POLITECNICO DI TORINO

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Incentive Compensation in Energy Firms Does Regulation Matter?

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Joint papers with

Carlo Cambini and Sara DeMasi

Evidence from an ongoing project on the impact of regulation on regulated firms' real and financial decisions

CEO incentives in European energy utilities
Evidence from regulated vs. unregulated firms

Cambini, Rondi, De Masi (2015)

Revise&resubmit

Incentive Regulation and Incentive Compensation

Cambini, Rondi, De Masi (2015)

Forthcoming in Corporate Governance – An International Review

The Big Picture

- 1980s: vertically integrated, state-owned firms
- 1990s: unbundling of operations and privatization
  - De-regulation and privatization of **Generation**
  - Regulation of **Transmission** and **Distribution** (IRAs), after partial liberalization and incomplete privatization
- 2000s: energy firms become financial markets' pet: Large investments, high dividends and firm value
- Now: strong interest for corporate governance mechanisms meant to pressurize managers to boost profitability and shareholder value even in a regulated setting

Motivation/1

- In recent years, CEO compensations of utilities have attracted a lot of attention by media and public opinion in EU and US

"The Big Six energy companies have walked into a political storm over executive pay amid revelations that their bosses are earning up to £4m a year as an increasing number of their customers are being pushed into fuel poverty – i.e. they spend more than a tenth of their income on warmth and light."

The Guardian, December, 2011

Motivation/2

- A sweeping wave of reforms (liberalization, regulation, privatization) has changed not only the industrial organization, but also the internal organization of the companies by making them more oriented to maximize shareholders' wealth

"Utilities have different strategic objectives and the criteria used to assess performance will therefore vary."

"*Executives running regulated enterprises will be evaluated differently from those overseeing unregulated ones."*
Forbes, April 2013

These differences deserve a closer look

Corporate Governance and Regulation

- Internal and external incentives for managers
  - CEO pay and Market competition
- What if the market is non-competitive?
- Regulation is expected to inject competitive pressures, but it also reduces managers' discretion
- What effect of regulation on CEO incentives?
  - Are internal (*Pay*)/external (*Competition*) incentives substitute or complements?
- Important to know which … because
- Agency costs are large

What We Do

- We analyze the interaction of two corporate governance mechanisms within a <u>single utility industry</u>: the energy sector in Europe

- We test the differences in the relationship between CEO pay and firm performance across
  - *Unregulated vs. Regulated* segments

- Within regulated segments, we test the differences across different regulatory schemes
  - *Incentive vs. Cost-Based* regulation

Related Literature

- Incentive compensations to discipline agency problems
  - Murphy 1985; Gibbons and Murphy 1990; Jensen and Murphy 1990
- Research mainly focuses on US *unregulated* companies
  - Hall and Liebman 1998; Murphy 1999; Frydman and Saks 2010, Murphy 2012
- Market competition as a condition for the severity of the agency problem
  - Hart 1983, Hermalin 1992; Bertrand and Mullainathan 2003; Cunat and Guadalupe, 2005, Giroud et al. 2010; Beiner et al. 2011
- Regulation, by constraining firm activity, weakens the internal incentives driven by market-based (external) mechanisms while also adding political constraints
  - Joskow, Rose and Shepard 1993; Palia, 2000; Hubbard and Palia 1995; Booth et al. 2002; Becher and Frye 2011, mainly on financial services

Testable Hypothesis #1

- Regulated vs. Unregulated firms

  When subject to regulation, CEOs have less discretion and motivation to exert effort and maximize profits, hence

- H1: Pay-performance sensitivity is lower at *regulated* firms than at *unregulated* firms

Two Types of Regulatory Contracts

- The choice of the regulatory regime is a key policy decision (Armstrong & Sappington, 2006, 2007)
- *Cost-based regulation*: regulators set the price so as to cover all main operating costs and to allow firms to earn a specified *rate of return (*typically used in transmission service)
  - C-B is a low-powered incentive scheme that does not prompt managerial effort
- *Incentive regulation*: regulators set a limit *(e.g. price-cap)* on retail prices → by pursuing cost-saving strategies managers can increase profits and max. shareholders' value (Typically used in energy distribution service)
  - High-powered schemes that reduce managerial slack and provide efficiency-seeking incentives
    - Other forms: benchmarking, revenue cap, hybrid mechanisms

