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Chapter 2: The Economic Function of Retail Organizations

A main theme of this work is that the economic function of any retail organization is to provide consumers with a set of distribution services together with the explicit items or services bought at retail. Section 2.1 discusses six types of distribution or transaction costs incurred by consumers and how they map into five distribution services or outputs provided by retail organizations. One implication of this discussion is that the shifting of distribution or transaction costs between retailers and consumers is an essential characteristic of retail markets. This characteristic is discussed in Section 2.2, where we also explain the two formal economic concepts used to capture cost shifting: namely, distribution services as outputs of retail institutions and as fixed inputs into the purchase or consumption activities of consumers. Subsequently, Section 2.3 discusses a second essential characteristic of retail markets: the bundling of these distribution services among themselves and with the items or explicit services provided at retail. I also present here basic implications of these characteristics for the specification of demand and cost functions.

Characteristics such as the above two are elementary yet powerful in helping us understand the functioning of retail markets. For instance, they are sufficient to generate price dispersion and product variety with respect to distribution services in these markets, which is illustrated with a simple model of monopolistic competition in Section 2.4. Furthermore, they have profound implications for competition and welfare in these markets. Some of these are derived in Section 2.5. by means of a model that provides a

basis for analysis in various parts of the book. In Section 2.6 I demonstrate how this model generates the so called full price model of services as a special case, which also brings out limitations of the full price model. Section 2.7 discusses the measurement of distribution services and empirical evidence on their role in explaining retail margins at the sectoral level. Finally, Section 2.8 illustrates the measurement of distribution services at the store level and a strategic application of these concepts.

2.1. Distribution Costs and Services.¹

In order to carry out their purchase or consumption activities consumers incur a variety of costs that can be characterized as distribution or transaction costs. We begin by identifying six types of distribution costs that consumers can incur when interacting with any part of the retail system. Among the most easily identifiable ones there are, of course, direct time and transportation costs. The former include the opportunity costs of travel time to and from a retail establishment, waiting time inside or outside the establishment and time spent in planning purchase activities. The latter include the monetary costs of transport to and from the purchase site. These costs are obvious enough that they require no further elaboration.

Purchasing or consumption activities also generate distribution costs in the form of adjustment costs as a result of the unavailability of products or services at the desired time of (or in the desired amount for) consumption or purchase. These adjustment costs arise as a result of additional time and transportation costs incurred due to forced search or due to the increased expenditure or lower utility associated with altering the

¹This section draws heavily from earlier work (Betancourt and Gautschi, 1988).

consumption or purchase bundle of goods and services. Economists would also characterize these costs as the costs of rationing through unavailability. While not as obvious as the previous ones, they are ubiquitous and play an important role, for example, in the development of one stop shopping institutions and in the success of technological innovations such as ATM's.

One type of distribution costs stressed in the retailing literature (Ingene, 1984) are psychic costs. These are costs inflicted on the consumer utilizing the retail system by undesirable characteristics of the retail environment. Examples of these characteristics would be drudgery, anxiety or disagreeable social interactions.

Another type of distribution costs are storage costs. These would arise, for instance, in the purchase of household products in bulk. An example would be purchasing wine in cases rather than in bottles. Storage costs feature prominently in the development of a particular retail form, warehouse stores. The last type of costs to be considered explicitly are information costs. Information may be desired with respect to price, availability, physical attributes or performance characteristics of the goods and services provided at the retail level as well as with respect to similar characteristics of the retail establishment. The acquisition of this information entails costs through the use of time, transport and other resources. Economists often characterize these costs as search costs.

Having considered the demand or end use side of the market, it is useful to switch perspective and consider the supply or retail system side. Any particular configuration of a retail system imposes a particular level of these six types of

distribution or transaction costs on consumers. Furthermore, different retail forms entail different levels of these costs for consumers. In order to make these points more easily, it is convenient to think in terms of five broad categories of distribution services that are provided by any retail organization, albeit at different levels. There is some degree of arbitrariness in the level of detail at which one chooses to describe these services. My particular choice here of five categories and the implied level of aggregation has three aims: providing a framework in which any particular type of retail establishment can be included, establishing the link between these services and the costs just described for the consumer and leaving no doubt that the production of these services requires resources. At various points in the arguments throughout the book, however, I will dis-aggregate some of these five services and at other points I will aggregate them into a single service.

Distribution services are difficult to define and measure with precision. Perhaps the most difficult one to define and measure is what may be labeled ambiance. It determines the level of psychic costs imposed on the consumer by the nature of the retail environment. While this service is difficult to define and measure, it is clear that some types of retail establishments specialize in providing low and others high levels of this service. Discount stores are examples of the former where the associated lower prices of the goods sold in these establishments are due, at least in part, to the resources saved by providing low levels of ambiance. By contrast, high scale stores such as Nieman Marcus are examples of the latter type of establishment. The higher prices associated with the products sold there are due, at least in part, to the cost of the resources used in providing high levels of ambiance, including part of the costs of operating sites in high rent

districts.

A second category of distribution services provided by a retail system is the level of product assortment, which for some purposes can be subdivided into breadth (different product lines) and depth (different varieties within a product line). This service affects the levels of several types of distribution costs experienced by consumers who patronize retail institutions. For example, it affects direct time and transportation costs associated with multiple shopping trips. It also affects adjustment costs associated with foregoing an item for purchase or consumption. Examples of retail activities stressing product breadth are supermarkets, department stores and hypermarkets. Examples of retail activities stressing product depth are specialty stores of various kinds. For a given number of goods sold, higher levels of assortment will entail higher costs for the retailer, for instance the costs of labeling and layout.

Our next category of distribution services is accessibility of location. It is the easiest one to define and measure in many situations. At the most elementary level it is the distance to the retail establishment. It affects the direct time and transportation costs experienced by consumers in their purchasing or consumption activities. For a given number of goods sold, a retail system may provide greater accessibility to consumers by having several retail sites in a given market area, and this configuration would entail higher costs than operating a single retail site.

A fourth type of output provided by the retail system is assurance of product delivery, which can be dis-aggregated into delivery at the desired time and in the desired form. The former is accomplished through the extension of opening hours as well as

through the provision of credit², for example. The latter includes functions such as breaking bulk as well as risk bearing through the acquisition of ownership or the provision of warranties. This service affects several types of distribution costs: the direct time costs of waiting inside or outside the establishment; adjustment costs due to unavailability, and storage costs forced upon the consumer by the lack of availability at the desired time in the desired quantities. The provision of higher levels of this service leads to higher costs for the providers in the retail system in the form of costs of extended opening hours, credit provision, storage and risk bearing.

