Journal of Business and Economics, ISSN 2155-7950, USA
February 2015, Volume 6, No. 2, pp. 231-243
DOI: 10.15341/jbe(2155-7950)/02.06.2015/001

http://www.academicstar.us

Proximity of Retailer Locations under Informative Advertising

S. Chan Choi

(Rutgers Business School, Newark, NJ 07102, USA)

Abstract: When a branded retailer decides to add a new store, one major decision is the distance of a proposed location from its competitors. It is widely believed that one of the advantages of a free-standing location is the absence of nearby competition which a shopping-mall location typically faces. We are interested in examining whether the absence of nearby competition is indeed an advantage when there is a spill-over effect of advertising. The proximity between the two stores affects how much of one store's informative advertising "spills over" to the other store. When the stores are located close to each other, a fraction of consumers who are informed of only one retailer will decide to "shop around" between the two differentiated but substitutable stores. We show that, when advertising is relatively cheap, it can be more profitable to have competing stores located close to each other and let a certain fraction of partially-informed consumers shop around.

Key words: marketing; store location; informative advertising; retailing

JEL codes: M310, M370

1. Introduction

Suppose that a typical consumer needs a new pair of business-casual pants. She would pay attention to promotional mailings and newspaper inserts for product and price information of retail stores in town. Further suppose that she found a nice product on promotion from, say, Express, and decided to visit that store. If the retailer is at a free-standing location around which there is no competing store, she would make a purchase there instead of driving across the town for comparison shopping. But if the retailer is located in a large shopping mall, she would probably (but not certainly) find Banana Republic a few doors away. In that case, it is likely that she would end up visiting both stores for comparison shopping. That is, the former store's informative advertising has a spill-over effect when a competing store is located nearby.

Most branded retail stores are frequently located inside shopping malls in which there are direct competitors located in a very close proximity. This includes such product categories as casual clothing (Gap and Limited), designer fashion (Ann Taylor and Talbots), jewelers (Zales and Kay), wireless phones (ATT and Verizon), beauty shop (Trade Secret and Sephora), and even restaurants (Wendy's and Sbarro's). On the other hand, many of these same retailers can also be found as free-standing stores, which may not have competing stores within a short walking distance. Clustered shopping area can be considered as an intermediate store location between the two, where competing stores are located in varying proximities from each other. When a branded retailer decides to add a new store, its location choices include a free-standing location, a shopping-mall location, or anywhere in

S. Chan Choi, Ph.D., Professor, Rutgers Business School-Newark and New Brunswick; research areas/interests: marketing. E-mail: chanchoi@rutgers.edu.

between. Each of these locations has advantages and disadvantages. For example, a shopping mall location offers heavier consumer traffic, attraction of anchor stores, mix of different merchants, and shared promotion. On the other hand, a free-standing location offers lower rent, more space, and in particular *less inter-store competition*. The conventional wisdom is that when retail stores are located close to each other, say, in a shopping mall, the intense competition will erode profits for both. This paper examines whether the inter-store competition is indeed a liability. Our result shows that it does not have to be, which adds a check mark to the argument for the central retailer location.

2. Literature Review

Store location problem has been extensively studied in the literature. Most studies focus either on the issue of finding an optimal store location in a geo-demographic context to maximize store sales (Nelson, 1966; Drezner, 1994; Durvasula, Sharma & Andrews, 1992) or on the competitive nature of store locations via Hotelling model (Brown, 1989; Mackay, 1972) or the central place theory (Craig, Ghosh, & McLafferty, 1984; Ingene & Lusch, 1981). Ghosh and Craig (1986) propose a conjoint analysis-based approach of selecting service locations. For a review of these methodologies, see Ghosh and McLafferty (1987). A recent empirical approach is proposed by Leszczyc, Sinha, and Sahgal (2004) as an econometric model that assumes consumers' multi-purpose shopping trips to analyze competitive location and pricing decisions of retail grocery stores. Our paper is similar in its problem context to Thomadsen (2007), who examines different location choices of fast food restaurants in an asymmetric competition with differentiated products. In that paper, the size of the total market is the determining factor of different location equilibrium outcome. Our paper also deals with the problem of evaluating store location options for a branded retailer in a specialty product category. However, our model treats advertising as a decision variable in a market that is sufficiently large. Our model is related with MacKay's (1972) notion that introduces comparison shopping behavior in which consumers' store choice decisions are affected by the presence of neighboring establishments. This paper presents a game-theoretic model of advertising and pricing competition to examine the effect of the proximity between two retail stores.

The rest of the paper is organized as follows: The next section presents underlying behavioral assumptions that lead to the specific model structure in Section 3, which presents two models of advertising-price competition and derives their equilibrium solutions. The first is the base model which assumes that the retailers are located sufficiently far from each other. The second model generalizes the first by allowing a varying degree of proximity between stores. Section 4 examines these solutions to derive their implications and summarizes the findings in propositions. The last section concludes the paper and delineates future research topics.

3. Behavioral Assumptions

Two key components of our model are: (a) the informative aspect of advertising and (b) opportunistic comparison shopping among partially-informed consumers, which is related with the distance between competing stores. For specialty goods within a relatively low-to-medium price range, consumers may visit multiple stores for comparison shopping only if competing stores are nearby (i.e., low search cost).

