POLITECNICO DI TORINO

Regulators and Firms

The comparative analysis of alternative regulatory principles

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The Impact of Regulatory Regimes, Ownership and Institutions: A Roadmap

- Liberalization and privatization reforms in the EU
- Independent Regulatory Agencies (IRA)
- Independent Regulation when firms are partially controlled by the Government
  - Implications for firm value, capital structure and investment
- Regulatory regimes: Cost-based vs. Incentive Regulation
  - Implications for firm investment, executive compensation and dividend policy
- The impact of (weak and strong) political institutions

Liberalization and Regulation

- In the 90s, major reforms in the EU public utility sector
  - ✓ *Liberalization of markets*
  - ✓ *Privatisation of large utilities*
  - ✓ *Inception of IRAs* - Regulatory Agencies, *independent* of ministries and gov't departments, with their own budget; independently chosen staff; with specific and detailed tasks as delegated by the Government
- The European Commission promoted IRAs
  - Regulate the activity of/enhance competition within network industries
  - Enhance credibility and time-consistency of regulatory policy
  - Discipline potential conflicts of interest between the Government and (still) state owned utilities

Privatization and Regulation

- Extent of Privatization left to governments
  - ✓ A huge ownership transfer until mid-nineties
  - ✓ Reluctant privatization henceforth
- ✓ Extent of Delegated powers left to governments
  - ✓ Before reforms, executive-branch commissions
  - ✓ Reluctant regulation henceforth
- Implementation of privatization and regulatory reforms differs across countries →
- What is the impact of changing regulatory institutions and ownership patterns for regulated firms' decisions?

Firm Ownership and Regulation

- Within EU utilities, private ownership is the exception rather than the rule…
  - At the end of 2000s, governments were controlling more than 60% of privatized firms (either through full ownership or golden shares) (Bortolotti & Faccio, 2009)
- The European Commission recognized the potential influence of govt. ownership on regulatory decisions and outcomes

  "… concerns are reported that *the structures in place do not ensure that regulatory decisions are not influenced by State ownership considerations*"

Why Regulatory *Independence*?

- When regulators are “not independent”, e.g. in executive-branch commissions, Governments can persuade them to modify their decisions in line with politicians’ objectives

- Political interference may lead to time-inconsistent regulatory decisions

- The rationale behind the inception of IRAs is to insulate regulators from political interference and to enhance their credibility

IRAs and Politicians

- Politicians ***delegate*** policy powers to bureaucrats, i.e. the regulators (Alesina and Tabellini, 2008)
- IRAs are endowed with ***formal*** independence (i.e. the *right* to decide), but this does not necessarily imply ***real*** independence (i.e. the effective *control* over the decisions) (Aghion and Tirole, 1997)
- Hence, governments, even when an IRA exists, still have ***room for maneuver*** (Shleifer and Vishny, 1994)
- Politicians may pursue their partisan goals by interfering in public utilities' decisions, especially when the firm is ***state-owned*** (Zelner and Henisz, 2006)

Politicians and Institutions

- What makes political interference in regulatory matters possible? What is the transmission mechanism?
- Levy and Spiller (1994) show that regulation is credible and independent where **political institutions constrain the executive's discretion**
- Political institutions influence the latitude governments have to decide about **privatization** and **delegation** of powers to IRAs imposed by the European Union, hence:
- Political interference in regulatory decisions is more likely, i.e. where **institutional constraints on executive discretion are weakest**
- **Reluctant regulation** is the institutional setting where regulatory powers are delegated to a formally independent regulator, but subject de facto to political interference

Regulation and Ownership in EU15

(source: Cambini, Rondi and Spiegel, 2012; in Harrington et al. *Recent Advances in the Analysis of Competition Policy and Regulation,* Edward Elgar)

	Energy			Telecommunications	
		Electricity	Gas		
Country	**Date of establishing an IRA**	**Ownership (end 2010)**	**Ownership (end 2010)**	**Date of establishing an IRA**	**Ownership (end 2010)**
Austria	2000	State (51%)	Partially private (State 31%)	1997	Partially private (State 25%)
Belgium	1999	Partially private (State 49%)	Partially private (State 31%)	1991	State (> 50%)
Denmark	1999	--	--	2002	Private
Finland	1995	State (54%)	--	1987	State (>50%)
France	2000	State (85%)	Partially private (State 37,5%)	1996	Partially private (State 32%)
Germany	2006*	Private (State 2.5%)	Private (State 2.5%)	1996*	Partially private (State 28%)
Greece	2000	State (51%)	--	1992	Partially private (State 10%)
Ireland	1999	--	--	1997	Private
Italy	1995	Partially private (State 33%)	Partially private (State 20%)	1997	Private
Luxemburg	2000	State (100%)	State (100%)	1997	State (100%)
Netherlands	1998	--	--	1997	Private
Portugal	1995	Partially private (State 26%)	--	2001	Private (State 6%)
Spain	1998	Private	Private	1996	Private
Sweden	1998	Private	Private	1992	State (> 50%)
UK	1989	Private	Private	1984	Private

… And in new EU Member States

	Energy			Telecommunications	
		Electricity	Gas		
Country	**Date of establishing an IRA**	**Ownership (end 2010)**	**Ownership (end 2010)**	**Date of establishing an IRA**	**Ownership (end 2010)**
Bulgaria	1999	State (100%)	State (100%)	2006	Private
Czech Rep.	2001	State (67%)	Private	2005	Private
Cyprus	2003	State (100%)	State (100%)	2002	State (100%)
Estonia	2008*	Partially private	Partially private	2008*	Private
Hungary	1994	Private	Private	2003	Private
Latvia	2001**	State	Private	2001**	State (51%)
Lithuania	1997**	State (96.5%)	Partially private (State 30%)	2004	Private
Malta	2001	State	State	2001	Private
Poland	1997	State (100%)	Private	2006	Private
Romania	2000	Private	Private	2006	Partially private (State 46%)
Slovenia	2001	State	Partially private (State 31%)	2001	Partially private (State 49%)
Slovakia Rep.	2001**	State (51%)	State (51%)	2004	Partially private (State 49%)

Top Regulated Telecom Firms in EU 15

(source: Bortolotti, Cambini and Rondi, 2013)

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)
		Telecommunications			
Telefonica de Espana SA	Spain	1996	1987	71.88	0.000
Deutsche Telekom AG	Germany	1996	1996	69.74	0.575
France Telecom	France	1996	1997	64.58	0.324
Telecom Italia SpA	Italy	1997	1997	56.04	0.000
British Telecommunications PLC	U.K.	1984	1991	33.02	0.000
Telia Sonera AB	Sweden	1992	2000	24.10	0.590
Koninklijke KPN NV	Netherlands	1997	1994	21.32	0.078
TeleDanmark AS	Denmark	2002	1994	11.64	0.000
Portugal Telecom SA	Portugal	2001	1995	11.27	0.127
Telekom Austria AG	Austria	1997	2000	10.83	0.302

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

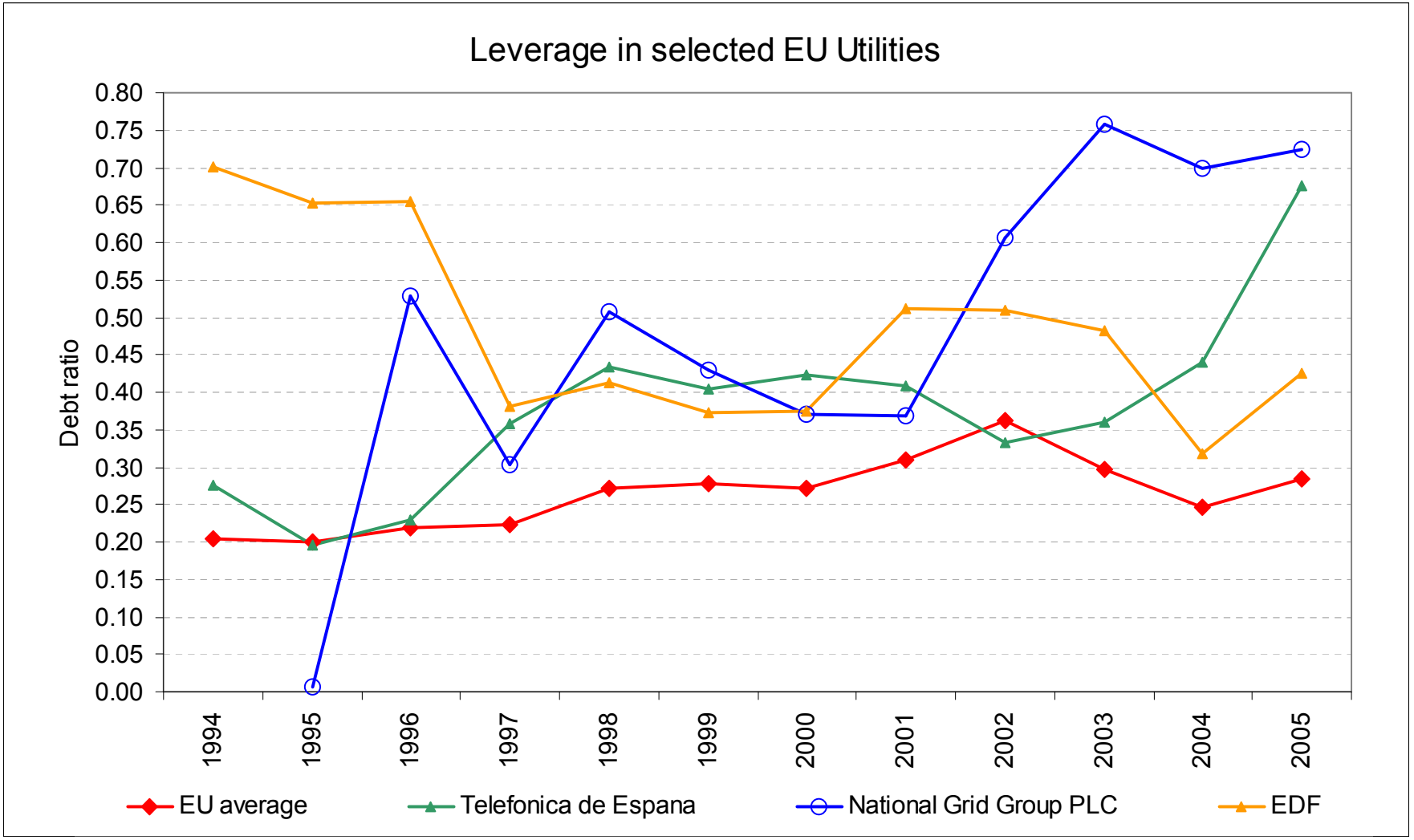
Capital Structure and Regulation
Do Ownership and Independent Regulation Matter?

