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Spatial competition between shopping centers☆

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ABSTRACT

We study competition between two shopping centers that sell the same set of goods and are located at the extremes of a linear city, without restricting consumers to make all their purchases at a single place. In the case of competition between a shopping mall (set of independent single-product shops) and a department store (single multiproduct shop), we find that: if the number of goods is low, all consumers shop at a single place; if it is moderately high, some consumers travel to both shopping centers to buy each good where it is cheaper (a single good is cheaper at the shopping mall). The shops at the mall, taken together, obtain a lower profit than the department store. Nevertheless, two shopping malls should be expected to appear endogenously.

1. Introduction

Shopping centers have existed for many centuries as galleries, market squares, bazaars or seaport districts. Today, they are mainly organized in two alternative formats: shopping malls and department stores. Both are spaces where consumers can buy a huge variety of goods. But, while a department store can be seen as a multiproduct firm, a shopping mall is constituted by independent shops.

Competition between shopping centers exists in most large cities, with physical distance between them playing a relevant role.[1] Even when they offer similar product lines, the fact that they are spatially differentiated provides them with some market power that they can exploit when setting prices.[2] This market power is limited by the fact that some consumers may find it worthwhile to visit more than one shopping center in order to purchase goods where they are cheaper.

To study competition between shopping centers, one should take into account the demand for multiple goods and also the cost of traveling to one or more shopping centers. Most of the existing spatial competition models fail to do so, because they either restrict the analysis to markets with a single good or assume that consumers make all their purchases at the same place (Bliss, 1988; Beggs, 1994; Smith and Hay, 2005; Innes, 2006; Lahmandi-Ayed, 2010). This "one-stop shopping" assumption is very convenient because it allows treating multiple goods as a single bundled good.

We provide a study of competition between shopping centers by extending the standard model of spatial competition (Hotelling, 1929; D'Aspremont et al., 1979) to the case of multiple goods, without assuming one-stop shopping. We consider the existence of two shopping centers located at the extremes of a linear city, selling the same set of goods. Consumers are uniformly spread across the city and buy exactly one unit of each good.[3] They may

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[1] Our hometown, Porto, having a metropolitan area with 1.3 million residents, is served by seven shopping centers with a commercial area above 39 000 m^2: six shopping malls (ArrábidaShopping, Dolce Vita, GaiaShopping, MAR Shopping, NorteShopping and Parque Nascente), and one department store (El Corte Inglés). They are more or less evenly distributed around the city, so that a car trip between two adjacent shopping centers can take around 10 min.

[2] In his empirical study on store choice in spatially differentiated markets, which uses data on store sales of packaged goods in Pittsfield (Massachusetts, USA), Figurelli (2013) reports that 99% of expenditure is on items for sale in more than one store and 96% in more than one chain of stores.

[3] Total demand is inelastic, as in the standard single-product model. It would undoubtedly be of interest to relax this simplifying assumption. A possible approach

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travel to a shopping center and buy all goods there, or travel to both shopping centers and buy each good where it is cheaper.[4]

A shopping center may be either a shopping mall (where each good is sold by an independent firm) or a department store (where a single firm sells all the goods).[5] We solve for equilibrium prices, market shares and profits in three scenarios: (i) competition between a department store and a shopping mall; (ii) competition between two department stores; (iii) competition between two shopping malls.

In the case of competition between a department store and a shopping mall, we find that there may be consumers visiting the two extremes of the city or not, depending on the number of goods that are sold by the shopping centers. If the number of goods is low, all consumers make their purchases at a single place (one-stop shopping). If the number of goods is moderately high, some consumers are willing to travel to both extremes of the city to buy each good where it is cheaper (two-stop shopping). In this case, there is only one good that is cheaper at the shopping mall than at the department store. However, its price is low enough for some consumers to travel there just to buy this good. If the number of goods is moderately low or very high, there is no price equilibrium in pure strategies.

Regardless of the number of goods, the equilibrium price of the bundle is lower at the department store than at the shopping mall. This occurs because unrelated goods become complements when they are sold at the same location (and substitutes when they are sold at opposite extremes of the city).[6] When a shop at the mall considers the possibility of decreasing its price, it only cares about the increase of its own demand and not about the increase of the demand of the other shops at the mall. In contrast, the department store internalizes this effect and takes into account that a decrease in the price of one good also increases the demand for its other goods.[7] In spite of charging a lower price for the bundle, the department store obtains a higher profit than the shops at the mall taken together.

