

# Segmentation, advertising and prices <sup>☆</sup>

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## Abstract

This paper explores the implications of market segmentation on firm competitiveness. In contrast to earlier work, here market segmentation is minimal in the sense that it is based on consumer attributes that are completely unrelated to tastes. We show that when the market is comprised by two consumer segments and when there is sufficient variation in the per-consumer costs firms need to incur to access the different consumer populations, then firms obtain positive profits in symmetric equilibrium. Otherwise, the equilibrium is characterized by zero profits. As a result, a minimal form of market segmentation combined with advertising cost asymmetries across consumer segments give firms an opportunity to generate positive rents in an otherwise Bertrand-like environment.

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## 1. Introduction

Individuals have unifying characteristics, such as age, gender, mother tongue, profession, sexual orientation, life-style, etc. Often, these characteristics influence individuals' media affinity and, as a result, firms can reach the various groups of buyers by placing advertisements in selected media. Moreover, by choosing advertising strategies appropriately, an individual firm can decide to address its advertisements to just one or, alternatively, more consumer segments at a time.

Consider for example consumer segmentation based on mother tongue, like in Belgium. A firm operating in Belgium may want to address only the French-speaking community by inserting commercials in TV channels that broadcast only in French, or by inserting ads in newspapers and magazines written in French. Alternatively, the firm

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may decide to address only the Dutch-speaking community, or else all the consumers in the market, and proceed accordingly. Since different advertising strategies have distinct costs, the question for a firm is how to market its product optimally in these circumstances. In this paper we explore the implications of consumer segmentation on firms' profits, the distribution of prices and advertising strategies.<sup>1</sup>

For this purpose, we study a pricing and advertising simultaneous moves game where homogeneous product sellers operate in a market consisting of two consumer segments. Consumers are initially uninformed about the firms' offerings and prices. The key feature of the model is that firms' advertising strategies can be designed to reach the distinct consumer segments or, alternatively, the entire market. Specifically, there are two groups of consumers, groups A and B, of possibly different size. Firms may decide to send their ads to segment A's consumers at a cost  $\phi_A$  and charge a price  $p_A$ , or to segment B's ones at a cost  $\phi_B$  and charge a price  $p_B$ , or to all consumers at a cost  $\phi_A + \phi_B$  and charge a price  $p$ . In this setting, advertising costs should be seen as the cost of providing product and price information to the different consumer groups. *Ceteris paribus*, a segment is relatively more profitable than another if it has a lower per-consumer advertising cost.

We assume that the advertising technology is perfect in the sense that if a firm decides to address its advertisements to one consumer segment, then all individuals in that particular segment observe the firm's ads, while no consumer in the other segment does observe the ads.<sup>2</sup> Since firms sell homogeneous goods, this as-

<sup>1</sup> In recent days, consumers visit different on-line chat rooms and social networking websites like MySpace and FaceBook. As in the case of mother tongue, the participation of an individual in one of those groups is generally not related to his/her preferences over a particular product. Yet, the mere existence of different websites opens up the possibility for firms to communicate with consumers in a particular on-line group, without affecting the information of consumers in other on-line groups. For a study of firms' use of promotional chat on the internet, see Mayzlin (2006).

<sup>2</sup> We are assuming here that the advertising technology is arbitrarily precise, i.e., a firm can 'communicate' with the consumers in one of the groups without affecting the information set of the consumers in the other group. The other extreme is when the advertising technology is totally imprecise and a firm intending to send its ads to a given group of consumers ends up also reaching the consumers in the other group. In such a case segmentation would be irrelevant and the model equivalent to one where the market is not segmented. The intermediate case where some of a firm's ads intended for one of the two groups of consumers spill over the other group of consumers is equivalent to a model where consumer segments partially overlap. In such a case, if a firm sends its ads to, say, group A, then also a fraction of group B's consumers receive the ads. In our working paper Galeotti and Moraga-González (2003), we show that the main insights we present here carry on if we consider imperfect targeting technologies.

sumption leads to a Bertrand-like environment where, in the absence of segmentation, firms obtain zero profits in equilibrium. This highly competitive environment provides us with a useful benchmark to isolate the effects of segmentation on competition. The main result of the paper is that a minimal amount of market segmentation allows firms to obtain positive profits as long as there is sufficient variation in per-consumer advertising costs across consumer segments. We now explain the economic forces behind this result.<sup>3</sup>

There are two important properties which describe the nature of price-advertising equilibria in segmented homogeneous product markets. The first property is that equilibrium prescribes firms to randomize between sending their ads only to segment A's consumers, sending their ads only to segment B's buyers, and sending their ads to all the consumers in the market. As a result, with strictly positive probability, consumers in different segments observe offerings of distinct firms. We refer to this situation as one where the market outcome is partially segmented because, from time to time, consumers in a given segment are only aware of the offering of one of the firms.

The second property of equilibrium is that pricing behavior, advertising frequencies and firm profits depend on the relative profitability of the different segments. Suppose that segment A is more profitable than segment B. This implies that, *ex-ante*, firms find it more attractive to address their ads to segment A's buyers than to segment B's. Since in equilibrium all segments must be equally attractive, segment A must attract more advertising than segment B, which creates different intensities of price competition across the two consumer groups. As a result, firms offer better deals to segment A's consumers than to B's. This, in turn, discourages firms to send their ads to all the consumers at a time (because in that case they have to charge a uniform price), which makes partial segmentation likely. We find that, for segmentation to be a source of economic profits, there must be large variation in per-consumer advertising cost across segments. In that case, partial segmentation arises very frequently and firms are able to extract positive rents.

An interesting feature of our model is that it explains firm size dispersion as an equilibrium phenomenon. Moreover, since consumers located in larger consumer

<sup>3</sup> Unlike in recent work by Iyer et al. (2005), we obtain this result in a setting where consumers always buy from the lowest-price supplier, i.e., where market segmentation has nothing to do with product differentiation. Despite this, segmentation enables firms to randomize advertising strategies across markets, which weakens price competition and thus opens up the possibility to obtain positive profits.

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