Management Summary of the Study Report «Polynomics Regulation Index 2012»

Polynomics*

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Economic theory has focused on (sector-specific) government interventions and their effects on the behavior of market participants and market performance for a long time. In addition to analyzing the privatization of public enterprises, the focus has also turned to the effects of government regulation on the behavior of companies. Studies have also examined the influence interventions in the market have on a sector's ability to produce better production processes and new products.

Over-investment is a problem that has often been observed on regulated markets. One of the best-known articles on regulatory economics demonstrated in a static model that companies lean towards excessive capital expenditure when the profits to capital ratio is limited to a «fair rate of return» Averch and Johnson (1962). It should, however, be noted that the empirical evidence for this study is not without controversy (Viscusi, Harrington, and Vernon, 2000, p. 373). Problems associated with under-investment have been part of regulatory policy discussions following the failure of specific liberalization efforts, for example, the privatization of railways in Britain or the deregulation of California's electricity sector. Recent economic research suggests an inverted U-shaped relationship between competition and dynamic efficiency: Both, too little and too much competition – and the primary goal for regulation is to promote competition - can delay or even impede innovation (see Aghion, Bloom, Blundell, Griffith, and Howitt, 2005).

Without doubt, the concentration of sector-specific regulation has implications on the market performance. Because regulation is always multi-dimensional and has many complex facets, it is helpful to have an aggregated and tractable indicator on regulations. Ratings offer such a simplified view. Institutions like OECD (2006); ECTA (2006, 2009); EURI (2004); WIK (2003) published telecommunication ratings that focused on specific issues. The best-known telecom regulation rating in Europe, the so-called «Ecta Regulatory Scorecard», for example, shows how EU member states are implementing the EU regulatory framework and compares progress rates within the EU.

The use of rating indicators to determine the influence of regulation on market performance (for example, investments in the telecom sector) has raised a new problem in recent years. Attempts to link market performance to such ratings indicators hide the fact that the rating

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indicators already assess regulation in certain areas. They often include market performance factors in addition to regulatory factors and thus blend input and output factors. Ratings like the «Ecta Regulatory Scorecard» are comprised of both inputs (such as sector regulation) and market outputs. Ratings resulting from a combination of inputs and outputs are not well suited for investigating the link between regulation and the market performance.

In comparison, our index has the advantage, that intensity of regulation is only measured but not rated. The index is a measured value, comparable to a measure of length or weight. It reveals nothing about the effectiveness of regulation, but focusses on the quantitative dimension, i.e., the density or intensity of a regulation or a set of regulations.

Scores of regulatory indicators in terms of «regulatory density» can be «0» for the lowest regulatory density (only competition law) and «1» for the highest comprehensive sector-specific regulation density. Most indicators such as, for example, «Is network access for MVNOs regulated?» or «Existence of regulated vertical separation?» can be answered by «0» (equals «no») or «1» (equals «yes»). Of course, some indicators attain values in between «0» and «1». With regard to price regulations for interconnection, for example regulated incremental costing is assumed to be more severe (therefore score «1») than price-cap regulation (score «0.5»). The value the indicators are based on publicly available information (ECTA, ITU, OECD etc.). For a detailed description of the indicators and the coding of the answers, see the manual for the «Polynomics Regulation Index 2012» data set.[1]

A comparative international measure of the density of sector-specific regulation in telecommunications is available since 2007 in the form of the «Plaut Economics Regulation Index» (Zenhaeusern et al., 2007). This data set has been applied, for example, by Grajek and Röller (2011) who examine the extent to which there is a non-linear, inverted U-shaped relationship between the intensity of regulation and innovation activities or by Bacache, Bourreau, and Gaudin (2010) who assess the effectiveness of the so-called investment ladder (Cave, 2003).

Sector-specific regulations are especially relevant when influencing expected returns on planned infrastructure investment projects. In the telecommunications sector, sector-specific price regulations, quantity regulations as universal service obligations, market entry and exit regulations and miscellaneous regulations (e.g. the state's shares of the incumbent in percent, sector-specific environmental regulations) potentially have a major impact on investment.

