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Comments on "Economic Foundations for Pricing"

Introduction

Economic theory, or more specifically the theory of price, is not an exact science. It is a conglomeration of principles and assumptions concerning the behavior of individuals and firms put together in a specified paradigm to "explain" the behavior of prices in markets. An economist's model usually starts with a set of assertions such as utility-maximizing behavior on the part of individual consumers and profit maximization on the part of firms. Based on a set of working conditions, the behavior of prices is then examined. The focus is on attempting to predict the movement of prices from an initial equilibrium value due to changes in the model parameters. Thus a retail model might say, for example, (i) the retail price will come down if the manufacturer lowers the price to the retailer, and (ii) the amount of the price reduction at the retail level will be predicated by the elasticity of demand facing the retailer. As Nagle points out in this issue, such statements or predictions are not very helpful for a store manager in setting prices. The usefulness of economic theory lies in its ability to identify the forces or factors that are relevant to the manager's decision variable. In trying to judge the usefulness of a theory or a model, the relevant question is, In the absence of such a theory or a model, is my understanding better, or are my decisions going to be better, if I follow the principles of some other model? The comparison is between two alternatives, both of which may be imperfect.

The set of working conditions an economist assumes are sometimes unpalatable to the marketing researcher for one very simple reason: The goals of the two modelers are different. A simple example will clarify this. Consider the case of price discrimination. Economic theory generally assumes identifiable and isolable segments (i.e., no

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arbitrage) and no differences in cost of serving the segments. The theory then predicts that prices should be inversely related to the demand elasticities. In the real world, a certain leakage between segments may exist and the cost of monitoring the segments may differ. An economist would simply say that if the prices are different, they will be in the predicted direction; and if the costs are less than the incremental profits due to segmentation, then we should observe different prices. But a marketing researcher is concerned with a clearer prescriptive solution and therefore is concerned with such "violations" in the real world. The need is then to relax the assumptions in the economist's model and explicitly to incorporate such trade-offs (in the example above, the cost of administering the prices, some notion of leakage, the sizes of the segments, etc.) to understand the profitability of segmentation better. However, the understanding and the power of prediction that economic theory provides are hard to ignore and should serve as useful starting points for a marketing researcher.

In the following pages, I have illustrated some attempts that have been made in the literature to understand marketing problems using economic theory. Specifically, literature on segmentation and the economics of information are used to identify such examples. This discussion should complement the review in Nagle's paper.

Segmentation

The concept of segmentation refers to the pricing of a product differently for different segments or the development of a portfolio of brands to serve different segments of the population. In these comments, we are more concerned with the former. The fundamental idea can be illustrated by the following framework. Let X_i, the quantity demanded by the ith household, be related to the market price P of the product as follows:

$$X_i = f(P, H_i), \tag{1}$$

where H_i is a set of household resource variables specific to the ith household.[1] In the classical theory, H_i more often than not consisted of a single variable, namely, income. Noting the lack of power of the classical theory to explain many observed phenomena,[2] economists

1. Household resource variables are demographic variables that affect the consumption behavior of households. Examples are family size, possession of an automobile, presence of children, whether the housewife is employed.

2. Michael and Becker (1973) and Stigler and Becker (1977) cite many examples and provide explanations for some observations that the classical theory could not explain, such as why beef and chicken are stronger substitutes than say, beef and autos; why higher-income households will be willing to pay more for certain timesaving products; why demand for some products might vary over time, etc.

have included many other variables in H_i, such as family size, education, and the employment status of the housewife, to explain observed behavior. Michael and Becker (1973) provide the framework for such an analysis.

In the demand function above, all households are assumed to have the same functional form for the demand relationship and any difference across households is due to the differences in H_i or how H_i affects the elasticity of demand for the product.

Now, suppose one observes different households exhibiting different demand elasticities for the product. Then economic theory tells us that by charging different prices, a monopolist (the term is used to indicate a firm facing a downward-sloping demand curve) should be able to increase his profits subject to the usual caveats. This brings us to the following three important issues:

i) How does H_i affect price elasticity?

ii) What variables on proxies can be used to identify H_i?

iii) How can one reduce price *only* to the target segment?