Testable Hypothesis #2

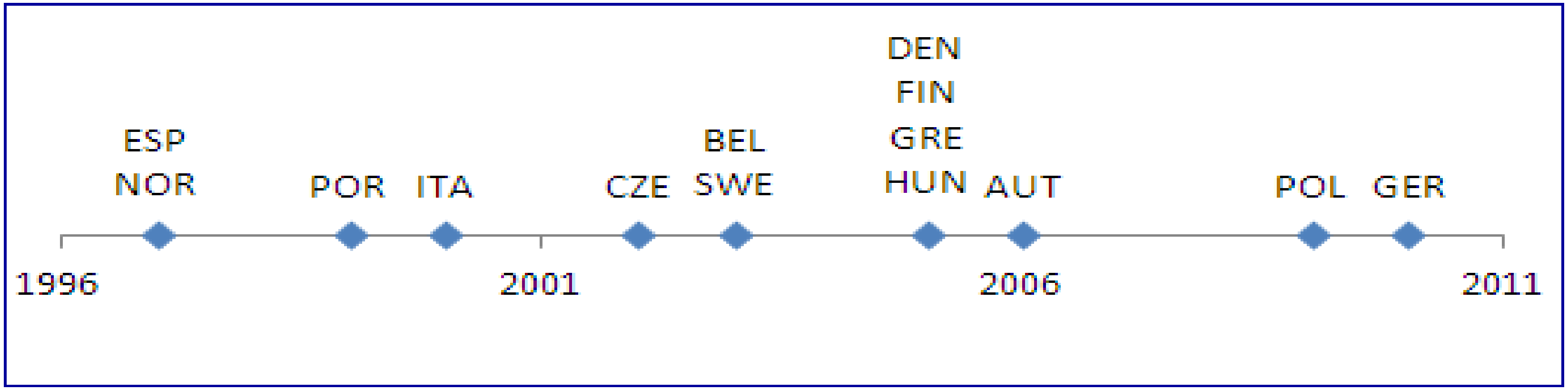
- Incentive vs. Cost-based Regulation

  Under incentive regulation, shareholders are residual claimants of the outcome of CEO efforts, so they are more willing to link pay to performance

- H2: Pay-performance sensitivity is higher at *Incentive* than at *Cost-based* regulated firms

Institutional Context in the EU

- EU Commission prompts gov.ts to unbundle vertically integrated activities, to set up IRAs, liberalize generation, regulate transmission and distribution and to privatize firms
- Private *control* mainly in the UK, GER, ITA, SWE and ESP
- Key novelty is incentive regulation: over time, most EU countries switch from cost-plus to incentive regulation



(source: Bremberger, Cambini, Gugler, Rondi, 2015)

Regulation and Ownership in EU15

(source: Cambini, Rondi and Spiegel, 2012)

		Electricity	Gas
Country	Date of establishing an IRA	Ownership (end 2010)	Ownership (end 2010)
Austria	2000	State (51%)	Partially private (State 31%)
Belgium	1999	Partially private (State 49%)	Partially private (State 31%)
Finland	1995	State (54%)	--
France	2000	State (85%)	Partially private (State 37,5%)
Germany	2006*	Private (State 2.5%)	Private (State 2.5%)
Greece	2000	State (51%)	--
Italy	1995	Partially private (State 33%)	Partially private (State 20%)
Luxemburg	2000	State (100%)	State (100%)
Portugal	1995	Partially private (State 26%)	--
Spain	1998	Private	Private
Sweden	1998	Private	Private
UK	1989	Private	Private

The Sample

- 59 publicly listed Energy utilities (gas and Electricity), of which 43 Transmission and Distribution Operators subject to an IRA
  - Spain, France, United Kingdom, Germany, Italy, Austria, Switzerland, Norway, Poland, Portugal, Finland and Belgium
- 436 CEO compensation-year observations,
- Period: from 2000 to 2011
- Data collected from three main sources:
  - Financial data from Worldscope and COMPUSTAT database
  - CEO pay and ownership data hand-collected from Annual Corp. Governance Reports
  - Regulatory schemes from National Regulators’ reports

Main Variables

CEO comp is the sum of salary and bonus

Four measures of **firm performance**, stock-based and accounting:

1) **Stock return**
2) **Market Capitalization** (= share price*n. outstanding shares)
3) **Market-to-Book** (= ratio of market and book value of equity)
4) **ROA** (= EBIT/Total Asset)

(low cross-correlation, the highest r = 0,35 between MTB and ROA)

