

COMMITMENT AND REGULATORY INDEPENDENCE IN PRACTICE IN LATIN AMERICAN AND CARIBBEAN COUNTRIES

Francesc Trillas, UAB, Spain
(Francesc.Trillas@uab.es)

Miguel A. Montoya, ITESM, México
(mmontoya@itesm.mx)

Outline of Presentation

- Introduction
- Literature Review
- Construction of indices of independent regulation in practice
- The impact of regulatory independence on network penetration
- Conclusions

Introduction

- Theory: regulatory independence may be a way to commit not to expropriate sunk investments.
- But independence relocates, does not solve, the commitment problem: government must commit to respect independence.
- Empirical literature: regulatory independence measured as dummy variable or legal independence, and treated as exogenous.
- What we do: we measure independence in practice and treat independence as endogenous.
- Based on careful study of 23 LA and Caribbean telecom regulators between 1990 and 2004.

Literature

- Two related branches of the literature:
 - Determinants of telecommunications penetration: Gutiérrez, Ros, Wallsten, Gual and Trillas...
 - Literature on Central Bank Independence: Cukierman, Webb, De Haan and Kooi, etc.

Studies on Telecommunications Regulation

Table 1. Studies on Telecommunications Regulation and Telecommunications Regulatory Authorities (TRAs)

<i>Study</i>	<i>Type</i>	<i>Characteristics</i>	<i>Data Sources</i>	<i>Result</i>
Bortolotti et al. (2002)	<i>D</i>	Date in which the agency starts operating	ITU	The creation of TRA is non-significant in most estimations
Edwards and Waverman (2005)	<i>I</i>	Twelve-component index	EC and other	TRA' independence is significant by itself and interacting with privatization
Fink et al. (2002)	<i>D</i>	Whether country has a separate regulatory agency or otherwise	ITU	Significant in most estimations
Gual and Trillas (2004)	<i>I</i>	Nine-component index	ITU, OECD, and others	Legal TRA is non-significant.
Gutiérrez (2003a)	<i>I</i>	Four-dimension index of regulatory governance	Own research	Positive and significant (at 1% level) in tele-density and efficiency (at 10% level)
Henisz et al. (2005)	<i>I</i>	Four dimension index	ITU	Deregulation is robust and significant
Pargal (2003)	<i>I</i>	Six-dimension index	Guasch (2001)	TRA independence gives mixed results depending on the dimension
Ros (2003)	<i>D</i>	Whether there is a separate agency	ITU	Positive and significant at 10% level for expansion and at 1% level for efficiency.
Wallsten (2001)	<i>D</i>	Whether the country's agency is under the control of a Ministry.	ITU	Non-significant at 1% and not always at 5%
	<i>D</i>	Whether the agency was established before privatization.	ITU	Positive and significant in three different regressions.
Wallsten (2003)	<i>D</i>	Whether the Regulatory agency states that it is independent relative to politicians.	ITU	Negative and significant at 5%

D: Dummy; *I*: Index

Studies on Central Bank Independence

Table 2. Studies measuring Central Bank independence in practice in developing countries.

<i>Article</i>	<i>Number of countries (developing)</i>	<i>Estimation Period</i>	<i>Does it use a legal index?</i>	<i>Variable measuring independence in practice</i>
Cuikermann (1992)	68 (49)	1950-1989	YES	Turnover Rate
Cuikermann et al. (1992)	71 (50)	1950-1989	YES	Turnover Rate
Cuikermann and Webb (1995)	67 (47)	1950-1989	YES	Vulnerability
Akhand (1998)	62 (40)	1960-1989	YES	Turnover Rate and Vulnerability
De Haan and Kooi (2000)	82 (82)	1980-1989	NO	Turnover Rate

Turnover Rate

Table 4. Duration of TRA's heads by law vs. Turnover Rate (only countries with duration prescribed by law). Period 1990-200

	Country	Legally prescribed (years)	Legally prescribed (months)	Turnover Rate (months)	Accomplishment
	<i>Latin America (17)</i>	4	54	32	60%
1	Argentina	5	60	16	27%
2	Barbados*	4	48	24	50%
3	Belize	6	72	72	100%
4	Bolivia	5	60	40	67%
5	Brasil	5	60	24	40%
6	Colombia	1.3	16	13	81%
7	Costa Rica	4	48	22	46%
8	Dominican R.	4	48	21	44%
9	Ecuador	4	48	20	42%
10	El Salvador	7	84	22	26%
11	Honduras	4	48	18	38%
12	Jamaica	5	60	60	100%
13	Paraguay	5	60	22	37%
14	Peru	5	60	66	110%
15	Surinam	5	60	42	70%
16	Trinidad and Tobago	3	36	18	50%
17	Uruguay*	4	48	48	100%