Competition among network-based companies such as fixed networks, cable companies and mobile communication has increased substantially in the last few years. With the emergence of this so-called platform competition, various types of sector-specific regulation need to be viewed in a new light. In particular, the issue of «monopolistic bottlenecks» and, associated therewith, the question of market power regulation, must be reexamined.

The emergence of new platforms and the spread of (mobile) broadband have an impact on sector-specific regulation. For example, existing forms of regulation may be replaced, amended, or abolished. When assessing the regulation of new platforms in terms of their effect on investment, the impact on returns has to be revisited. This is true for horizontal regulations (e. g. unbundling of the local loop) and for vertical regulations, such as network neutrality rules that may impose varying restrictions regarding contractual freedom between

[1] See www.polynomics.ch/rdi

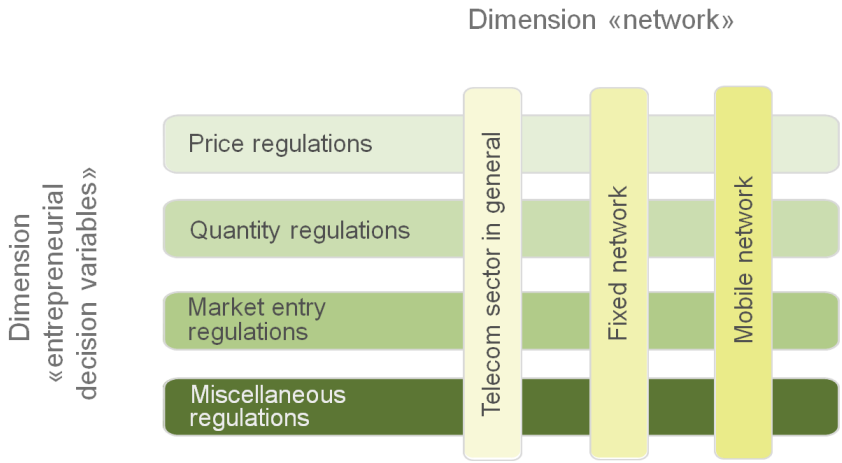

Figure 1: Regulatory density index along two dimensions.

service providers, content providers and network operators.

The «Polynomics Regulation Index 2012» (Zenhaeusern, Schneider, Berner, and Vaterlaus, 2012) takes into account recent OECD recommendations (OECD, 2008, 2011) regarding construction and composition of indices and, on this basis, extends the «Plaut Economics Regulation Index» (Zenhaeusern, Telser, Vaterlaus, and Mahler, 2007). Within the framework of the new index, 41 regulatory indicators are evaluated and gathered for 32 countries (EU-27, Australia, Japan, Switzerland, Singapore and USA) for a period of 14 years (1997 until 2010), thus since liberalisation of telecommunications markets in many of these countries.

The indicators used to compose the index constitute a comprehensive data set and a valuable basis to analyze possible economic links between sector specific regulatory density and market outputs. In general, the data enables an in-depth analysis of the connection between inputs (regulations, gross domestic product, inflation etc.) and outputs (market results like innovation activities etc.). For example, Bauer und Shim (2012) used these indicators in a recent study and found that different types of innovation are facilitated by different legal and regulatory conditions, and that the best balance is not self evident. It is thus beneficial to have institutional regulatory diversity, multi pronged strategies and the willingness to experiment to detect superior regulatory regimes over time.

Basically, our regulatory indicators for the telecommunication sector can be analyzed along two dimensions: along the dimension of «networks» (e. g. solely the indicators of the fixed network, or exclusively the indicators of the NGA-fixed network) and along the dimension of «entrepreneurial decision variables» (see Figure 1). Clearly, each indicator constituting the «Polynomics Regulation Index 2012» can also be used separately and independently of our categorization.