Tenure is the number of years served as a CEO in the company

Firm size (Log Total Assets) pay increases with firm size

GDP controls for cross-country differences and business cycle

CeoComp, MktCap and Tot Assets in Thou. of 2005 constant EUR

Control Variables and Robustness

- **Market Openness** (industry/country control)
  - OECD Indexes of liberalization from 0 to 6: Larger index means weaker competition and less liberalization
- **State Ownership**
  - Dummy = 1 if the government holds at least 30%
- **Shareholder Protection** and **Mkt Cap to GDP ratio** to control for financial market development
- **Corporate Governance Variables**
  - CEO-Chairman duality
  - Size of Board of Directors
  - Chair of the Board who was a CEO in the past
- **Electric and Gas utilities subsamples**
- **Multinational vs. Local firms subsamples**

Cross-sample differences

Variable	Regulated segments (TSO, DSO) Obs	Mean	Std. Dev.	Deregulated segment (Generation) Obs	Mean	Std. Dev.	Diff. *t*
CEO compensation	321	1333.37	1638.36	97	1028.67	798.44	*
Stock return	396	0.09	0.35	96	0.05	0.48	-
ROA	431	6.83	4.61	104	7.21	12.95	-
Market-to-book	383	1.36	0.46	99	1.59	0.78	***
Market capitalization	386	$1.35*10^{7}$	$2.28*10^{7}$	99	$1.42*10^{7}$	$2.24*10^{7}$	-
Log (Total Asset)	450	15.85	1.69	128	14.16	3.19	***
Tenure	401	3.73	2.40	118	3.66	2.36	-
State Ownership	490	0.66	0.47	161	0.23	0.42	***
OECD Index of Liberalization	490	1.58	1.74	161	0.98	1.11	***

Variable	Regulated segments (TSO, DSO): Incentive Regulation Obs	Mean	Std. Dev.	Regulated segments (TSO, DSO): Cost-based Regulation Obs	Mean	Std. Dev.	
CEO compensation	238	1201.25	1583.79	83	1712.25	1740.45	**
Stock return	248	0.04	0.32	148	0.16	0.39	***
ROA	285	7.65	5.22	146	5.23	2.41	***
Market-to-book	248	1.38	0.52	135	1.31	0.31	-
Market capitalization	251	$1.04*10^{7}$	$1.36*10^{7}$	135	$1.93*10^{7}$	$3.30*10^{7}$	***
Log (Total Asset)	292	15.58	1.60	158	16.35	1.76	***
Tenure	282	3.84	2.41	119	3.48	2.37	-
State Ownership	318	0.57	0.49	172	0.81	0.39	***
OECD Index of Liberalization	318	0.93	1.15	172	2.77	1.99	***

Econometric models

Jensen & Murphy (1990)'s Pay-performance Sensitivity
(first-difference regressions)

$$\Delta\,(CEOcomp)_t = \alpha + \beta_1\,\Delta\,Market\ Cap_t + \beta_2\,\Delta\,Market\ Cap_{t-1} + \varepsilon_t$$

$\beta_1 + \beta_2$ measures estimated pay-performance sensitivity, i.e. A $ Change in CEO pay for a $ change in firm performance

Pay-performance Elasticity (fixed-effects with interacted *Perf*)

$$\begin{aligned} Log(CEOcomp)_{it} = {} & \alpha + \beta_1(performance)_{it} + \beta_2(performance)_{it} * REG/CAP + \\ & + \beta_3 tenure_{it} + \beta_4 firmsize_{it} + \beta_5 stateown_{it} + \beta_6 liberalization_{jt} + \\ & + \beta_7 GDP_{kt} + \mu_{it} + \varepsilon_{it} \end{aligned}$$

Perf: Stock Return, Log(MarketCap), Log MTB or *Log(ROA)*

β_1 measures pay-performance **Semi-elasticity**, or **Elasticity** , i.e. % change of CEO pay due to a *unit* or % change of performance variable

Pay-Performance Sensitivity à la J&M

Δ CEO compensation	*Full Sample*	*Deregulated firms*	*Regulated firms*	*Firms under incentive regulation*	*Firms under Cost-based regulation*
	(1)	(2)	(3)	(4)	(5)
Δ Market value of equity$_t$	0.0000175*	0.0000072	0.0000197	0.0000808***	0.0000046
	(1.72)	*(0.93)*	*(1.52)*	*(2.93)*	*(1.19)*
Δ Market Value of equity$_{t-1}$	0.0000047	0.0000060*	0.0000048	0.0000013	0.0000057
	(1.04)	*(1.87)*	*(0.88)*	*(0.04)*	*(1.50)*
Estimated pay-performance sensitivity, *b*	0.0000222	0.0000132	0.0000254	0.0000821	0.0000103
F-statistic for *b*	2.43*	6.08***	1.80	6.52***	1.14
R-squared	0.031	0.049	0.033	0.117	0.055
N. Obs	*235*	*55*	*180*	*134*	*46*