Construction of indices of independent regulation in practice

- We know (Table 3 in the article) what happened to each NRA between 1990 and 2004 in terms of:
 - Year of creation.
 - Start and end date of tenure of each head of the agency, and reason for the termination of the period.
- We develop indices of (inverse) regulatory vulnerability at 1 and 6 months.

Rankings

Table 5. Ranking IR1, LPI1 and LPI2. 1990-2004 average.

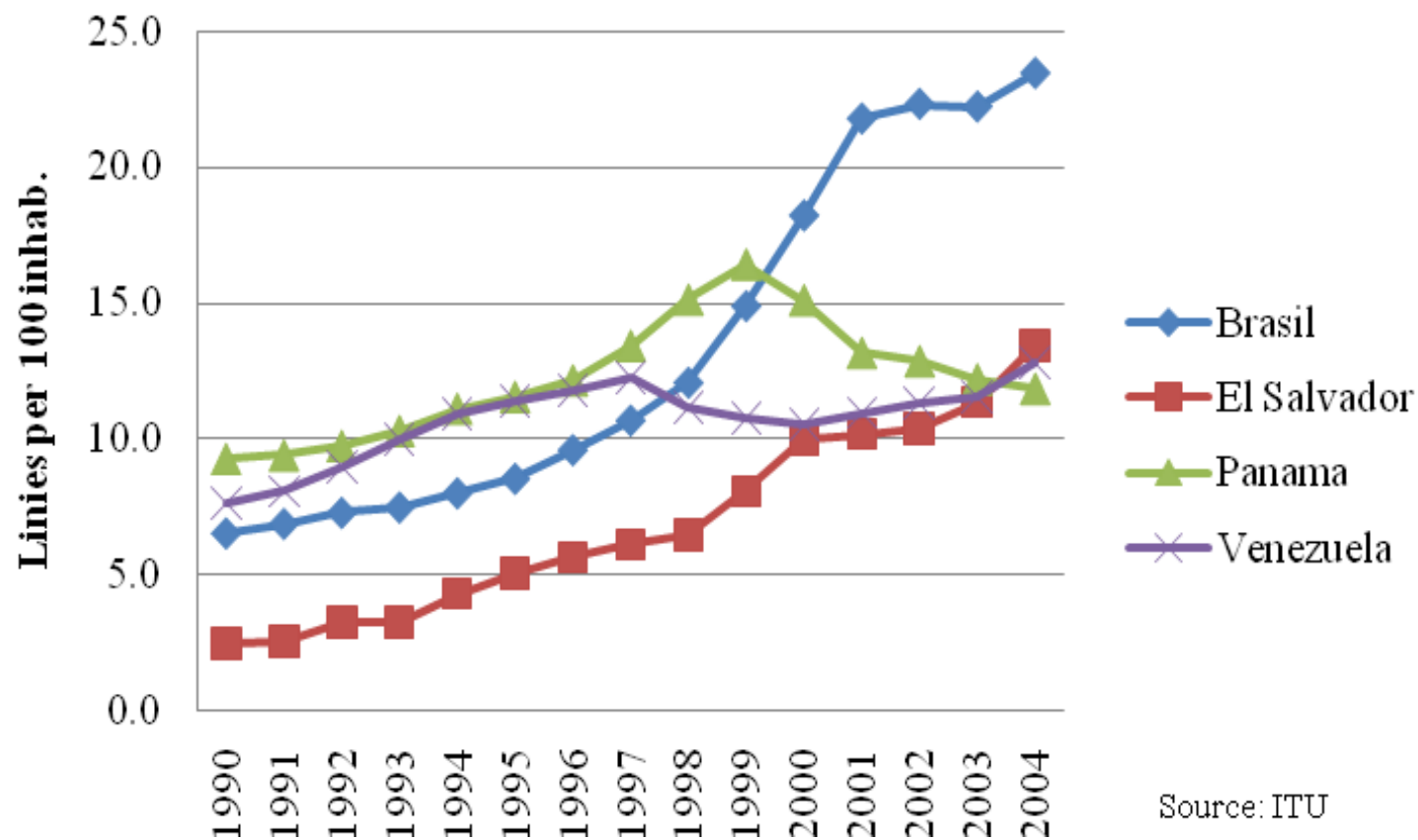
#	<i>Country</i>	IR1	<i>Country</i>	LPI1	<i>Country</i>	LPI2
1	Argentina	0.647	Peru	0.581	Peru	0.947
2	Bolivia	0.487	Bolivia	0.577	Jamaica	0.793
3	Panama	0.459	Argentina	0.490	Colombia	0.774
4	El Salvador	0.441	Brazil	0.478	Bolivia	0.710
5	Peru	0.428	Venezuela	0.468	Argentina	0.590
6	Brazil	0.422	Jamaica	0.460	Panama	0.563
7	Paraguay	0.416	Honduras	0.443	Venezuela	0.557
8	Chile	0.400	Mexico	0.415	Belice	0.550
9	Ecuador	0.387	Paraguay	0.408	Paraguay	0.508
10	Nicaragua	0.371	Colombia	0.385	Costa Rica	0.485
11	Costa Rica	0.370	Panama	0.380	Mexico	0.448
12	Venezuela	0.314	Belice	0.350	Brazil	0.411
13	Belice	0.300	Barbados	0.265	Nicaragua	0.385
14	Honduras	0.286	Ecuador	0.260	El Salvador	0.354
15	Colombia	0.281	Trinidad and T	0.240	Trinidad and T	0.340
16	Trinidad and T	0.279	Uruguay	0.227	Chile	0.333
17	Barbados	0.264	El Salvador	0.221	Barbados	0.299
18	Jamaica	0.253	Chile	0.200	Dominican R.	0.258
19	Dominican R.	0.249	Costa Rica	0.185	Uruguay	0.227
20	Mexico	0.229	Nicaragua	0.181	Guatemala	0.225
21	Uruguay	0.187	Dominican R.	0.125	Ecuador	0.193
22	Guatemala	0.183	Guatemala	0.091	Honduras	0.143
23	Surinam	0.047	Surinam	0.023	Surinam	0.023