Bortolotti, Cambini, Rondi and Spiegel, 2011
Journal of Economics & Management Strategy

Regulated Firms and Financial Debt

- **Evidence**: Ten years after the beginning of privatization and liberalization in network industries in Europe, regulated utilities have substantially increased their financial leverage
- In the U.K., the DTI and HM Treasury (2004) have expressed a concern about the "***dash for debt***" and *"flight of equity"* within the U.K. utilities sector from the mid-late 1990's
- They argue that high leverage "*could imply greater risks of financial distress, transferring risk to consumers and taxpayers and threatening the future financeability of investment requirements*"

The “Dash for debt”



A Strategic Use of Leverage (I)
Why capital structure matters
(Spiegel and Spulber, 1994 RJE)

- Regulated rates are set so as to ensure the firm a "fair" rate of return on its capital which will induce it to enhance and maintain its network

⇒ The determination of the rate of return and of the regulated rates depends to a large extent on the firm's capital structure

⇒ By properly choosing its capital structure, a regulated firm can affect its rates and hence its profitability

A Strategic Use of Leverage (II)

Opportunism, Financial distress and Underinvestment

- Regulators define tariff rates within a given *time framework*
  - Typical problem is regulators' lack of committment
  - Firms fear that the regulator will reduce the price after the investment is sunk thus leading to underinvestment (Armstrong & Sappington, 2006; Guthrie, 2006)
- Theoretical predictions (Spiegel and Spulber, 1994)
  - Firms may "use" financial leverage to influence regulators' decisions
  - … and regulators may "use" the debt-related bankruptcy threat to *tie their own hands* and discipline their own opportunism
- A welfare maximizing regulator has the incentive to set a high regulated price so as to reduce the probability that the firm will become financially distressed

But Ownership Matters…

- Public ownership lowers the risk of financial distress, but it can also work as an alternative *commitment* device
  - Politicians support *high tariffs* to cash in dividends, but also *high investment ("broad service")* to bring in votes
  - Politicians would not act opportunistically against the firms they own via regulation

⇒ Thus state-controlled firms do not need to issue debt to hedge regulatory risk

- In EU, no IRA before privatization, only informal regulation (executive-branch commissions)
  - Evidence that IRAs take a tougher stance towards regulated firms (Guasch, Laffont, Straub (2003) Edwards and Waverman (2006))

Testable Hypotheses

- **Hypothesis 1:** *Regulated firms will increase their leverage once they become regulated by an Independent Regulatory Authority (IRA)*

- **Hypothesis 2:** *High leverage leads to higher regulated prices*

- **H 1 and H 2 hold in the case of privately owned firms, but not necessarily in the case of state-controlled firms**

- We can test the theory by examining whether there is a significant difference between privately-controlled and state-controlled firms

The Dataset

- We constructed an unbalanced panel of 92 publicly traded utilities and transportation infrastructure operators in 14 EU member states, during 1994-2005 (927 firm-year observations) :
  - 44 firms in electricity and gas distribution
  - 13 water supply companies
  - 15 telecoms (mainly vertically integrated operators)
  - 8 freight roads concessionaires
  - 12 transportation infrastructure operators

- The sample covers 85-90% of publicly traded utilities in EU and 12 of the top 30 for Mkt. capitalisation in EU
- For every company we construct the *Government Ultimate Control Rights* measured using the "weakest link concept" (LLSV, 1999)
  - 67 firms in our sample have been privatized by 2005. Of these firms 24 have been privatized during 1994-2005 period. 25 firms in our sample are still state-controlled in 2005.
  - Privatization is still incomplete: in this sample, state's share of UCR is 37% on av.

Variables

- Leverage: (LT+ST Fin Debt)/(LT + ST Fin Debt + Market/Book value of Equity)
- Regulated Prices: retail price indices from OECD or Eurostat for all final services sectors except *ports and docks and airports* (intermediate services)
  - Limited competition and little price dispersion → the price indices appropriately reflect the prices of the regulated firms in our sample
- Private Control dummy = 1 when Government UCR< 50% (or <30%)
- IRA dummy = 1 when the IRA is set up and thereafter (Gilardi, 2005)
- Country controls: Financial Markets controls (Investor Protection and Stock Markets Indexes), Political Orientation (Bortolotti and Faccio, 2008)
- Company controls: Size, Tangibility, Profitability, Non-debt tax shields (source: Worldscope)

Estimation Methods

- Static Leverage equation
  - Random effects with country, sector and year dummies

- Dynamic Leverage equation
  - Instrumental variable method → system GMM (Arellano and Bond, 1991, Blundell and Bond, 1998) in: Cambini, Rondi, Spiegel, 2012, *Investment and the strategic role of capital structure in regulated industries: theory and evidence*, in Harrington &Katsoulacos.

- *Price-Leverage* relationship
  - Granger Causality Tests→ System GMM (Arellano 2003)

Results/H1 – Explaining Leverage

- Utilities increase their leverage following the introduction of independent regulation, provided they are ***privately controlled***
- Significant long-run effects are found:
  - The inception of the IRA is associated with a long-run increase in leverage by 7.2% for the full sample.
  - The long-run effect is a leverage increase of 9.2% in privately-controlled firms overall and 11.9% in firms that were privately controlled throughout the sample period

H1: Dynamic Model and Long Run Effects

Leverage$_t$	**(1) Full sample**	**(2) Full sample**	**(3) Privately- or State-controlled throughout the period**	**(4) Privately- or State-controlled throughout the period**
Leverage$_{t-1}$ (β)	**0.418*** **	**0.361*** **	**0.423*** **	**0.430*** **
Log of real total assets	**0.012*** **	**0.016*** **	**0.006**	**0.009**
Fixed-to-Total Assets	**-0.099** **	**-0.108** **	**-0.088***	**-0.099***
Non-debt Tax Shield	**-1.110*** **	**-1.312*** **	**-1.202*** **	**-1.260*** **
EBIT-to-Total Assets	**-0.249** **	**-0.247** **	**-0.249** **	**-0.250** **
GDP Growth	**-0.005**	**-0.008**	**-0.007**	**-0.010**
Investor Protection	**-0.013**	**-0.012***	**-0.014**	**-0.012**
IRA (α_1)	**0.042** **	**-0.018**	**0.048** **	**-0.020**
Private Control (α_2)	**0.025**	**-0.028** **	**0.024**	**-0.041**
Private Control*IRA (α_3)	**-**	**0.077***	**-**	**0.088***
$\alpha_1/(1-\beta)$	0.072***	-0.028	0.083**	-0.035
$(\alpha_1+\alpha_3)/(1-\beta)$	-	0.092***	-	0.119***
$(\alpha_2+\alpha_3)/(1-\beta)$	-	0.077**	-	0.083*
N. Firms [N. Obs.]	88 [612]	88 [612]	63 [445]	63 [445]

Results/H2: Leverage and Regulated Prices

- Leverage Granger-causes Regulated Prices:

$$\uparrow Leverage_{t-1,t-2} \Rightarrow \uparrow Regulated\ Prices_{t}$$

  - (i.e. lagged Regulated Prices are insignificant in Leverage equations)
- In the full sample
- When the IRA is in place
- Within firms that were and remained private (never privatized)
- Privately-controlled firms (using 50% and 30% thresholds)
- **Leverage does not Granger-cause regulated prices in the subsample of State-controlled firms.**
- Results consistent with the hypothesis that regulated firms use leverage strategically to mitigate regulatory opportunism. *However*,
- Firm ownership does matter: the theory holds only for *privately-controlled firms*

H2: Leverage and Prices- Granger Tests

Utility Prices	*(1) Full sample*	*(4) Private firms*	*(6) State controlled*
α_1 Utility Price$_{t-1}$	0.759***	0.787***	0.821***
	(0.083)	*(0.074)*	*(0.134)*
α_2 Utility Price$_{t-2}$	0.183*	0.161*	0.025
	(0.103)	*(0.092)*	*(0.118)*
β_1 Leverage$_{t-1}$	-0.052	-0.019	0.040
	(0.053)	*(0.038)*	*(0.065)*
β_2 Leverage$_{t-2}$	0.154***	0.154***	0.001
	(0.057)	*(0.055)*	*(0.045)*
P-value test on H_0: $\beta_1 = \beta_2 = 0$	*0.025*	*0.024*	*0.604*
P-value test on H_0: $\beta_1 + \beta_2 = 0$	*0.048*	*0.023*	*0.327*
Arellano-Bond test for AR(1) *(p-value)*	*0.000*	*0.000*	*0.031*
Arellano-Bond test for AR(2) *(p-value)*	*0.898*	*0.475*	*0.764*
Sargan-Hansen test *(p-value)*	*0.191*	*0.264*	*0.964*
N. Firms [N. Obs.]	74 [482]	57 [362]	30 [120]
Instruments	t-3; t-4; Δt-2	t-3; t-4; Δt-2	t-2; Δt-1

Conclusion and Implications for Research

- We study the strategic interaction between capital structure, independent regulation, and regulated prices
- We check whether this interaction is affected by firm's private vs. state ownership
- We find that utilities increase their leverage once they become regulated by an Independent Regulatory Authority (IRA), but only if they are privately-controlled
- We find that leverage leads to higher regulated prices, but only if the firm is privately-controlled
- State controlled public utilities do not need to rely on a strategic use of leverage strategically to mitigate regulatory opportunism. Why?

Reluctant Regulation

Bortolotti, Cambini and Rondi, 2013
Journal of Comparative Economics

Of Public Utilities, Regulators and Politicians

- From *The Economist, Jan. 2012:* "How can the state regulate the firms it also runs"?
- Theory: Governments are "bad owners": they typically impose political objectives that destroy firm value (Shleifer & Vishny 1994). Governments are also "bad regulators" as their interference leads to time-inconsistent regulatory decisions (Stigler, 1971)
- Empirical evidence shows:
  - *Partial*, not full, privatization boosts economic and financial performance (Gupta, 2005)
  - Fully privatized firms are typically *less* valuable than state-controlled firms (Bortolotti and Faccio, 2009) and require a premium to compensate political risk (Beltratti et a. 2007)
- Why *partial* ownership (mainly in EU)? Residual state ownership may reassure investors that politicians will not behave so as to reduce the value of partially privatized company (Perotti, 1995)

