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Special Session organized by INFORMS Poland Chapter

"Analytical Methods for Telecommunication Policy Modeling"

September 16, 2013 (Monday), 10:00-12:00

Session Chair: Bogumił Kamiński (Warsaw School of Economics)

Schedule:

1. Agnieszka Gładysz (Office of Electronic Communications)
   Current challenges of telecommunication policy modeling

   Pursuing an effective and efficient regulatory policy in the telecommunications markets requires each regulator to identify overarching goals, define adequate strategic objectives for each of them and specify the ways for their successful implementation. At the same time, it is crucial to take into account market trends. Polish membership of the European Union means that not only national, but also global and especially European perspective is an important point of reference in modeling telecommunication policy.

   Based on the conducted analysis, it is possible to formulate the challenges for telecommunication policy in the coming years. These are:

   - Commission recommendations and guidelines as one of the main determinants of regulatory policy in Member States (including Digital Agenda for Europe);
   - Development of Next Generation Networks - incentives for investment in infrastructure based on modern technologies, promoting fiber-based networks, roll-out of low-cost and high-speed Internet connections in areas with low population density;
   - Roll-out of a wide range and use of mobile networks 3G and 4G (LTE) (growing substitution of fixed-line services with mobile services);
   - New technologies and their influence on competition in regulated wholesale telecommunications markets, for example, GPON, VDLS Vectoring/Bonding.

   Modeling telecommunication policy needs a professional regulator responding to the demands of changing markets and stimulating growth of competition in the telecommunications market. Competitiveness is the potential, the possibilities, and the

ability of a given market entity to meet competition, i.e. rivalry with other entities operating in the same industry in the market.

Competitiveness is also the capability of a long-term and effective growth. Competition Policy for 2011-2013 formulated by UOKiK (the Polish Office for Competition and Consumer Protection) stipulates that the primary and overarching objective of competition policy is to ensure the conditions for its functioning in the economy wherever it may increase efficiency of management and innovation, and thus - consumer welfare. Achieving this goal involves the implementation of three partial objectives, namely protecting competition, creating conditions and supporting its development.

Due to the infrastructural nature of the telecommunications market, the increase in competition may be difficult without effective regulatory action. Competition in Poland is highly variable in individual local markets (areas where numerous providers are active, and areas where there is one operator or no operator providing services). This primarily applies to fixed-line broadband Internet access. The main objective in modeling telecommunication policy should be therefore striving to provide end-customers with telecommunications services of an operator of their choice at a fair price, corresponding to costs associated with the provision of broadband services.

2. Marcin Juchnowicz (Office of Electronic Communications)

Preventing Non-price Discrimination by an Upstream Monopolist – Evidence from the Polish Telecommunications Market

The objective of this presentation is to propose methods of detecting non-price discrimination in a setting where a company is present in both upstream and downstream markets and sells wholesale services to its downstream competitors. This situation is very common, specifically on telecommunications markets, where the incumbent operator is either the main wholesale service provider or is a natural monopolist on the upstream market due to high sunk costs.

Theoretical and empirical studies show that in such a situation, the incumbent operator, having significant market power, has the incentive to discriminate against its downstream clients using price or non-price instruments. Price discrimination occurs when a company offers the same product at different prices to different customers for reasons unrelated to production costs or competition issues. To deal with this problem, National Regulatory Authorities (NRAs) use margin squeeze tests or price caps as regulatory obligations on incumbent operators. While price discrimination has been widely discussed and can be effectively reduced or eliminated by NRAs, the problem of non-price discrimination remains difficult to resolve.