The scenario in which prices are lowest is that of competition between two department stores. In this case, the price charged for the bundle of goods is equal to the price charged in the single-good model (independently of the number of goods). The two department stores obviously capture equal shares of the market and obtain equal profits. These are, unsurprisingly, lower than the profits obtained when competing against a shopping mall.

Finally, in the scenario of competition between two shopping malls, we find that each good is sold at the same price as in the single-good model. The shops behave as if consumers only bought their good. This is the competitive scenario in which prices are highest. The explanation is the same as before: the shops at the mall set the same price as in the single-good model because they do not internalize the positive effect of a price decrease on the other shops at the same mall.

After finding the equilibrium prices and profits in each of the three competitive scenarios, it is straightforward to analyze whether it is more profitable to have a department store or several independent shops at a mall.[8] We answer this question by considering a two-stage game in which the shopping centers start by acquiring land and then compete in prices. We find that, if the number of goods is low, shopping malls are willing to bid higher for the land. Therefore, the competitive scenario that appears in equilibrium is that of competition between two shopping malls. However, if the number of goods is moderately high, there is another self-fulfilling equilibrium, which is Pareto-inferior: competition between two department stores.

As explained previously, a department store has stronger incentives to charge lower prices than the independent shops at a mall. If the prices of the rival retailers remained the same, the greater aggressiveness of the department store would be profitable. However, setting lower prices induces the rivals to lower their prices as well. If the number of goods is low, this effect dominates, leading to lower profits for everyone. The reason why both sides would win if a department store separated itself into several independent shops was explained by Innes (2006): "*a multi-product retailer can effectively pre-commit to higher prices by organizing itself as a mall of independent outlets*". If the number of goods is moderately high, it becomes more profitable to compete against a department store by behaving as a department store. But it is still better to compete against a shopping mall by behaving as a shopping mall. This is why there are two scenarios that may emerge endogenously: competition between two department stores or competition between two shopping malls.

We also compare the consumer surplus and the total surplus in the different competitive scenarios. Since all consumers are assumed to buy exactly one unit of each good, a change in prices simply transfers surplus between consumers and stores. Therefore, total surplus is maximized when consumers shop at the closest shopping center (transportation costs are minimized).[9] This occurs when there are either two department stores or two shopping malls. Unsurprisingly, consumer surplus is maximal in the case of competition between two department stores. Competition between two shopping malls is actually the worst scenario for consumers. In spite of bearing a higher total transportation cost, consumers are better off when there is competition between a department store and a shopping mall than when there is competition between two shopping malls.

One possible policy implication of our work concerns the debate regarding the regulation of big-box retail.[10] According to Griffith et al. (2003), the "wholesale and retail" sector is responsible for 20% of the productivity gap between the UK and the USA. This may partly be due to the stricter regulatory environment in the UK, which is restricting the development of large out-of-town retail stores.[11] While the welfare-losses associated with regulatory

could be to maintain indivisibility, but introduce heterogeneous valuations for each good as in the multiproduct monopoly model of Rhodes (2012).

4 Consumers are assumed to be fully informed about the prices charged in each extreme of the city. Multiproduct pricing in the presence of search costs has been recently studied by Rhodes (2012). One of his main conclusions is that a firm that sells more products attracts consumers that are less price-elastic and, therefore, has lower incentives to surprise customers with higher prices once they have visited the store.

5 We rule out bundling strategies, i.e., we restrict the price of a bundle of goods to be equal to the sum of the prices of the individual goods. For an analysis of the bundle pricing problem in a related context, see Armstrong and Vickers (2010). See also Hanson and Martin (1990).

6 See Stahl (1987).

7 Gould et al. (2005) showed that rental contracts in shopping malls typically include incentives for an individual shop to act in a way that is beneficial for the other shops at the mall. Therefore, one should not expect a shopping mall to behave exactly as a set of independent shops.

8 Since otherwise unrelated goods become complements when they are sold at the same shopping center, this question is related to the literature on mergers between firms that sell complementary goods. See, for example, Economides and Salop (1992), Matutes and Regibeau (1992) or Bart (2009).

9 Under the assumption that total demand is inelastic, statements about total surplus should be taken with a grain of salt. In more realistic settings, high prices entail a deadweight loss.

10 We thank a referee for describing to us how our work could be meaningful to this policy issue.

11 See Griffith and Harmgart (2008), Sadun (2011), Schiraldi et al. (2011) and Cheshire et al. (2012). See also Bertrand and Kramarz (2002) and Schivardi and Viviano (2011) on the effects of retail sector regulation in France and Italy, respectively.