In our duopoly model, the two brands (hence two retail stores) are differentiated along the horizontal dimension that represents a uniform distribution of consumer tastes, and they are positioned at either end of the Hotelling's linear market. Each retailer has two short-term variables: retail price and advertising. The advertisements are assumed to be informative ones that inform or remind consumers of the store location and its price.

In addition to the taste distribution, consumers are also assumed to be uniformly distributed in a sufficiently large geographical market area so that the distances between the stores and individual consumers are averaged out between the competing retailers. But the main feature of our model is that the proximity between the two stores affects the extent to which one store's informative advertising "spills over" to the other store. When the retailer stores are sufficiently far from each other, partially-informed consumers who are exposed to only one retailer's advertisement would not shop around. However, consumers who are exposed to both retailers' advertisements are informed of both prices and locations. Such fully-informed consumers can do comparison shopping even without having to visit both stores.

On the other hand, when the stores are located close to each other (like in a shopping mall), consumers who were exposed to only one retailer's advertisement may accidentally discover the competing retailer and have an opportunity for comparison shopping. Therefore, there is a certain amount of *advertising spill-over*: Consequently, it may appear that a part of the advertising dollars not only goes wasted but also helps the competitor's business. However, our result shows that, when advertising is relatively cheap, it can be more profitable to have competing stores located close to each other and let *a certain fraction* of the partially-informed consumers shop around. Figure 1 presents a framework of the consumer search and decision making process.

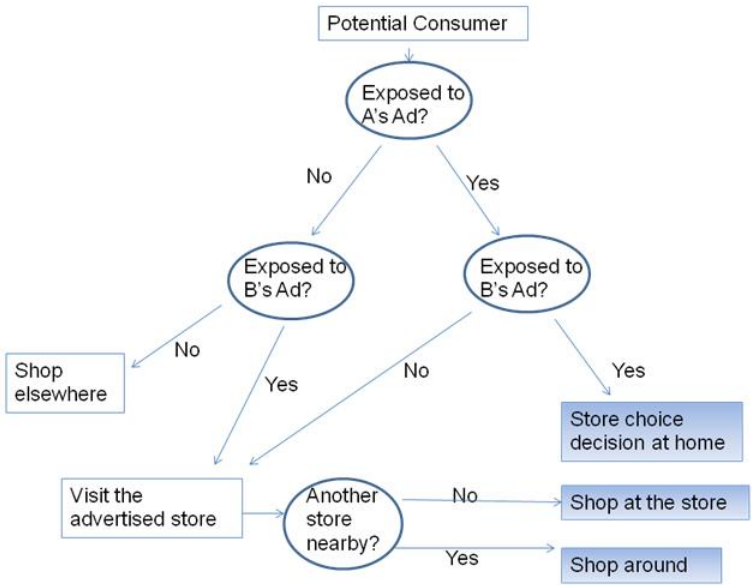

Figure 1 Consumer Choice of a Branded Retailer

4. The Model

Among major factors that influence consumer choice of a branded retail store is their awareness of the store location and its price. In particular, for specialty goods such as fashion clothes and jewelries which are purchased infrequently, the level of informative advertising would be relevant in keeping the brand and its store location on consumers' top-of-the-mind awareness (TOMA). Our model assumes that advertising expenditure is directly related with the probability that any particular consumer is informed of the store. Advertising competition has been modeled in the economics literature as a circular market (Grossman & Shapiro, 1984) or a linear market

(Tirole, 1989). Levy and Gerlowski (1991) applied the linear market model to examine the effect of matching competitor's clause (MCC) policy using price discrimination.

As in Levy and Gerlowski (1991), let ϕ_i denote the probability that any consumer receives a given firm i's advertisement where $0 \leq \phi_i \leq 1$, which is independent of the consumers' taste distribution. The advertising cost $A(\Phi_i)$ is an increasing function of this probability. ϕ_1 and ϕ_2 are independent from each other. Therefore, the potential market can be divided into four segments: those who are informed of either one of the two stores, those who are informed of both stores, and those who are exposed to neither advertisement. The last segment is assumed to be out of the market.

The retail stores know the proportions of the informed consumers, which is a known function of the advertising expenditure. But they cannot distinguish between informed and uninformed consumers; hence price discrimination is not possible.

4.1 No Advertising Spill-over Case

First, consider the case in which the two retailers are located sufficiently far from each other so that a consumer would not casually shop around. The demand for retail store$i$ is derived from two consumer segments. Partially-informed consumers would not engage in opportunistic comparison shopping behavior because there is no other store nearby. That is, consumers who are exposed to only retailer 1's advertising ($\phi_1 - \phi_1\phi_2$) would visit only that retailer and make a purchase without a chance to shop around. However, those who are also exposed to retailer 2's advertisement ($\phi_1\phi_2$) have full information and engage in comparison shopping without the need to visit both retailers.

The retailers are assumed to be horizontally differentiated. This monopolistic competition has been widely modeled using a linear market of unit length, in which the two retailers are positioned at either end of the line segment (Tirole, 1989). Consumer tastes are uniformly distributed along the line segment [0, 1] as shown in Figure 2. A consumer whose taste is located at x will incur a total cost of p_1+tx for brand 1 and $p_2+t(1-x)$ for brand 2, where t is the unit cost of the "lack of fit". This parameter is related with the degree of retailer differentiation. Since the consumer will purchase the brand with lower total cost, the iso-cost point can be found by equating the two costs and solving for x, which is $(p_2-p_1+t)/2t$. This quantity becomes brand 1's share in the segment that was exposed to *both* retailers' advertising.

