Manual for the «Polynomics Regulation Index 2012» Data Set

Polynomics[*]

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1 Introduction

The «Polynomics Regulation Index 2012» data set measures the intensity of regulation in the telecommunication sector of 32 countries from 1997 to 2010. It updates and extends the «Plaut Economics Regulation Index» from 2007.[1] It encompasses a total of 41 qualitative indicators of various regulations in the telecommunication sector.

Economists are often interested in investigating the effect of regulation on behavior and market outcome. They are thus interested in estimating the relationship of the sort like

$$outcome_{i,t} = f(regulation_{i,t,t-1,...}, other)$$

linking the market outcome in country i at date t to intensity of regulation in individual countries across time. The «Polynomics Regulation Index 2012» aims to provide such a measure for the intensity of regulation. We hope that our data set becomes a valuable input for empirical research. The study report «Polynomics Regulation Index 2012» available on our website www.polynomics.ch/rdi provides additional background information on our index. This note describes the data set and the individual indicators which can be used to construct a regulatory density index. The data set is available from Polynomics upon request. Visit http://www.polynomics.ch/rdi. If you publish results based on our data, please cite our work. Suggested citation:

> Zenhaeusern, Patrick, Yves Schneider, Stephanie Berner and Stephan Vaterlaus (2012): «Polynomics Regulation Index 2012 - Regulatory Density in the Telecommunication Sector», www.polynomics.ch/rdi.

2 Data Sources

Each indicator asks a question related to regulation in the telecommunication sector (see Table 2). We answered these questions by consulting many different sources:

- BEREC http://www.erg.eu.int/documents/berec_docs/index_en.htm.

- Cullen International, Telecommunications, Western Europe, Cross-Country Analysis, various editions up to 2011.

- Cullen International, Telecommunications, Central & Eastern Europe, Cross-Country Analysis, various editions up to 2011.

- European Radiocommunications Office (2005), Information Document on GSM Frequency Utilisation within Europe (http://www.ero.dk).

- Cable Europe, European Broadband Cable, Brussels, various editions up to 2010.

- European Federation of Journalists (2005), Media Power in Europe: The Big Picture of Ownership, Brussels (http://www.ifj.org/pdfs/EFJownership2005.pdf).

- European Commission, Reports on the Implementation of the Telecommunications Regulatory Package, Brussels, various editions up to 2010.

- International Comparative Legal Guide Series (ICLG), http://www.iclg.co.uk.

- ITU World Telecommunications Regulatory Database (from 2004 onwards), Geneva.

- OECD Communications Outlook (1999, 2001, 2003, 2005, 2007, 2009, and 2011), Paris.

- OECD (2005), Draft Report to Council on Experiences with Structural Separation, Working Party No. 2 on Competition and Regulation, DAF/COMP/WP2(2005)1/REV1, Paris.

- OECD (2003), Working Party on Telecommunications and Information Services Policies, Development in Local Loop Unbundling, DSTI/ICCP/TISP (2002)5/Final.

- Commission of the European Communities (2001), The Introduction of Third Generation Mobile Communications in the European Union: State of Play and the Way For-ward, COM(2001)141 final, Brussels.

- Baker & McKenzie (2005), Telecommunications Laws in Europe, 5. edition, Joachim Scherer, Tottel publishing, West Sussex.

- Websites of the national regulatory agencies.

3 Description of Variables

The data consists of coded answers to a total of 29 questions regarding sector specific regulations. Table 2 lists all questions. Each question relates to one or possibly several «networks»: a question may be asked with regard to the traditional fixed line network, to the next generation access (NGA) fixed line network, to the traditional mobile network, the NGA mobile network or with regard to telecommunication companies in general. Table 4 shows which question is asked with regard to which network. Each combination of a question (numbers) and a network (letters) constitutes an indicator. For example, indicator 15B asks whether full unbundling is regulated (15) for traditional fixed line networks (B). This process leads to a total of 41 indicators. The answers to these 41 indicators are contained in the data set and coded according to Table 3.

4 Some Descriptive Statistics

The data set contains 28 indicators for 32 countries over 14 years plus 13 indicators for 32 countries over 4 years, amounting to a total number of $18,368$ observations. Table 1 shows the mean values of all indicators for each year. Each value is the mean over 32 country observations.[2]

The regulatory indicators can be aggregated to indices. We can, for example, take the average over all or over a subset of indicators. One particular way to do this is to compute the average over the indicators for each subset of regulations (price, quantity, entry, miscellaneous). As an example, we construct a subindex for each subset of regulation for the three «networks» fixed net, mobile, and general (the boldfaced indicators in Table 4):

$$PriceReg = \tfrac{1}{5}\left(4B + 5D + 6B + 7B + 7D\right)$$
$$QuantReg = \tfrac{1}{4}\left(9B + 10B + 11B + 12D\right)$$
$$EntryReg = \tfrac{1}{11}\left(13A + 14A + 15B + 16B + 17B\right.$$
$$\left. +18B + 20B + 21D + 22D + 23D + 24D\right)$$
$$MiscReg = \tfrac{1}{4}\left(26A + 27A + 28D + 29A\right)$$

