null hypothesis of equality between the means (proportions) for early and late adopters of the reform. For profits, we drop outlier observations of firm-level annual growth rates. CEO pay-performance elasticities are estimated coefficients from compensation regressions for early and late adopters, for the pre-reform period, with controls for worker-firm and other sets of fixed effects. The p-value is for the test that the coefficients are not different.

Appendix Table 5: Effect of the "On the Spot Firm" program on executives' pay-performance sensitivity; current and lagged performance

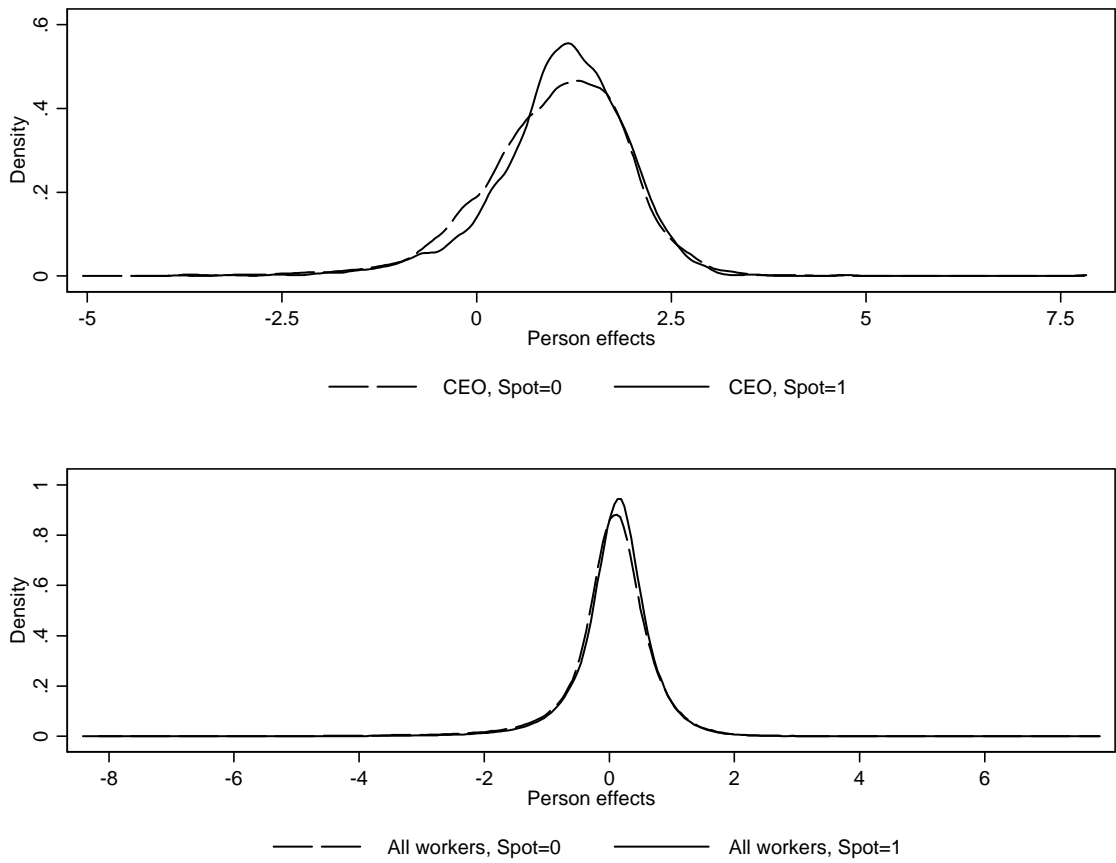
Dependent variable	ln Compensation			
	(1)	(2)	(3)	(4)
CEO × Profit _t	0.004** (0.002)	0.004*** (0.001)	0.004** (0.002)	0.004*** (0.001)
Dpt. Mng. × Profit _t	0.001 (0.000)	0.001*** (0.000)	0.001 (0.000)	0.001*** (0.000)
CEO × Profit _{t-1}	-0.001*** (0.000)	-0.001*** (0.000)	-0.001** (0.000)	-0.001*** (0.000)
Dpt.Mng. × Profit _{t-1}	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Profit _t	-0.001** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Profit _{t-1}	0.000* (0.000)	0.000* (0.000)	0.000* (0.000)	0.000* (0.000)
CEO × Spot × Profit _t	-0.004* (0.002)	-0.004** (0.002)	-0.004* (0.002)	-0.004** (0.002)
Dpt.Mng. × Spot × Profit _t	-0.001*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)
CEO × Spot × Profit _{t-1}	0.001 (0.001)	0.002 (0.001)	0.001 (0.002)	0.001 (0.001)
Dpt.Mng. × Spot × Profit _{t-1}	0.001*** (0.000)	0.001** (0.000)	0.001*** (0.000)	0.001** (0.000)
Spot × Profit _t	0.001 (0.000)	0.001* (0.000)	0.001* (0.000)	0.000 (0.000)
Spot × Profit _{t-1}	-0.001 (0.000)	-0.001** (0.000)	-0.000 (0.000)	-0.001** (0.000)
CEO × Spot	0.027*** (0.007)	0.028*** (0.006)	0.026*** (0.008)	0.028*** (0.007)
Dpt.Mng. × Spot	0.013** (0.005)	0.025*** (0.004)	0.013** (0.005)	0.025*** (0.004)
Spot	-0.011*** (0.003)	-0.008*** (0.002)	-0.010*** (0.003)	-0.007*** (0.002)
CEO	0.104*** (0.009)	0.058*** (0.010)	0.103*** (0.009)	0.055*** (0.010)
Dpt. Mng.	0.087*** (0.004)	0.053*** (0.006)	0.086*** (0.004)	0.052*** (0.006)
ln(firm size)	0.011** (0.006)	0.048*** (0.004)	0.011* (0.006)	0.049*** (0.003)
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Rivals' profits and interactions			Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes		Yes	
Munic × time trend	Yes	Yes	Yes	Yes
Region × Year FE		Yes		Yes
Worker FE	Yes		Yes	
Match (worker-firm) FE		Yes		Yes
<hr/>				
Nb. Obs.	7,786,667	7,786,667	7,693,076	7,693,076
R ²	0.046	0.040	0.045	0.039