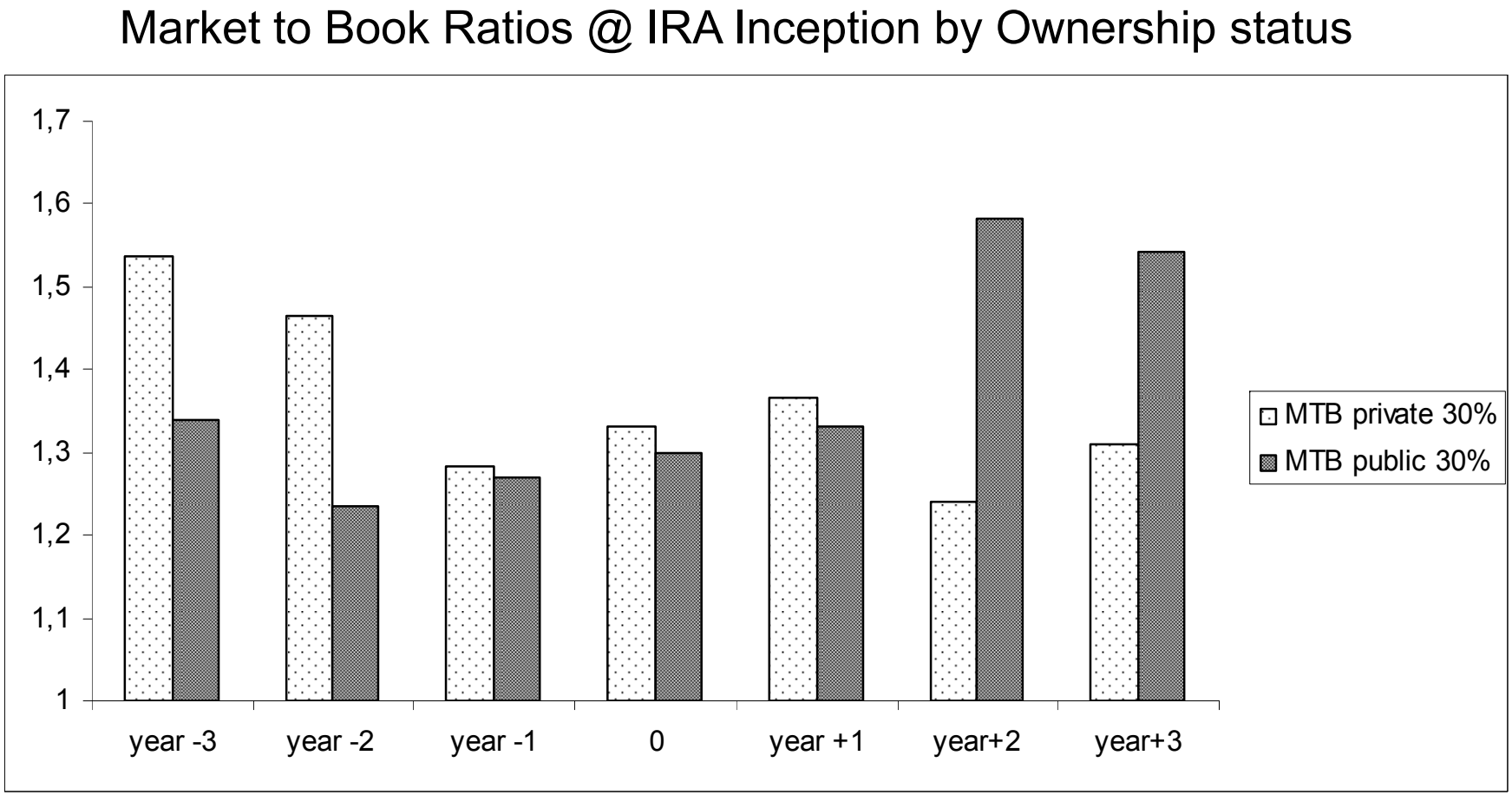
Firm Ownership and Market Value in EU

- **We investigate if state ownership affects firm value when Independent Regulatory Agencies are in place**
- IRAs are set up to prevent politicians from extracting **political rents** from state-controlled utilities: e.g. "*white elephant*" investment and employment programs
- …This works, but only if regulators are de-jure AND de-facto independent from political influence …
- But some IRAs are more independent than others
- Politicians can interfere with **legally** (but not **genuinely**) independent regulators to obtain favorable decisions and extract **economic** rents

IRAs, Ownership and Market value

- In principle, independence (from the government) is expected to enforce the credibility of regulatory policy and to assure an institutional interface with politicians
- Thus, when *regulator* is *de facto independent*, the market value of state-controlled firms should not differ from the value of privately controlled firms
  - "Ownership does not matter"
- If, instead, imperfect delegation makes the IRA only formally independent, then *state-controlled firms* could still be used by politicians to affect regulatory outcomes for their own benefits (e.g. dividends).
- This sort of indirect governmental "protection" is recognized and rewarded by the equity market.

Evidence on Market Value in EU



Empirical Modeling

- *Does ownership matter for the market value of firms subject to an IRA?*

$$MTB_{it} = \alpha_0 + \alpha_1 GovUCR_{i,t-1} + \alpha_2 IRA_{i,t-1} + \alpha_3 GovUCR_{i,t-1} * IRA_{i,t-1}$$
$$+ \alpha_4 \mathbf{X}_{i,t} + \alpha_5 \mathbf{Y}_{i,t} + \mu_i + \lambda_t + \varepsilon_{it},$$

- The relation between state ownership and firm value will materialize where political interference in regulatory decisions is more likely, i.e. where institutional constraints on government discretion are weakest
- **We test if the quality of political institutions affect the extent to which state ownership affects firm market value**

Identification and Instruments

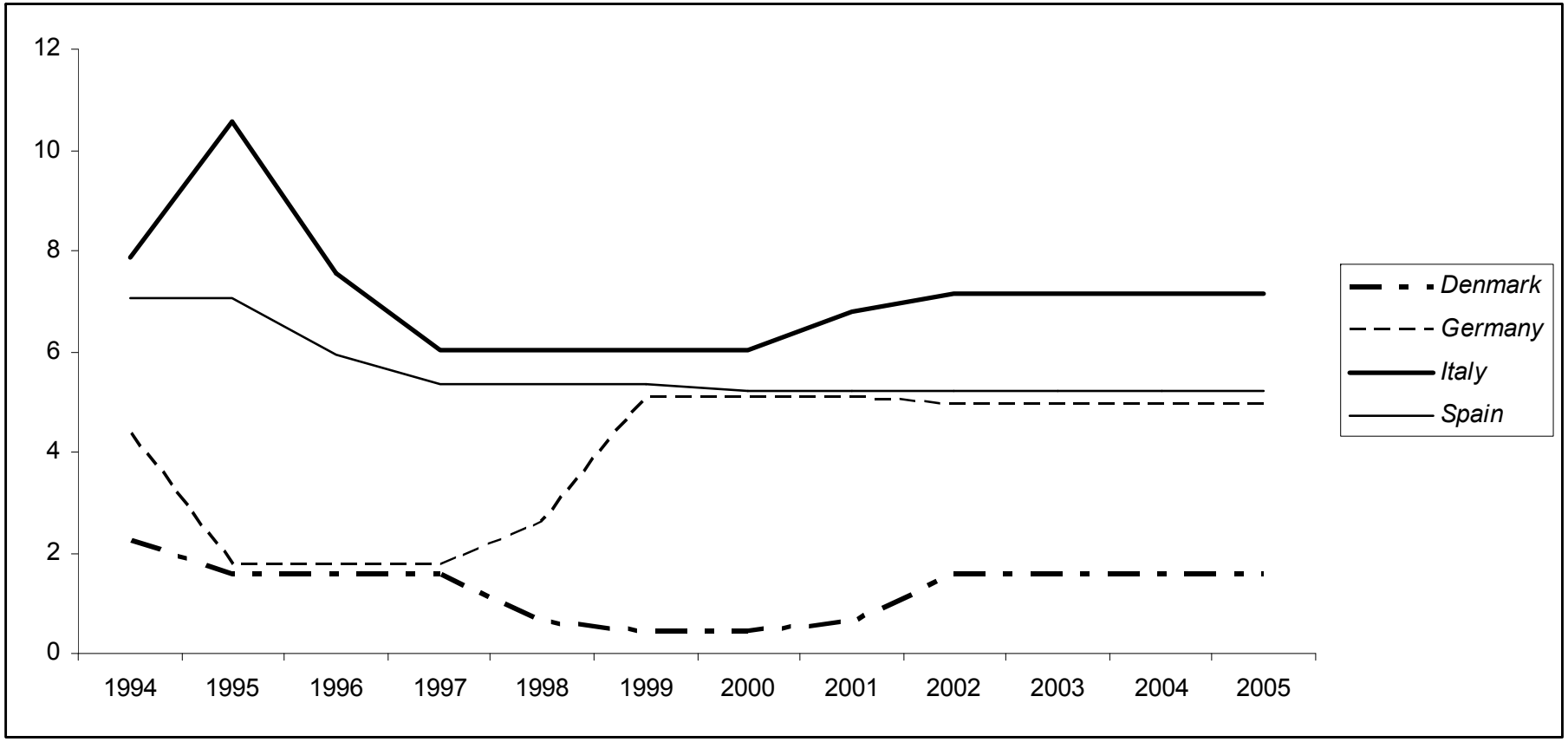
What defines a weak or strong institutional environment?

⇒ State ownership and regulatory independence are endogenous
⇒**Political Institutions →GovUCR*IRA→MTB**

- We use Political Institutions as instruments
  - ***Checks & Balances***: number of decision-makers whose agreement is necessary before policies can be changed or revoked (WB-DBPI)
  - ***Electoral Proportionality***: Proportional electoral systems lead to party proliferation and fragmented governments, making policy changes less likely, and regulatory commitments more credible (Gallagher, 1991) (Alesina and Rosenthal, 1996)
- **Our goal**: Identify the channel through which weak political institutions allow governments to affect firms and investors (and consumers)

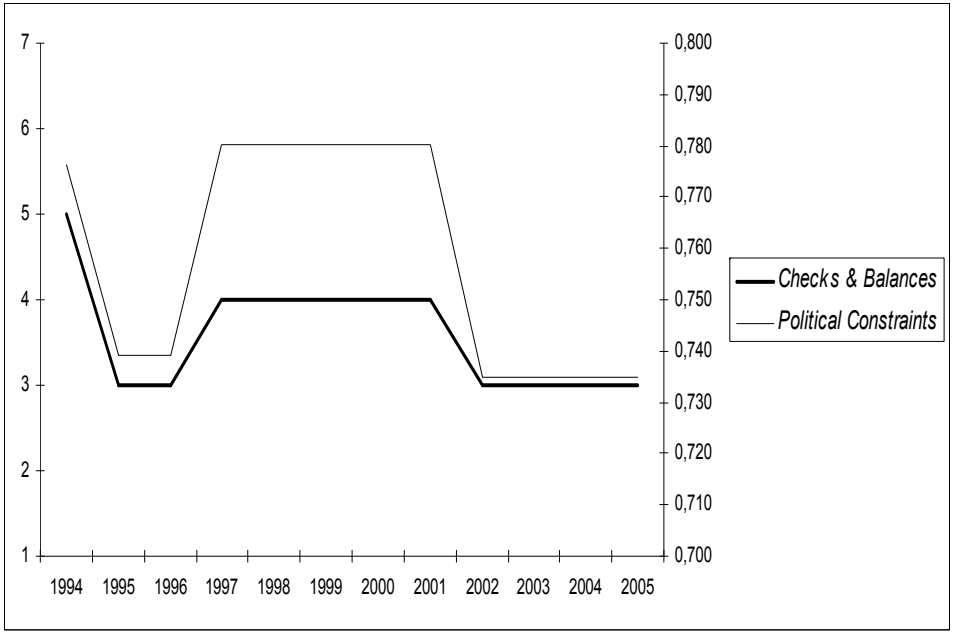
Political Institutions:

Electoral Disproportionality Index

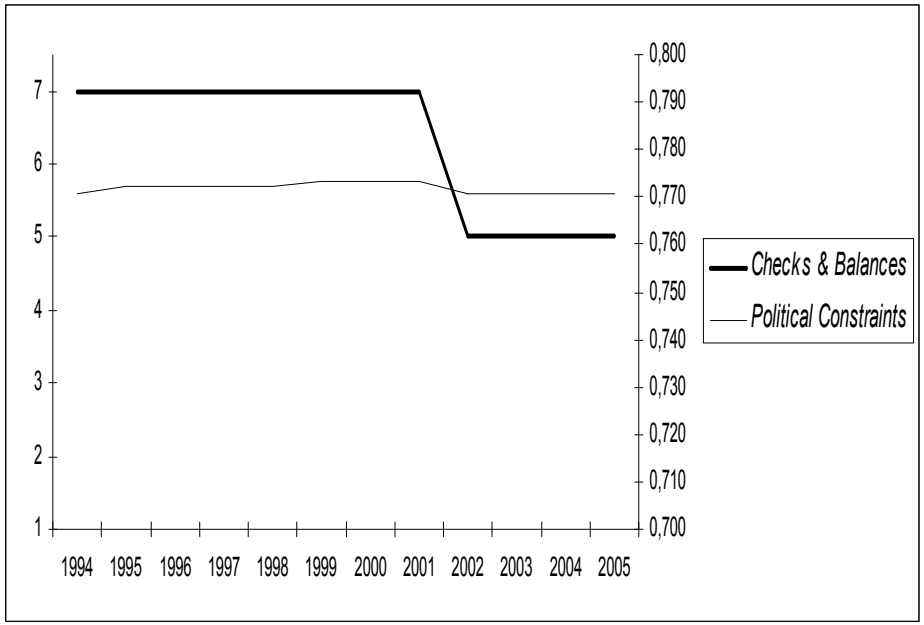


Political Institutions: *Checks & Balances* (World Bank) and *Political Constraints* (Henisz, 2000)

