Reforming Utilities

The Empirics of Performance, Ownership and Liberalisation

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Infraday, TU Berlin

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Today's Talk

Today's talk should provide . . .

- the research question and relevant literature.
- a look at the data and framework for analysis.
- a discussion of results.
- some concluding comments.

Motivation/Questions

Infrastructure industries have been subject to substantial reform in the past 15 years.

→ When and how did these reforms work?

In particular is it possible to differentiate between ownership effects and liberalisation effects?

Are the reforms an important determinant of firm performance?

Ownership effects have been well-documented, but generally not in combination with market reform.

Literature 1/2

In privatisation literature infrastructure tends to be an "after-thought."

Performance improvements and efficiency rises have been found across empirical work (Megginson & Netter 2001, *JEL*).

D'Souza & Megginson (1999) *JFin*, performance in 1990s.

Includes entire UK electricity sector, statistical difference in pre/post- privatisation mean.

Literature 2/2

Recently some attempts have been made to account for market reform:

Ros (1999) *JRegEcon* for telecoms private ownership is associated with network expansion, competition with efficiency. (see also Bortolotti et.al., 2002).

Villalonga (2000) *JEBeOrg*, political and organizational variables significant in Spanish sample.

Boubarki et.al. (2005) *JCorpFin*, uses mostly utilities and telecoms, some liberalisation indicators.

D'Souza et.al. (2007) *GlobFinJ*, find positive relation between profitability and private ownership, but not regulation.

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Data Set

Data set covers six utility industries in 18 European countries.

Variables include

$\longrightarrow$ financial data,

$\longrightarrow$ ownership,

$\longrightarrow$ regulatory/competition indicators,

$\longrightarrow$ and GDP.

The unbalanced panel ranges from 1996 to 2006 with $n = 2204$.

Data Sources

Financial data is taken from AMADEUS and Reuters:

- $\longrightarrow$ Missing observations
- $\longrightarrow$ Ownership data not suitable (direct/indirect Owner, matching)

Regulatory and Ownership indicators are calculated in Conway & Nicoletti (2006).

Income data (PPP adjusted) is provided by the OECD.

Industry Data

Industry	Number of Firms
Electricity (2211)	820
Natural Gas (2212)	162
Airlines (4810-12)	159
Rail (4820-1)	190
Post (4910+1)	53
Telecom (5151, 5179)	729

Note: NAICS Code in Parenthesis

Skewed distribution $\rightarrow$ localised approach to electricity and reforms in telecoms.

Country Data

Country	No of Firms	Country	No of Firms
Austria	20	Belgium	78
Czech Republic	62	Denmark	83
Finland	59	France	153
Germany	224	Greece	27
Ireland	22	Italy	203
Netherlands	152	Norway	163
Poland	82	Portugal	11
Spain	233	Sweden	80
Switzerland	63	United Kingdom	489

Summary Statistics for Reform Indicators

Indicators cover a wide range of reform issues.

Including entry regulation, market structure, vertical integration from 0 (e.g. unbundeld) to 6 (e.g. integrated).