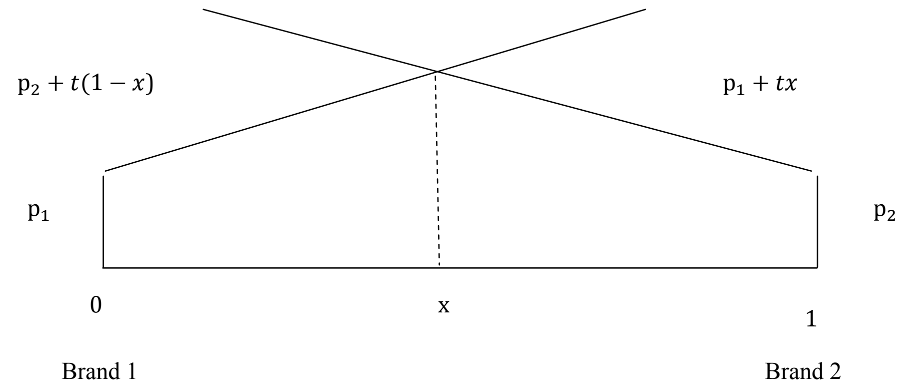

Figure 2 The Monopolistic Competition

$$D_1 = \phi_1(1-\phi_2) + \phi_1\phi_2(p_2 - p_1 + t)/2t, \quad (1)$$

and with the unit cost of the product c, retailer 1's profit is

$$\Pi_1 = (p_1 - c)D_1 - A(\phi_1). \quad (2)$$

The second retailer's demand and profit can easily be obtained by exchanging subscripts. In the following, we assume a typical quadratic advertising cost function (Tirole, 1989; Levy & Gerlowski, 1991): $A(\phi_i) = a\phi_i^2/2$. The only parameter restriction is $a \geq t/2$, which is needed to satisfy the condition that a probability cannot be greater than one.

Firm 1's first order conditions for profit maximization with respect to price and advertising expenditure are

$$\frac{\partial \Pi_1}{\partial p_1} = \phi_1 + (c - 2\,p_1 + p_2 - t)\phi_1\phi_2/2\,t = 0 \tag{3}$$

$$\frac{\partial \Pi_1}{\partial \phi_1} = p_1 - c - a\phi_1 + (p_1 - c)\,(p2 - p1 - t)\phi_2/2\,t = 0 \tag{4}$$

(4)

Solving (3) and (4) for p_1 and ϕ_1, we obtain firm 1's reaction functions:

$$\hat{p}_1 = (p_2 + t + c)/2 + t(1 - \emptyset_2)/\emptyset_2,$$

$$\widehat{\emptyset}_1 = [(p_2 - c - t)\emptyset_2 + 2t]^2/8at\emptyset_2.$$

Examining the first-order derivatives of these reaction functions, we find the following reactive directions against the competitor's price and advertising changes:

Table 1 Sensitivity of Reaction Functions

Reaction	p_2	$\emptyset_2$
$\hat{p}_1$	+	−
$\widehat{\emptyset}_1$	+	+ if $3t < p_2 - c$ − if $3t > p_2 - c$

That is, when firm 2 raises price, it's best for firm 1 to also raise its price *and* to increase advertising spending. When firm 2 increases advertising, the best response for firm 1 is to lower its price *and* to decrease advertising if t is small (decrease advertising otherwise). The price reaction is intuitive, but the advertising reaction is a surprise. When the retailers are less differentiated (i.e., smaller t), consumers are more prone to switch between brands at a smaller price advantage. Thus, firm 1 can attract more shoppers by lowering its price at the same time increasing advertising. But when t is large, a lower price would not be sufficient to lure consumers who are shopping around.

Since the retailers are symmetric, we can delete the subscripts and solve the equation system (3) and (4) for p and ϕ. Among three roots, the only positive solution is

$$p^* = c + \sqrt{2at} \tag{5}$$

$$\phi^* = 2/(1 + \sqrt{2a/t}) \tag{6}$$

Because ϕ is a probability that needs to be less than one, (6) requires a parameter condition $a \geq t/2,$ which will be used later in the analysis. These are exactly the same solution as in Levy and Gerlowski (1991). The resulting demand and profit at this equilibrium are

$$D^* = 2\sqrt{2at}/(\sqrt{2a} + \sqrt{t})^2 \text{ and } \Pi^* = 2a/(1 + \sqrt{2a/t})^2 \tag{7}$$

Note that the unit cost c does not play a role in the equilibrium except as an additive term in price. Hence in the following section, the cost will be set to zero without loss of generality.

4.2 Advertising Spill-over Effect

Now consider the case in which both branded retailers are located close to each other. When a consumer is exposed to only one retailer's informative advertising, she would decide to visit that store. But when a competing retailer is located closely from the advertised store, the more likely will the consumer shop around. Suppose that among these partially-informed consumers, a fraction of s ends up shopping around. s is inversely related with the distance between the two retail stores. Then retailer 1's captive consumer segment is reduced by $s(\emptyset_1 - \emptyset_1\emptyset_2)$. Therefore, consumers in this expanded competitive segment have full information either by being exposed to both advertisements or by visiting both stores.