Non-price discrimination by the incumbent company consists in using strategies that exclude service pricing in order to weaken the position of its retail competitors. Nikogosian and Veith, as well as Economides, agree that both price discrimination and non-price discrimination raise competitors' costs. However, non-price discrimination (commonly referred to as "sabotage") has an indirect influence on costs. An incumbent operator discriminates against alternative operators if it degrades the quality of provided services or offers preferable conditions for its retail subsidiary. As there is no detailed definition of "quality," non-price discrimination is particularly difficult to identify, let alone prevent. Additionally, complicated

legal procedures and high information asymmetry make non-price discrimination cases very costly. According to OFCOM, sabotage has the same negative impact on competition as price discrimination. As evidenced by the problems, the prevention of non-price discrimination is worth researching.

According to the existing literature on non-price discrimination and empirical examples, one of the possible tools for preventing non-price discrimination is service level monitoring. The Office of Electronic Communications (UKE, Polish NRA) and Telekomunikacja Polska SA (TPSA, the incumbent operator) signed an agreement that requires TPSA to monitor service levels by publishing a set of Key Performance Indicators (KPIs) on a monthly basis. This requirement was established to ensure non-discriminatory access to TPSA's services for all operators in the market. The existence of non-price discrimination was verified based on TPSA's service quality and by comparing KPI values corresponding to alternative operators and to TPSA's subsidiaries. Originally, TPSA was expected to achieve the highest values for each KPI. This approach, however, raised questions of whether TPSA is able to achieve the expected KPI values, taking into account service-specific characteristics and unpredictable circumstances. As a result of these uncertainties, an alternative way of detecting discrimination was implemented.

In this alternative approach, the minimum KPI values are obtained either by using linear regression or by a fixed error margin. The method used depends on the features of the measured processes. A fixed error margin is an arbitrary value agreed on between UKE and TPSA and it represents the number of faulty services. For processes, where the amount of data is relatively large, the minimum KPI values are set using a simple linear regression model based on historical KPI data. At first, outliers are identified through boxplot analysis. Outliers are then eliminated by incorporating a dummy variable and setting it to 1 if the given observation is an outlier. The value of the dependent variable is the minimum service level and the confidence bands indicate the reference values depending on the properties of the given KPI. We will show that this is an effective approach for preventing potential non-price discrimination, considering the different features within wholesale services offered by the incumbent operator, as well as the dynamic aspect of the KPI system.

3. Wit Jakuczun (WLOG Solutions)

   On monitoring KPI system for non-discrimiation control

   As a result of agreement between Telekomunikacja Polska S.A. (TPSA) and The Office of Electronic Communications (Polish NRA) there was a KPI system established. The goal of the system was to control non-price discrimination that could be possible between TPSA and other operators using TPSA'a infrastructure. In this talk we will present a non-parametric boostrap statistical test for detecting short and long term discrimancy for quality of service. The method has been implemented and is being used on monthly basis. Its results are published on Polish NRA's webpage.

4. Mateusz Zawisza (Warsaw School of Economics)

   Multi-criteria Evaluation of Broadband Internet Access in Poland

   The level of access to Internet is constantly evaluated and promoted by electronic communications regulators around the world. The issue is especially important in countries,

such as Poland, where there exists high heterogeneity of Internet access between local markets. The objective of this paper is to identify socio-economic factors that influence the level of Internet access in local Polish communities (gminas).

The definition of Internet access involves multiple criteria and encompasses in particular its availability, adoption, speed, quality of service and price. In the paper we propose a two-phase approach to perform its comparison between gimnas. First we use Data Envelopment Analysis (DEA) to assess Internet broadband access conditional on their demographic characteristics based on data from 2010 and 2011 collected by Polish Office of Electronic Communications (UKE). In the second stage we explain obtained DEA effectiveness indices using supervised learning techniques with socio-economic status of the community as explanatory variables. We show that in the time period under study rural communities experienced larger Internet access improvement than urban communities, therefore catching up with large cities and abating technological gap. Moreover, we identify drivers of broadband Internet advancement including: community type, community education and age structure, computerization level in schools and Herfindahl-Hirschman competition index. We show that the effective regulation may foster the advancement of fixed location broadband Internet access.