We propose to define four sub-indices based on «entrepreneurial decision variables»: price regulations, quantity regulations, entry and exit regulations and other regulations influencing entrepreneurial decisions. Within each sub-index all indicators are equally weighted. In the baseline scenario, the four sub-indices are, in turn, weighted by 25% each and aggregated to form the overall regulatory density index. Of course, any choice of weights remains arbitrary. In our full report we conduct a few sensitivity tests and find that the country rankings are

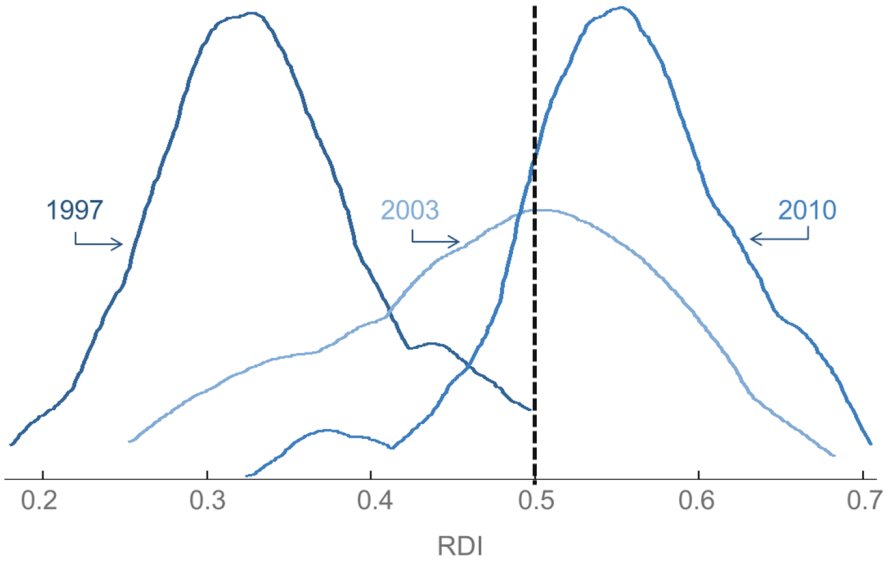

Figure 2: Evolution of cross country distribution

quite robust to changes in the weighting strategy.

The regulatory density index indicates how regulatory density changes over time and across countries. A higher index value for a one country compared to some other countries means that this country regulates its telecommunication sector more intensively than the other countries. Overall, the index identifies an increase in regulatory density over time for the EU-27-countries and Asia-Pacific. For the United States, on the other hand, the regulatory density index decreases over time. This tendency is particularly pronounced for fixed network regulations, but also shows up for mobile network regulations.

Figure 2 shows the evolution of the index' cross country distribution. A narrow distribution implies lower cross country variation in regulatory density while a wider distribution implies more variation in regulatory density across countries. The density function shows, that between 1997 and 2010, the regulatory density of the countries did not shift symmetrically «to the right». Instead, regulatory density in 1997 was initially concentrated along a specific range (approximately 0.3), around the year 2003 the variance has increased, and in the year 2010 the values were concentrated again along a higher index level (around 0.5 and 0.6). Essentially, the density functions reflect a kind of «catch-up-effect»: In 1997 only a few countries had a significantly higher regulatory density than 0.3. These countries are, in some sense, the «first movers». Some years later, in 2003, regulatory density increased in most countries; however, countries are spread over a wider range of regulatory densities (between less than 0.3 and almost 0.7). In 2010, the distribution narrows again. While in 1997 there were some «first movers», there are now a few «followers», catching up with the other countries in terms of regulatory density.

The rich data set allows for many more descriptive analyses and econometric applications. We hope that our panel data set on regulation in the telecommunication sector stimulates many interesting research projects shedding more light on the interaction between regulation, industry behavior and market outcome.

We conclude with a cautionary note: Even though the sub-indices and indicators used

in the «Polynomics Regulation Index 2012» were all selected by the criterion, that they potentially influence investment and innovation activity by telecommunication companies, they do not make any direct statements about the quality of regulation. The indicators measure the intensity of regulation but do not rate it. The conclusion that countries with a high index value hamper investments or innovations in the telecommunications sector through their regulatory regime is not valid. Such an effect – or the opposite of it - can only be assessed econometrically in a second step, estimating the relationship between investments or innovations in the telecommunication sector and regulatory density (as, e.g., measured by our indicators and sub-indices).

The manual for the data set of the «Polynomics Regulation Index 2012» can be downloaded at www.polynomics.ch/rdi. The data set itself can be requested by mail to rdi@polynomics.ch.

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