Last but not least among the distribution services provided by the retail system is the amount of information with respect to prices, availability and other characteristics of the goods and services provided as well as of the retail establishment. The provision of higher levels of this service through advertising and sales personnel, for example, leads to higher costs for the retail system. On the other hand, it lowers consumers' costs of information, adjustment and storage.

Several implications of the previous discussion of distribution costs and services are worth emphasizing at this point. First, there is no necessary one to one mapping between the six types of distribution costs and the five types of distribution services. Since we concentrate on distribution services in what follows, we will not try to provide an exhaustive account of the possible mappings here. Second, there is joint-ness in the provision of distribution services. For instance, by providing information on store hours a retailer increases assurance of product delivery at the desired time as well; similarly, by

² Providing credit allows a consumer to acquire products without either waiting to have the cash on hand or making an additional trip to a bank or ATM to secure the cash.

providing deeper assortments a retailer increases assurance of product delivery in the desired form. Finally, some distribution services are specific to a product or line of products whereas others are common to the entire assortment. For example, by having two identical stores instead of one a retailer is providing higher levels of accessibility of location to the entire assortment. Similarly by adding a new product line the retailer is expanding the breadth of assortment for all the items that he or she carries. Hence, these two services are examples of common distribution services. By contrast, other services such as information on the nature of a specific item are of value only to the item at issue. For example, how well a suit or a shoe fits or the operating properties of an appliance are examples of information specific to the item or the product line.

2.2. Cost Shifting.

One implication of the previous discussion is that cost shifting is an essential characteristic of retail markets. Thus, it will be the focus of this section and it will play an important role throughout the book. In each of the five categories of distribution services identified above, we have illustrated how providing higher levels of any of these distribution services entails higher costs for the retailers. We have also illustrated how higher levels of these services lower different types of distribution costs incurred by consumers. That is we have illustrated the shifting of costs that takes place in retail markets between retailers and consumers.

The idea of cost shifting is not novel either in the economics or in the marketing literature. For instance, in economics Fuchs (1968) attributes the productivity gains of supermarkets to putting the consumers to work; in marketing Ingene (1984) discusses

productivity in terms of the shifting of functions between consumers and retailers. What the previous discussion makes clear, however, is that this is not a limited phenomenon but a pervasive one that takes place in all the possible dimensions of distribution services that a retail system provides. Hence, it can be misleading to discuss productivity by looking at only one of these dimensions.

Considering the pervasiveness of cost shifting in retail markets, it is useful to be as rigorous and precise as possible in capturing this notion. On the side of the retail system this can be made precise by identifying each of these distribution services as an output of any retail organization. The fundamental economic characteristic of any output is that providing higher levels of the output entails higher levels of cost. This criterion is clearly satisfied by each of the distribution services identified above. Once again thinking about the functions of marketing systems in terms of outputs is not new. For instance, Bucklin (1973) identifies four indexes of output for the distribution sector as a whole. These collapse to accessibility, assortment and a more limited definition of assurance of product delivery. While the identification of the five categories of distribution services in the previous section as outputs of the retail system is somewhat recent (Betancourt and Gautschi, 1986, 1988), it can be viewed as an application and extension of Bucklin's basic idea. This approach of treating distribution services explicitly as outputs has also been adopted by Oi (1992), who creates a list that overlaps with the one above.

A decision to treat each of these services as output implies that any retail organization that provides a higher (lower) level of any of these services is shifting

distribution costs onto (away from) itself and away from (onto) its customers. Thus, it is desirable to have an equally fundamental concept as output on the demand side that can allow us to capture the shifting of costs between consumers and retailers. This concept is that of a fixed input.

Each of these distribution services that are outputs of retail organizations will be viewed as a fixed input into the production functions of end users, especially into the household production functions of consumers. The fundamental economic characteristic of a fixed input is that higher levels of this input lower or at least do not increase the costs of producing any given level of output.³ Hence, this concept captures the description of how each of the distribution services identified in the previous section affects the various types of distribution costs experienced by consumers. Thus, these two concepts provide us with a precise mechanism to capture the shifting of costs between consumers and retailers that permeates retail markets. An increase in a distribution service by a retailer increases the retailers costs in its role as an output and it usually decreases the distribution costs of any consumer who chooses to patronize the retailer in its role as a fixed input into the (household) production function of the consumer.⁴

An advantage of this conceptualization is that it brings out the role played by both

³This characteristic is one of the defining properties of any restricted cost function (Fuss and McFadden, 1978).

⁴ In some situations a consumer may not take advantage of the fixed input provided by a retailer. For instance, a consumer may not avail herself of the information provided by a sales assistant. This is perfectly consistent with the definition of the distribution service as a fixed input as it does not directly increase the costs to the consumer of ignoring this information. All we are assuming is that there is free disposal of the distribution service by the consumer. In so far as the prices of the items sold by a retailer increase because of the availability of assistance, the costs to the consumer will be affected indirectly and one would expect this particular form of service to be eliminated if many consumers find it irrelevant. Nevertheless, this set of circumstances is logically consistent with the definition of a fixed input.

participants in the retail market. The consumer chooses a level of each of these distribution services when she chooses to patronize a particular retailer. The retailer chooses the levels of each distribution service that he provides by its choice of mode of operation and the characteristics of the market will determine the equilibrium configuration that is actually observed. Another advantage of this conceptualization is that it brings out the role of a retailer as a multi-product producer with respect to distribution services. This makes it immediately clear that statements about productivity require controlling for the level or the mix of each of these outputs in some fashion. To illustrate, saying that the increase in productivity of supermarkets is due to making the consumer work more (shifting distribution costs to the consumers) ignores the considerable lowering of distribution costs to the consumers from the larger and deeper assortments of supermarkets as well as from their convenient parking facilities. The fact that these retail forms have not only succeeded but seem to be expanding along these dimensions would suggest that the net result is a lowering of the overall distribution costs experienced by the consumer.

2.3. Bundling.

All five of the distribution services discussed above are bundled together in any retail setting, which generates one type of bundling. A second type of bundling, however, is generated by the bundling of these distribution services with an additional indispensable output of the retail system left out from the previous discussion -- the explicit goods or services distributed by the retailer. This type of bundling generates another essential feature of retail markets: namely, the consumer explicitly pays for these

items or services and only implicitly for the outputs of distribution services that are bundled with them.⁵ One should also note that there can be joint-ness in the provision of a distribution service and in the provision of explicit outputs. For instance, an increase in assortment usually entails an increase in the number of items to be distributed by the retailer. To sum up, in viewing the retailer as a multi-product producer we have one more dimension of output and this dimension is different from the others in that it is the one that is explicitly priced.⁶

For purposes of analysis this dimension of output must be treated differently from the others. There are two ways of specifying the demand for the explicit output of a retailer depending on the assumptions one makes about the retailer's decision variables. One can assume that the retailer chooses the quantities of the items for sale. In that case the demand function faced by the retailer is specified as an inverse demand function . For instance,

$$(2.1) \quad p = f(Q, D, W, p')$$

where p is the retailer's price, Q is the quantity of explicit items for sale, D is a vector of outputs representing the five distribution services identified previously, W is the full income of a representative consumer and p' is a set of other prices that can potentially

⁵There can be exceptions, of course, as in the cases where delivery services are explicitly charged for when a customer employs them or when a gas station charges differentially for self-service and full-service.