Italy



Denmark



Data and Variables

- **A panel of 57 publicly traded energy and telecom** operators, subject to **IRAs** in all countries (IRAs were set up between 1997 and 2000)
- **Market-to-book***:* (TA – BE + ME) / TA (Worldscope)
- **Formal Regulatory Independence: ** dummy equal to 1 when the IRA is in place (Gilardi, 2002)
- **State ownership: Government Ultimate Control Rights** continuous variable, measured using the "weakest link concept"
- **Firm, industry and country controls**: Size, Profitability, Leverage, OECD Liberalization Index, Investor Protection, GDP growth, Debt/GDP
- **Instruments for Ownership & IRA**: Checks & Balances, Electoral Dis-proportionality*, Political Orientation*, *Election date, Government Stability, Social Capital* - Distrust Index (World Value Survey)

Firm Value, Ownership & Political Institutions

	Checks and Balances		Proportionality Index	
Dependent variable: MTB ratio	(1) *Low C&B*	(2) *High C&B*	(3) *Low proportionality*	(4) *High proportionality*
Leverage$_{t-1}$	-0.171	-0.169	-0.322**	0.122
	(0.141)	*(0.243)*	*(0.139)*	*(0.301)*
EBIT-to-Total Assets$_{t-1}$	0.237*	-1.209	0.183	-0.709
	(0.131)	*(0.943)*	*(0.140)*	*(0.450)*
Log of real total assets$_{t-1}$	-0.229***	-0.090	-0.239**	-0.416***
	(0.085)	*(0.165)*	*(0.097)*	*(0.162)*
Investor Protection$_t$	0.033	-0.171	-0.003	0.103
	(0.048)	*(0.199)*	*(0.057)*	*(0.222)*
GDP Growth$_t$	-0.026	0.001	0.015	0.041
	(0.023)	*(0.069)*	*(0.054)*	*(0.074)*
Debt/GDP $_t$	-1.240**	0.726	-0.202	0.164
	(0.500)	*(1.576)*	*(0.828)*	*(0.760)*
OECD Index of Liberalization $_t$	0.101*	-0.205***	0.059	-0.130**
	(0.056)	*(0.068)*	*(0.055)*	*(0.064)*
Government UCR$_{t-1}$ (α_1)	-0.522**	-1.074*	-0.436	-0.526
	(0.223)	*(0.558)*	*(0.296)*	*(0.339)*
IRA$_{t-1}$ (α_2)	-0.122	0.870**	-0..019	0.005
	(0.161)	*(0.426)*	*(0.110)*	*(0.234)*
Government UCR$_{t-1}$ * IRA (α_3)	0.803***	-1.123**	0.875***	0.009
	(0.237)	*(0.564)*	*(0.345)*	*(0.288)*
Firm dummies	*Yes*	*Yes*	*Yes*	*Yes*
Year dummies	*Yes*	*Yes*	*Yes*	*Yes*
P-value test on $\alpha_1 + \alpha_3 = 0$	0.125	0.038	0.036	0.335
P-value test on $\alpha_2 + \alpha_3 = 0$	0.000	0.264	0.006	0.938
R squared	0.375	0.552	0.393	0.477
N. Firms [N. Obs.]	50 [353]	22 [93]	38 [271]	26 [177]

The Role of Political Institutions:
First-Stage Regressions

Dependent variable:	Government UCR_t	Government UCR_t	IRA_t	IRA_t	Government UCR_t* IRA	Government UCR_t* IRA
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Political Orientation $_{t-1}$	-0.016**	-0.006	0.067***	0.061***	0.001	0.009
	(0.006)	*(0.006)*	*(0.011)*	*(0.012)*	*(0.005)*	*(0.005)*
Election Date $_{t-1}$	-0.021	-0.041	0.015	0.010	0.007	-0.009
	(0.034)	*(0.030)*	*(0.099)*	*(0.101)*	*(0.034)*	*(0.033)*
Government Stability $_{t-1}$	-0.018	-0.020	-0.003	0.029	-0.018	-0.019
	(0.018)	*(0.017)*	*(0.038)*	*(0.036)*	*(0.018)*	*(0.018)*
Checks & Balances $_{t-1}$	-0.039**	-	-0.050	-	-0.033**	-
	(0.016)	-	*(0.031)*	-	*(0.015)*	-
Proportionality Index $_{t-1}$	-	-0.034***	-	0.031**	-	-0.028***
	-	*(0.007)*	-	*(0.015)*	-	*(0.007)*
Additional instruments: Leverage, EBIT-Total Assets, Log Tot Assets, Investor protection, GDP growth						
F Test (*p value*)	2.90 (0.000)	3.48 (0.000)	13.83 (0.000)	13.08 (0.000)	3.33 (0.000)	3.65 (0.000)
N. Firms [N. Obs.]	57 [449]	57 [449]	57 [449]	57 [449]	57 [449]	57 [449]

Firm Value and Political Institutions
2SLS estimation

Dependent variable:	MTB_t (1)	MTB_t (2)	MTB_t (3)	MTB_t (4)
$Leverage_{t-1}$	-0.114	-0.251*	-0.271	-0.325
	(0.156)	*(0.066)*	*(0.249)*	*(0.235)*
$EBIT\text{-}to\text{-}Total\ Assets_{t-1}$	0.205*	0.189**	0.175*	0.174*
	(0.108)	*(0.095)*	*(0.104)*	*(0.103)*
$Log\ of\ real\ total\ assets_{t-1}$	-0.150**	-0.227***	-0.239*	-0.269**
	(0.067)	*(0.066)*	*(0.130)*	*(0.112)*
$Investor\ Protection_t$	-0.054	-0.046	-0.014	-0.013
	(0.050)	*(0.046)*	*(0.077)*	*(0.096)*
$GDP\ Growth_t$	0.084**	0.107***	0.114*	0.126*
	(0.040)	*(0.041)*	*(0.060)*	*(0.068)*
$Debt/GDP_t$	-0.470	-0.224	0.104	-0.341
	(0.414)	*(0.458)*	*(0.951)*	*(0.578)*
$OECD\ Index\ of\ Liberalization_t$	0.068	0.043	0.045	0.024
	(0.045)	*(0.048)*	*(0.058)*	*(0.062)*
$Government\ UCR_t$ (α_1)	-1.202	-3.386**	-4.151	-4.380
	(1.315)	*(1.651)*	*(4.190)*	*(3.187)*
IRA_t (α_2)	-0.824**	-1.304***	-1.562	-1.370**
	(0.338)	*(0.507)*	*(1.027)*	*(0.592)*
$Government\ UCR_t * IRA$ (α_3)	3.133***	3.496***	3.799***	3.388***
	(0.986)	*(1.096)*	*(1.358)*	*(1.099)*
$Checks\ \&\ Balances_{t-1}$	-	-	-0.135	-
	-	-	*(0.175)*	-
$Proportionality\ Index_{t-1}$	-	-	-	-0.037
	-	-	-	*(0.091)*
Hansen J (all instruments) (*p value*)	0.639	0.857	0.799	0.806
Diff-in-Sargan C test: C&B Index / Prop. Index (*p value*)	0.447	0.852	-	-
F Test (*p value*)	5.79 (0.000)	5.67 (0.000)	5.25 (0.000)	4.97 (0.000)
N. Firms [N. Obs.]	57 [449]	57 [449]	57 [449]	57 [449]
P-value test on $\alpha_1 + \alpha_3 = 0$	0.053	0.910	-	-
P-value test on $\alpha_2 + \alpha_3 = 0$	0.006	0.005	-	-

Robustness Checks

- We test the over-identifying restrictions by including one by one the external political institutions instruments in *2nd* stage
- Robustness analysis:
  - We control for possible endogeneity of market liberalization
  - We account for social capital and culture – **(dis)trust** generates more demand for regulation (Aghion et al., 2012)
- Sensitivity analysis:
  - We include also transport and infrastructure operators and water supply firms as control sample with no IRA
  - We exclude UK companies (IRAs and privatizations earlier)
  - We use a threshold dummy (=1 at 30%) for state control

Firm Value and Political Institutions: Main Findings and Conclusions

- The larger the Gov't ownership stake, the higher the market value of regulated firms, *when* the Gov't can discretionally interfere with formally but not really independent regulators
- Political interference with IRAs is likely to intensify:

  $\Rightarrow$ In presence of residual state ownership, as a soft regulatory stance will raise profits and dividends: the "*motive*"

  $\Rightarrow$ When the country's institutional endowment (e.g. weak checks and balances) allows them to do so: the "*opportunity*"
- Our results raise concerns about the effectiveness of privatization and regulatory policies in EU network industries when the institutional constraints to political interference in regulatory matters are weak

Independent Regulation, Investment and Political Interference

Cambini and Rondi (2013)

Aim of the paper

- We argue that the establishment of IRAs influences firms' investment and that this influence is entwined with
  - Government's residual stake in firms and
  - Government's political orientation about State intervention in the market.
- Politicians may interfere in investment decisions in order to be re-elected (direct effect)
- Governments can affect regulatory reforms and decisions in line with their political objectives (indirect influence)
- We investigate the effect of changes in the institutional framework on investment of a large sample of EU public utilities, allowing for potential *endogeneity* of reforms
- We draw the identification strategy from the applied political economy literature

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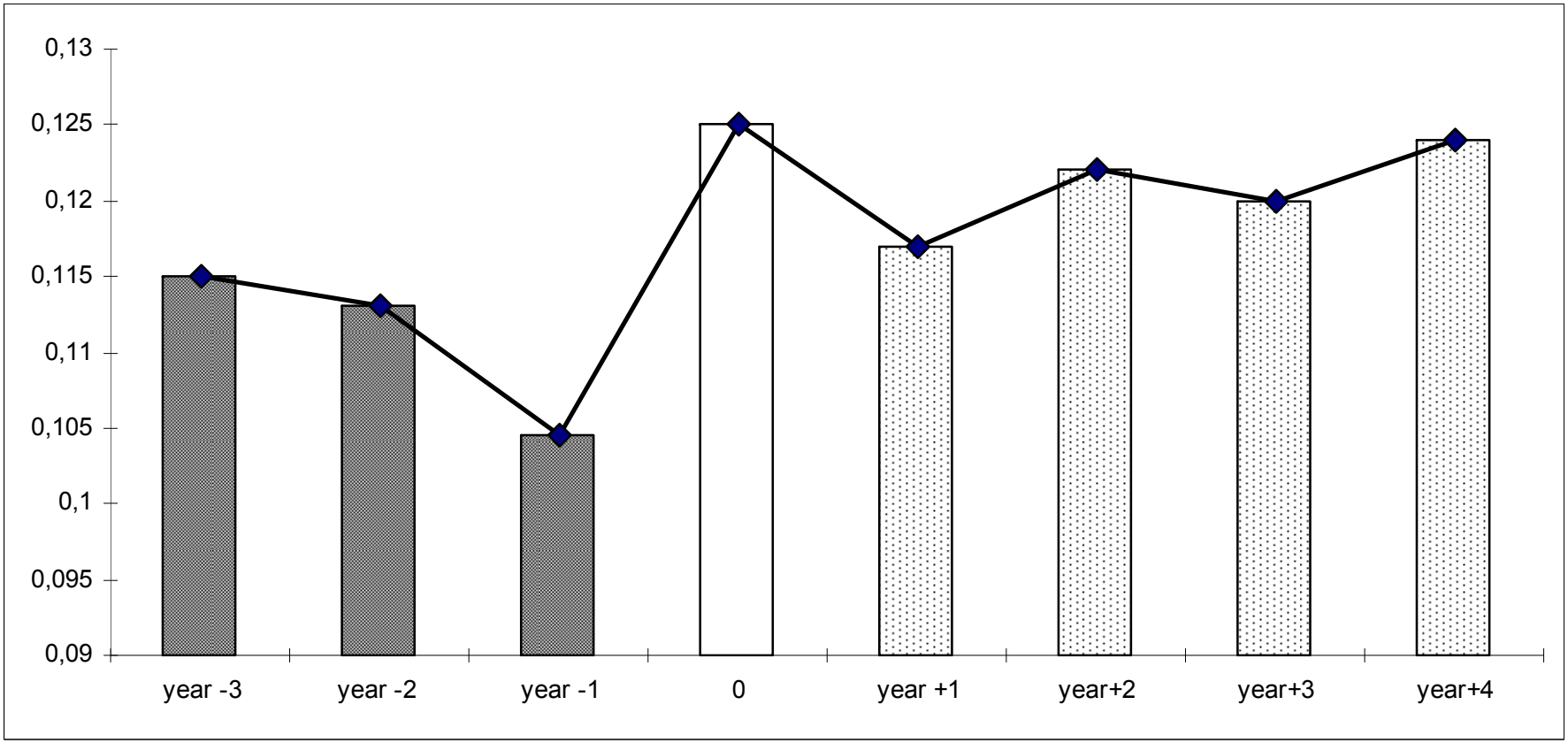
Average Investment Rate at the IRA Inception and Before and After the Event



