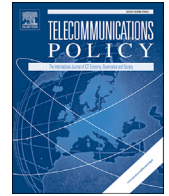


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Telecommunications Policy

journal homepage: www.elsevier.com/locate/telpol

Predation and network based price discrimination in Chile

Claudio A. Agostini ^a, Manuel Willington ^{a, *}, Raúl Lazcano ^b, Eduardo Saavedra ^c^a School of Government, Universidad Adolfo Ibáñez, Chile^b SUBTEL, Chile^c ILADES-Universidad Alberto Hurtado, Chile

ARTICLE INFO

JEL classification:

D43

L41

L51

L96

Keywords:

Telecommunication network competition

On-net/off-net price discrimination

Call externality

ABSTRACT

This paper uses a model of strategic interaction among firms –that set discriminatory and non-linear prices– in addition to public information on prices of the plans marketed by the three major mobile phone companies, to assess the extent to which on-net/off-net price differentials in the plans they offered could represent predatory practices in the mobile telephony market in Chile. The results show that the largest companies offered a few plans with an off-net/on-net price differential larger than what a competitive theoretical model predicts. This larger differential is consistent with the notion of predation defined by Hoernig (2007) as reducing a competitor's profits. Despite the fact that these plans were a small fraction of all the plans mobile phone firms offered, they were recently banned by the antitrust authority because of their potential anti-competitive effects.

1. Introduction

The issue of network-based price discrimination in telephony markets has been subject of a significant regulatory and competition policy debate. In Germany, the firm KPN brought an early complaint to the European Competition against the two largest operators in 2007. Similar complaints were presented in Italy, Austria, Turkey, South Africa, and New Zealand. The French competition authority fined the three main operators as they offered unlimited on-net calls in 2012. At the same time, Papua New Guinea's sectorial regulator (NICTA) recommended limiting the price differential to 40% of on-net price after a public consultation originated by the complaint of a small operator. In Colombia, the authority limited the off-net/on-net price differential to the regulated access charge.

In Chile, on December 2012 the Competition Court decided to limit off-net/on-net price discrimination due to its potential predatory and foreclosure effects against small operators (mainly Mobile Virtual Network Operators –MVNOs, as some of them had just entered the market and others were attempting to enter it).¹ During the first year after the Court's ruling, price discrimination was limited to the value of the access charge, and it was completely banned thereafter.

The intuition of why off-net/on-net price discrimination may have a negative impact on competition is straightforward: when a large firm chooses high off-net prices and low on-net prices, smaller firms become less attractive as their customers can expect to receive fewer calls from the large network. Moreover, this effect is reinforced if the call termination rates are set above the marginal cost, as the smaller

* Corresponding author.

E-mail addresses: claudio.agostini@uai.cl (C.A. Agostini), manuel.willington@uai.cl (M. Willington), raul.lazcano@subtel.cl (R. Lazcano), saavedra@uahurtado.cl (E. Saavedra).¹ Between 2010 and 2014 several regulatory measures were introduced to foster competition: Off-net/on-net price differentials were reduced first and then banned, Mobile Network Operators were forced to make reasonable wholesale offers to all MVNO, number portability was introduced, and access charges were greatly reduced. As a result, in 2012 there were 9 firms in the market, 6 of which were MVNOs representing 1.25% of the market.<http://dx.doi.org/10.1016/j.telpol.2017.04.006>

Received 19 January 2016; Received in revised form 17 April 2017; Accepted 18 April 2017

Available online xxxx

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firm may find it impossible to set its off-net price at the same level of the on-net price of the large network.²

For the latter reason the public and academic debate of network-based price discrimination has been tied to the one of optimal access charge regulation. But even under Bill-and-Keep regulation, the call externality effect –due to the fact that consumers derive utility from incoming calls– generates the incentive to price discriminate according to the call destination. Firms have the incentive to set on-net prices at the socially efficient level and off-net prices above the marginal cost. The incentive to set higher off-net prices becomes larger as the market share of the firm is greater.

Theoretical literature shows that off-net/on-net price differentials exceed the difference between the access charge and the call termination cost in a model with asymmetric firms that compete in non-linear prices. Moreover, [Hoernig \(2007\)](#) shows that if a firm wants to reduce a rival's profits, the best way of doing it is by increasing the off-net price and, therefore, the off-net/on-net price differential. In this sense, excessive network price discrimination may be considered predatory.³

This paper empirically assesses the extent to which observed on-net/off-net price differentials, which are explicit in the plans marketed by the three major mobile telephone companies in Chile, can be considered predatory in this restricted sense.⁴ For this purpose, we constructed a detailed price database for the Chilean market –using information from the telecommunications regulator– and calibrate [Hoernig's \(2007\)](#) model for asymmetric firms. Then, we compare the prices that would emerge under competition with the actual prices offered by the three main operators (Movistar, Entel, and Claro).