⁶Incidentally, retailers sometimes engage in production as well as distribution of the explicit items sold. In these cases it is frequently impossible to separate the distribution activity from the production activity. This happens frequently in the case of services. For example in the case of restaurants, production and distribution of a meal are usually inseparable. Hence, the explicit output of the restaurant would be the meals. The five categories of distribution services would continue to be relevant. The main practical consequence of inseparability between the explicit output of distribution and its production would be that the value added generated by a restaurant would be greater than that of a typical retail form that did not engage in production activities. This would be so precisely because of the contribution of production activities to value added in the case of restaurants.

affect the consumer's demand. This demand function has the following properties: It is a nonincreasing function of the quantity of items distributed ($f_Q \leq 0$), a nondecreasing function of each of the distribution services provided ($f_D \geq 0$, for all elements of D), and a nondecreasing function of full income ($f_W \geq 0$).⁷ Thus, consumers are willing to pay the same or a higher price for a given set of items (Q) that come in a bundle with at least one distribution service at a higher level and all the others the same than another bundle. The other two properties are standard ones for inverse demand functions.

In some instances we want to specify the retailer as choosing prices rather than quantities. In these cases the demand function faced by the retailer would be specified in standard form as

$$(2.2) Q = g(p, D, W, p')$$

The variables are the same as before. This demand function would have the following properties: It is a nonincreasing function of the retail price ($g_p \leq 0$), a nondecreasing function of each of the distribution services provided ($g_D \geq 0$, for all elements of D), and a nondecreasing function of full income ($g_W \geq 0$). In this case consumers are willing to buy the same or more explicit items at a given price when they come in a bundle with at least one distribution service at a higher level and all the others the same than in another bundle. The other two properties are standard ones for ordinary demand functions.⁸

The above two specifications capture the consequences of the bundling of explicit outputs with distribution services on the demand side. With respect to the supply side,

⁷These properties are derived in Betancourt and Gautschi (1988).

⁸In the next chapter we discuss in greater detail the derivation of this demand function.

this bundling merely implies that a retailer is a multi-product producer and any special features of the bundling can be captured through the properties of a multi-product cost function, which can be specified in general as follows:

$$(2.3) C = C(Q, D, v)$$

where C are the costs of retailing, v is a vector of input prices⁹ and Q and D are as defined previously. The main property of interest of this function presently is that it is increasing in outputs. That is, $C_Q > 0$ and $C_D > 0$, for all elements of D .¹⁰

2.4. Price Dispersion and Product Variety in Distribution Services.

In this section we illustrate two important consequences of bundling in terms of a simple model of monopolistic competition. First, the bundling of distribution services with the explicit output sold at retail is a fundamental source of equilibria with price dispersion and differential cost shifting in retail markets. Second, the bundling of distribution services among themselves is a fundamental source of equilibria with product variety in distribution services and differential cost shifting in retail markets.

Consider a representative profit-maximizing retailer who faces the demand function in (2.1), i.e., a quantity setter, and who is subject to the cost function in (2.3). Her objective is to maximize the profits (π) of retailing activities. Thus,

$$(2.4) \pi = pQ - C(Q, D, v) - wQ,$$

where w is the price of the items acquired from suppliers. Hence, wQ is the costs of goods sold. To keep matters simple we will assume that there is only one distribution

⁹These input prices correspond to the inputs used by the retailer other than the goods or items acquired from suppliers for resale, namely the capital, labor and intermediate products used in the retailing activity.

¹⁰In Chapter 4 we discuss the underpinnings of the cost function and its properties in greater detail.

service subject to the retailer's control, D .

The first-order conditions for profit maximization can be written, after some manipulation, as

$$(2.5) \quad (p - w)Q/C - S_Q = \epsilon Q/C$$

$$(2.6) \quad S_D C/Q = p\delta$$

where S_Q is the proportionate increase in costs from distributing an additional item ($C_Q Q/C$) and S_D is the proportionate increase in costs from providing an additional unit of the distribution service ($C_D D/C$). ϵ is the absolute value of the reciprocal of the price elasticity of demand ($-f_Q Q/p$) and δ is the reciprocal of the distribution services price elasticity of demand ($f_D D/p$).

If the market is to be in long-run equilibrium profits must be zero. Therefore, this condition implies from (2.4) that $(p - w) = C/Q$. In other words the retail margin obtained from selling an additional item must equal the average costs of retailing this additional item. Imposing this condition on the short-run equilibrium ones leads to

$$(2.7) \quad (p - w)/p = \delta / S_D = \epsilon / (1 - S_Q).$$

The left hand side of this equation is the retail gross margin expressed as a percentage of sales, R , and it moves in the same direction as the retail price.

Equation (2.7) can be used to establish the following proposition:

Proposition 2.1: Heterogeneity among consumers with respect to price sensitivity or the demand for distribution services is sufficient to yield equilibria with price dispersion and differential cost shifting even if firms are identical.

To illustrate the validity of this proposition consider first two market segments, A

and B, where consumers differ with respect to their price sensitivity by having different values of a constant price elasticity of demand: $\epsilon(A) > \epsilon(B)$.¹¹ We will assume the cost function for firms to be such that $S_D = (1-S_Q) = k$, where k is a constant.¹² Long run equilibrium in segments A and B requires, by (2.7), that the retail gross margins, R , be such that $R(A) = [\delta(A) = \epsilon(A)]/k > R(B) = [\delta(B) = \epsilon(B)]/k$. If the inverse demand function has the following form, $p = h(D)Q^{-\epsilon} W$, then $\delta = (h_D D)/h(D)$. Note that $h_D = \partial h(D)/\partial D$. The retail price will always be higher in A than in B. If the distribution services elasticity is decreasing (increasing) in D , however, the level of distribution services will be lower (higher) in A than in B. In either case there will be price dispersion and a different level of distribution costs (differential cost shifting) borne by consumers in long run equilibrium.