Theoretical background

Investment, IRA, Ownership and Politics

- Problems affecting the ability to pursue efficiency and optimal investment within public utilities:
  - **Time-inconsistency problem and lack of commitment** (Besanko and Spulber, RAND 1992). The creation of an independent authority is the necessary condition for policy credibility (Levy, Spiller, JLEO 1994)
  - **Firm ownership**: Private ownership enhances investment incentives (Sappington and Stiglitz, JPAM 1987; Laffont and Tirole, JLEO 1991; Bias and Perotti, AER 2002; Martimort, JRE 2006)
  - **Political Interference**:
    - *Direct impact* (Shleifer and Vishny, QJE 1994; Shleifer, JEP 1998)
    - *Indirect impact – through institutions or regulatory performance* (Laffont, 1996; Besley and Coate, JEEA 2003; Guerriero, 2010)

Related Empirical Literature

- **IRA and lack of commitment**
  - Gutierrez (JRE, 2003): TLCs in Latin America; Cubbin and Stern (WB, 2005): electric utilities in development countries
  - *Guasch, Laffont and Straub (IJIO, 2008): transportation and water concessions in Latin America*
- **State vs. Private ownership**
  - Megginson and Netter (JEL, 2001); Gupta (JF, 2005); Cambini and Rondi (JRE, 2010)
- **IRA and ownership**
  - Wallsten (JIE 2001): TLCs in Latin America and Africa; Li (2009): Mobile carriers in 7 EU countries; *Bortolotti, Cambini, Rondi and Spiegel (JEMS, 2011)*
- **Political Interference**
  - **Direct effect on firms' investment**: Henisz and Zelner (JEMS, 2001); Zelner and Henisz (IO, 2006) → "white elephants"
  - **Indirect effect - through market reforms**: Li and Xu (JCE, 2002); Gilardi (2005): IRA more likely to be established when political uncertainty; Duso and Seldeslachts (JCE, 2010); Potrafke (PC, 2010): Impact on Product Market Reforms

Variables and Instruments

- **Investment rate**: Fixed Investment / Capital Stock at replacement value
- **Firm level controls**: Cash flow, Sales, Debt (Worldscope)
- **Regulatory Independence:**
  - **IRA dummy** = 1 when the IRA is set up and thereafter
  - **Formal Regulatory Independence Index** (Gilardi 2002), from 0 to 1
- **Government Ultimate Control Rights** (*Bortolotti and Faccio, 2009*), measured using the "weakest link concept" (LLSV, 1999)
- **Political Orientation Index** from 0 (left) to 10 (right) (*B&F, 2009*)
- **Country variables and instruments that capture cross-country heterogeneity in policy credibility, law enforcement, etc.**
  - ***Investor Protection Index*** (Pagano and Volpin, 2005)
  - ***Disproportionality*** – Parliamentary fragmentation (Gallagher, 1991)
  - ***Political Institution variables*** from the *World Bank PI Dataset*: Gov't Stability, Checks and Balances, Election date and Partisanship

Investment Equation

- **Three empirical investment models**:

  1) simple difference-in-difference specification

$$(I/K)_{it} = \beta_0 + \alpha_1 \text{IRA}_{it-1} + d_t + \eta_i + e_{it},$$

  2) "accelerator"-like model (Fazzari, Hubbard and Petersen, 1988)

$$(I/K)_{it} = \beta_0 + \beta_1 (\Pi/K)_{it-1} + \beta_2 (Y/K)_{it-1} + \alpha_1 \text{IRA}_{it-1} + d_t + \eta_i + e_{it},$$

  3) the Euler Equation of Investment describes the optimal path of firm investment and captures the current expectations of future profitability without using stock market values (Bond and Meghir, 1994). The dynamic investment model is:

$$(I/K)_{it} = \beta_0 + \beta_1 (I/K)_{it-1} - \beta_2 (I/K)^2_{it-1} - \beta_3 (CF/K)_{it-1} + \beta_4 (Y/K)_{it-1} + \\ + \alpha_1 IRA_{it} + \alpha_2 Gov\,UCR_{it} + \alpha_3 PolOrient_{it} \\ + \eta_i + d_t + \varepsilon_{it}$$

with $\beta_1 \geq 1$ and $\beta_2 \geq 1$, while $\beta_3 > 0$ and $\beta_4 \geq 0$

Econometric Strategy

1. *WG* with robust standard errors clustered at firm and sector level because the IRAs vary at sector level
2. *GMM System Estimation* of the dynamic investment model, where the IRA dummy, Government UCR and Political Orientation are first treated as *exogenous* and then endogenized
3. Identification: Lags of external institutional variables as instruments
    1. instrument our policy variables with alternative sets of external variables, borrowed from political economy literature (Acemoglu, 2005 JEL);
    2. check the validity of the subset of excluded instruments by including them directly in the regressions (Tabellini, 2010 JEEA)
    3. test the effect of liberalization reforms since investment decisions of incumbent regulated firms might in fact be influenced by the degree of market competition (Alesina *et al.* 2005 JEEA)
4. Robustness:
    1. Subsample of firms undergoing the change from no-IRA to IRA
    2. Use alternative Formal Regulatory Independence Index

Main results

- The equilibrium level of investment is
  - Higher when the **IRA is in place** or when Regulatory Independence is higher
    - The IRA set up leads to a long-run increase of 2.5% in the investment rate (= capex to total asset)
  - Unaffected by state ownership
  - Influenced by political orientation when we control for the presence of IRA

  $\Rightarrow$ initially positive, but turns negative when a rightwing government and an independent regulator coexist. Why?

IRA, State Ownership and Political Orientation

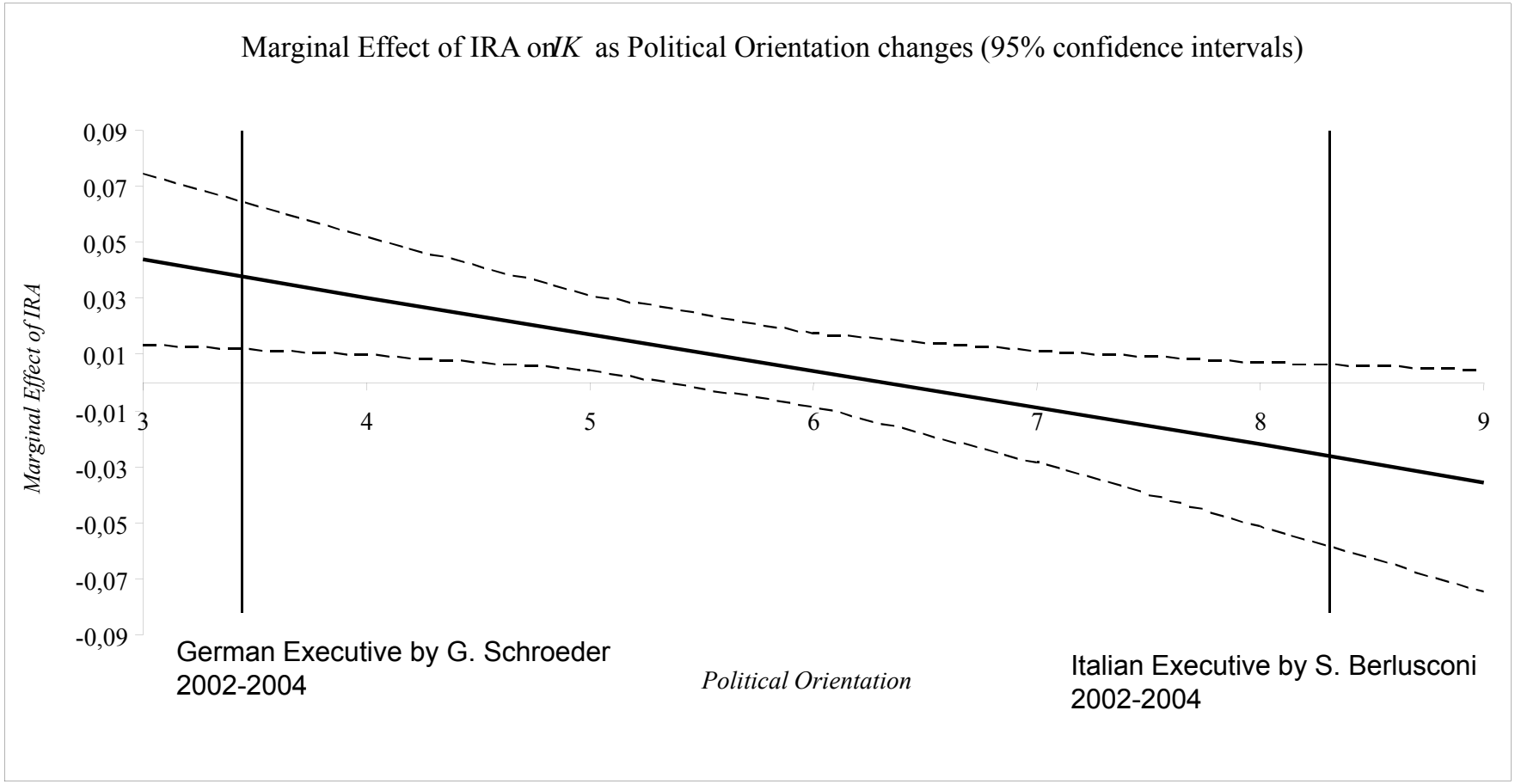
(GMM-System Estimates, external instruments)