Positive and significant Pay-Performance sensitivity in Unregulated and Incentive Regulated firms

Fixed effect regressions

- **Fixed effects** account for unobservable omitted variables
- We focus on the ***differential* pay-performance sensitivity** across firms subject to different regulatory regimes (so less concern for endogeneity)
- **Control variables**: Industry, country and firm specific features may influence the propensity to rely on incentive compensation

Regulated vs. Unregulated Firms

	Log(CEO compensation)		
	Stock return	Log(MarketCap)	Log(ROA)
	(1)	(2)	(3)
Performance	0.31**	0.36**	0.23***
	(2.14)	*(2.61)*	*(2.89)*
Performance*REG	-0.34**	-0.29*	-0.18*
	(-2.19)	*(-1.97)*	*(-1.97)*
CEO Tenure	0.06***	0.05***	0.04**
	(3.24)	*(2.86)*	*(2.11)*
Log (TotalAsset)	0.13	0.20**	0.29***
	(1.59)	*(2.60)*	*(3.39)*
State Ownership	-0.31*	-0.31	-0.31
	(-1.65)	*(-1.64)*	*(-1.49)*
OECD Index of	-0.12	-0.19***	-0.15*
Liberalization	*(-1.40)*	*(-3.45)*	*(-1.70)*
Shareholder Protection	-0.01	-0.02*	-0.01
	(-0.52)	*(-1.65)*	*(-0.98)*
Market Cap/GDP	-0.0002	-0.0002	-0.0005
	(-0.23)	*(-0.59)*	*(-0.65)*
R-squared	*0.30*	*0.35*	*0.32*
N. Obs	*353*	*346*	*360*
N. Firms	*54*	*55*	*53*

Pay-performance sensitivity in Regulated energy firms is lower than in Unregulated firms

Pay-performance Sensitivity in Electric Firms

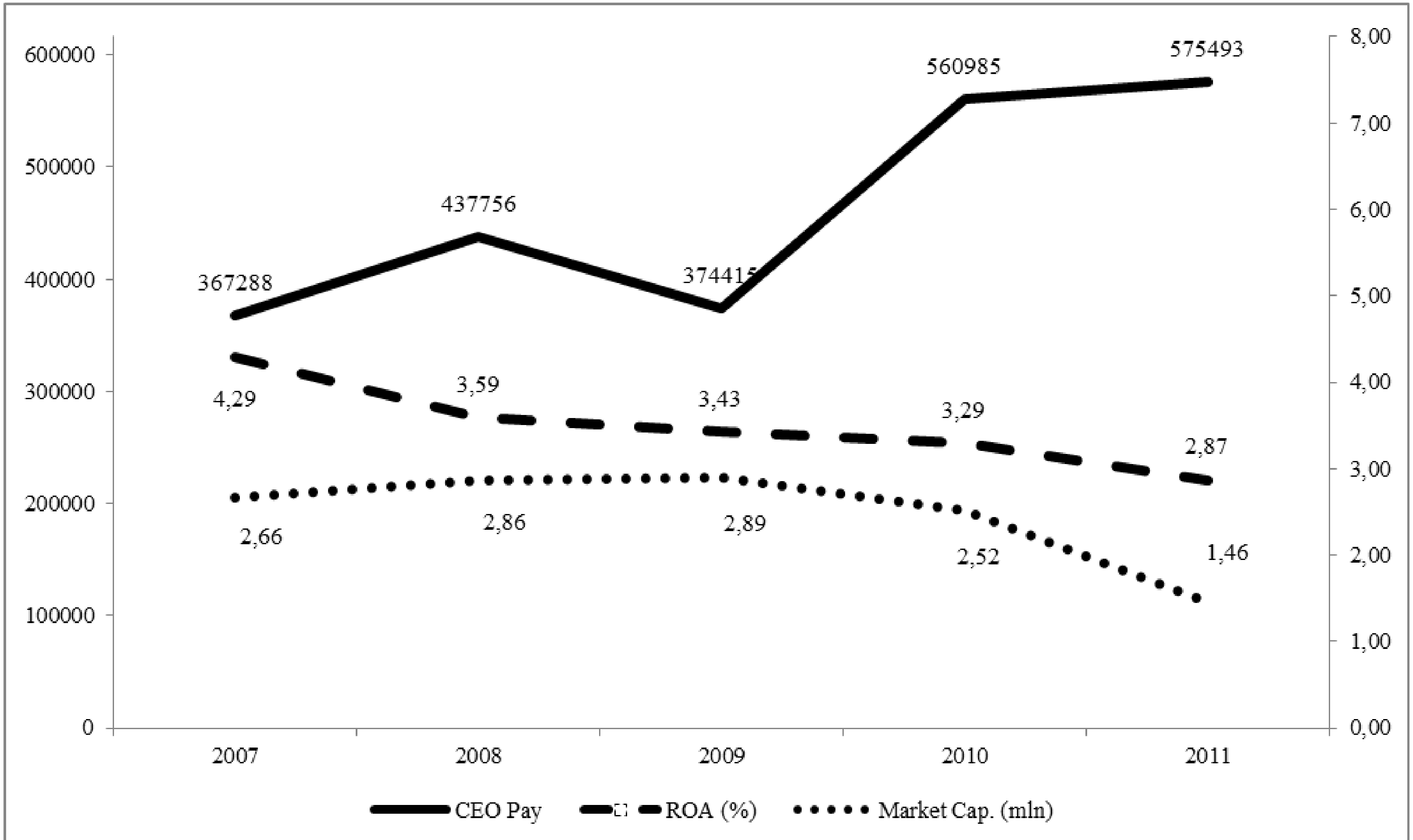
	Log(CEO compensation)		
	Stock return	Log(MarketCap)	Log(ROA)
	(1)	(2)	(3)
Performance	**0.35****	**0.38*****	**0.23****
	(2.30)	***(2.59)***	***(2.53)***
Performance*REG	**-0.33****	**-0.26***	**-0.16***
	(-2.05)	***(-1.64)***	***(-1.59)***
CEO Tenure	**0.06*****	**0.05****	**0.04****
	(2.75)	***(2.42)***	***(1.78)***
Log (TotalAsset)	**0.24****	**0.24*****	**0.35*****
	(2.41)	***(2.78)***	***(3.96)***
State Ownership	**0.06**	**0.12*****	**0.10*****
	(1.62)	***(2.57)***	***(2.69)***
OECD Index of Liberalization	**-0.06**	**-0.10***	**-0.91**
	(-0.80)	***(-1.81)***	***(-1.09)***
Market Cap/GDP	**0.00**	**0.00**	**0.00**
	(0.53)	***(0.04)***	***(0.08)***
R-squared	***0.62***	***0.07***	***0.65***
N. Obs	***291***	***286***	***297***
N. Firms	***45***	***46***	***45***