When consumer heterogeneity is generated by differences in the valuation of distribution services, we can establish a similar conclusion. For this purpose, let the inverse demand function have the following form, $p = D^\delta m(Q)W$. The price elasticity of demand is now variable, i.e., $\epsilon = -[m_Q Q/m(Q)]$, and the distribution services elasticity of demand is now constant. If in segment A consumers value distribution services more than in segment B, $\delta(A) > \delta(B)$. This situation can arise because the opportunity cost of their time, for example, is different.¹³ It follows from (2.7), under the same assumptions

¹¹Note that we have an inverse demand function; hence $\epsilon(A) > \epsilon(B)$ implies a greater price sensitivity in B than in A when measured in the usual way, i.e., in terms of the reciprocals.

¹²This can be generated by the following function: $C = c(v)D^\alpha Q^\beta$, where v are input prices and $\alpha = (1-\beta)$.

¹³Chapter 3 argues that one of the main effects of distribution services on household activities is to economize on the household's use of time in purchasing tasks.

on k as before, that $R(A) = [\delta(A) = \epsilon(A)]/k > R(B) = [\delta(B) = \epsilon(B)]/k$.

Thus, the retail price will be higher in the segment with the higher valuation of distribution services. Moreover, there is a wide array of combinations of distribution services, D , and output, Q , that are consistent with this equilibrium, including many which entail differential cost shifting in the two markets.

Consumer heterogeneity as a source of equilibrium price dispersion in retail markets is quite pervasive. Many of the models in the literature that seek to explain price dispersion can be recast in these terms, despite their seemingly different approaches.¹⁴ What has not been noticed is that these equilibria usually imply differential cost shifting as well. For instance, Salop and Stiglitz (1977) seminal analysis of imperfect information requires low and high search costs consumers to generate different price equilibria; and, the implied cost shifting of information between consumers and retailers differs across these equilibria.

Generalization of the previous model to more than one distribution service is straightforward, Betancourt and Gautschi (1988). Suppose that there are two distribution services, D_1 and D_2 . The long run equilibrium condition becomes

$$(2.8) R = (p - w)/p = \delta_1 / S_1 = \delta_2 / S_2 = \epsilon / (1 - S_Q),$$

where the subscripts 1 and 2 indicate the respective distribution service.

Equation (2.8) can be used to establish the following proposition:

Proposition 2.2: Consumer heterogeneity with respect to the valuation of different

¹⁴For an illustration in terms of rich and poor consumers with different search costs see Lal and Matutes (1989). For an illustration in which consumer heterogeneity makes it impossible to attain a first best outcome without middlemen see Biglaiser and Friedman (1999).

distribution services is sufficient to generate equilibria with product variety in distribution services and differential cost shifting at the same retail price, even if firm's cost functions are identical.

To illustrate the validity of this proposition, assume that consumers in both markets have the same constant price elasticity of demand and firms in both markets have the same cost function, given by $C = c(v, D_1, D_2) Q^\beta$. These assumptions ensure that the retail margin and the prices in both markets will be the same, since $R = \epsilon/(1-\beta)$ in both cases. What differs between the two markets is at least one of the two distribution services elasticities, let us say $\delta_1(A) > \delta_1(B)$ and $\delta_2 = k$ in both markets. If S_1 is an increasing function of D_1 , for example, both markets can be in long run equilibrium at the same retail price. If D_2 is the same in both markets, this merely requires Q to be larger in market A than in market B. In any event, this generates equilibria with product variety in distribution services and differential cost shifting with respect to at least the first distribution service.

Consumer heterogeneity with respect to distribution services is an important source of equilibria with product variety in distribution services. These equilibria imply a different degree of cost shifting of distribution services. While this phenomenon has received far less attention than price dispersion in the literature, there are analyses employing different approaches that generate the same result.¹⁵ For instance, Oi's (1992) location and store choice model (Section 4.4.2) requires consumer heterogeneity with respect to location and other shopping costs, which correspond to assurance of product

¹⁵In this context we should note that the desire to allow for the role of several distribution services and the analytical difficulties in doing so lead De Palma et.al. (1994) to develop a simulation model.

delivery in the desired form in our terminology, to generate equilibria with product variety in distribution services and differential cost shifting for each consumer at the same full price at competing stores for the marginal consumer. The full price model is a perfectly competitive model, in contrast to the one considered here.

Extensions of the analysis to richer environments, i.e., allowing for different cost functions and more than one explicit product, would expand the opportunities for retail price dispersion and product variety in distribution services to arise as characteristics of equilibria. These two consequences of the bundling of distribution services among themselves and with the explicit products sold at retail lead to the coexistence of different retail forms that we observe in the market place, which is a topic that will reoccur throughout the book, e.g., in chapters 6 and 7.

2.5. Competition and Welfare in Retail Markets.

In this section I explore the consequences of cost shifting and bundling for competition and welfare in retail markets. This will be done in the context of a simple model which is an adaptation of several contributions in the literature. Bliss (1988) points out that a major problem for any retailer is to offer a consumer good enough value in the store to keep her at the store. He captures this idea in terms of an indirect utility function. Betancourt and Gautschi (1993a) reformulate Bliss's idea in terms of an expenditure function and extend it by incorporating distribution services into the analysis. Betancourt and Malanoski (1999)¹⁶ adapt the model for empirical analysis and note how it generates the full price model as a special case.

¹⁶The model that follows borrows heavily from this last reference.

Consider a representative retailer who faces the demand function in (2.2), i.e., a price setting retailer, and the cost function in (2.3). This retailer wants to choose prices and distribution services to maximize profits subject to the constraint of keeping a representative consumer patronizing the store. To keep matters simple we will focus on the single price, single distribution service situation. The problem can be specified as maximizing profits, defined as in (2.4), subject to the constraint that the choice of price and distribution service affects the expenditure function, $E(p, p', D, Z^0)$, of the representative consumer in the following way: It keeps her patronizing the retailer because her level of expenditures will be less than or equal to the minimum cost of attaining the same level of satisfaction at another establishment, E' . Z^0 represents the optimal level of the consumption activities of the consumer.¹⁷

Formally, this is captured as follows:

$$(2.9) L = pQ - C(v, Q, D) - wQ + \mu[E' - E(p, p', D, Z^0)]$$

where μ is a Lagrange multiplier that measures the degree of competition in a sense to be explained below. Optimal choices of retail prices and distribution services by the retailer in this setting must satisfy the following first-order conditions:

$$(2.10) p[1 - (1/\epsilon)(1-\mu)] = C_Q + w$$

$$(2.11) p(\partial Q/\partial D) + \mu r = C_D + (C_Q + w)(\partial Q/\partial D)$$

$$(2.12) E' - E(p, p', D, Z^0) = 0,$$

where $r = -(\partial E/\partial D)$ is the shadow price of distribution services or what the consumer would be willing to pay for an additional unit of distribution services if it were available

¹⁷ The expenditure function of the consumer will be discussed in greater detail in the next chapter.

in the market at an explicit price. ϵ is the absolute value of the price elasticity of demand for the explicit output.¹⁸

A lowering of the competitive standard faced by the optimizing retailer by one unit means a \$1 increase in the lowest cost to a representative consumer of attaining her optimal level of consumption activities at an alternative establishment. μ measures the marginal contribution to the profits of the retailer of such a lowering of the competitive standard. When μ is zero we have the standard monopoly situation; the retailer gains no sales. When μ is unity we have the standard competitive situation; the retailer gains all sales.¹⁹ If μ is .5, the benefit to a retailer of keeping a representative customer is half of the sales.²⁰ Thus, the value of μ can be thought of as a direct measure of the degree of competition from similar establishments faced by the retailer.