I/K_t	(1)	(2)	(3)	IRA in place (4)
$(I/K)_{t-1}$	0.950***	0.950***	0.905***	0.890***
	(0.133)	*(0.138)*	*(0.133)*	*(0.149)*
$(I/K)^2_{t-1}$	-1.170***	-1.155***	-1.140***	-1.115***
	(0.188)	*(0.194)*	*(0.194)*	*(0.215)*
$(\Pi/K)_{t-1}$	-0.002	0.003	0.004	0.120
	(0.029)	*(0.030)*	*(0.028)*	*(0.088)*
$(Y/K)_{t-1}$	0.002	0.002	0.002	-0.001
	(0.004)	*(0.004)*	*(0.004)*	*(0.003)*
IRA Dummy$_{t-1}$ (α_1)	0.013**	0.013*	0.122**	-
	(0.006)	*(0.007)*	*(0.052)*	-
Government UCR $_{t-1}$ (α_2)	-	-0.013	-0.029	- 0.011
	-	*(0.012)*	*(0.019)*	*(0.018)*
Political Orientation $_{t-1}$ (α_3)	-	-0.001	0.010*	-0.009***
	-	*(0.002)*	*(0.006)*	*(0.003)*
Government UCR $_{t-1}$* IRA (α_4)	-	-	0.050*	-
	-	-	*(0.026)*	-
Political Orientation $_{t-1}$* IRA (α_5)	-	-	-0.021**	-
	-	-	*(0.009)*	-
P-value test on $\alpha_1 + \alpha_4 = 0$	-	-	0.001	-
P-value test on $\alpha_2 + \alpha_4 = 0$	-	-	0.230	-
P-value test on $\alpha_1 + \alpha_5 = 0$	-	-	0.020	-
P-value test on $\alpha_3 + \alpha_5 = 0$	-	-	0.018	-
Arellano-Bond test for AR(1) *(p-value)*	0.00	0.004	0.004	0.011
Arellano-Bond test for AR(2) *(p-value)*	0.851	0.865	0.795	0.832
Sargan-Hansen test *(p-value)*	0.473[70]	0.419[68]	0.226[64]	0.537[47]
External and Excluded Instruments	**Difference-in-Hansen tests *(p-value)***			
IP - Investor Protection	0.496	0.614	0.611	0.999
D- Disproportionality	0.276	0.210	0.831	-
WB Political Institutions	0.473	0.432	0.759	-
EXECRLC $_{t-2}$	-	-	-	0.355
N. Firms [N. Obs.]	80 [521]	80 [521]	80 [521]	55[306]

Cohabitation of formally independent IRAs with a decidedly rightwing government generates a negative spillover

Marginal Effect of IRA on Investment as Political Orientation of the Executive changes from Left to Right

$\alpha_1+\alpha_5$*Pol Orientation



Interaction of politics with the IRA regulatory functions hurts investment when the executive is decidedly rightwing

Conclusions

- IRAs strengthen the credibility of regulatory commitment and positively affects investment, but…
- Cohabitation of formally independent IRAs and a decidedly rightwing executive generates a negative spillover. Why?
  - Regulators are “bureaucrats”, that oversee the behavior of utilities to enhance competition and protect consumers
  - Rightwing executives aim at reducing the size and scope of government and regulatory interventions in the economy
  - Such opposite attitudes and views of the regulatory task collide, generating conflicts about policy goals and regulatory uncertainty that undermine investment

Alternative Regulatory Mechanisms and Firm Behavior

Investment Decisions

Dividend Policy

Compensation Policy

Two Types of Regulatory Contracts

- A key policy decision (Armstrong & Sappington, 2006, 2007)

- *Cost-based regulation (e.g. rate of return)*: 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 services

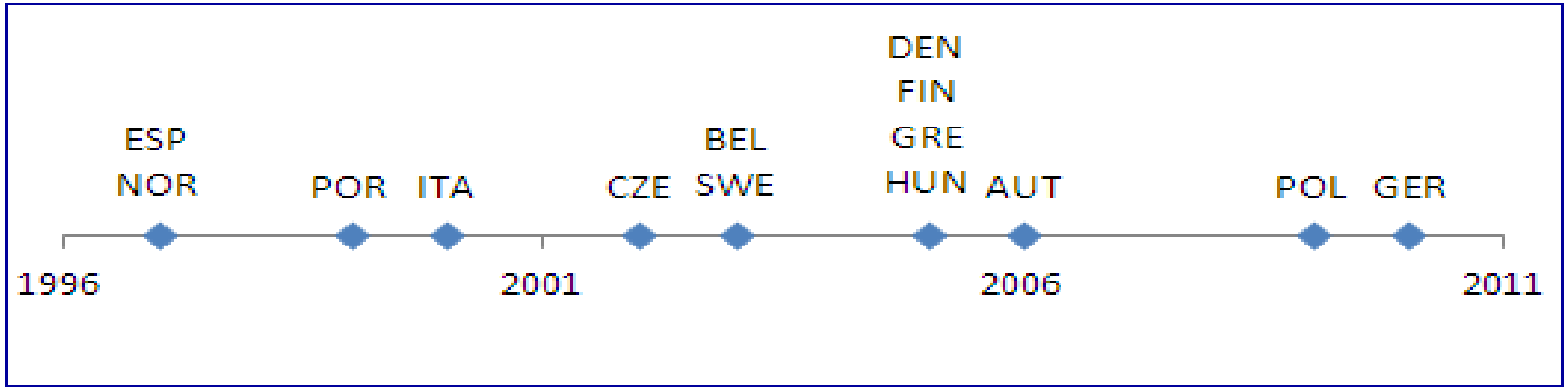
- *Incentive regulation (e.g. price-cap)*: regulators set a limit (*cap*) on retail prices → hence managers can generate higher profits and benefit shareholders by pursuing cost savings
  - Typically used in energy distribution

- Do firms subject to *CB* or *IR* mechanisms behave differently?

- Evidence from European energy firms

Institutional Context in the EU

- Directive 96/92/EC: opens national electricity markets and prepares an integrated electricity market in Europe.
- EU Commission encourages privatization and promotes unbundling of transmission networks.
- Key novelty is the introduction of incentive regulation: most countries switched from a cost based regulation to incentive regulation



Incentive Regulation and Investment

Cambini and Rondi (2010)
Journal of Regulatory Economics

- Many EU countries have reformed their energy sectors and switched from cost-based to incentive regulation

1. Does investment differ under different regulatory contracts: cost-based vs. incentive regulation?
2. Is investment sensitive to changes in regulatory instruments: X (Caps) and WACC

- Evidence for a panel of European energy utilities
- We control for public vs. private ownership and country, industry characteristics: underlying energy demand, existing infrastructure
- Potential endogeneity of regulation and ownership

Regulation of EU Energy Utilities

- Cost-based (Rate of Return) in Germany, France and, up to late 90s, Spain and Italy
  - A *cost-plus mechanism* where the regulator sets the rate of return the utility can earn on its asset base → The allowed rate or return through the **WACC** is the key instrument, providing incentives to invest
- Incentive regulation in UK, Italy and Spain
  - A *fixed-price contract* imposes a *cap* to tariff rates or firm revenues → **RPI – X** mechanism: The **X-factor** is the regulatory tool which prompts efficiency but is viewed as detrimental to investment
- All countries have IRAs (except Germany)
- Private control of energy utilities, mostly in the UK, Spain and, partly, in Germany

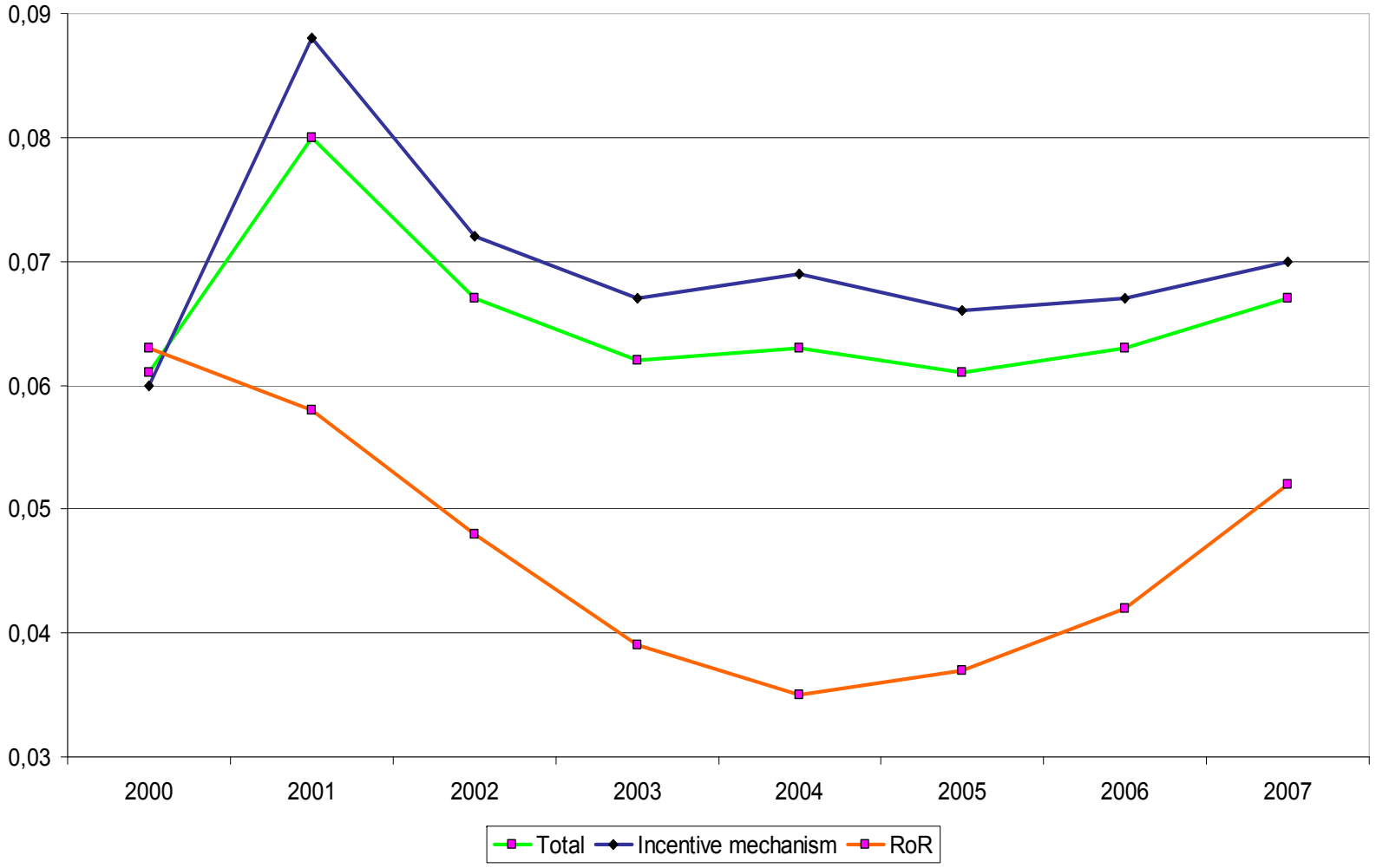
The Sample and the Data

- 23 large energy utilities in France, Germany, Italy, Spain, UK (1997-2007), small panel, but representative
  - 90% of FR and ITA markets; 60% Germany; 80% Spain; 40-50% UK
  - 6 firms (ITA & SPA) with regime switch, 13 TSO, 5 Vertically and 5 Horizontally integrated; 13 State (30%) and 10 Privately controlled
- Firm data: Investment rate, Capital stock at replacement value, Sales growth (accelerator), Cash Flow (financial factors), State Own.
- Regulatory instruments
  - WACC rates and X-factors observed at various regulatory hearings: 2-3 changes in each country
- National indicators and structural energy characteristics
  - Manufacturing share of GDP; Energy supply per GDP; OECD-PMR indexes of Market Openness and Vertical Integration

The Sample of Energy Utilities

		TRANSMISSION	DISTRIBUTION
ELECTRICITY	Italy	Terna (TSO)	Enel, AEM Milano ASM Brescia, Iride, Hera, ACE
	Spain	Red Electrica (TSO)	Endesa, Iberdrola, Union Feros
	UK	National Grid (TSO)	Scottish Power, CE Electric, Scottish and Southern Energy
	France	EDF	EDF
	Germany	E.On, RWE	E.On, RWE
GAS	Italy	Snam Rete Gas (TSO)	AEM Milano, ASM Brescia Italgas, Hera
	Spain	Enagas	Gas Natural
	UK	National Grid	National Grid
	France	Gaz de France	Gaz de France
	Germany	E.On (Ruhrgas), RWE	E.On (Ruhrgas), RWE