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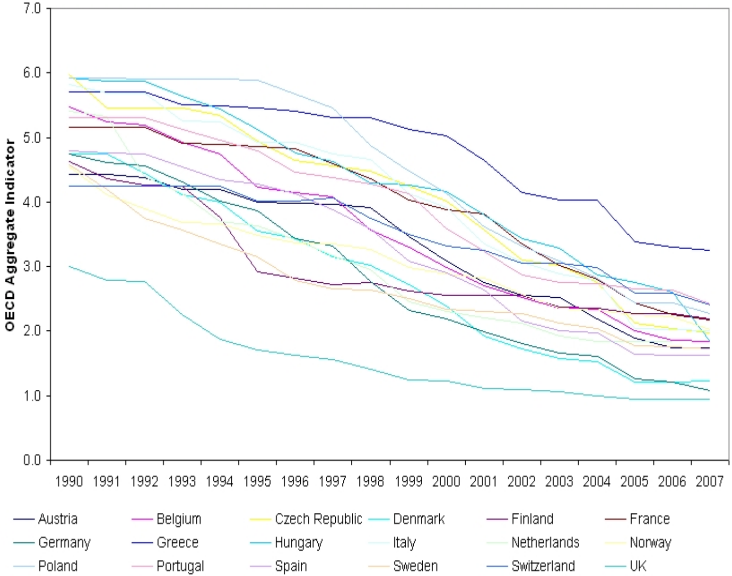
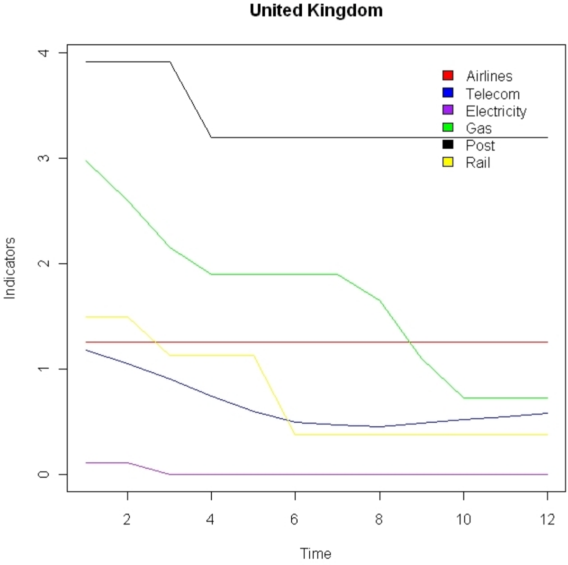
Statistic	Regulatory Reform	Ownership
Minimum	0.00	0.00
1st Quantile	0.80	0.00
Median	1.60	2.60
Mean	1.96	2.54
3rd Quantile	2.60	4.50
Maximum	6.00	6.00
Correlation	0.4194	