The demand function for retailer 1 can be derived as

$$D_1 = \phi_1(1-\phi_2)(1-s) + (\phi_1\phi_2 + \phi_1(1-\phi_2)s + \phi_2(1-\phi_1)s)(p_2 - p_1 + t)/2t \quad (8)$$

Retailer 2's demand function is symmetric, and one can easily check that the combined demand stays the same as in the previous case: i.e., $D_1 + D_2 = \emptyset_1 + \emptyset_2 - \emptyset_1\emptyset_2$.

The symmetric equilibrium solution can be obtained by solving the equation system of the first-order conditions for p and $\emptyset$ as in the base model above:

$$p^* = \frac{-4as+st+\sqrt{16a^2s^2+8a(4-3(2-s)s)t+s^2t^2}}{4-6s+4s^2}, \quad (9)$$

$$\emptyset^* = \frac{-4(as+t)+st+\sqrt{16a^2s^2+8a(4-3(2-s)s)t+s^2t^2}}{2(a(2-4s)-t)} \quad (10)$$

The corresponding symmetric demand and profit at equilibrium have messy expressions so that they will not be presented here. The next section analyzes the solutions to examine key properties of these equilibria.

5. The Findings

5.1 The Free-standing Stores

First, the equilibrium solution for the free-standing retail stores (Equations (5), (6), and (7)) is examined. Note that the unit cost affects price in linear fashion, and it is not a part of the other quantities including the profit. Hence, the cost term is dropped from the subsequent analysis. Table 2 presents comparative statics of the equilibrium solution:

Table 2 Comparative Statics of Equilibrium Solutions: Free-Standing Case

	∂p^*	$\partial \emptyset^*$	∂D^*	$\partial \Pi^*$
∂a	+	−	−	+
∂t	+	+	+	+

As advertising becomes more expensive (i.e., as a becomes larger), the firms increase price ($\frac{\partial p^*}{\partial a} > 0$) and reduce the advertising level ($\frac{\partial \emptyset^*}{\partial a} < 0$). However, the total advertising expenditure ($a\phi^2/2$) goes up despite the reduced advertising. Increased price and reduced advertising has negative impacts on the demand($\frac{\partial D^*}{\partial a} < 0$, since $a > t/2$). Surprisingly, however, the equilibrium profit increases ($\frac{\partial \Pi^*}{\partial a} > 0$) as the advertising becomes more expensive. Here is an explanation: The reduced advertising means a lower probability of exposure ϕ_i, but the area of price competition $\phi_1\phi_2$ is reduced by its square. The reduced competition allows both retailers to raise prices sufficiently high that the increased revenue more than compensates the reduced demand. Furthermore, the increased revenue is sufficient to also offset the increased total advertising expenditure.

As the retailers are more differentiated (i.e., larger t), the equilibrium price increases ($\frac{\partial p^*}{\partial t} > 0$). That is, as the retailers are more differentiated, price competition becomes less intensive, resulting in a higher equilibrium price. At the same time, the retailers will spend more on advertising as they are more differentiated ($\frac{\partial \emptyset^*}{\partial t} > 0$). This latter result seems puzzling initially, but it can be explained by the reduced price competition. More horizontal differentiation means that the retailers will face less price competition because those consumers who were exposed to both advertisements ($\emptyset_1\emptyset_2$) are less sensitive to price difference. Thus, firms can afford to spend more on advertising with less negative impact of the increased intersection area. Optimal advertising is determined by a balance between marginal revenue and marginal cost. When the price increases, the contribution margin also increases; hence, which results in a higher advertising spending. With a higher price and increased advertising, the end result of more horizontal differentiation is an increased demand ($\frac{\partial D^*}{\partial t} = \frac{\sqrt{2a}(\sqrt{2a}-\sqrt{t})}{(\sqrt{2a}+\sqrt{t})^3\sqrt{t}} \geq 0$). Increased price and demand naturally result in a higher profit ($\frac{\partial \Pi^*}{\partial t} = \frac{2t^{\frac{3}{2}}}{(\sqrt{2a}+\sqrt{t})^2} > 0$).

Proposition 1: Suppose the two retail stores are located sufficiently far from each other so that there is no spill-over effect of advertising. As advertising becomes more expensive, equilibrium price increases, advertising expenditure decreases, and demand decreases, but profit increases.

Proposition 2: Suppose the two retail stores are located sufficiently far from each other so that there is no spill-over effect of advertising. As the retailers are more differentiated in horizontal dimension (i.e., a larger t), equilibrium price increases, advertising increases, demand increases, and profit increases.

5.2 The General Model with Advertising Spill-over

We are now interested in examining whether the equilibrium properties derived above still hold in the more general values of $0 \leq s \leq 1$. Recall that s represents the fraction of partially-informed consumers who engage in opportunistic comparison shopping. Also recall that s is inversely related with the proximity between the two retail stores. The following table summarizes comparative statics of the equilibrium solution in the mall-location case:

Table 3 Comparative Statics of Equilibrium Solutions: Free-Standing Case

	∂p^*	$\partial \emptyset^*$	∂D^*	$\partial \Pi^*$
∂a	+	−	−	+ when s is small −when s is large
∂t	+	+	+	+
∂s	Indeterminate	−	−	Indeterminate

Setting t at an arbitrary value ($t = 1$), we graphically examine the equilibrium price at several middle values of s in Figure 3. The graph concurs with the finding from the free-standing case: when advertising becomes more expensive, the equilibrium price increases.