Investment by Regulatory Contract



The Investment Equation

$$IK_{it} = \alpha_0 + \alpha_1 IK_{it-1} + \alpha_2 \Delta LogSales_{it} + \alpha_3 CFK_{it-1} + \alpha_4 IncentiveRegulation_{it} + \alpha_5 PrivateControl_{it} + \beta_1 ManufacturingShareGDP_{jt-1} + \beta_2 InterestRate_{jt-1} + \mu_i + \delta_t + \varepsilon_{it}$$

Endogeneity problems

- The choice of the **regulatory regime** may depend on whether the government thinks that either *larger infrastructure* or *cost reducing investment* is needed
- The choice of **privatization** may fall on firms in a healthier financial situation in order to fulfill investment programs rather than on firms under a budget constrain
- 2SLS with external instruments that capture features of the competitive, political and institutional environment
- GMM with internal instruments, lags of all RHS variables

Investment, Regulation, Ownership

	OLS	Fixed effects	2SLS Estimation	One-step difference GMM
	(1)	(2)	(3)	(4)
Investment Rate $_{t-1}$	**0.458*** (0.094)**	**0.181** (0.072)**	**0.160* (0.082)**	**0.341*** (0.106)**
ΔLog of Sales $_{t}$	**0.048*** (0.017)**	**0.066*** (0.024)**	**0.064** (0.025)**	**0.150*** (0.049)**
Cash Flow to Total Asset $_{t-1}$	**0.124* (0.066)**	**0.151* (0.075)**	**0.177** (0.083)**	**0.152 (0.166)**
LT Interest Rate $_{t-1}$	**-0.004 (0.007)**	**0.015 (0009)**	**0.022* (0.012)**	**- -**
Manufacturing Share of GDP $_{t-1}$	**-0.026 (0.053)**	**0.046 (0.304)**	**0.226 (0.312)**	**-0.329 (0.831)**
Incentive Regulation Dummy$_t$	**0.009** (0.004)**	**0.022* (0.012)**	**0.038** (0.015)**	**0.038* (0.021)**
Private Control Dummy$_t$	**0.007* (0.004)**	**0.033*** (0.004)**	**0.052 (0.136)**	**0.022 (0.015)**
Arellano-Bond test AR(1) (p-value)	-	-	-	0.015
Arellano-Bond test AR(2) (p-value)	-	-	-	0.512
Hansen χ^2 test (p-value)	-	-	-	0.999
R squared (within)	0.481	0.299	0.623	-
N. Firms [N. Obs.]	186 [23]	186 [23]	182 [23]	138 [23]

Private firms seem to invest more, but not if we account for endogeneity of ownership

Investment, the X and the WACC

	Full sample	Firms Under Incentive Mechanisms			
		Fixed effects		2SLS	GMM
	(1)	(2)	(3)	(4)	(5)
Investment Rate $_{t-1}$	0.136	0.141	0.117	0.063	0.188***
	(0.115)	*(0.117)*	*(0.085)*	*(0.123)*	*(0.058)*
ΔLog of Sales$_t$	0.057**	0.070**	0.062***	0.067**	0.168*
	(0.024)	*(0.031)*	*(0.011)*	*(0.029)*	*(0.098)*
Cash Flow to Total Asset $_{t-1}$	0.143**	0.148*	0.166**	0.185***	-0.257
	(0.069)	*(0.082)*	*(0.067)*	*(0.071)*	*(0.246)*
Manufacturing Share of GDP $_{t-1}$	-0.187	-1.478	-1.063	-0.469	0.014
	(0.314)	*(0.939)*	*(0.964)*	*(1.141)*	*(1.602)*
Private Control Dummy$_t$	0.028***	0.031***	0.036***	0.090	0.152
	(0.004)	*(0.007)*	*(0.005)*	*(0.072)*	*(0.120)*
Incentive Regulation Dummy$_t$	0.059***	-	-	-	-
	(0.007)	-	-	-	-
WACC$_t$	0.782[a]	0.385	-	-	-
	(0.473)	*(0.448)*	-	-	-
X Factor$_t$	-	-	-0.676**	-1.280*	-2.652**
	-	-	*(0.269)*	(0.738)	(0.999)
Arellano-Bond test AR(1) (p-value)	-	-	-	-	0.036
Arellano-Bond test AR(2) (p-value)	-	-	-	-	0.285
Hansen χ^2 test (p-value)	-	-	-	-	0.999
R squared (within)	0.311	0.312	0.349	0.595	-
N. Firms [N. Obs.]	143 [20]	112 [16]	126 [19]	124 [19]	100 [19]

Large Xs reduce current revenues and expected returns, generates financial constraints, weakening incentives to invest

Summary of Results and Conclusion

- In the first decade after EU-driven privatization and liberalization reforms, investment at energy utilities under IR was higher than at firms under RoR regulation
- WACC rates positively affect investment of firms under RoR
- Investment of firms under **IR** is negatively related to the **X**
- Lack of significance of structural characteristics suggests that IR is more effective in encouraging investment aimed at reducing costs rather than at expanding infrastructure
- If regulators want to balance cost-efficiency and infrastructure investments, then increases in the X have to be compensated by including a premium in the WACC aimed at investment programs

Incentive Regulation and Incentive Compensation

Cambini, Rondi, De Masi (2014) (IEFE-Bocconi WP)

- Regulation expected to inject competitive pressures in non-competitive markets, but also to reduce managerial discretion
- What effect of regulation on CEO incentives?
  - Internal (*Pay*) vs. External (*Market*) Incentives
- We test the effect of regulation on CEO Pay-Performance sensitivity in the EU energy sector
  - *Deregulated vs. Regulated* segments
  - *Incentive vs. Cost-Based* Regulated firms

Regulation and Corporate Governance

- In the 80s, vertically integrated, state-owned firms
- In the 90s, unbundling of operations
  - De-regulation and privatization of Generation
  - Regulation of Transmission and Distribution, after partial liberalization and incomplete privatization
  - Many countries switch from Cost-based to Incentive regulation
- A quasi-natural experiment
- Energy firms become financial markets' pet: Large investments, high dividends and firm value
- Strong interest for corporate governance mechanisms meant to pressurize managers to boost profitability and shareholder value

Related Literature

- Incentive compensation to discipline agency problems

  (Murphy 1985; Gibbons and Murphy 1990; Jensen and Murphy 1990)

- Most research 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 firms' activities, alters the internal incentives resulting from the standard market-based mechanisms

  (Joskow, Rose and Shepard 1993; Palia, 2000; Hubbard and Palia 1995; Booth et al. 2002; Becher and Frye 2011)

Testable Hypothesis #1

- When subject to market regulation, CEOs have less discretion to undertake strategies aimed at increasing profitability, so:
- Does pay-performance sensitivity differs across regulated and deregulated *segments* in the EU energy industry?
- H1: Regulated firms display lower pay-performance sensitivity than deregulated firms

Testable Hypothesis #2

Cost-based: regulators fix the RoR for the firm, covering all main operating costs →Low-powered incentive schemes do not prompt managers to increase firm's efficiency

Incentive Regulation: regulators apply fixed-price contracts, so CEOs that pursue cost savings and efficiency can generate higher profits and benefit shareholders → Shareholders are the residual claimants of managers' performance, hence they are more willing to implement incentive compensation contracts

H2: Firms under incentive regulation display higher pay-performance sensitivity than firms under ROR

The Sample and the Data

59 publicly listed Energy utilities from 12 EU member states, of which 43 Transmission and Distribution Operators (TSO and DSO) subject to National Regulatory Agency (NRA)

436 CEO compensation-year observations, 2000-2011

CEOcomp is the sum of salary and bonus awarded by the CEO in year

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

Stock return; **Market Capitalization**; **Market-to-Book**; **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, to control for cross-country heterogeneity and business cycle

Firm-fixed effects, to control for unobservable firm characteristics

Or, **CEO-fixed effects**, to control for CEO-specific omitted variables

CeoComp, MarketCap and Total Assets in Thou. of 2005 constant Euros

Empirical models

Model (1): 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. $ Change in CEO pay for $ change in firm performance (first-difference regressions)

Model (2): Pay-performance (Semi-)Elasticity (fixed-effect panel)

$$Log\,(CEOcomp\,)_{it} = \alpha + \beta_1(\,performanc\ e)_{it} + \beta_2 tenure_{\,it} + \beta_3 firmsize_{\,it} + \\ + \beta_4 GDP_{it} + \mu_{it} + \varepsilon_{it}$$

Alternative measures: *Log(MarketCap)*, *Log MTB* or *Log(ROA)*

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

J&M 1990 Pay-Performance Sensitivity

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*

CEO pay in Deregulated and Incentive Regulated firms displays positive and significant sensitivity to performance

Fixed effect regressions: Identification and Robustness

- Since we estimate the ***differential* pay-performance sensitivity** across firms subject to different regulatory regimes, the typical potential **endogeneity** problem, i.e. managers **manipulating information** about firms' results to bolster their compensation should be less severe
- **Control variables**: Industry and firm specific features may influence the propensity to rely on incentive compensation
- **Degree of market competition/liberalization**
  - OECD Sector/Country Indexes of liberalization: from 0 to 6, large values mean weak competition and less liberalization
  - Incumbent's market shares, barriers to entry, vertical integration
- **State Ownership**
  - Dummy = 1 if the government holds at least 30%
- **Multinationality**
  - Dummy = 1 if the firm operates in more than one country
- **Controlling for CEO-specific omitted variables**
  - Panel regressions with CEO fixed effects, clustering by CEO

Regulated vs. Deregulated

$$Log(CEOcomp)_{it} = \alpha + \beta_1(performance)_{it} + \beta_2(performance)_{it} * REG +$$
$$+ \beta_3 tenure_{it} + \beta_4 tenure_{it} * REG + \beta_5 firmsize_{it} + \beta_6 firmsize_{it} * REG +$$
$$+ \beta_7 GDP_{it} + \mu_{it} + \varepsilon_{it}$$

Log (CEO compensation)
Regulated vs Unregulated
(Panel regressions)

	(1) *Stock Return*	(2) *Log(MarketCap)*	(3) *Log(ROA)*	(4) *Log(MTB)*
Performance	*0.31***	*0.35***	*0.23****	*0.26**
	(2.13)	*(2.47)*	*(2.65)*	*(1.85)*
Performance*REG	*-0.33***	*-0.29**	*-0.18**	*-0.13*
	(-2.17)	*(-1.92)*	*(-1.91)*	*(-0.84)*
Tenure	*0.6****	*0.05****	*0.04***	*0.05****
	(3.24)	*(2.89)*	*(2.19)*	*(2.99)*
Log (TotalAsset)	*0.13*	*0.21****	*0.28****	*0.28****
	(1.60)	*(2.67)*	*(3.32)*	*(3.74)*
State Ownership	*-0.30*	*-0.26*	*-0.28*	*-0.27*
	(-1.51)	*(-1.24)*	*(-1.26)*	*(-1.25)*
OECD Index of Liberalization	*-0.11*	*-0.16****	*-0.13**	*-0.17****
	(-1.53)	*(-2.82)*	*(-1.71)*	*(-3.19)*
R-squared	*0.30*	*0.35*	*0.31*	*0.33*
N. Obs	*355*	*347*	*362*	*345*
N. Firms	*54*	*55*	*53*	*54*