Multinational vs. Local Energy Firms

- Regulation does not affect sensitivity in Multinationals
- The impact of State ownership on the level of pay differs!

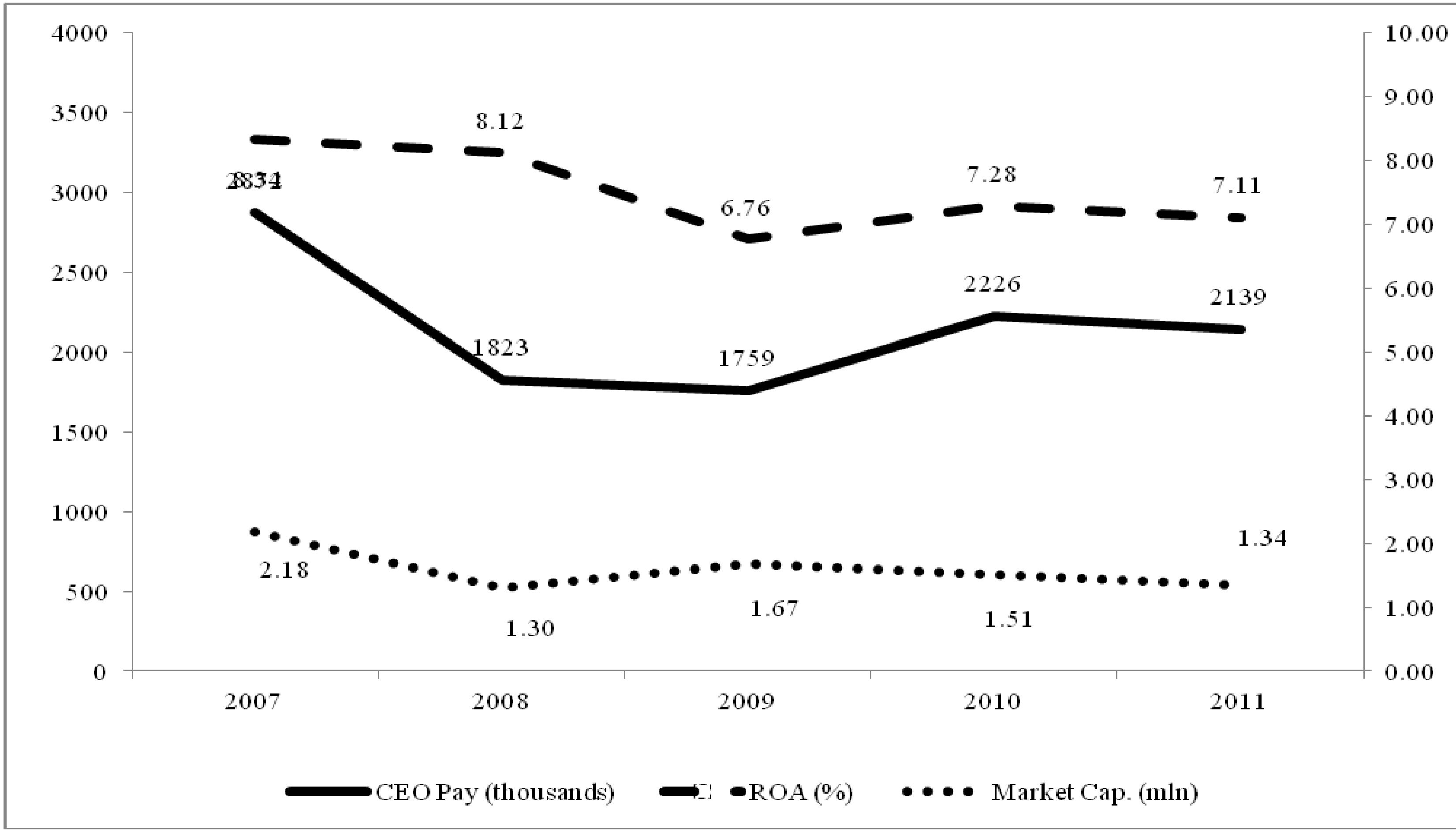
	Multinational Firms		Local Firms	
	Log(MktCap)	Log(ROA)	Log(MktCap)	Log(ROA)
	(1)	(2)	(3)	(4)
Performance	0.32	-0.10	0.28***	0.28***
	(1.07)	*(-0.68)*	*(3.27)*	*(5.74)*
Performance*REG	-0.27	0.08	-0.22**	-0.18***
	(0.88)	*(0.46)*	*(-2.08)*	*(-2.60)*
CEO Tenure	0.06*	0.04	0.04***	0.03***
	(1.75)	*(1.24)*	*(3.37)*	*(2.67)*
Log (TotalAsset)	0.36	0.92	0.38***	0.39***
	(0.29)	*(0.57)*	*(4.37)*	*(5.73)*
State Ownership	-0.48***	-0.53***	0.12**	0.11***
	(-7.70)	*(-15.76)*	*(2.11)*	*(3.80)*
OECD Index of Liber.	-0.17	-0.15	-0.08	-0.08*
	(-1.66)	*(-1.25)*	*(-1.31)*	*(-1.81)*
Market Cap/GDP	0.00	0.00	-0.00*	-0.00*
	(0.82)	*(1.38)*	*(-1.91)*	*(-1.99)*
R-squared	*0.27*	*0.22*	*0.34*	*0.68*
N. Obs	*142*	*148*	*205*	*214*
N. Firms	*22*	*22*	*33*	*31*

Testing H2: Average CEO Pay, ROA and MktCap in Energy Companies



Firms under Cost-based Regulation

Testing H2: Average CEO Pay, ROA and MktCap in IR Energy Companies



Firms under Incentive Regulation

Incentive vs. Cost-plus