Source: Montoya & Trillas (2007) and authors calculations

Impact of independence on network penetration

- We are interested in the impact of independence on network penetration.
- Telephone penetration: low starting levels and high country and time variation.
- Control variables: GDP per capita and population density.

**Graph 1. Main telephone lines per 100 inhabitants.
Four LA countries**



Source: ITU

Impact of independence on network penetration

- Starting point: cross section regression.
- Independence has a negative sign: it suggest an endogeneity problem, low network penetration increasing incentives to grant regulatory independence (to be added to measurement error and omitted variables problems).
- GDP per capita and density, useful control variables.
- Need to control for many country specific effects

Cross Section

Table 6. Parameter Estimates for Main Lines per 100 Inhabitants.

23 Countries, average values 1990-2004. Cross-Section

Regressors	OLS	OLS	IV
	1	2	3
<i>IR1</i>	-11.903*		-7.9605
<i>t</i>	-1.80		-0.57
<i>LPI1</i>		-3.826	
<i>t</i>		-0.61	
<i>GDPpc</i>	0.003***	0.003***	0.003***
<i>t</i>	6.58	6.01	6.30
<i>Density</i>	0.014*	0.015*	0.015*
<i>t</i>	2.05	1.97	2.03
Instrument			<i>polconiii</i>
Adjusted R-sqr	0.7811	0.7489	0.777
N-obs.	23	23	23

Notes. *** Statistically significant at 1%. ** Statistically significant at 5%. *Statistically significant at 10%.

Impact of independence on network penetration

- Panel Data with fixed effects controls for unobserved country characteristics that do not vary over time.
- Usual exercise in most of the literature.
- Static Panel: treats network penetration as if countries could easily go from 100 to 0 lines per 100 inhabitants in one year

Static Panel Data

Table 7. Parameter estimates for main lines per 100 inhabitants. 23 countries. 1990-2004. Panel Data, country fixed effects.