Notes: The dependent variable is the worker's ln monthly pay. Further covariates include age and tenure (and their squares), type of contract (whether fixed term or not), whether the firm is an exporter, whether it is multi-establishment and ownership of the firm. Interaction terms between the educational categories and the "On the Spot Firm" variable also included, not reported for compact presentation; results for these variables are similar to those in Table 6. Robust standard errors, clustered by municipality, are reported in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

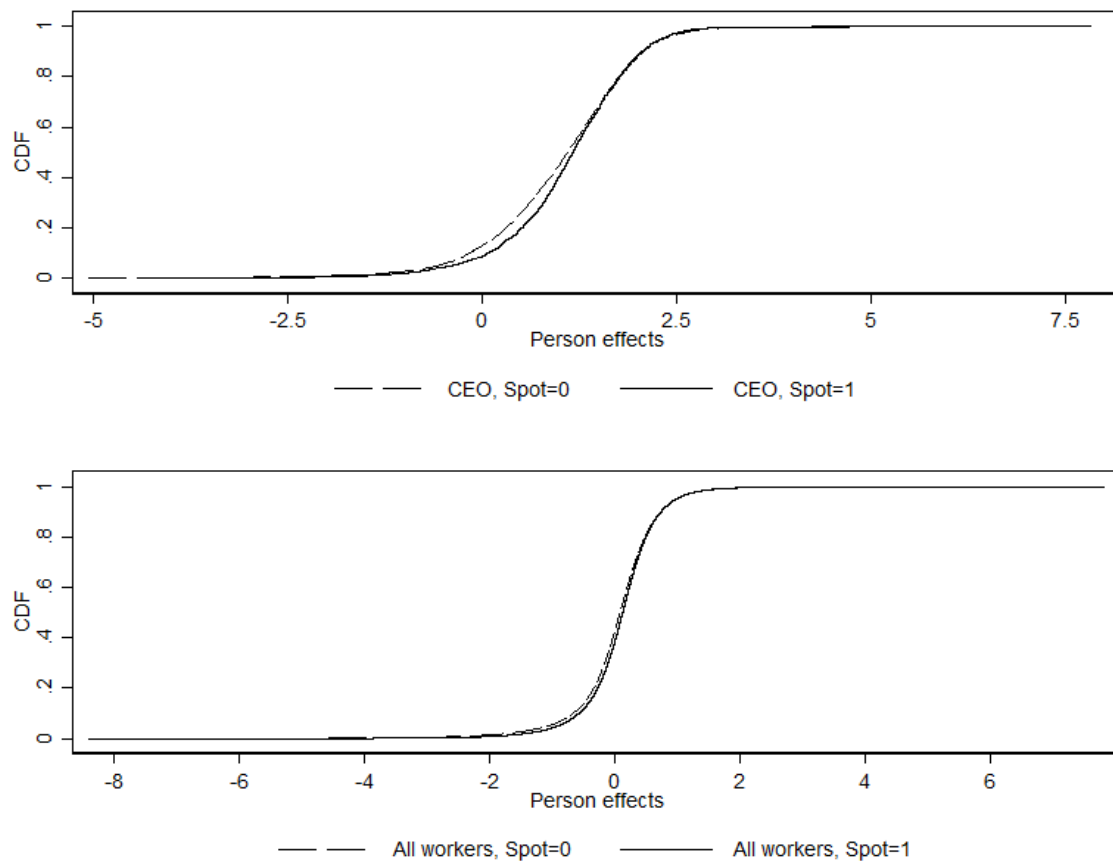
Appendix Table 6: Summary statistics of CEO turnover rates and probability of talented CEO

Variable	Mean	Nb. Obs.
Overall turnover	38.63	17,799
Turnover_a	38.29	17,799
Turnover_b	37.93	17,799
Turnover_c	33.40	17,799
Turnover, age<60	33.05	17,799
Turnover_a, age<60	32.75	17,799
Turnover_b, age<60	32.40	17,799
Turnover_c, age<60	28.50	17,799
Talented CEO	63.60	13,754

Notes: The table reports average CEO turnover rates and average probability of employing a talented CEO, using the estimation samples. The overall turnover variable includes all turnovers. Turnover_a excludes events in which the CEO moves to a larger firm in the subsequent year in the CEO position. Turnover_b additionally excludes cases where the CEO moves to a smaller firm as the CEO but with a higher pay. Turnover_c additionally excludes moves to a larger firm in a non-CEO position, or to a smaller firm in a non-CEO position but with higher pay.



Appendix Figure 1: Distribution of worker fixed effects (talent), by occupational group and "On the Spot Firm" presence



Appendix Figure 2: Cumulative density function of worker fixed effects, by occupational group and "On the Spot Firm" presence