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Estimating demand for fixed-line telecommunication bundles

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ABSTRACT

In this study, a stated preference discrete choice experiment is applied to model subscription choices between standardized packages of fixed-line telecommunications services in a sample of individuals in Poland. We provide willingness-to-pay (WTP) estimates for telephony, broadband and pay TV offered as stand-alone services and dual or triple-play bundles. The main goal of the paper is to investigate substitutability and complementarity between various component services based on estimated valuations. Considerable preference heterogeneity towards fixed-line services is identified and explained by service profile and usage intensity.

Broadband is the highest valued among fixed-line services. Fixed-line broadband and pay TV are super additive in valuations indicating complementarity. We obtain evidence of fixed to mobile substitution in voice and data, driven by unlimited mobile voice plans and data plans with higher transfer limit. On methodological grounds, choice-based WTP estimates are more adequate measure of consumer reservation prices for telecommunications services than self-reported valuations.

1. Introduction

Over recent years, bundling has become a common sales format on various markets, including airlines, banking, and in particular telecommunications. The main rationale for integrating different services in a package is that it increases revenues via extracting more surplus from heterogeneous consumers. Not surprisingly, dual, triple-play and quadruple-play bundles, already command for 70% of subscription revenues in the telecommunications industry.[1] According to recent Eurobarometer survey, in 2015 exactly 50% of EU households purchased telecommunication services in packages (European Commission, 2015).[2] Fixed-line triple play bundles (i.e. packages consisting of telephony, broadband Internet and pay TV) were adopted by 7% of households. Interestingly, this proportion has dropped by four percentage points since the previous survey, after a period of continuous growth over several years.[3] Reversion of triple-play adoption trend has been induced by emergence of unlimited mobile voice plans. It reflects an ongoing shift in preferences from fixed-line to mobile technology in telecommunication services. Since 2014, adoption of bundles with fixed-line telephony dropped sharply by 15% points, while adoption of bundles with mobile telephony increased by 16 points. Fixed-to-mobile substitution (FMS), driven by continuous enhancements of mobile access technology, can be expected to spread beyond voice to video and data services. Above changes already have a significant bearing on the demand for converged fixed-line offerings and

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[1] Digital TV Research (2013).

[2] Data from October 2015. This percentage has increased by 4 points since the previous survey from January 2014 (European Commission, 2014), but still shows considerable variation among member states. In some countries, like France, Belgium and the Netherlands, bundle adoption hits 63–87%, while in Poland, Czech Republic, Slovakia it is much smaller (32–39%) due to less developed fixed network infrastructure.

[3] Quadruple-play bundle (fixed triple-play with mobile telephony) was adopted only by 5% of EU households in 2015. This package does not seem to be a game changer in Europe, because of increasingly obsolete fixed-line telephony.

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increase pressure on traditional operators. However before those changes will become fully visible in market statistics, they can be traced on individual level by looking at how usage and service profiles affect consumer utility from fixed-line services. We argue that elicitation of preferences and analysis of their heterogeneity can serve as an early indicator of upcoming changes in consumer behavior, providing operators and policy makers with better understanding of evolving playing ground in the telecommunications industry.

The objective of our study is to estimate willingness-to-pay (WTP) for the three major fixed-line telecommunication services: telephony, broadband and pay TV offered as stand-alone services or in different dual or triple-play bundles. By disclosing substitutability and complementarity patterns across different services, we are able to assess how much of additional value is created by integrating them into the package. We provide insights into the prospects of fixed network operators, by looking at how usage profiles and intensity affect utility from fixed-line broadband and pay TV. Methodologically, we model subscription choices over packages of fixed-line services with stated preference discrete choice experiment (DCE) on a sample of Polish respondents. Then, from the estimates of utility function parameters, we derive money-metric WTP estimates for particular services and compare them with self-reported valuations collected from respondents. Our interest in indirect elicitation methods is motivated by the evidence on weaknesses of self-reported valuations. We narrow a gap in literature related to the lack of studies which apply stated preference method to disclose patterns of substitutability and complementarity for bundles with more than two items. This case is particularly relevant for telecommunications because bundles contain a larger number of component services then usually analyzed in other applications.

