



The complementarity between calls and messages in mobile telephony[☆]

Lukasz Grzybowski^{a,*}, Pedro Pereira^b

^a UK Competition Commission, Victoria House, Southampton Row, London WC1B 4AD, United Kingdom

^b Autoridade da Concorrência, Rua Laura Alves, n.º 4, 6.º, 1050-188 Lisboa, Portugal

ARTICLE INFO

Article history:

Received 2 July 2007

Received in revised form 13 June 2008

Accepted 18 June 2008

Available online 8 July 2008

JEL classification:

L13

L43

L93

Keywords:

Mobile telephony

Price elasticities

SMS

Complementarity

ABSTRACT

This article estimates price elasticities of demand for mobile telephone calls and messages. We use panel data consisting of telephone bills to Portuguese mobile telephony consumers. In order to account for the unobserved individual heterogeneity and data censoring, we estimate a Tobit model for panel data with individual random effects. The demands for calls and messages are inelastic. Calls and messages are found to be complements.

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1. Introduction

The *Short Message Service*, SMS, has so far been the most successful mobile telephony data service and, together with voice, is the main service offered on mobile telephones. Messages account for 15–20% of the revenues of many mobile telephony firms, and for up to 95% of the data revenues. However, it is unclear whether the services are substitutes or complements for one another. On the one hand, messages can be seen as cheaper, lower quality alternatives to calls. On the other hand, they enhance the usefulness of calls, e.g., one may make a call to schedule a meeting, and then send a message to confirm the schedule.

Knowing whether mobile telephone calls and messages are complements or substitutes is important for mobile telephony firms because that knowledge affects their pricing strategies. If they are complements, firms have less incentives to increase the prices of calls and messages than if they are substitutes. Thus, the equilibrium prices of both services are lower if they are complements.

The issue of whether these services are complements or substitutes is also important for telecommunications sector regulators. In almost every country of the European Union, for instance, the message termination prices are unregulated, either at the wholesale or retail level. However, the need to regulate the wholesale market for message termination has been debated by the regulators because they were obliged to analyze the relevant market for “voice call termination on individual

[☆] We are grateful to two anonymous referees and to the editor Tommaso Valletti for valuable comments. The opinions expressed in this article reflect only the authors' views, and in no way bind the institutions to which they are affiliated.

* Corresponding author.

E-mail addresses: lukasz@mushroomski.com (L. Grzybowski), jpe.pereira@netcabo.pt (P. Pereira).

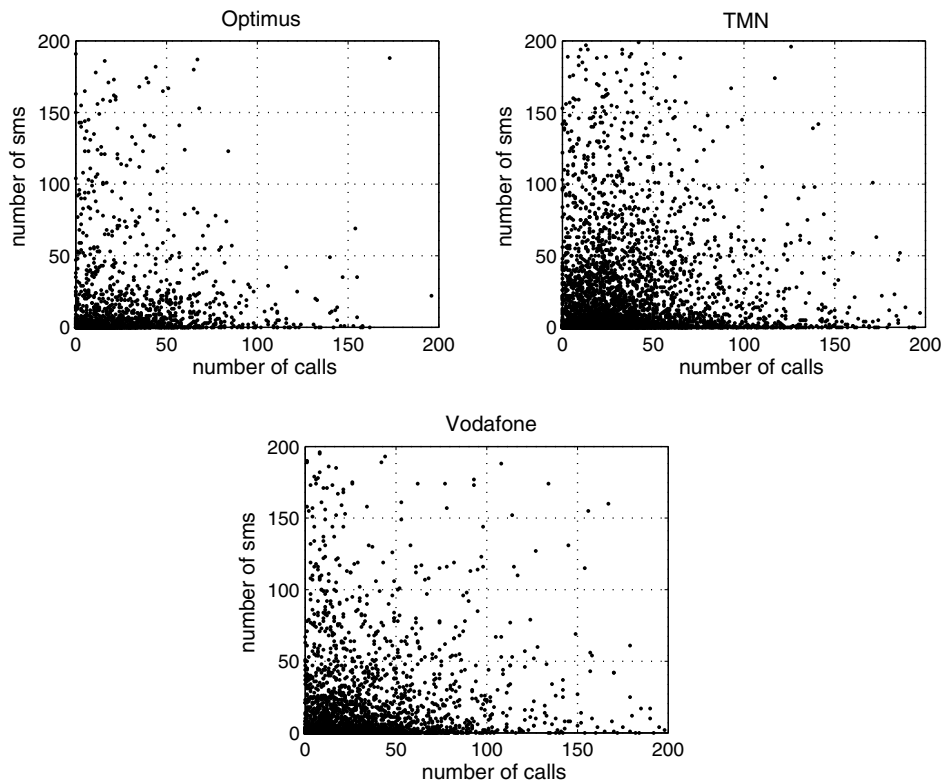


Fig. 1. Number of SMS and calls to mobiles numbers per month between April 2003 and March 2004.

mobile networks”, defined as Market 16, following a recommendation from the European Commission.¹ For instance, on July 27 2006, the French sector regulator, ARCEP, became the first to impose *ex ante* regulation of the wholesale market for the termination of messages. In the market analysis, ARCEP stated that calls and messages are not substitutable because “SMS and voice correspond to different usages: voice is real time while SMS delivery is undetermined; SMS is more discrete; SMS is a social phenomenon using new forms of communication such as smileys: or teenager phonetic writing”. The final conclusion was based on the fact that “the seasonal variations of traffic volumes are different for voice and data (SMS) on mobile networks”, which, according to ARCEP, is evidence that messages and calls are used for different purposes. Also, the Italian sector regulator, AGCOM, for the purpose of a formal public consultation document on Market 16, commissioned a study involving interviews with 2008 end-users.² According to this study, the majority of end-users consider messages to be an alternative to calls. As these two examples illustrate, the sector regulators in different countries seem to have contrasting views on the complementarity or substitutability of mobile telephone calls and messages.

To implement adequately the regulation of wholesale termination charges for messages, and to understand its effect on consumer surplus and firms’ profits, the sector regulators must know the own-price and cross-price elasticities of demand for calls and messages. If these services are substitutes, the decrease in the retail prices of messages caused by the regulation of termination charges leads to a lower demand for calls. On the other hand, if these services are complements, a decrease in the retail prices of messages stimulates the demand for calls. Consumer surplus after regulation will be higher in the latter case.

This article sheds light on the question of whether mobile telephone calls and messages are complements or substitutes. We use individual-level data on the number of mobile telephone calls and messages from monthly telephone bills to a representative group of Portuguese consumers between April 2003 and March 2004 to estimate price elasticities of demand.

Fig. 1 presents the monthly usage of mobile telephone calls and messages. Consumers have heterogenous preferences for these services. Some consumers send many messages and make few calls, others do the opposite. Clearly, the intensity of usage depends on some unobservable factors, which are unrelated to the price level. For instance, some consumers may make many mobile telephone calls or send many messages because of their lifestyle. Consequently, we estimate a Tobit model for panel data with individual random effects, to account for the unobservable individual heterogeneity in usage intensity and to allow for data censoring, i.e., no mobile telephone calls or messages being made in certain months.

¹ See the Relevant Markets Recommendation of the European Commission (2003/311/EC).

² See Delibera n. 465/04/CONS on Market 16.

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