Pay-performance sensitivity is significantly higher in Incentive regulated energy firms

	Log (CEO compensation)			
	(1) *Stock Return*	(2) *Log(MarketCap)*	(3) *Log(ROA)*	(4) *Log(MTB)*
Performance	-0.24**	0.03	-0.06	-0.24**
	(-2.46)	*(0.44)*	*(-0.86)*	*(-2.03)*
Performance*CAP	0.30**	0.03***	0.17**	0.35***
	(2.39)	*(3.40)*	*(2.40)*	*(2.91)*
Tenure	0.03	0.03	0.01	0.03
	(0.99)	*(1.33)*	*(0.39)*	*(1.22)*
Tenure*CAP	0.03	0.01	0.03	0.02
	(0.94)	*(0.41)*	*(1.00)*	*(0.53)*
Log (TotalAsset)	0.11	0.19*	0.31***	0.20**
	(1.08)	*(2.00)*	*(2.79)*	*(2.13)*
Log (TotalAsset)*CAP	-0.001	-0.02	-0.02**	-0.001
	(-0.07)	*(-1.48)*	*(-2.02)*	*(-0.12)*
State Ownership	-0.19	-0.28*	-0.31	-0.32*
	(-1.42)	*(-1.73)*	*(-1.41)*	*(-1.76)*
OECD Index of Liberalization	-0.13	-0.21***	-0.14	-0.22***
	(-1.46)	*(-3.44)*	*(-1.52)*	*(-3.70)*
Shareholder Protection	0.02	-0.03	-0.02	-0.03*
	(-1.03)	*(-1.61)*	*(-0.95)*	*(-1.73)*
Market Cap/GDP	0.0001	-0.0004	-0.0004	-0.003
	(0.14)	*(-0.45)*	*(-0.43)*	*(-0.34)*
GDP	$6.92e^{-07}$**	$1.49e^{-07}$	$8.14e^{-07}$	$2.22e^{-07}$
	(2.30)	*(0.45)*	*(0.21)*	*(0.79)*
R-squared	*0.28*	*0.27*	*0.26*	*0.28*
N. Obs	*271*	*267*	*292*	*265*
N. Firms	*40*	*41*	*42*	*40*