We thus get for each country in each year the four sub-indices price regulation, quantity regulation, entry regulation, and miscellaneous regulation. Averaging again over these four sub-indices we construct the overall index

$$RDI = \tfrac{1}{4}\left(PriceReg + QuantReg + EntryReg + MiscReg\right).$$

This is, of course, only one arbitrary way of creating an aggregate view on regulatory density in the telecommunication sector. Depending on the research question at hand, another procedure

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[2]27 EU countries, Australia Japan, Singapore, Switzerland, and USA.

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1A	0.22	0.50	0.50	0.53	0.66	0.69	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
2B	0.94	0.91	0.94	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.84	0.84
2C	0.94	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.92	0.92	0.92	0.92	0.92	0.89
3A	0.97	0.94	0.94	0.94	0.94	0.91	0.59	0.28	0.12	0.06	0.06	0.06	0.06	0.06
4B	0.90	0.89	0.94	0.93	0.92	0.92	0.88	0.88	0.91	0.91	0.91	0.86	0.84	0.84
4C											0.06	0.11	0.18	0.34
5D	0.08	0.08	0.09	0.11	0.11	0.12	0.10	0.13	0.31	0.65	0.74	0.76	0.79	0.79
6B	0.03	0.03	0.42	0.44	0.43	0.43	0.44	0.44	0.45	0.48	0.48	0.46	0.49	0.51
7B	0.78	0.81	0.81	0.78	0.78	0.78	0.78	0.78	0.75	0.75	0.78	0.81	0.78	0.72
7D	0.03	0.06	0.06	0.03	0.03	0.03	0.03	0.03	0.06	0.06	0.03	0.03	0.03	0.03
8C											0.02	0.02	0.02	0.02
8E											0.02	0.02	0.02	0.02
9B	0.12	0.12	0.19	0.19	0.22	0.22	0.19	0.22	0.22	0.22	0.22	0.25	0.22	0.19
9C											0.03	0.03	0.03	0.03
10B	0.12	0.12	0.16	0.16	0.16	0.16	0.22	0.22	0.25	0.28	0.28	0.31	0.31	0.31
10C											0.00	0.00	0.00	0.00
11B	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
11C											0.03	0.03	0.03	0.03
12D	0.03	0.03	0.03	0.22	0.56	0.62	0.66	0.69	0.78	0.84	0.84	0.84	0.84	0.84
13A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.09	0.09	0.09
14A	0.25	0.47	0.47	0.56	0.56	0.62	0.66	0.75	0.81	0.94	0.97	0.97	0.97	0.97
15B	0.09	0.22	0.31	0.38	0.62	0.66	0.66	0.75	0.94	0.94	0.97	0.97	1.00	1.00
16B	0.00	0.03	0.09	0.16	0.19	0.28	0.25	0.31	0.31	0.44	0.69	0.75	0.78	0.78
17B	0.03	0.03	0.19	0.22	0.28	0.47	0.44	0.44	0.44	0.44	0.44	0.50	0.56	0.62
18B	0.06	0.09	0.12	0.19	0.41	0.66	0.66	0.75	0.91	0.97	0.97	0.97	0.97	0.97
18C											0.25	0.41	0.53	0.72
18E											0.34	0.38	0.44	0.44
19C											0.41	0.44	0.53	0.53
19E											0.41	0.41	0.41	0.41
20B	0.97	0.97	0.97	1.00	1.00	1.00	1.00	0.97	0.97	0.97	0.97	0.97	0.84	0.81
20C											0.88	0.88	0.75	0.72
21D	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.03	0.16	0.19	0.19	0.19
22D	0.65	0.57	0.49	0.47	0.49	0.48	0.48	0.48	0.47	0.47	0.46	0.46	0.46	0.47
23D	0.00	0.00	0.02	0.03	0.21	0.28	0.31	0.33	0.39	0.47	0.41	0.43	0.43	0.46
24D	0.75	0.75	0.75	0.72	0.78	0.78	0.72	0.66	0.62	0.56	0.50	0.47	0.38	0.34
25C											0.02	0.02	0.02	0.02
25E											0.02	0.02	0.02	0.02
26A	0.71	0.67	0.58	0.53	0.52	0.50	0.48	0.43	0.41	0.36	0.36	0.36	0.36	0.35
27A	0.22	0.22	0.22	0.25	0.22	0.22	0.16	0.16	0.16	0.16	0.09	0.09	0.09	0.09
28D	0.47	0.47	0.47	0.50	0.69	0.75	0.78	0.81	0.81	0.81	0.84	0.84	0.84	0.84
29A	0.28	0.31	0.31	0.31	0.31	0.38	0.38	0.34	0.44	0.44	0.41	0.41	0.41	0.41

Table 1: Mean values for each indicator over time.

using different indicators may be appropriate.