Let us consider the third issue first. Assume that it is illegal to price discriminate explicitly or that the firm does not know, when it sees a consumer, whether he has a high price elasticity or a low price elasticity.[3] These two assumptions are probably met in real life. Given this, the firm faces the problem posed by iii. The economic solution is elegant. Do not reduce the price of the product on the retailer's shelf. Instead, bundle the product with a price-cutting instrument of which only those consumers with a more price-elastic demand will take advantage. Thus, self-selection by a consumer is almost always the key in the real world to administering different prices. The nature of such price-cutting instruments would, of course, depend on the answers to questions i and ii. If we can identify the variables that affect demand elasticity, then it is possible, in principle, to devise mechanisms of which only more price-elastic households will take advantage. Several examples of such mechanisms are discussed below.

Trading Stamps

Alchian and Klein (undated) propose a framework to answer questions concerning the incentives of retailers to offer trading stamps. Based on search costs and the cost of storing and redeeming the stamps, they argue that the more elastic demanders are likely to be those with a lower cost of time and hence are more likely to use trading stamps. They derive a number of implications from their theory, such as the type of retailers who would offer trading stamps, the type of purchases

3. In the economics literature, this is labeled "asymmetric information" and the pricing strategy adopted to discriminate is often labeled "imperfect" to contrast it with the classical price discrimination where the firm can clearly identify and isolate the segments.

on which stamps will be offered, and the location of redemption centers.

In summary, trading stamps act as price-discrimination devices by lowering the cost of the product to the more elastic demanders. Use of stamps is by self-selection.

Cents-Off Coupons

Narasimhan (1983*a*) uses a similar framework to argue that cents-off coupons distributed through the mass media (newspapers, magazines, etc.) could serve to price discriminate between segments with different demand elasticities.

Based on a utility-maximization model, it is shown that users of coupons have a more price-elastic demand than nonusers. Other implications of interest to marketing researchers are that (i) the savings given through a coupon and the price of the brands in a product category are positively correlated and (ii) the savings per unit of the product bought and the package size will be negatively correlated. These implications are tested using diary panel data, and the empirical results offer support to the price-discrimination argument.

Bundling (Quantity Discounts)

It is well known that in the consumer packaged goods industry, products packaged in larger sizes generally cost less per unit than smaller sizes. Differences in preference alone cannot explain the diverse number of packages one observes in the market (why does not someone with a low consumption rate buy a large size and store it for future use?). Narasimhan (1983*b*) shows that if consumers differ in their inventory costs for storing a product, then the amount they buy varies systematically. In particular, it is shown that consumers with lower inventory costs have a more elastic demand. A firm that cannot identify the consumer types (i.e., their demand elasticities) can use a nonlinear pricing schedule to increase profits. Under certain simplified conditions, an explicit pricing schedule is derived by using optimal control theory.

Price Deals

It is a common practice among retailers to offer reduced price on a selected set of items for a short duration (usually less than a week). Blattberg, Eppen, and Lieberman (1981) propose a model that explains the occurrence of such price deals. Faced with a heterogeneous population of consumers with differing inventory costs, they argue that a retailer, by offering such deals, can increase his profits. Consumers who have lower holding costs take advantage of such deals by stocking up. Implications concerning the frequency of deals, the amount of discount offered, etc., are derived and tested. Jeuland and Narasimhan

(1983) use a similar framework to show when dealing is viable. Varian (1980), also discussing deals, argues that such price reductions are the results of a "randomizing strategy" adopted by firms in monopolistic competition in order to price discriminate between consumers who are informed of the retail prices and those who are uninformed.

All the above examples show the value of using economic theory to understand marketing problems and the marketing implications that these models predict.

Economics of Information

The economic theory of information, as espoused in the seminal work of Stigler (1961), has many important marketing implications. This literature is concerned with the role of information on prices, quality and the location of sellers, and on the distribution of these variables in the market place. Since consumers incur some cost to acquire information about the product and the seller, the nature of the market organization and the resulting price and quality distributions depend greatly on such costs and the seller's ability to lower these costs to consumers. Researchers in this area have addressed issues relating to the role of advertising in the economy, the interaction between advertising and prices, and demand and the role of warranties, etc. (see Akerlof 1970; Nelson 1970; Rosen 1978; Klein and Leffler 1981; and Barzel 1982).