Incentive vs. Cost-Plus with Corporate Governance Controls

In *IR* firms, sensitivity is higher & Managerial Entrenchment is weaker

	Log (CEO compensation)			
	(1) *Stock Return*	(2) *Log(MarketCap)*	(3) *Log(ROA)*	(4) *Log(MTB)*
Performance	-0.21	0.13	-0.29**	-0.02
	(-1.18)	*(1.14)*	*(-2.12)*	*(-0.07)*
Performance*CAP	0.40**	0.06**	0.34***	0.60**
	(2.22)	*(2.19)*	*(2.87)*	*(2.20)*
Tenure	0.05*	0.05	0.06*	0.05*
	(1.70)	*(1.67)*	*(1.74)*	*(1.77)*
Log (TotalAsset)	0.12	0.06	0.17	0.25**
	(0.87)	*(0.45)*	*(0.97)*	*(2.32)*
State Ownership	-0.31**	-0.26	-0.42**	-0.37
	(-2.51)	*(-1.50)*	*(-2.20)*	*(-1.64)*
OECD Index of Liberalization	-0.08	-0.04	-0.08	-0.02
	(-1.08)	*(-0.50)*	*(-0.77)*	*(-0.26)*
Shareholder Protection	-0.02	-0.02	-0.03	-0.04*
	(-0.96)	*(-1.16)*	*(-1.16)*	*(-1.83)*
Market Cap/GDP	0.0006	-0.0005	0.0007	-0.001
	(0.38)	*(-0.51)*	*(0.47)*	*(-1.36)*
CEO Duality	0.39**	0.16***	0.33**	0.24***
	(2.65)	*(2.75)*	*(2.07)*	*(3.47)*
CEO Duality*CAP	*-0.43***	*-0.17**	*-0.41***	*-0.26***
	(-2.36)	*(-1.89)*	*(-2.10)*	*(-2.42)*
Board Size	-0.02	0.002	-0.02	-0.03
	(-1.48)	*(0.11)*	*(-1.09)*	*(-1.48)*
Board Size*CAP	0.02***	-0.03	-0.02	0.01
	(4.36)	*(-1.19)*	*(-1.47)*	*(0.70)*
Chair ex CEO	0.45***	0.12	0.18	0.01
	(2.76)	*(0.46)*	*(1.05)*	*(0.02)*
Chair ex CEO*CAP	-0.71***	-0.47***	-0.54***	-0.34*
	(-6.79)	*(-3.14)*	*(-5.48)*	*(-1.97)*
R-squared	*0.28*	*0.28*	*0.26*	*0.30*
N. Obs	*168*	*160*	*172*	*158*
N. Firms	*26*	*27*	*27*	*26*

Summary of Results

Within European Energy firms CEO pay is positively and significantly related to performance

- Regulated vs. Unregulated Segments
  - CEO pay in unregulated energy companies is tightly related to variations in firm performance
  - CEO pay is unresponsive in regulated firms
- Incentive vs. Cost-based Regulation
  - Pay-performance sensitivity is positive and significant only in regulated utilities under Incentive Regulation
  - Corporate governance board-related mechanisms are more effective within incentive regulated firms

Conclusions and Policy Implications

- Corporate governance and regulation work together to ensure an effective governance structure, in line with shareholder wealth maximization (they are complements)
- Unregulated vs. Regulated
  - Lower discretion and less impact of managerial decisions explain and justify lower pay-performance sensitivity in regulated firms
- Incentive regulation
  - Corporate governance of firms under incentive regulation is similar to that of unregulated firms
- Cost-plus regulation
  - Adopting incentive compensation contracts within cost-based regulated utilities seems to bring no advantages to the firm and only additional costs to the shareholders