Figure 1 illustrates the evolution of the four sub-indices over time and Figure 2 shows the evolution of the overall index. Overall, regulatory density increases over time. The increase is particularly pronounced for entry and exit regulations.
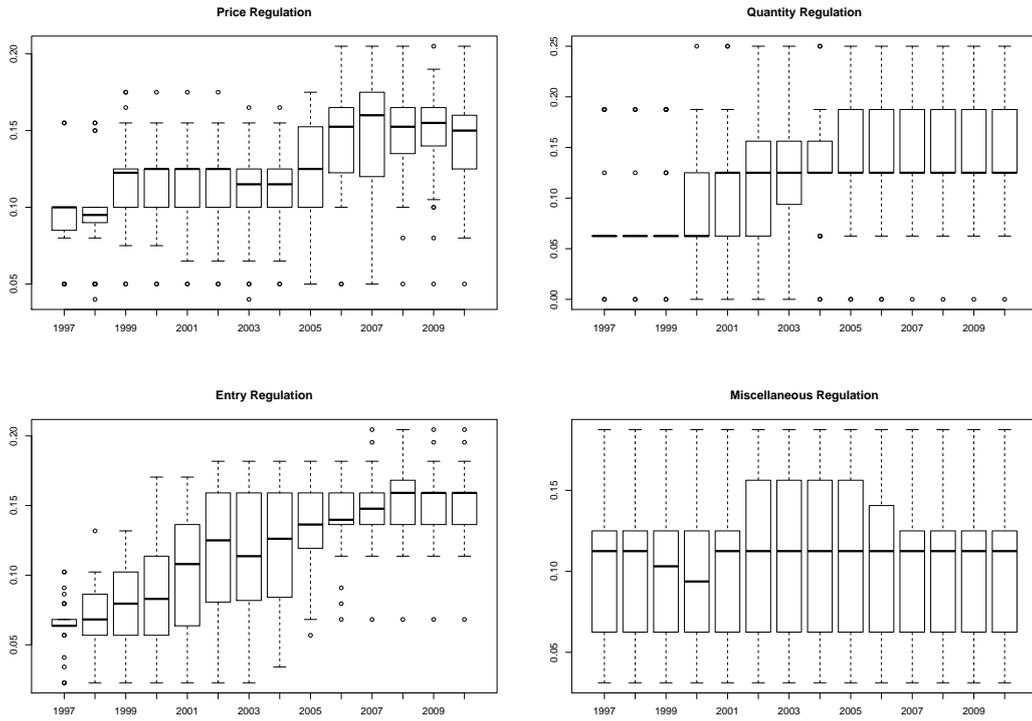
Figure 1: Boxplots illustrating the evolution of the sub-indices price regulation ($PriceReg$), quantity regulation ($QuantReg$), entry regulation ($EntryReg$) and miscellaneous regulation ($MiscReg$) over time.
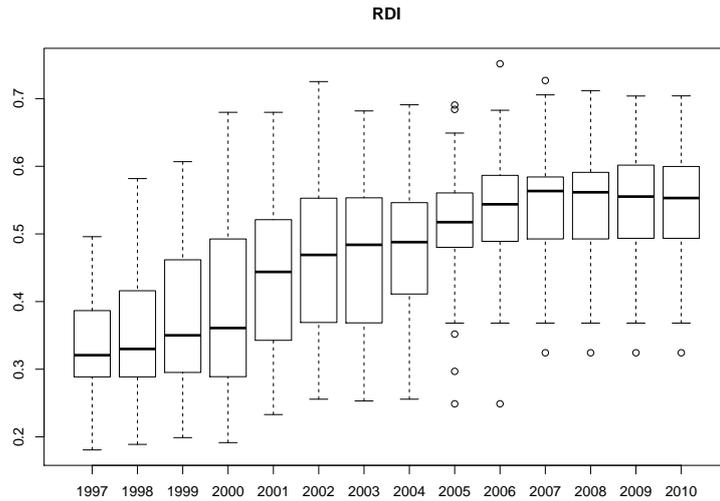

Figure 2: Evolution of the overall regulatory density index RDI (average of the four sub-indices price regulation, quantity regulation, entry regulation, and miscellaneous regulation) from 1997 to 2010.