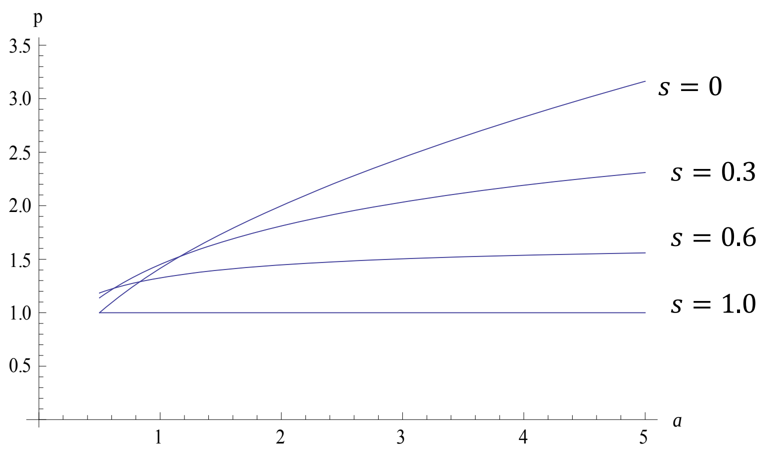

Figure 3 Equilibrium Price in Advertising Cost ($t = 1$)

As the advertising cost increases, the retailer will spend less on advertising ($\frac{\partial \phi^*}{\partial a} \leq 0$), but the total advertising cost will be higher. Although the expression of the first order derivative of demand with respect to advertising cost is analytically messy, it is graphically consistent with the free-standing case ($\frac{\partial D^*}{\partial a} \leq 0$) as shown in Figure 4.

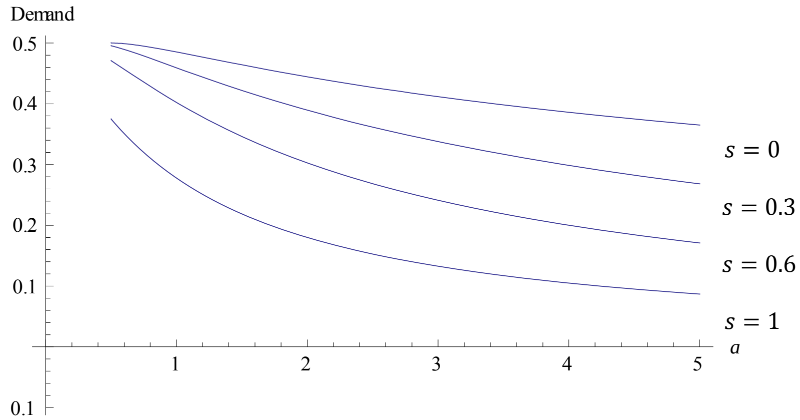

Figure 4 Equilibrium Demand in Advertising Cost ($t = 1$)

Similar to the free-standing case, increased advertising cost will raise price, decrease advertising level but at a higher advertising expenditure, and consequently suppress the demand.

The effect of advertising cost on profit is more complex. When there is no advertising spill over (i.e., $s = 0$), the equilibrium profit increases as advertising becomes more expensive ($\frac{\partial \Pi^*}{\partial a} \geq 0$). On the other hand, as more consumers shop around (i.e., a larger s), the profit decreases as advertising becomes more expensive particularly when a is already high (see Figure 5). When mutual spill-over of informative advertisement becomes extensive in the shopping mall location, the increased price becomes insufficient to compensate the decreased demand. However, we show below that when the advertising cost is relatively low, it can be more profitable to let some portion of consumers shop around.

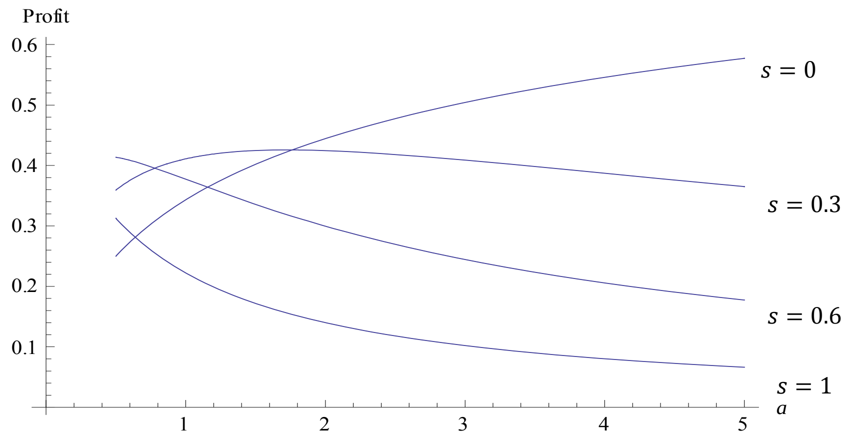

Figure 5 Equilibrium Profit in Advertising Cost ($t = 1$)

Proposition 3: Suppose the two retail stores are geographically concentrated. As advertising becomes more expensive, equilibrium price increases, advertising decreases but its expenditure increases, demand decreases. The equilibrium profit increases when the probability of shop-around is low but decreases when the probability is high.

Proposition 4: Suppose the two retail stores are geographically concentrated. As retailers are more horizontally differentiated, equilibrium price increases, advertising increases, demand increases, and profit increases.

