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Mobile-only consumers arise from heterogeneous valuation of fixed services☆

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ABSTRACT

Mobile-only users are usually perceived as a consequence of fixed-mobile substitution. This study uses a unique dataset based on a survey in France, combined with interviewee's telecommunications billing data, to reveal heterogeneous consumer preferences for fixed services. With the same mixed logit model we estimate the willingness to pay (WTP) for fixed communications services and fixed-mobile relationship. Results show a very large heterogeneity of WTP for fixed services among consumers. In addition, we show that fixed and mobile data are complement for all consumers. Mobile-only consumers have a much lower but non-zero WTP, and higher price sensitivity compared to fixed-mobile consumers. Consequently, an increase in the fixed offer price would reduce the demand for fixed service. Heterogeneous preferences for fixed services constitute an alternative explanation for the existence of mobile-only users, despite the complementary nature of fixed and mobile broadband. Counter-factual simulations show that the share of mobile-only could also be driven by the way to subsidize mobile handset. For instance, making the handset subsidy only available to fixed-mobile quadruple play subscribers could reduce the share of mobile-only by half.

1. Introduction

Fixed-mobile substitution on voice services is well documented, whereas the literature regarding the relation between fixed and mobile broadband is still relatively scarce. The aim of this paper is to contribute to the understanding of this very relation.

Todays electronic communication usage is much more data driven than it was several years ago, which places traditional voice and SMS services in the near off-side. In a society with a steep rise in data usage, the substitution pattern between fixed and mobile services may be impacted, or even reversed. The question arises whether data consumption underlies an equivalent substitution as observed in voice or SMS services, or, alternatively, if there is complementarity. Using a data set on French consumption behavior, the first aim of this paper is to assess whether fixed and mobile broadband usage (or subscription) are complementary or substitutes.

Intuitively, it could be assumed that fixed and mobile broadband are complementary, especially when todays rise in data usage is considered in relation to the specificities of the different subscriptions. Indeed, mobile broadband subscriptions differ from their fixed counterparts in speed and volumes. Whereas mobile broadband subscriptions primarily offer limited monthly allowances at higher costs, fixed broadband offers are often characterized by virtually unlimited volumes at much lower prices. For instance, a typical fixed

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broadband offer in France costs around €30 per month, offers unlimited volumes and guarantees a relatively high average download speed. For the same price, a mobile offer allows for an average download volume of 10 GB without a guarantee on speed.[1]

However, this intuition is confronted with the existence of mobile-only consumers. If fixed and mobile broadband are supposedly complementary, why is 10% of the French market still made up of people using only a mobile subscription to satisfy their need for electronic communications? A similar question can be asked for the US market, where according to NCHS data, the share of mobile-only consumers is almost fourfold. Given the increasing and ubiquitous Internet usage, the question arises regarding the explanation of this phenomenon. This paper attempts to address this issue by analyzing the potential heterogeneity of French consumers willingness to pay (WTP) for both fixed and mobile broadband subscriptions. Given the above, the consumers preferences for fixed broadband are too heterogeneous, resulting in diverging subscription patterns.

When analyzing WTP, market dynamics must be considered. Among such dynamics, the most apparent to the consumer is the price they pay for their service(s). The French communication services market has shown impressive dynamics in terms of prices, mostly driven by competition in the market. For instance, some quadruple play offers, launched in 2009, provided consumers with a strong incentive to combine their fixed and mobile offers since the quadruple offer was cheaper than the sum of the stand-alone service prices.[2] The other market players naturally followed this trend to stay competitive and maximize the number of new customers.

Besides highly competitive pricing, market dynamics are also driven by technological developments. The replacement of traditional voice networks with data networks, led to the adoption of IP technology on the fixed and mobile core network, as well as the deployment of optical fiber for mobile base stations backhaul traffic. This technological transformation, which occurred on the fixed network in the early 2000s, allows operators to provide voice over IP (VoIP) as a basic, generic component of triple play offers. On the mobile market, voice and SMS services account for a declining share of the price of mobile plans, which is increasingly dominated by mobile data. Despite the recent arrival of LTE technology with better spectral efficiency improving the capacity of mobile networks, the usage of mobile data has also increased exponentially. Because of this, the higher mobile network capacity still appears to be relatively limited and therefore the added value of fixed networks compared to mobile services in terms of data volumes can still be forward. This may explain the large percentage of consumers who use both networks.

Consumption behaviors constitute the central point of this study, which introduces a micro-econometric model. Survey data on French interviewees combined with their detailed billing data is fitted in a mixed logit model. Individuals have three different consumption choices: i) only using a mobile offer; ii) purchasing a stand-alone fixed offer in addition to their mobile offer; or iii) subscribing to a quadruple play offer.

The remainder of the article is organized as follows. Section 2 discusses the relevant literature. Section 3 presents the data used in the estimation. Section 4 introduces empirical model. Section 5 presents the main results. Finally, Section 6 concludes the paper.

2. Literature review

The relevant literature reviewed here focuses on the characteristics of demand for telecommunications services. Early academic literature on this issue, published in the 1970s, mainly focused on estimating demand elasticity with respect to prices, in an era marked by high inflation and upward pressure on call rates (Taylor, 2002). Later, with the increasing popularity of mobile services and thus the emerging replacement of fixed services with mobile services, the literature integrated non-price factors, such as socio-demographic factors, to profile consumers based on the services they use.

Rodini, Ward, and Woroch (2003) used a logit model to estimate cross-price elasticities between fixed and mobile voice services. Their study was based on microlevel data from 2000 to 2001 in the US. In addition to the significant impacts of usage, access and prices, the authors found that socio-demographic variables such as income, education and household size have a positive impact on the probability of taking out a mobile subscription, to the detriment of a second fixed line subscription. In contrast, the older the person surveyed, the lower their probability of subscribing to a mobile voice service.

Similarly, Ward and Woroch (2004) analyzed substitution patterns in the US in 1999–2001 and concluded that non-price factors like mobile network coverage and quality also play a major role in mobile subscription take-off. Using data from 2004 to 2006, Schejter, Serenko, Turel, and Mehdi (2010) performed separate cluster analysis on the wireline and wireless market segments to identify the characteristics of the consumers in each segment. Their results revealed that wireless users are predominantly young and low-income. Moreover, home owners are more likely to be fixed line users. The authors also concluded that mobile-only consumers are newcomers to the markets, reflecting the emergence of a new type of consumer rather than a shift among existing consumers. Macher, Mayo, Ukhaneva, and Woroch (2012) empirically estimated a consumer choice model using household-level observations from 2003 to 2010 and found that fixed and mobile voice line subscriptions are replacements, rather than complements. Grzybowski and Verboven (2016) found significant fixed-mobile voice substitution with substantial heterogeneity across households and EU regions. Their paper also revealed that the decline in fixed telephone lines has slowed due to the high degree of complementarity between the fixed-line and mobile connections offered by the fixed-line incumbent operator.

With the emergence of broadband Internet access, several studies have focused on estimating the demand for the different Internet access technologies and deriving consumers' willingness to pay for different components of the available offers. For instance, Savage and

[1] It should be kept in mind that a given cell in a mobile network is shared by a potentially large number of users, which impacts the performance perceived by each user connected to that cell. Although, fixed lines may be shared by all the members of a household, the impact on the performance of the Internet access service is much less.

[2] According to Eurobarometer, the French market has a significant level of quadruple play penetration, 24% in 2015, putting it second in Europe after Belgium (27%).