Increasing the size of the package from two to three items rises a few challenging issues. First, the number of potential offering rises from three to seven, which complicates experimental design. Second, demand for telecommunication bundles is affected by numerous relationships between component services. For example, for many users, the so called over-the-top (OTT) online voice and video services such Skype or YouTube are to some extent substitutes for fixed-line telephony and pay TV. Therefore, reservation prices for the fixed telephony and pay TV will be conditional on whether a consumer has access to fixed-line broadband. On the other hand, multiple-play bundles such as broadband and television package may create additional value to consumers due to complementarity between components. Complementarity might stem from various sources like the technical integration, or convenience from managing several services on a single account.[4] Another issue which adds complexity to the elicitation of subscribers preferences for telecommunication bundles is the impact of mobile technologies. Numerous studies evidence fixed-to-mobile substitution in voice (Barth & Heimeshoff, 2012; Grzybowski, 2014) and more recently also in data services (Grzybowski, Nitsche, Verboven, & Wiethaus, 2014; Srinuan, Srinuan, & Erik, 2014). Technological substitution between fixed-line and mobile technologies is accounted for in the study by exploring how utilities from fixed-line voice, data and video services are impacted by unlimited mobile voice tariffs and data allowances as well as over-the-top video services.

We obtain parameters of all seven distributions of willingness-to-pay. By checking for (non-) additivity of median reservation prices we can infer whether integrated telecommunications services create additional value. The main result of the paper establishes complementarity of fixed-line broadband and pay TV. The study finds out that fixed-line voice is already an obsolete service, especially for subscribers with unlimited mobile voice tariffs, as implied by the negative mean utility in comparison to the baseline utility level for mobile voice. The study offers a contribution to the ongoing research on FMS in data and video services. With respect to fixed-line and mobile broadband our results indicate partial substitutability and partial independence. This is a transitional stage between initial complementarity and full substitutability which will emerge with an advent of unlimited, high-speed mobile broadband access. Finally, the study identifies considerable preference heterogeneity and explains its sources with a set of respondent characteristics such as subscribed services, use intensity or income.

The rest of the paper is organized as follows. In Section 2 we provide a literature review on bundling. In Section 3 we describe details of our empirical study. Section 4 sets up the modeling framework and Section 5 presents estimation results. Finally, Section 6 provides summary and conclusions.

2. Literature review

Bundling is defined as a sale of two or more products in a package at a discounted price (Stremersch & Tellis, 2002). Since the seminal works of Stigler (1963) and Adams and Yellen (1976) economic literature recognizes the two main forms of bundling,[5] and research agenda focuses on conditions under which they generate more profits than separate sales (see Venkatesh & Mahajan, 2009 for an overview). Assessment of global gains from bundling is a core issue from managerial standpoint. Interestingly, only few studies adopted this perspective.[6] For example, Eckalbar (2010) suggests that bundling is rarely better enough to justify its implementation unless monopolist encounters favorable combination of low unit costs and strong negative correlation of valuations. His results explain why bundling might be applicable mainly to low marginal cost industries such as information goods or ICT

[4] Stremersch and Tellis (2002) list many ways in which integration creates value added, such as compactness, seamless interaction, reduced risk, interconnectivity and enhanced performance. Integrated ICT-based products and services, such as smart TV and video on demand (VOD) serve as good examples of those benefits.

[5] Under pure bundling, a consumer can buy only a package while under mixed bundling he may choose to buy either a package or any component separately. There can be also other forms of packaging, like partial mixed bundling.

[6] Localized approach looks at the improvement of profits from introducing a package with an infinitesimal small discount on the sum of prices for all components. McAfee, McMillan, and Whinston (1989) establish sufficient condition for mixed bundling to (locally) dominate separate sales for any atomless joint distribution of reservation prices. Recently, Chen and Riordan (2013) utilized copula approach to generalize sufficient and necessary conditions of McAfee et al. (1989) for bundles of a size larger than two.