One important contribution of this literature is to quantify the propensity of consumers to search and the factors that influence consumers' decision to search for prices. In the most simplistic framework, the decision to obtain information on prices is characterized by the following condition:

$$q \left| \frac{\partial P}{\partial s} \right| = MC_s,$$

where q is the quantity bought of the product, $|\partial P/\partial s|$ is the incremental decrease in the expected price to be paid, and MC_s is the marginal cost of one more search activity. Stigler developed a number of testable implications based on this simple model, implications which have been supported by empirical tests. In his model, Stigler assumed that consumers select a fixed sample size (i.e., the number of stores or retailers to search for) ex ante and search over this set of stores. This assumption has been criticized and several researchers have reformulated this model (see, e.g., Rothschild 1973) to describe the consumer's search process better. According to this revised framework, the consumer will search until he obtains a quotation that is lower than his reservation price (this would depend on the distribution of prices). However, the important implications that Stigler obtained are still preserved.

Farley (1964) tested the proposition that buyers of larger quantity

would pay on the average lower prices and found support based on data obtained from consumer purchase diaries. He, however, found that higher-income consumers are not more brand loyal than lower-income consumers.[4] Alcaly (1976), using Stigler's framework, tested propositions concerning the distribution of prices (both mean and variance) and the demographic profile of consumers across different geographical areas and found support for Stigler's proposition on the intensity to search for lower prices. Benham (1972) and Cady (1976) tested the effect of prohibiting advertising on retail prices for eyeglasses and prescription drugs, respectively. Both found support to Stigler's propositions.

The role of market forces (especially advertising) in producing information to consumers about the product attributes has also drawn the attention of economists. Nelson (1974), in particular, makes a forceful argument for viewing advertising as a source of information to consumers who ex ante are uncertain about the quality of a product. He advances and tests a number of propositions concerning the relationship between advertising and demand elasticities, advertising and monopoly power, the intensity of advertising, and the media used for different product groups.

In summary, both the theoretical and empirical work in this area have helped us to understand the important market forces and their impact on consumers' decisions.

Directions for Future Research

The economics of information is a relatively new area; only during the last decade has it received much attention. Consequently, there exist many unresolved issues and interesting research dimensions, some of which are discussed below.

The cost of information about prices will be different from the cost of information about quality. Most of the literature addresses the first issue. However, the cost of ascertaining quality is much higher. Again, most of the literature addresses the issue of searching for low price among firms for a homogeneous product. But what happens when the consumer faces a set of differentiated brands with known or unknown price distribution? As a final example, most of the literature is concerned with consumers searching for one good. Only recently Burdett

4. Since higher-income consumers are those with higher opportunity cost of time and consequently are less likely to search for lower-priced brands, the economic theory of search predicts greater brand loyalty among higher-income consumers. However, since income is highly correlated with education, higher levels of income lead to more efficient search process. The combined effect is therefore ambiguous and it may be diffifcult to separate these effects empirically. A further problem is caused by the different ways of operationalizing the notion of brand loyalty. See also Sharir (1974).

and Malueg (1981) have attempted to extend this to searching for several goods. In terms of marketing implications, the following questions are pertinent: When is it profitable for the firm to provide information on prices and quality? At what cost? To whom? What are the determinants of such provision of information? For example, what factors can explain systematic differences in advertising intensity, advertising copy, etc., across different product markets?[5]

Conclusions

William Moran, president of Admer Research, Inc., once observed (Conference Board 1978): "Pricing strategy always has been more of a poker game than science . . . but even in poker it helps to know the percentages. Experience is a poor teacher if all you can remember is the time you won the pot by filling an inside straight." Our firm belief is that price theory can be an invaluable tool in understanding such "percentages," that is, when one strategy is more likely to work than another and why. A theory or a model is welcome if it can remove the unsystematic part of the risk in a guessing game. Economic theory helps to fulfill that need.

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5. Nelson (1974) characterized the different products as made up of "search" and "experience" attributes and argued that the intensity of advertising will be different across product markets because of differences in these attributes. This classification has been criticized as somewhat ad hoc. For marketing researchers, modeling the influence of such parameters as brand loyalty and repeat-purchase frequency on advertising intensity will be of interest.

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