Comparative statics with respect to s are very messy, so we again resort to graphical analysis. Figure 6 presents the effect of the shop-around probability (s) on equilibrium price. Although the effects are mixed, we found that at some combinations of the two parameters, the equilibrium price is the highest at an internal value of s. This is related with the behavior of profit level to be discussed below.

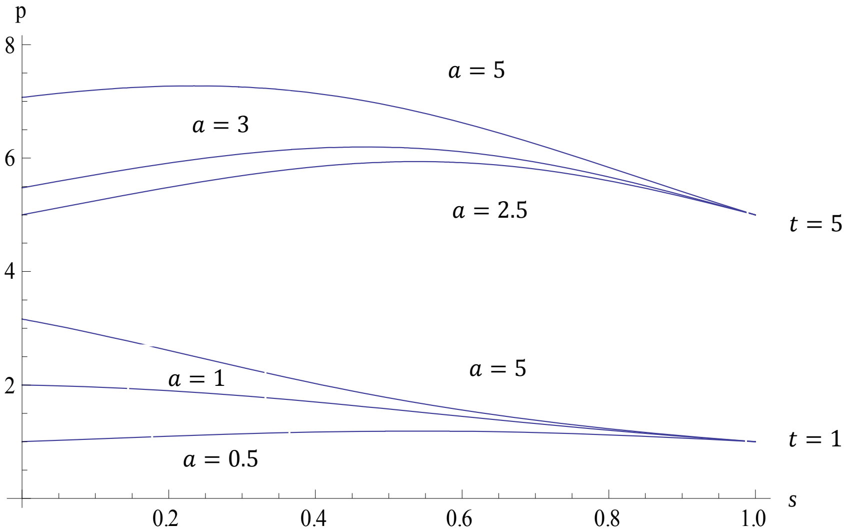

Figure 6 Equilibrium Price in the Shop-Around Probability

The effects of s on advertising and demand are negative as can be seen in Figures 7 and 8. That is, as more partially-informed consumers discover the other store and decide to shop around, the retailers have less incentive to advertise, and the equilibrium demand decreases.

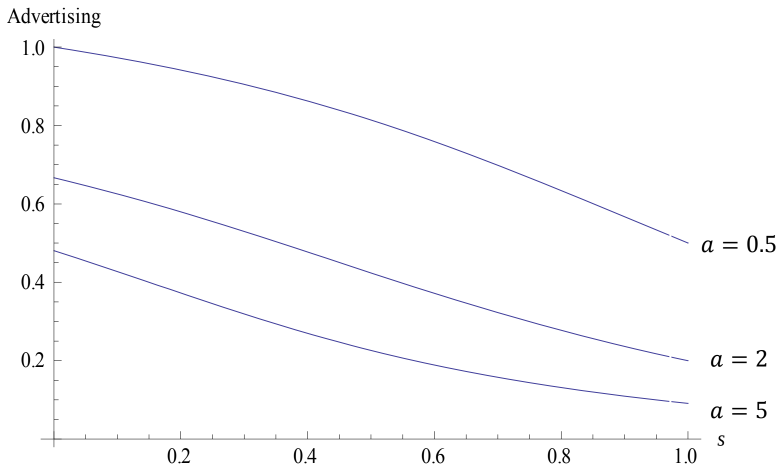

Figure 7 Equilibrium Advertising in the Shop-Around Probability ($t = 1$)

The effect of the shop-around probability on profit is more complex. When $s = 0$, which is the same as the free-standing model, the equilibrium profit is higher as advertising cost is higher. But that changes radically as s increases. When the advertising cost a is high, the equilibrium profit decreases in s; when a is low, however, the profit increases initially with s and then decreases (see Figure 9). That is, when advertising cost is low, there is an "optimal distance" between the retail stores that maximizes equilibrium profit. Since we know that the demand decreases in s, positive profit effects are mainly due to a higher price. As the retailer differentiation is greater (i.e., a larger t), these effects are amplified at a higher profit level because the price competition becomes less intense. That is, when advertising is cheap, branded retailer profits can be increased by locating their stores close to each other and letting a portion of consumers shop around; and that is more pronounced as the retailers are more differentiated.

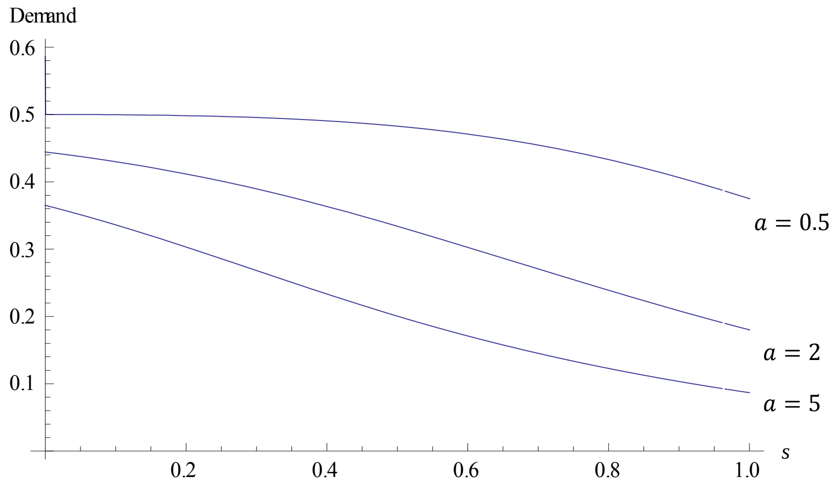

Figure 8 Equilibrium Demand in the Shop-Around Probability ($t = 1$)