QID	Question
1	Is the sector-specific regulation generally applied «ex ante»?
2	Is the national sector-specific regulation based on a regionally differentiated market definition (with the goal of taking into account competition at regional level)?
3	Are there time-bound regulatory cycles (e. g. every two years) mandating periodic market analysis in order to reassess sector-specific regulations?
4	What regulation of network interconnection is applied to the incumbent's network?
5	What regulation of mobile communications is applied?
6	Amount of the weighted average cost of capital accepted by the NRA
7	Is there any retail price regulation for telecommunication services?
8	Is a net-neutrality price regulation in place (price regulation between Internet Service Providers and Content providers)?
9	Does the NRA recognize a USO burden?
10	Is there a sharing of USO cost between operators?
11	Is there an obligation to meet the demand for certain services at regulated prices?
12	Are there regulatory requirements regarding coverage of the population with 3G mobile communications technology?
13	Does regulation require a vertical separation of the incumbent telecommunication firm?
14	Is there an obligation to separate accounting to ensure non-discrimination?
15	Is full unbundling regulated?
16	Is bit stream access regulated?
17	Is sub-loop unbundling regulated?
18	Is there a sector-specific regulation forcing the incumbent to share infrastructure (e.g. «line sharing», «duct sharing», «mast sharing»)?
19	Is there a sector-specific regulation forcing other network operators (cable operators, utilities, city carriers, etc.) to share infrastructures like manholes, antenna locations etc.?
20	Is the telecommunications access regulation between DSL and cable network provider asymmetric?
21	Is there a regulated network access for mobile virtual network operators (MVNOs)?
22	Number of network-based mobile communications licenses of the 2nd generation?
23	Number of network-based mobile communications licenses of the 3rd generation?
24	Does the NRA restrict trading of already allocated frequencies?
25	To what degree is net neutrality mandated by means other than price regulation?
26	What is the state's ownership share in the incumbent telecommunication firm (in percent)?
27	Is there a «golden share» (i.e. the state's right to veto corporate decisions of the incumbent telecommunication firm)?
28	Is there a sector-specific environmental regulation (e.g., regarding radiation limits)?
29	Can the NRA issue fines that exceed 5% of the turnover of the regulated activity?

Table 2: List of questions. QID refers to the identification number of the question. See Table 3 for the coding used for the answers to each question.

QID	Coding of Answers
1	Yes = 1, No = 0
2	Yes = 0, No = 1, regionally differentiated market definition = 0.5
3	Yes = 0, No = 1
4, 5, 8	Regulated monopoly or incremental cost regulation = 1
	General cost regulation or some mixture of all other regulations = 0.8
	Price cap regulation or rate of return regulation = 0.5, no regulation = 0
6	0%–6.9% = 1, 7%–9.9% = 0.8, 10%–13.9% = 0.5, otherwise=0
7	Yes = 1, No = 0
9	Yes = 1, No = 0
10	Yes = 1, No = 0
11	Yes = 1, No = 0
12	Yes = 1, No = 0
13	Yes = 1, No = 0
14	Yes = 1, No = 0
15	Yes = 1, No = 0
16	Yes = 1, No = 0
17	Yes = 1, No = 0
18	Yes = 1, No = 0
19	Yes = 1, No = 0
20	Yes = 1, No = 0
21	Yes = 1, No = 0
22, 23	1 license = 1, 2 licenses = 0.8, 3–4 licenses = 0.5, more = 0
24	Yes = 1, No = 0
25	Yes = 1, exclusivity restrictions for content not allowed = 0.5, No = 0
26	Less than 21% = 0, 21%–50.9% = 0.5, 51%–79.9% = 0.8, more than 80% = 0
27	Yes = 1, No = 0
28	Yes = 1, No = 0
29	Yes = 1, No = 0

Table 3: Coding of the Answers. See Table 2 for the questions asked by each indicator.

	QID	general A	fixed net B	Network fixed net NGA C	mobile D	mobile NGA E
Design	1	1A				
	2		2B	2C		
	3	3A				
Price	4		**4B**	4C		
	5				**5D**	
	6		**6B**			
	7		**7B**		**7D**	
	8			8C		8E
Quantity	9		**9B**	9C		
	10		**10B**	10C		
	11		**11B**	11C		
	12				**12D**	
Entry - Exit	13	**13A**				
	14	**14A**				
	15		**15B**			
	16		**16B**			
	17		**17B**			
	18		**18B**	18C		18E
	19			19C		19E
	20		**20B**	20C		
	21				**21D**	
	22				**22D**	
	23				**23D**	
	24				**24D**	
Miscellaneous	25			25C		25E
	26	**26A**				
	27	**27A**				
	28				**28D**	
	29	**29A**				
Total		7	12	10	8	4

Table 4: Overview over all indicators in the data set. The number in the indicator ID refers to the question (Table 2) it answers and the letter of the indicator ID refers to the network for which the question is answered. For example, 10B answers the question whether USO cost are shared between operators on the traditional fixed net. The boldfaced indicators are used to construct the aggregate indices.