The power of competition from other similar establishments in retail markets can be illustrated by a special case that eliminates the economic consequences of bundling and leads to what one may label the Pareto efficient degree of cost shifting from the point of view of welfare. It leads to the following proposition:

Proposition 2.3: If the marginal cost functions are independent in outputs ($C_{DQ} = 0$), perfectly competitive behavior ($\mu = 1$) eliminates the consequences of bundling of distribution services with the explicit items sold at retail and leads to Pareto efficient cost

¹⁸Notice that this elasticity is the reciprocal of the one in the previous section, since here we are using the ordinary demand function instead of the inverse demand function used there.

¹⁹This case encompasses two different situations: Bertrand behavior where a firm behaves as if it were a perfect competitor and perfect competition proper. Note that the degree of competition in this model is exogenously determined.

²⁰Values greater than unity violate second-order conditions. Thus, the unit interval is the relevant range.

shifting in retail markets.

When μ equals unity (2.10) implies that retail prices are set to equal the marginal cost of producing plus retailing the explicit items sold. This result implies for (2.11) that the level of distribution services will be set solely by the condition that the shadow price of the distribution service equals the marginal cost of producing the service. Thus, bundling becomes irrelevant to the market outcome and the degree of cost shifting that prevails between consumers and retailers is Pareto efficient. This special case also brings out the importance of imperfectly competitive behavior in imparting on retailing its special characteristics.

When μ departs from unity, the choice of prices by the retailer is going to be affected in general by the choice of distribution services, which is a direct consequence of the bundling of explicit items with distribution services. This observation follows directly from (2.10) and (2.11). Moreover, it also follows from these equations that the degree of cost shifting between the consumer and the retailer will in general be affected by the degree of competition from other similar establishments (μ) as well as the general competition for the consumer's dollar, which is measured by the price elasticity (ϵ).

To ascertain the consequences for welfare of retail competition, however, it is useful to look at two special cases: First, suppose that prices are given, perhaps due to government regulation. Then, we have

Proposition 2.4: When the marginal costs with respect to explicit output are constant or increasing ($C_{QQ} \geq 0$) and there is cost shifting, an increase in competition from similar establishments (μ) increases welfare.

When prices are given (2.10) is irrelevant. Consider the case of constant marginal costs with respect to Q , (2.11) can then be rewritten as $M(\partial Q/\partial D) + \mu r = C_D$, where M is a positive and constant profit margin per unit. An increase in μ requires an increase in distribution services if C_D is increasing in D . For r , the shadow price, is decreasing in distribution services due to the convexity of the expenditure function in the fixed input.²¹ Moreover, $(\partial Q/\partial D)$ must be decreasing in D or else demand would increase without bound as a result of increasing distribution services. By (2.12) an increase in D increases the welfare of the representative consumer, who can now attain the same level of utility as before at a lower cost, since the expenditure function is decreasing in D , or a higher level of utility at the same cost as before. A similar argument holds if C_D is decreasing in D , because second-order conditions in this case require marginal revenues (the LHS of 2.11) to cut marginal costs (the RHS of 2.11) from above. The importance of this result is that it contradicts the conventional wisdom stemming from Hotelling's (1929) model. The reason is that Hotelling assumed that the marginal costs of providing distribution services (location in his case) were constant at the zero level.²²

Consider now a situation where the price elasticity of demand is constant but prices are not given. It allows us to establish the following proposition:

Proposition 2.5: When the marginal costs with respect to explicit output are constant or increasing ($C_{QQ} \geq 0$) and there is cost shifting, an increase in competition for the consumer's dollar (ϵ) generates ambiguous welfare results if the marginal costs of

²¹See Chapter 3 for elaboration.

²²See Betancourt and Gautschi (1993a) for elaboration.

distribution services are increasing in distribution services.

Equations (2.10) and (2.11) can be rewritten as

$$(2.10)' (p - C_Q - w) = (p/\epsilon)(1 - \mu)$$

$$(2.11)' (p/\epsilon)(1 - \mu)(\partial Q/\partial D) + \mu r = C_D$$

An increase in ϵ requires a lowering of p in (2.10)' under our assumptions. This increase leads to a decrease in distribution services by (2.11)' when the marginal costs of distribution services are increasing in D , since we saw above that both terms on the LHS are decreasing functions of D . From the expenditure function of the consumer in (2.12) this implies that welfare goes up due to the decrease in p and down due to the decrease in D . Hence, a quantitative evaluation is necessary to determine the net effect on welfare. A similar argument can be made for increases in competition through changes in (μ) .

From the point of view of economics, the existence of cost shifting in retail markets necessitates accounting for what happens to distribution services in welfare evaluations of changes in these markets. From the point of view of marketing, the existence of cost shifting supports including distribution services in consumer's payoff functions, as proposed by Wernerfelt (1994), to evaluate marketing designs in retail markets. The model presented in this section provides one mechanism for implementing both welfare evaluations in economics and efficiency comparisons in marketing that account for the role of distribution services in retail markets.

2.6. Full Price Models of Retail Services.

In this section I show how the model of the previous section generates as a special case a standard model in the literature on retailing. It is a model developed by Ehrlich

and Fisher (1982) to analyze the demand for advertising. They argue that if retailing is competitive consumers must face the same full price at all stores. Stores can compete by cutting prices or supplying more services but they are always subject to the constraint of the constant full price.