In general, the main result is that the observed price differentials are within the boundaries of what can be expected as the resulting equilibrium of the three firms' strategic interaction in this market. Only a few plans with a small fraction of customers could be considered predatory in the sense that their price differential between off-net and on-net calls cannot be justified by cost differentials and just strategic (static) interaction among firms.

The empirical exercise contributes to the policy discussion on how to proceed with the recurring allegations presented before the antitrust authorities for predatory practices and/or the introduction of artificial entry barriers in this industry in Chile.

The analysis complements the one by [Rojas \(2015\)](#), which focuses on the short run welfare effects of banning price discrimination in Chile. For that purpose, he only considers linear prices and the prepaid segment, which represented around 72% of the customers in April 2013 and around 26% of the total outgoing traffic. Instead, our focus is on the period before the ban and the extent to which the off-net/on-net price differentials could be considered anticompetitive. The analysis is restricted to non-linear prices and the post-paid segment, where the largest fraction of traffic is generated.

The paper continues as follows: Section 2 reviews the main results from the literature on network competition; Section 3 briefly describes the Chilean mobile market; Section 4 discusses the model of asymmetric networks competing in non-linear discriminatory prices, and in Section 5 we calibrate it to evaluate the extent to which observed price differentials can be considered anti-competitive in Chile. Finally, Section 6 presents the results and Section 7 concludes.

2. Literature on network competition off-net/on-net price differentials

The literature on network competition begins with the seminal works of [Laffont, Tirole and Rey \(1998a and 1998b\)](#) –hereinafter referred to as LTR– and [Armstrong \(1998\)](#), which lay out the basic framework to analyze this type of markets. Their work has been followed by a myriad of papers that consider a number of alternative setups: linear vs. non-linear prices, discriminatory or non-discriminatory prices (on-net/off-net), symmetric vs. asymmetric networks, considering or ignoring call externalities, homogeneous or heterogeneous consumers, balanced call pattern vs. the formation of clubs within networks, and, more recently, distinguishing between passive vs. responsive expectations for consumers.

Beyond the analysis of optimal price setting by firms, the main issue addressed by this literature is the regulation of access charges and the extent to which they can be used as a collusive mechanism if left unregulated. In the case of discriminatory prices, the literature has focused on two issues. First, on the incentives that firms have to price discriminate between on-net and off-net calls, particularly when call externalities are considered, and when it could have anti-competitive effects. Second, on how the incentives generated by the access charge regulation may differ between larger and smaller firms (or potential entrants). We briefly discuss here the main results in this literature to provide a general context for the model we then calibrate. For this reason, we focus only on models with discriminatory prices.

[Laffont, Tirole and Rey \(1998b\)](#) analyze the case of linear but discriminatory pricing, finding that the socially optimal reciprocal access charge is less than the marginal cost of terminating calls. However, this access charge would be set above marginal cost if left to the firms. The authors show that, in equilibrium, the gap between on-net and off-net prices and the average price level are both increasing with the access charge. Therefore, as in the simpler case of nondiscriminatory prices ([Laffont, Tirole and Rey, 1998a; Armstrong, 1998](#)), the access charge can be used as an instrument to collude. Furthermore, [Laffont, Tirole and Rey \(1998b\)](#) show that if access charges are set above marginal cost –whether set by the regulator or the companies–, then price discrimination between on-net and off-net calls is desirable from a social point of view since it leads to lower prices.

In the case of non-linear and discriminatory prices, [Gans and King \(2001\)](#) show that firms' incentive is to agree on setting a below cost

² In several European countries, however, small operators have pioneered the introduction of network-based price discrimination ([Haucap & Heimeshoff, 2011](#)). One potential explanation is that “calling clubs” are formed even in small network operators ([Gabrielsen & Vagstad, 2008](#)). A complementary explanation is that consumers may not weigh correctly the price differentials against the probability of placing on-net vs. off-net calls, biasing their decisions towards operators that offer high price differentials ([Haucap & Heimeshoff, 2011](#)).

³ In a context of asymmetric firms, high access charges, and switching costs, [López and Rey \(2016\)](#) show that network based price discrimination is necessary for the incumbent to foreclose the market to its rival.

⁴ This is different from the Areeda-Turner logic, as prices need not be below costs and there is no analysis about recovering lost profits.

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