Regressors	1	2	3	4	5	6	7	8	9	10
<i>LPI1</i>	6.561***					12.307***				
<i>z</i>	7.78					7.34				
<i>LPI2</i>			2.165***					7.67***		
<i>z</i>			4.47					5.93		
<i>LPI3</i>				5.525***					8.783***	
<i>z</i>				7.07					7.39	
<i>PI</i>					.6962**					4.489*
<i>z</i>					2.28					1.65
<i>IR1</i>		5.268***			4.152***		8.997***			-.771
<i>z</i>		6.55			4.43		7.23			-0.13
<i>Density</i>	.1809***	.113***	.1867***	.1143***	.124***	.163***	.051	.1502***	.0632**	.1614*
<i>z</i>	7.42	4.02	7.23	4.16	4.36	6.20	1.55	4.77	2.02	2.25
<i>GDPpcpppr</i>	.0023***	.0025***	.0024***	.0025***	.0023***	.0018***	.002***	.0013***	.0022***	.0014*
<i>z</i>	8.51	9.14	8.21	9.01	8.32	5.88	7.82	3.12	7.75	2.10
<i>R-sqr</i>	0.5443	0.5222	0.4897	0.5312	0.5299	0.4779	0.4899	0.2823	0.5057	0.2975
<i>N-obs.</i>	344	344	344	344	344	344	344	344	344	344
<i>Instruments</i>	---	---	----	----	----	<i>efi, staff</i>	<i>efi, staff</i>	<i>efi, staff</i>	<i>efi, staff</i>	<i>efi, staff, polconiii (weak)</i>

Notes. * statistically significant at 1%. ** statistically significant at 5%. *** statistically significant at 10%.

Hausman Test of Ho: † Fixed Effects vs Random Effects. ‡ The explanatory variable is not endogenous.

Results of static panel data

- Regulator independence has a positive and significant effect on network penetration.
- Treating independence as exogenous underestimates the impact of independence (but difficult to find good instruments –only in one specification all relevant tests have the *right* results).
- When a country has the independence level in 2004 of Peru, it has **4 more lines** per 100 inhabitants than when it has 0 independence, everything else constant. If independence (correctly) treated as endogenous, the impact of the difference is to have **7.6 more lines**.

Dynamic Panel

Table 8. Parameter estimates for main lines per 100 inhabitants. 23 countries. 1990-2004. Panel Data, country fixed effects.

Regressors	1	2	3	4	5	6
<i>Lines100-1</i>	.9286***	.9308***	.926***	.9212***	.9117***	.9317***
λ	56.19	54.63	55.78	51.34	41.33	33.92
<i>LPII</i>		0.212			1.006	
λ		0.74			1.56	
<i>PI</i>			0.1269			-1.546
λ			1.36			-1.5
<i>IRI</i>	0.3382		0.1479	0.654		3.895*
λ	1.31		0.5	1.56		1.87
<i>Density</i>	.0162*	.0208**	.0184**	0.0123	.022***	-0.025
λ	1.87	2.56	2.08	1.28	2.69	-0.95
<i>GDPpcpppr</i>	.0002*	.0002*	0.0001	.0002*	.0002*	0.0005
λ	1.93	1.91	1.65	1.92	1.77	1.99
<i>R-sqr</i>	0.9564	0.9562	0.9567	0.9562	0.9552	0.9094
<i>N-obs.</i>	344	344	344	344	344	344
Instruments	---	---	----	<i>efi, staff</i>	<i>efi, staff</i>	<i>efi, staff, polconiii</i>

Dynamic Panel

- When 1 year lagged penetration added as regressor, this variable explains most of current penetration.
- The other regressors lose significance and magnitude.
- Independence still positive impact, but not significant.
- Need to work on the right dynamic structure.

Conclusions I

- We made progress in the literature by
 - Obtaining detailed information about the practice of independence in 23 Latin American and Caribbean countries between 1990 and 2004.
 - Constructing with this information indices of independence that combine legal and practice issues, borrowing from the methodology used in the Central Bank Independence literature.
 - Quantifying the impact of this better measured regulator independence on network penetration for telecommunications markets.

Conclusions II

- Regulator independence is associated to higher network penetration in Latin American and Caribbean telecommunications markets.
- Magnitude and statistical significance of this impact are probably low and difficult to assess.
- High turnover and political vulnerability of regulators, but this adds little to the impact of legal independence.
- Treating independence as exogenous, as done so far in the literature, may underestimate the impact of regulatory independence.
- Need to consider both benefits and costs of independence (Bernstein, 1955).

Thanks