Measures of Performance: Correlation Matrix

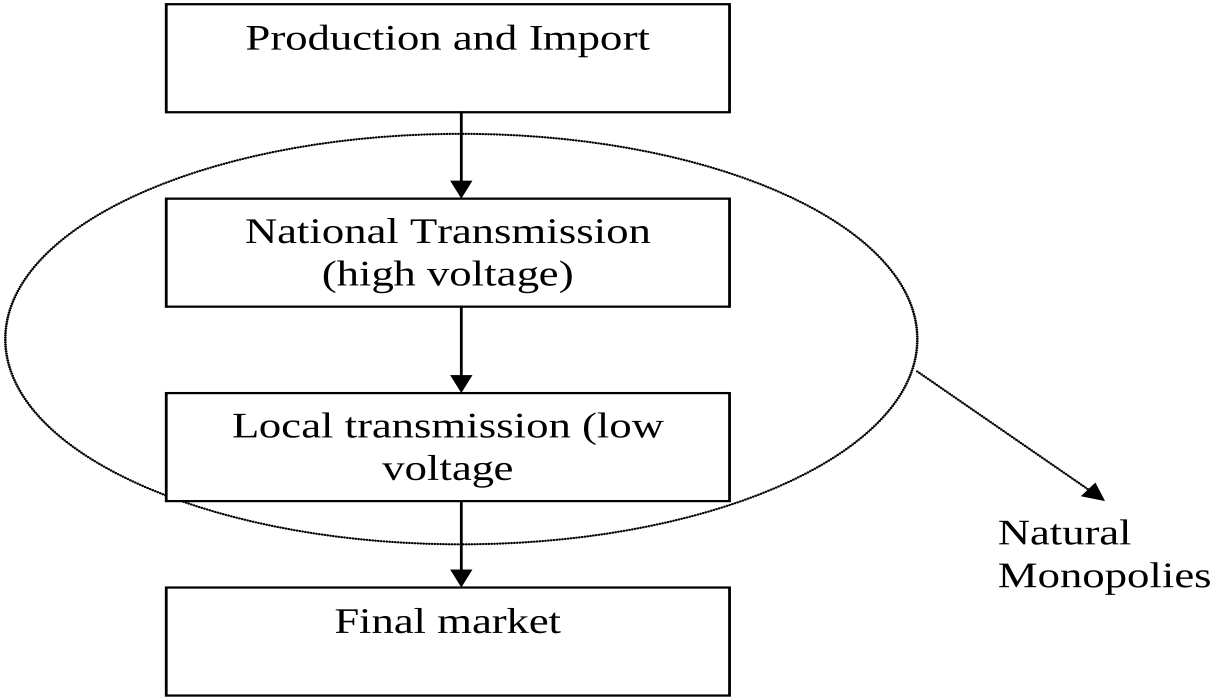
	Stock Return	ROA	Market-to-Book	Market Cap
Stock Return	**1**			
ROA	**0.080**	**1**		
Market-to-Book	**0.239**	**0.349**	**1**	
Market Cap	**0.006**	**0.151**	**0.158**	**1**

Top Regulated Energy Firms in EU 15

Table – The top 20 European regulated companies by market capitalization

Company Name	Country	Date of Establishment of an IRA	IPO Year	Market Capitalization (US$bn, end 2005)	Government Control Rights (end 2005)
			Energy		
Electricité de France	France	2000	2005	68.88	0.873
E.ON	Germany	2006	1987	68.14	0.048
Enel	Italy	1995	1999	48.29	0.322
RWE	Germany	2006	1922	41.47	0.310
Suez	France	2000	1987	39.10	0.197
Vivendi	France	2000	2000	36.00	0.124
British Gas PLC	U.K.	1989	1986	35.03	0.000
Gaz de France	France	2000	2005	28.80	0.801
National Grid Transo PLC	U.K.	1989	1995	28.67	0.000
Iberdola	Spain	1998	1992	24.60	0.020

Organization of the Electricity Industry



- **In the EU, a sweeping wave of reforms (liberalization, regulation, privatization) has changed not only the industrial organization, but also the internal organization of the companies by making them more oriented to maximize shareholders' wealth**

Regulation of EU Energy Utilities

- Cost-based (Rate of Return) in Germany, France and, up to late 90s, Spain and Italy
- Incentive regulation in the UK, Italy and Spain

- All countries (except Germany) have IRAs
- Privately-controlled energy firms are (mainly) in the UK, Spain and, partly, in Germany