We can generate their model in the previous framework as follows: Interpret the distribution service (D) as the amount of information provided by the retailer. As we saw in the analysis of Proposition 2.3, perfectly competitive behavior results in the first-order conditions, (2.10) and (2.11), collapsing to the following ones

$$(2.13) \quad p = C_Q + w$$

$$(2.14) \quad r = C_D .$$

The constraint that the full price is constant implies in our model that

$$(2.15) \quad p + r = C_Q + w + C_D = K$$

The full price is nothing other than the sum of the retail price and the shadow price paid by the consumer for the distribution service. K is just a constant. Our analysis brings out two restrictive features of this model. First, there is only one value of the constraint that is consistent with perfect competition in Ehrlich and Fisher's model: Namely, that value of the full price that exactly covers both marginal costs. If the firm provides so much information that the shadow price of information becomes zero to the consumer²³, then the full price coincides with the retail price. As the firm lowers the amount of information provided, the value of information to the consumer increases and the retail price decreases. But, this must happen in such a way that their sum equals the retail price

²³Recall from the previous section that r is decreasing in distribution services.

when the value of information is zero.

Second, and perhaps more economically relevant, the marginal cost function for information must be increasing in the amount of information or the retail market is not feasible in Ehrlich and Fisher's model. Suppose C_D is decreasing in D . When the constraint is imposed at the maximum level of distribution services, so that p is the full price because r is zero, equilibrium is possible because the constraint is not really binding. Attempts to depart from this level, however, are impossible. If the retailer decreases the level of information, p decreases, r increases and the marginal cost of increasing the output of explicit items increases (under the usual assumption that C_Q is increasing in Q). The marginal cost of providing information, however, increases as you provide less information and equilibrium can not be restored. Increasing returns in the provision of information by the retailer or advertising pricing schemes incorporating quantity discounts generate decreasing marginal costs of information.

Ehrlich and Fisher's model can be useful in capturing cost shifting between consumers and retailers under decreasing returns to information. The model developed earlier, however, allows us to capture the same phenomenon without imposing this restriction.²⁴ Ehrlich and Fisher's model has been the basis for an important strand of work in the retailing literature, for example Ratchford and Stoops (1992). Furthermore, the same assumption that all consumers face a given identical full price characterizes other related contributions, for example Deacon and Sonstelie (1991). Hence, the relevance of the model in Section 2.5 is wider than the present context.

²⁴ It is shown in Chapter 4 that, in general, there are compelling arguments in favor of the assumption of increasing returns or declining marginal costs in distribution services.

2.7. Measurement and Evidence.

Discussions of measurement and evidence will take place throughout the book for two reasons. First, measurement is dependent on the level of aggregation, the purpose of the analysis and the availability of data corresponding to theoretical concepts.

Measurement can take place at the level of the store, firm, sector, region or nation. In this section we will focus on measurement at the sectoral level. Second, in dealing with evidence account must be taken of the fact that distribution services, as indicated earlier in this chapter, have been acknowledged in the economics and marketing literature for many years although they have been given different names and interpretations by different authors. Evidence can also be presented at each of the levels mentioned above. At any level, however, statements in the literature referring to the service level, the marketing mix, promotion effort, etc., usually map into one or more of the five distribution services identified in Section 2.1. In this section we will focus on evidence specifically aimed at identifying these five distribution services at the sectoral level.

By sectoral level data I mean dis-aggregation of the retail sector of a country into its various components at some level. For instance, in the case of the U.S. the 1982 Census of Retail Trade allows dis-aggregation into 49 different retail sectors, 14 of which are at the four digit SIC level and the remainder at the three digit SIC level. In France and Germany one can obtain data for the same year that allows dis-aggregation into 50 and 52 retail sub-sectors, respectively. Unfortunately, the categories are not identical.²⁵ For example, the most striking difference is that in France the food sector has 14

²⁵For a discussion of the measurement issues that arise in international comparisons of retail sub-sectors see Betancourt and Gautschi (1996).

categories while in the U.S. it has 4 and in Germany it has 5. In any event, in working with sectoral level data the choice of categories is determined, largely, by the statistical agencies collecting the data.

The analytical objective that we will consider is understanding the determinants of retail gross margins, R , across different retail sub-sectors. The definition of profits in (2.4) allows this concept to be expressed as follows:

$$(2.16) R = (pQ - wQ)/pQ = C(Q, D, v)/pQ + \pi/pQ.$$

The expression on the right hand side of the first equality is unproblematic from the point of view of measurement. pQ is measured as the sales of the retail sub-sector; wQ is measured as the cost of goods sold by the retail sub-sector; and the ratio of their difference to sales can be used to calculate the retail gross margin. Availability of data on sales and the cost of goods sold for each sub-sector allows the calculation of this basic concept.

Matters get complicated, however, when we consider the expression on the right hand side of the second equality. First, the concept of profits in the definition is economic profits not accounting profits. The former are not directly observable. Second, the specification of the first term on the right hand side of the second equality depends, in general, on whether we assume quantity setting behavior, (2.1), or price setting behavior, (2.2). At this level of aggregation it is difficult to make much progress on either issue. Hence, one procedure to deal with the first difficulty is to assume that in each retail sub-sector monopolistic competition leads to zero economic profits.²⁶ To deal with the

²⁶An alternative is to specify a function of market structure variables for the second term on the RHS of (2.16). For an example of this alternative see Betancourt and Gautschi (1993b).

second difficulty we simply view the denominator in (2.16) as a revenue function.²⁷

Equilibrium in each sub-sector is characterized by the representative retailer choosing the level of distribution services and output or price that satisfies the demand of the representative consumer. The latter patronizes each sub-sector at different times throughout the year and demands, in general, a different combination of distribution services and output or price. In essence, this uses the time dimension to separate these retail sub-sector markets in the same way that the hedonic approach uses the space dimension to separate, for example, housing markets.

A semi-reduced form specification which captures the previous discussion is:

$$(2.17) R = h(Q, D; v, W) + u,$$

where $h = C(Q, D; v)/S(Q, D; W)$.²⁸ Since h is the ratio of a cost function (C) to a revenue function (S), its functional form must be nonlinear. Furthermore, the impact of a variable that appears in both numerator and denominator on the retail margin measures the relative effect of the variable on costs and revenues. u is a stochastic error term which is assumed to be independent and identically distributed across the retail sub-sectors.

Conceptually Q is the explicit output of the retail sub-sector. The sales of each sub-sector deflated by a price index for each sub-sector is an appropriate measurement. Since these price indexes are usually not available²⁹, standard practice is to measure Q as

²⁷In Betancourt and Gautschi (1992), for example, we pursue the implications of quantity setting and price setting in this empirical context.

²⁸Estimation of (2.17) with a cross-section of sectoral data for a particular country is facilitated because W , full income, and v , input prices, can be assumed to be the same across the retail sub-sectors.