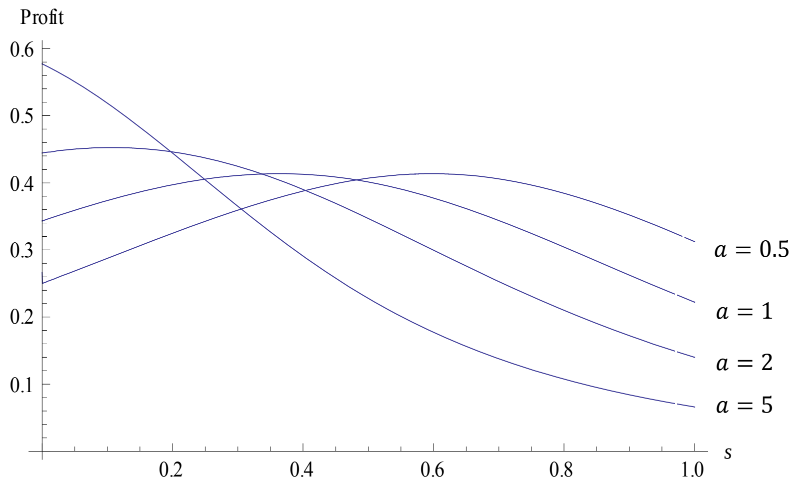

Figure 9 Equilibrium Profit in the Shop-Around Probability ($t = 1$)

Proposition 5: As the probability of shop-around increases,

(1) The equilibrium advertising and demand decrease.

(2) The changes in the equilibrium price and profit depend on the levels of advertising cost a and store differentiation t. For a given t, when advertising is expensive, the retailers are better off by discouraging shop-around behavior. When advertising is cheap, retailer profit is the highest at an interior solution of the shop-around probability.

Figure 10 presents the "optimal" levels of shop-around probability at various values of advertising cost and retailer differentiation. As discussed above, the probability of opportunistic shop-around behavior is inversely related with the distance between the two stores. This implies that, depending on the levels of advertising cost and brand differentiation, there is an optimal distance between the two stores. The lower the advertising cost is, the retail stores are better off to be located close to each other and let partially informed consumers engage in comparative shopping. This effect becomes more pronounced as the retailers are more differentiated.