Very weak pay-performance sensitivity in Regulated firms

Incentive vs. RoR Regulation

$$Log\,(CEOcomp\,)_{it} = \alpha + \beta_1(performanc\ e)_{it} + \beta_2(performanc\ e)_{it} * CAP +$$
$$+ \beta_3 tenure_{it} + \beta_4 tenure_{it} * CAP + \beta_5 firmsize_{it} + \beta_6 firmsize_{it} * CAP +$$
$$+ \beta_7 GDP_{it} + \mu_{it} + \varepsilon_{it}$$

Log (CEO Compensation)
CAP vs. ROR
Panel regressions

	(1) *Stock Return*	(2) *Log(MarketCap)*	(3) *Log(ROA)*	(4) *Log(MTB)*
Performance	*-0.27***	*0.04*	*-0.2*	*-0.31***
	(-2.43)	*(0.70)*	*(-0.30)*	*(-2.32)*
Performance*CAP	*0.34***	*0.02***	*0.09***	*0.42****
	(2.45)	*(2.21)*	*(2.15)*	*(3.71)*
Tenure	*0.05***	*0.04***	*0.04**	*0.05***
	(2.34)	*(2.15)*	*(1.80)*	*(2.22)*
Log (TotalAsset)	*0.12*	*0.18**	*0.27***	*0.19***
	(1.18)	*(1.83)*	*(2.47)*	*(2.03)*
State Ownership	*-0.26**	*-0.23*	*-0.11*	*-0.30*
	(-1.69)	*(-1.29)*	*(-1.26)*	*(-1.42)*
OECD Index of Liberalization	*-0.11*	*-0.17****	*-0.11*	*-0.18****
	(-1.60)	*(-3.40)*	*(-1.19)*	*(-3.66)*
R-squared	*0.25*	*0.26*	*0.25*	*0.27*
N. Obs	*273*	*268*	*294*	*266*
N. Firms	*40*	*41*	*42*	*40*

Positive and significant pay-performance sensitivity in IR firms

Conclusions and Policy Implications

- Corporate governance and regulation work together to ensure an effective governance structure, in line with shareholder wealth maximization
- Deregulated vs. Regulated
  - Within regulated firms, the diminished consequences of managerial their decisions explains, and justifies, lower sensitivity of pay to performance.
- Incentive regulation
  - Our results suggest that the corporate governance of firms under incentive regulation is somehow more similar to that of deregulated and unregulated firms
- Cost-plus regulation
  - The adoption of incentive compensation contracts for energy utilities under this scheme seem to bring no advantages to the firm and only additional costs to the shareholders

Dividend Policy in Regulated Electric Firms

Bremberger, Cambini, Gugler, Rondi (2014)

- Public utilities and energy firms payout large dividends
  - Dividend payout: 118% for telecoms and 56% in utilities
  - In Dec.2013, payout of energy firms in the STOXX EU 30: 317%
  - A good reason to interest financial markets AND governments

→ We investigate the dividend policy (smoothing and pay-out) of regulated utilities in Europe (electric companies) by accounting for the regulatory regime (Cost-based vs. Incentive regulation) and for the impact of ownership (private vs. state controlled)

What Links Dividends and Regulation?

- Cost-based regulation does not spur efficiency, but it guarantees financial integrity and reduces earnings volatility
- Incentive regulation leaves excess profits to the firm, but it shifts the risk of demand and costs' fluctuation on the firm
  - IR leads to higher systematic risk (Alexander and Irwin, 1996 WB; Grout and Zalewska, 2006 JFE)
  - IR increases earnings variability (Parker 1997 UtPol)
- Incentive Regulation generates stronger efficiency-enhancing pressures which lead to cash management optimization, hence to stronger impact effects of profits on dividends

- Empirical evidence by Leary and Michaely (2011 RFS): firms with high volatility of earnings smooth less

Theory: The Lintner Model (1956 AER)

Dividends are the result of a partial adjustment of last year's dividends towards a target payout ratio

$$D_{it} - D_{it-1} = a_i + \alpha_i (D_{it}^* - D_{it-1}) + u_{it} \qquad D_{it}^* = \tau_i E_{it}$$

$$D_{it} = a_i + \alpha_i \tau_i E_{it} + (1 - \alpha_i) D_{it-1} + u_{it}$$

$$D_{it} = a_i + \beta_1 E_{it} + \beta_2 D_{it-1} + u_{it}$$

τ = target payout ratio; α = speed of adjustment (SOA)
β_1= impact effect of profits; β_2= (1-α) = smoothing;

- We modify the SOA parameter to account for a measure of earnings volatility: σ
- The "adjusted" impact effect is: $\alpha_i (1+ \sigma) \tau = \beta_1$
- The "adjusted" smoothing parameter is: $1 - \alpha_i (1 + \sigma_i) = \hat{\beta}_2$

Research Hypotheses

- **Hypothesis 1**: Firms under Incentive Regulation have lower smoothing (β_2) parameters than firms under Cost-Based regulation.

- **Hypothesis 2**: Firms under Incentive Regulation have larger impact effect (β_1) parameters than firms under Cost-Based regulation.

- ***What about the Target Payout?*** $\tau_i = \frac{\beta_1}{1-\beta_2}$

  Higher impact effect (β_1) → TPR increases

  Lower Dividend Smoothing (β_2) → TPR decreases

- Overall effect of *IR* on target payout ratios is uncertain

Estimation Strategy

$$D_{it} = a_{0i} + a_{1i} D_{it-1} + a_{2i} D_{it-1} Inc\,Reg_{it-1} + a_{3i} E_{it} + a_{4i} E_{it} Inc\,Reg_{it} + \varepsilon_{it}$$

- We use the shift to Inc_Reg and test its effect on dividend policy: *D* and *E* with an *Incentive Regulation Dummy*
- We use the GMM-SYSTEM estimator to estimate a dynamic dividend model with a panel (see Goergen et al., JEF, 2009)
- Policy decisions/reforms are likely endogenous
  - We rely on "external" instruments" that help explaining the institutional and political environment behind privatization and regulatory reforms and present quasi-first stage analyses (Persson 2002): Political orientation of the Gov.; Political concentration of the Gov. Checks and Balances; Public Debt to GDP, Mean state control (Reg)
- We check on the sub-sample of firms that switch to *IncReg*

The Panel and the Data

- Unbalanced panel of 106 EU electric transmission and distribution operators from 17 European countries, 1986 - 2010

Variable Name	Source	Definition
Dividends	Worldscope	Total common and preferred dividends paid to shareholders of the company
Net Profits	Worldscope	Net income after preferred dividends that the company uses to calculate its basic earnings per share
Inc Reg	Regulatory Authorities	Self-constructed dummy
State Control	Annual Reports	Self-constructed dummy, indicating at least 25% state ownership
Political Orientation of Government	DPI2009	A time-varying variable: (1) for rightwing, (2) for centre and (3) for leftwing (Bank, Cheffins and Goergen, 2009)
Herfindahl Gov.	DPI2009	Herfindahl Index Government: The sum of the squared seat shares of all parties in the government (Acemoglu, 2005, Persson 2002).
Stability	DPI2009	A survey-based measure of the extent of turnover of a government key decision makers: (0) high-(1) low stability
Checks	DPI2009	Index of Checks and Balances in the political system
Debt to GDP	OECD	Ratio of the Public (Government) Debt to Gross Domestic Product (Bortolotti and Faccio, 2009)

The Impact of Incentive Regulation

Dep. Var.: Dividends $_t$	FE	GMM	GMM External Instruments	GMM Only firms that switched from RoR to Incentive
Dividends $_{t-1}$	0.506***	0.663***	0.661***	0.478**
	(0.0844)	(0.188)	(0.185)	(0.204)
Dividends$_{t-1}$*Inc Reg$_{t-1}$	-0.232	-0.497*	-0.508*	-0.391*
	(0.193)	(0.263)	(0.276)	(0.224)
Net Profits$_t$	0.247***	0.144	0.130	0.102
	(0.0439)	(0.0891)	(0.0897)	(0.200)
Net Profits$_t$*Inc Reg $_t$	0.0690	0.312***	0.333***	0.531***
	(0.0655)	(0.117)	(0.128)	(0.159)
N.Firms [N.Obs.]	106 [1417]	106 [1323]	96 [1103]	74 [809]
Hansen p-value		0.151	0.316	0.340
ar1 p-value		0.0124	0.0117	0.013
ar2 p-value		0.390	0.371	0.206

	GMM (External Instruments)	
	Inc	**Cost**
Smoothing	**0.152**	**0.661*** **
Impact	**0.464*** **	**0.130**
Tpr	**0.547*** **	**0.384*** **

- Smoothing is lower under IR
- Impact effect is higher, and
- Target Payout Ratio is higher

The State Ownership Effect

- In many EU countries, privatization is incomplete
- May continuing state-control counteract the impact of incentive regulation on dividends?
- Elected politicians may have a strong interest in steady flows of dividends from state-controlled firms:
  - *The "energy dividend" is a safe and steady source of financing when the budget constraint is tight*
  - *To convince citizens that the company is well run*
  - *To reduce cash in the hands of managers*

The Impact of Regulation and Ownership

Dep. Var.: Dividends $_t$	FE	GMM	GMM(external)
Dividends $_{t-1}$	**0.557*** (0.121)**	**0.388*** (0.0766)**	**0.397*** (0.146)**
Div $_{t-1}$*Inc $_{t-1}$ * State $_{t-1}$	**0.126 (0.145)**	**0.253** (0.118)**	**0.313* (0.162)**
Div$_{t-1}$*Inc $_{t-1}$ * Priv $_{t-1}$	**-0.498*** (0.140)**	**-0.336*** (0.130)**	**-0.405*** (0.157)**
Div$_{t-1}$*Cost$_{t-1}$*Priv$_{t-1}$	**-0.103 (0.201)**	**0.0667 (0.166)**	**0.028 (0.234)**
Net Profits	**0.215*** (0.0459)**	**0.304*** (0.0441)**	**0.442*** (0.106)**
NP *Inc * State	**-0.0597 (0.0621)**	**-0.0424 (0.0658)**	**-0.147 (0.156)**
NP *Inc * Priv	**0.120 (0.0950)**	**0.121 (0.0932)**	**-0.022 (0.184)**
NP* Cost* Priv	**-0.0319 (0.0724)**	**-0.0576 (0.0790)**	**-0.223** (0.108)**
N.Firms [N.Obs.]	106 [1358]	106 [1263]	95 [1057]
adj. R^2	0.588		
Hansen p-value		0.999	0.638
ar1 p-value		0.0435	0.045
ar2 p-value		0.226	0.143

- **Private** firms under IR have lower smoothing and larger impact effects
- ***State*** *firms report the largest Target Payouts,* ***regardless of regulatory regime***

Conclusions

- Firms under Incentive Regulation smooth less and report larger impact effects than firms under Cost-based Regulation (in line with H1 and H2)
  - Firms under IR have larger target payout ratios
- IR makes dividend policy more responsive to earnings variability and efficiency-seeking pressures
- However, lower smoothing under IR is entirely due to private firms. State firms are impervious/unreceptive to regulatory schemes
- State ownership seems to outmanoeuvre regulation (also) when it comes to dividend payout policy

A Tentative Sum Up

- Regulation has a strong impact on the real and financial decisions of public utilities
  - The inception of IRA - Independent Regulatory Authority
  - The choice of regulatory contract: Cost-based or Incentive regulation
- The effectiveness of regulation is affected by political interference
- Political interference is more likely when the Government is one of the shareholders of the regulated firm
- Political interference is more likely in countries where political institutions are "weak" and the room for maneuver is large
  - Institutional constraints on politicians do not prevent them to meddle with regulators to obtain more favorable conditions for the state-controlled regulated firm (for their own political benefit)
- Financial markets are well aware of the effect of political interference in firms' and regulatory decisions