²⁹This situation is changing. For instance, at this time BLS has implicit price deflators that are publishable for 40 of the 64 retail sub-sectors identified at the four digit level, Foster, Haltiwanger and Krizan (2002).

sales per establishment or shop. D is a vector of distribution services. In this context a conceptually appropriate measure of accessibility of location (D_1) is the number of establishments in each retail sub-sector. Fortunately, these data are usually available for each sub-sector.

With respect to assortment (D_2), it is possible to construct two conceptually appropriate measures on the basis of information provided, for example, by the U.S. Census of Retail Trade. For each retail sub-sector one can obtain the number of establishments carrying a product line and the sales of each product line for a universe of 30 product lines.³⁰ This information allows the construction of two different indexes of assortment for each sub-sector. The first one is a weighted average of the number of product lines carried by a sub-sector, using the number of establishments in a sub-sector carrying a product line relative to the total number of establishments in the sub-sector as weights. The second one is the entropy of the distribution of sales across product lines in each sub-sector, i.e., $D_{2i} = -\sum_j (S_{ji}/S_i)\ln(S_{ji}/S_i)$. j identifies the product line and it runs from 1 to 30 whereas i identifies the sub-sector. Either index measures the breadth of assortment in a retail sub-sector.

The remaining three distribution services identified in Section 2.1 are more difficult to measure at the sectoral level. Assurance of product delivery (D_3) and information (D_4) have several dimensions. Furthermore some of these dimensions are common to all items in an assortment and others are specific to a subset of items. In practice, assurance of product delivery is measured as the average of inventory holdings

³⁰The number of product lines in the universe varies over time for the U.S. Census and it also differs for other countries.

per establishment at the beginning of the year and at the end of the year and information is measured as advertising expenditures per establishment. Since the first measure fails to capture the provision of extended hours , for example, and the second fails to capture the provision of information at the store, for example through in store promotions or selling effort, another empirical construct can be added to these two to capture, at least partially, these dimensions: Namely, the payroll per establishment of each sub-sector (D_6). Finally, ambiance (D_5) can be measured in the US data by the gross value of assets in building and structures per establishment for each sub-sector.³¹ It is a weak measure.

In the three references cited in this section, alternative versions and extensions of (2.17) have been estimated with sectoral data for the U. S., France and Germany using a logistic functional form and alternative estimation techniques. One of two main regularities in the results is the rejection, in every country, of the linear specification in favor of this nonlinear one by a non-nested test. The other one is rejection in every country, by a classical F-test, of the hypothesis that the measures identified in this section, taken together, are not important determinants of retail margins. Finally, we reproduce in Table 2.1 below the results for one set of estimates of (2.17) employing a logistic functional form and using nonlinear least squares as the estimation method.

Table 2.1: Estimated Coefficients.

	Q	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆
U.S.	-9.22*	-0.94*	0.12	-5.55*	82.81*	-5.66	36.41*

³¹In France and Germany it can be measured as the value of new construction per establishment.

FRANCE	-3.12*	-0.96*	0.04	-0.21	n.a.	47.22*	19.72*
GERMANY	-1.67*	-1.22*	-0.41 [∇]	1.43 [∇]	n.a.	- 9.49	10.22*

n.a.= not available; * = t-ratio >2.5; [∇] = t-ratio > 1.75.

Retail sub-sectors that provide greater levels of output and accessibility of location in equilibrium increase revenues by more than they increase costs and, thereby, experience lower retail margins in all three countries. Retail sub-sectors that provide greater levels of specific distribution services increase costs by more than they increase revenues and, thereby, experience higher retail margins in all three countries. These individual results are not only robust across the three countries, which can be seen from Table 2.1, but they are also robust to alternative versions and extensions of (2.17), which can be seen by consulting the references. They are consistent with the observed variations in these variables between, for example, supermarkets and department stores. The results on information are also robust to alternative specifications, but no data is available for France and Germany. Finally, the results on assurance and ambiance are sensitive to both country and specification. This is not surprising since these variables are poor measures of the theoretical constructs. With respect to assortment, however, the results may simply mean that its impact on costs cancels out its impact on revenues.³²

By the way of a conclusion to this section, we consider briefly the main

³²This framework has been applied to Spanish sectoral retail data for 1992 by Santos-Requejo (1996). In the case of Spain there were 25 identifiable retail sectors, mainly at the four digit level. The variables were defined and measured as indicated above whenever possible, e.g., just as in the case of France and Germany advertising expenditures data were not available for Spain. The results of the analysis are essentially the same as those for the other three countries. For example, sales per establishment and payroll per establishment are both statistically significant at the 1% level and have the same sign as reported above. While accessibility of location also has the same sign as reported above, it is not statistically significant at the 1% level. None of the other individual coefficients are statistically significant at the 1% level, which is the same result obtained above for Germany.

alternative explanation of retail margins: Namely, a mark-up model, for example Nootboom (1985).

$$(2.18) R = (OE/S)[1 + m(Q, D, X)],$$

where OE are operating expenses excluding the shopkeeper's labor, S is sales, Q is sales per shop, D is referred to as the service bundle or product service package in the mark-up literature, and X are other variables said to affect the mark-up in various circumstances.

The discussion of the service bundle in this literature refers to a subset of the same concepts that we are calling distribution services. For instance, one particular application of this model to 16 Dutch retail sub-sectors over the period 1976-1983, Nootboom, Kleijweg and Thurik (1988), implements the model by including the reciprocal of Q, average inventory holdings relative to sales (D_3/Q in the notation of this section), (OE/S) , and time series variables in a linear regression. The coefficient of $(1/Q)$ is estimated to be positive with a t-ratio greater than 2.5, which is what one would expect from the results in Table 2.1 for Q in all three countries. A positive coefficient estimate with a t-ratio greater than 2.5 is also obtained for (D_3/Q) . This result is what one would expect for Holland from the result in Table 2.1 for Germany.

Summing up: the conceptualization of distribution services as outputs of retail firms and fixed inputs into the household production functions of consumers provides an attractive framework for the empirical analysis of retail gross margins; it is not rejected by the data at the sectoral level for four different countries; and it generates results that can be used to explain those of the main alternative approach to the analysis of retail gross margins employed in the literature.

2.8 Distribution Services as Strategic Tools: An Illustration.

It is fitting to conclude this chapter by reporting on a unique study that illustrates two practical aspects of the issues stressed in this chapter: how to measure distribution services at the store level, and how their role in creating price dispersion and product variety in equilibrium allows them to act as strategic instruments for survival in the presence of category killers. Barber and Tietje (2003) investigate what happens to the retail market for home improvements or hardware stores in a California community as a result of the entry of a Home Depot store. Prior to this entry, there were two stores that could be viewed solely as hardware stores in this community: one with the profile of a local hardware store and another with the profile of a regional hardware store.