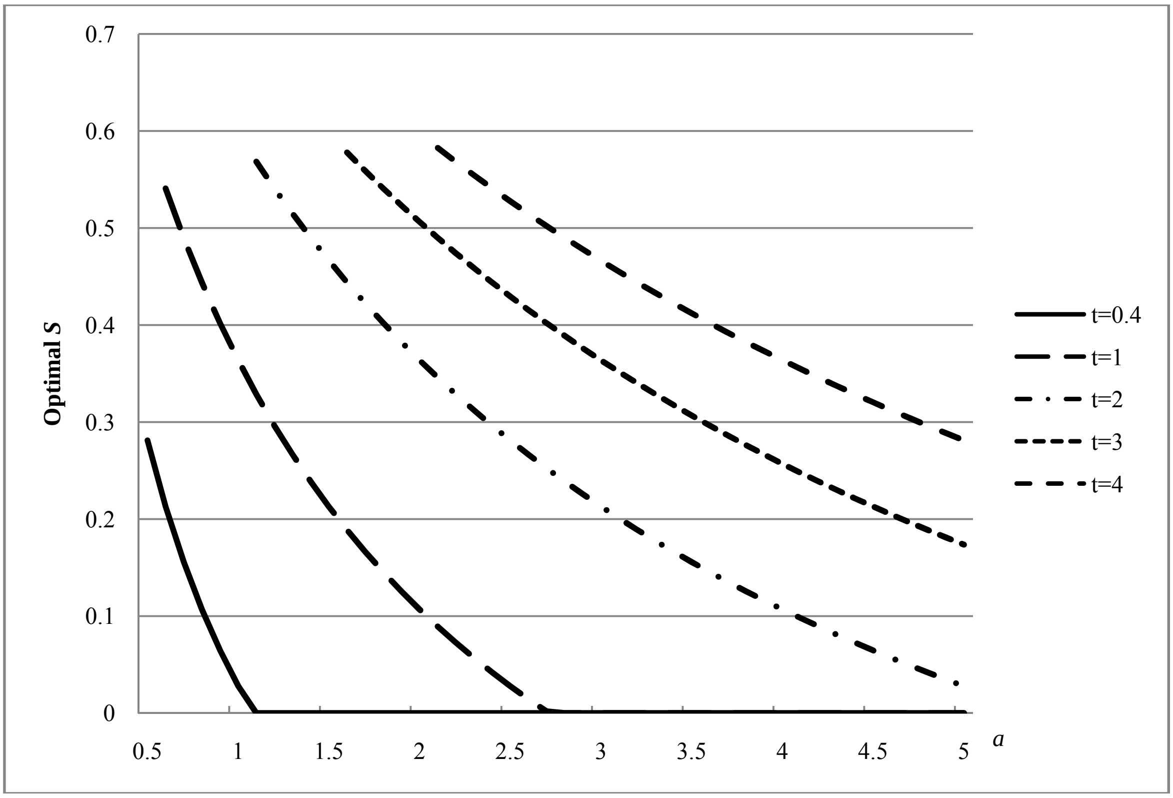

Figure 10 Optimal Probability of Shop-around Behavior

6. Conclusion

The problem of retail store location has been a subject of numerous studies in the past. An important parameter for the location decision is competition from other retailers, which is a function of the degree of retailer differentiation and the proximity among them. There are conflicting views on the effects of retail store proximity in the existing literature: while a larger gravitational consumer attraction favors concentrated retailer locations, the resulting intense price competition tends favor stand-alone retailer locations. Even using the same Hotelling model, one can derive opposite implications (i.e., minimum or maximum differentiation) depending on assumptions on choice and cost parameters. Thus, an actual location decision will have to consider all relevant factors. This paper adds one more reason to favor concentrated locations, especially when advertising cost is low and stores are differentiated.

Our model assumes that advertising is mostly informative, which is the case in most advertisements by local branded retailers. By advertising, each retailer attempts to remind consumers of its store and to inform about its promotions. For fully-informed consumers, who were exposed to both advertisements, their store choice is not much affected by the relative location of the stores. However, for partially-informed consumers, who were exposed to only one store's advertisement, their final purchase decision is affected by the proximity between the stores. If the stores are located close to each other, it permits opportunistic comparison shopping behavior. In other words, the informative advertisement has a spill-over effect among the partially-informed consumers. This effect causes the retailers to reduce spending on advertising. But equilibrium price and profit levels may be positively or negatively affected by the advertising spill-over, depending on the cost of advertising and the degree of retailer differentiation.

Interestingly, there is an "optimal" level of opportunistic shop-around behavior for each pair of advertising cost and retailer differentiation parameters. Since the probability of the opportunistic shop-around behavior is inversely related with the distance between the two retail stores, it follows that there is an optimal distance between the retailers, which is a function of the two parameters. As advertising is cheaper and products are more differentiated, the optimal distance becomes shorter: i.e., it is more profitable for the retailers to locate closer to each other, and let the partially-informed consumers shop-around.

These results are subject to several limitations, which can also become future research opportunities. First, we have assumed symmetric branded retailers that are horizontally differentiated. However, we observe many asymmetric stores in terms of quality differentiation and their sizes. Extending our model to accommodate asymmetric competition would be a very challenging but a fruitful study. Second, our model assumes that the market is not covered: i.e., those who were not exposed to either advertisement are not captured in our demand. In some product categories where consumers actively engage in search behavior, market would be fully covered. Or the gravity pull of a large shopping mall may attract uninformed consumers, too. A further study is under way to extend the current model to these covered-market cases. Third, the retailers are assumed to have no knowledge on consumer types. However, a savvy retailer should be able to identify partially-informed consumers from fully-informed consumers and employ discriminatory pricing (such as coupons). Finally, we observe that most product advertising is sponsored by the manufacturers, but retail pricing decisions are made by retailers. Applying the current research framework to analyzing different roles of channel members in a distribution system would be an important direction for future studies.

References:

Brown Stephen (1989). "Retail location theory: The legacy of Harold Hotelling", *Journal of Retailing*, Vol. 65, No. 4, pp. 450-460.

Craig C. Samuel, Avijit Ghosh and Sara McLafferty (1984). "Models of the retail location process: A review", *Journal of Retailing*, Vol. 60, No. 1, pp. 5-38.

Drezner Tammy (1994). "Optimal continuous location of a retail facility, facility attractiveness, and market share: An interactive model", *Journal of Retailing*, Vol. 70, No. 1, pp. 49-64.

Durvasula Srinivas, Subhash Sharma and J. Craig Andrews (1992). "STORELOC: A retail store location model based on managerial judgments", *Journal of Retailing*, Vol. 68, No. 4, pp. 420-444.

Ghosh Avijit and Sara McLafferty (1987). *Location Strategies for Retail and Service Firms*, Lexington, MA, Lexington Books.

Ghosh Avijit and C. Samuel Craig (1986). "An approach to determining optimal locations for new services", *Journal of Marketing Research*, Vol. 23, No. 4, pp. 354-362.

Grossman Gene M. and Carl Shapiro (1984). "Informative advertising with differentiated products", *Review of Economic Studies*, Vol. 51, No. 164, pp. 63-81.

Ingene Charles and R Lusch (1981). "Market selection decision for department stores", in: J Sheth (Ed.), *Research in Marketing*, Greenwich, CT, JAI Press, p. 5.

Leszczyc Peter T., L. Popkowski, Ashishi Sinha and Anna Sahgal (2004). "The effect of multi-purpose shopping on pricing and location strategy for grocery stores", *Journal of Retailing*, Vol. 80, No. 2, pp. 85-99.

Levy David T. and Daniel A. Gerlowski (1991). "Competition, advertising and meeting competitive clauses", *Economics Letters*, Vol. 37, pp. 217-221.

MacKay David B. (1972). "A microanalytic approach to store location analysis", *Journal of Marketing Research*, Vol. IX, May, pp. 134-140.

Nelson Richard L. (1966). *The Selection of Retail Locations*, New York, McGraw-Hill.

Tirole Jean (1989). *The Theory of Industrial Organization*, Cambridge, MA, The MIT Press.