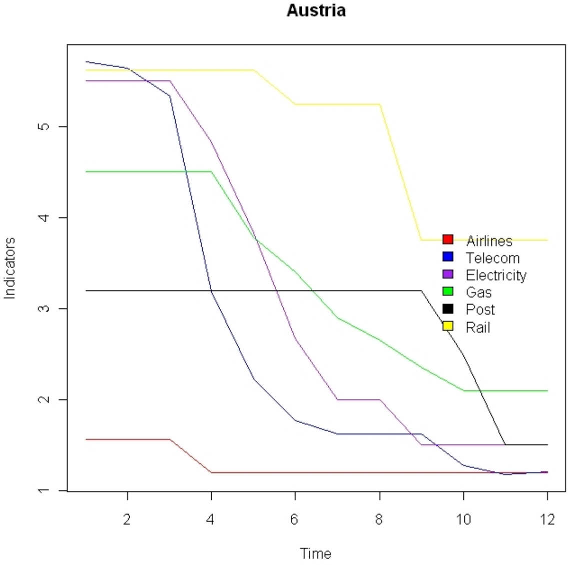
Regulatory Reform over Time



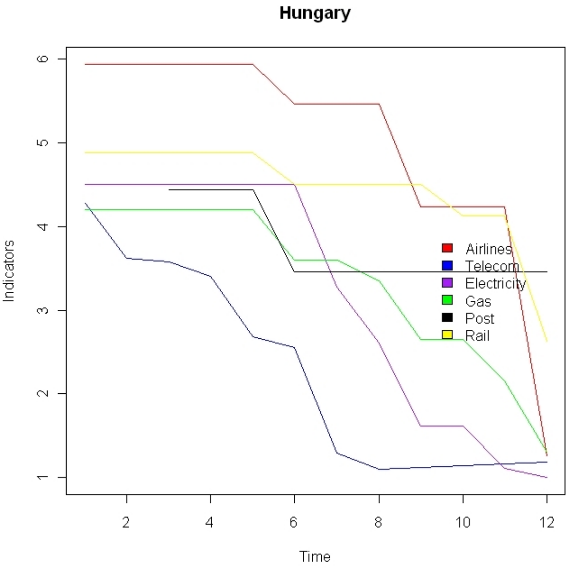
Regulatory Reform across Industries



Regulatory Reform across Industries



Regulatory Reform across Industries



Econometric Model

$$Y_{it} = X_{it}\beta + D_c\gamma_c + Z_{cit}\delta_{ci} + \eta_i + \epsilon_{it}, \tag{1}$$

$$Y_{it} = Y_{it-1}\alpha + X_{it}\beta + D_c\gamma_c + Z_{cit}\delta_{ci} + \eta_i + \epsilon_{it}, \tag{2}$$

Y_{it} . . . measures performance of i at time t,
X_{jt} . . . is the set of variables of interest,
D_c . . . are country dummies,
Z_{it} . . . is a set of additional controls,
η_i . . . firm-specific unobserved effects,
ϵ_{it} . . . are transient errors.

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- a brief overview of my thesis.

and for paper 3 . . .

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RE and FE for ROA

	Coefficients	Estimate	t-value	$Pr(>\|t\|)$
RE				
	Intercept	1.6409	1.6886	0.0913
	ln Employee	−0.2642	−2.0464	0.0407
	Quoted	1.1566	0.7241	0.4690
	Regulatory Reform	−0.3978	−3.0944	0.0020
	Ownership	0.4495	3.2953	0.0009
	GDP	$1.36e-06$	2.8642	0.0042
FE				
	ln Employee	−1.1549	−4.4575	0.0000
	Regulatory Reform	−0.2042	−1.2352	0.2168
	Ownership	0.1302	0.5351	0.5925
	GDP	$9.79e-06$	4.3731	0.0000

Notes: Unbalanced panel with $T = 1 - 10$ and $N = 1996$.
The number of observations totals 11029.

RE and FE for Sales per Employee

	Coefficients	Estimate	t-value	$Pr(> \|t\|)$
RE				
	Intercept	−962.00	−0.4849	0.6277
	Quoted	−1486.0	−0.3809	0.7033
	Regulatory Reform	633.38	1.8031	0.0714
	Ownership	798.98	2.2454	0.0248
	GDP	0.0015	1.2685	0.2046
FE				
	Regulatory Reform	816.09	1.6912	0.0908
	Ownership	1835.7	2.6656	0.0077
	GDP	0.0072	1.0728	0.2834

Notes: Unbalanced panel with $T = 1 - 10$ and $N = 1370$.

The number of observations totals 7672.

P-value for Hausman Test is 0.2275.

Dynamic Model

Sign and magnitude of coefficients stays the same.

Regulatory reform indicator significant in FE model, ownership in RE model.

Lagged coefficients also statistically significant.

P-value for Hausman test is < 0.01.

Results 1/2

Deregulation had a positive impact on ROA and a negative impact on efficiency.

$\rightarrow$ A one point decrease increases ROA by around 0.3 (sample mean = 3.1).

Increases in private ownership are associated with lower profitability and lower efficiency.

$\rightarrow$ A coefficient of 1835.7 suggests that this effect is substantial (sample mean = 3324).

Results 2/2

Results suggest that regulatory reform improved profitability whereas private ownership decreased profitability.

Results on Sales/Employee also conflicting.

Commonly a measure of efficiency in empricial work.

Would imply that reform and privatisation lead to decrease in efficiency.

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To Conclude . . .

Regulatory reform and privatisation appear to have an impact on firm performance and efficiency.

Even after taking into account firm-specific, country-specific and time effects some statistical significance remains.

Effects are also economically significant but not of the expected sign.

Possible extention: leverage and sub-sample analysis.