Barber and Tietje (2003) identify six strategic variables for each store type, namely pricing and the five distribution services identified in Section 2.1. They measured these variables in two different ways. One alternative is an ‘objective’ way through in-store visits by six ‘mystery shoppers’ that were given detailed instructions on what and how to measure these concepts. For instance, the authors developed a typical market basket of 24 items relevant for the hardware retail industry with the help of a pricing analyst from a national trade name franchise and used this basket to measure: pricing, as a weighted average of 10 of these items available at all three stores in all the visits; assortment, as the percentage of the 24 items in the market basket that were carried by the store (regardless of whether or not they were in stock) during any one visit; assurance, as the percentage of these items that were in stock during any one visit. The first two concepts were measured with just one variable and the same was true of

accessibility of location, which was measured as distance from the town center for each store. The third concept, however, was also measured in terms of the total weekly hours the store was opened and how much time did it take to purchase a single item during a visit. Information was also measured in two different ways: recording how much in-store product information was available and how much time did it take to obtain unsolicited assistance. Finally, ambiance was measured by rating each of six dimensions on a scale of 1 to 7, e.g., pleasant atmosphere and well dressed clerks were two of the dimensions. Nevertheless the scores on the six dimensions were averaged to obtain a single measure of store ambiance.

To complement this ‘objective’ measure the authors conducted two surveys of community members: one two months before and another six months after the Home Depot store opened. The surveys had two key questions for our present purposes. The first one asked respondents to indicate the most important reason for their selection of the hardware store at which they shopped most often. Consumers had a list of twenty aspects from which to select the most important. These twenty aspects were in turn reduced to fourteen aspects and the latter were grouped into the six dimensions of strategy mentioned above through the use of principal components.

Pricing policy was evaluated in terms of two dimensions, everyday low pricing and sale prices; assortment was evaluated in terms of three dimensions, overall product selection, number of different product categories and range of selection within each category; accessibility was rated in terms of one dimension, store location and convenience; assurance was rated in terms of two dimensions, having merchandise in

stock and quality of merchandise; information was assessed in terms of three dimensions, overall service level, knowledgeable and friendly employees; similarly, ambiance was assessed in terms of store layout, atmosphere and speedy checkouts.

A second question asked respondents to rate the importance of each of the twenty items on a scale of 1- 5. These scores were averaged for each of the six strategic variables after eliminating the aspects found to be weak or irrelevant by the principal components analysis. Two results stand out. First, there was no statistically significant difference between the first and the second survey on the average score given to each strategic variable. Thus, preferences over these variables seem stable.

Since the survey also identified where the consumer shopped most often, it was also possible to calculate these average scores for consumers loyal to each of the three types of stores. Table 2.2 below presents the combined (over the two surveys) importance ratings for all respondents and for those who shop most often at each of the three stores. The second result stands out from this Table. Namely, importance ratings vary dramatically across consumers. Thus, there is considerable consumer heterogeneity with respect to these strategic variables.

While all consumers and the patrons of each type of store rate assurance first and ambiance last in importance, the similarities stop there. Regional and local loyalists rate information second in importance while Home Depot customers rate assortment second in importance. Similarly regional and local loyalists rate price next to last in importance while Home Depot customers rate price third in importance.

Table 2.2: Importance Ratings³³

Variable	All Consumers	Home Depot	Regional Loyalist	Local Loyalist
Assurance	4.40 (5.8)	4.54 (3.5)	4.40 (6.3)	4.41 (7.1)
Information	4.17 (15.8)	4.00 (3.5)	4.15 (13.6)	4.31 (25.3)
Assortment	4.01 (27.8)	4.38 (49.3)	4.00 (28.2)	4.00 (20.1)
Accessibility	4.01 (29.8)	3.86 (9.0)	4.08 (37.5)	4.04 (17.5)
Price	3.76 (14.1)	4.08 (33.3)	3.74 (9.7)	3.68 (11.0)
Ambiance	3.19 (1.3)	3.09 (0.00)	3.18 (1.5)	3.27 (1.3)

A third result is also evident from Table 2.2. The numbers in parentheses represent the percentage of consumers indicating the variable as the primary determinant of store choice. Over 80 % of Home Depot’s clients choose the store on the basis of assortment or price, which are ranked, respectively, second and third in importance by these customers. Over 65% of the regional store customers choose the store on the basis of assortment and accessibility, which are ranked, respectively, fourth and third in importance by these customers. Over 45% of the local store customers choose the store on the basis of assortment and information, which are ranked, respectively, fourth and second by these customers.

One of the authors’ findings is a close but not perfect correspondence between the ‘objective’ measures of the strategic variables and consumers perceptions of these variables across the stores. For instance, they find that their ‘objective’ price index shows Home Depot to have the lowest price among the three stores and this is in accord

³³ All the information in this Table comes from Tables 6, 7, and 8 in the paper.

with the perceptions on pricing reported in Table 2.2. Similarly, they also found that Home Depot had the highest percentage of the 24 item basket carried by the store or available in stock and this agrees with their importance as reflected in the perceptions on assortment and assurance shown in Table 2.2. On the other hand, the ‘objective’ measure of accessibility, distance to the center of town, is inconsistent with the importance it has for customers choosing the regional center. Barber and Tietje suggest as a possible explanation that the survey question definitely included location as well as convenience whereas the objective measure ignores the convenience dimension.

With respect to ambiance, the mystery shoppers rate the local store as the best performer and the patrons of the local store do give it a higher score in terms of importance than the patrons of the other two stores. Finally, information has two very different dimensions in the ‘objective’ assessment. The provision of in-store information can be accomplished on a self-service basis but the amount of time that it takes to get assistance requires availability of personnel dedicated to the task. Home Depot does very well on the former and very poorly on the latter and the opposite is the case for the local retailer. The survey measure reported in Table 2.2 is picking up primarily the second dimension and it is reflected on how well the local store performs on this variable.

What is the final result of all this effort? The authors also gathered information on the sales and profitability of the incumbent stores before, immediately after and six months after the opening of the Home Depot store. They also discussed the strategy pursued by the local store with its managers. Both incumbent stores lost significant market share as a result of the new entrant; yet the local store was able to maintain its

profitability while the regional one was experiencing losses immediately after the opening and six months later. The explanation was that the local store increased the prices of some items to retain profitability and it also emphasized the provision of some services especially valued by its customers such as prompt in-store assistance and friendly and knowledgeable clerks. In terms of the model of Section 2.4, a new equilibrium with greater price dispersion and product variety in distribution services is generated by the new entrant and the use of these variables strategically by the local incumbent.